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AI2SD

Advanced Intelligent Systems for Sustainable Development

Second Edition

Digital Transformation is lever of the Industrial Revolution 4.0

PROCEEDINGS

International Conference On Advanced Intelligent Systems for Sustainable Development Applied To Agriculture , Energy , Health , Environment Industry and Economy

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Foreword

It is with deep pleasure and satistfaction that I write this Foreword to the Proceedings of the International Conference on Advanced Intelligent Systems for Sustainable Development (AI2SD-19) held in the wonderful Moroccan city of Marrakech in July 08-11, 2019.

This year, AI2SD-19 projected into broader hot research topics that strives to stimulate study and research in favor of socio-economic sustainable development.

AI2SD-19 consists of technical, invited sessions, keynote and tutorial sessions covering the state-of-the-art and advanced research work on intelligent systems applied to Agriculture, Environment, Health, Energy, Economy and Industry along with themes related to Big Data, Networking, Computer vision, Natural Language Processing, and other scopes.

The papers contributed with the most recent scientific knowledge known in the aforementioned. The Technical Program committee (TPC) will include more than 300 of them in these volume proceedings, given their originality and relevance to the conference scopes. The TPC will also include 12-14 keynote speeches addressing hot topics related the conference themes.

The papers accepted and presented in AI2SD-19 will be published in proceedings as special issue of Springer proceedings Books within the Advances in Intelligent Systems and Computing Serie (into 7 volumes). Moreover, a number of selected high-impact full text papers will also be considered for the special journal issues as extended version.

All our thanks and greetings are addressed to the committee chairs for their great work, in either the organization or the review process.

Prof. Mostafa EZZIYYANI

General Chair

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Table of Contents

TOPIC A: ADVANCES INTELLIGENT SYSTEMS FOR EDUCATION AND INTELLIGENT LEARNING SYSTEM

TOPIC B: ADVANCED INTELLIGENT SYSTEMS FOR SUSTAINABLE DEVELOPMENT APPLIED TO HEALTH

TOPIC C: ADVANCED INTELLIGENT SYSTEMS FOR SUSTAINABLE DEVELOPMENT APPLIED TO AGRICULTURE

TOPIC D: ADVANCED INTELLIGENT SYSTEMS FOR SUSTAINABLE DEVELOPMENT APPLIED TO ENVIRONMENT

TOPIC E: ADVANCED INTELLIGENT SYSTEMS FOR SUSTAINABLE DEVELOPMENT APPLIED TO INDUSTRY

TOPIC F: ADVANCED INTELLIGENT SYSTEMS FOR SUSTAINABLE DEVELOPMENT APPLIED TO ECONOMY

TOPIC G: INTELLIGENT SYSTEMS FOR INFORMATION AND SYSTEM SECURITY

TOPIC H: ADVANCED INTELLIGENT SYSTEMS FOR SUPPORTING DECISION AND PREDICTION

TOPIC I: ADVANCES INTELLIGENT SYSTEMS FOR COMPUTATIONAL WEB AND BIG DATA ANALYTICS

TOPIC J: ADVANCES INTELLIGENT SYSTEMS FOR MULTIMEDIA PROCESSING AND MATHEMATICAL MODELING

Topic K: Advances Intelligent Systems for Networking Systems and IoT

TOPIC L: ADVANCES INTELLIGENT SYSTEMS FOR GIS AND SPATIAL DATA

TOPIC M: ADVANCES INTELLIGENT SYSTEMS FOR ELECTRICAL ENGINEERING

TOPIC N: ADVANCED INTELLIGENT SYSTEMS FOR SUSTAINABLE DEVELOPMENT APPLIED TO ENERGY

Poster session

Data mining for the development of E-Learning

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Abstract— Despite having educational data mining as a new research area, it has already made contributions to the learning theories and their teaching practices.
The aims of this article are to present a way of improving both the student and the teacher performance, and to empower educational institutions through exploring data and through examining them with the purpose of motivating students in different aspects of their performance.

Keywords: *Educational data mining, the learning theories, performance, motivating students.*

Applied study of energy saving, voltage drop reducing technically using capacitors compensations and cable resizing in Gaza electrical grid and its program simulation quality improvement

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Abstract— This paper introduces suggestion to reduce the losses and voltage drop by reactive power compensation and cable sizing and satisfying this by computer program simulation. This losses reduction ratio, the annual saving and reducing in voltage drop is a good motivation to rehabilitate the Gaza Governorate Electrical Grid by applying this suggestion. The grid was unbalanced in most cases, there was a big difference in losses and voltage drop between balance and unbalanced load in the two feeders have been taken as a case study. Applying the simulation by improved a program Mat-lab engineering and the quality program control.

Keywords: *Distribution Grid, Cable Sizing, capacitor bank, reactive power compensation.*

Social Collaborative Filtering Approach for Recommending Courses in an E-learning Platform

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Abstract— In recent years, learning online using the e-learning platforms becomes indispensable in the teaching process. Companies and scientific researchers try to find new optimal methods and approaches that can improve education online. In this paper, we propose a new recommendation approach for recommending relevant courses to learners. Our method is based on social filtering and collab- orative filtering for defining the best way in which the learner must learn, and recommend courses which better much the learner's profile and social content.

Keywords: *E-learning, Collaborative filtering, Social Filtering, Sentiment Analysis, Social Network*

Abrupt climatic changes for the last 13,000 cal years BP using the Ifrah Lake data (Middle atlas, Morocco)

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Abstract— A new multiproxy analysis using mineralogy, geochemistry and mi- crocharcoal data from Lake Ifrah (Middle Atlas, Morocco) provides new in- sights for better understanding high climatic changes for the last 13,000 cal yr BP. Before 13,000 cal yr BP, the concentration in microcharcol was very low in connection with low fire activity and probably cold climate. Between 13,000 and 12,300 cal yr BP, there is increase in microcharcoal in relation with the in- crease aridity. This period corresponds probably to the Bölling-alleröd period in High latitude. Between 12,300 and 10,800 cal yr BP, there is a new decrease of the microcharcol corresponding probably to the Younger Dryas cold period. Be- tween 10,800 and 4,500 cal yr BP, marked a significant increase in microchar- coal abundance, which likely testifies to regional emissions from forest fires. Such biomass burning events were associated to prolonged periods of drought. The maximum of dryness occurred ca 8,500 cal yr BP.

Keywords: *mineralogy, geochemistry, microcharcoal, climate, Younger Dryas, Ifrah Lake, Morocco.*

Data Mining Algorithms for Knowledge Extraction from Web Log files

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Abstract— Web log files contain visitor activity information on a website. They are automatically created and maintained by a web server. The raw web log file format is essentially one line of text for each visit of the web site, each time a visitor requests a page (HTML document, image, etc.), information about the request (including client IP address, request date/time, page requested, HTTP code, bytes served, user agent, and referrer) are added to the current log file. The web maintains a standard format the CLF (Common Log Format) for web server log files. Analysis of server log file can provide significant and useful information, data extracted from log files could be stored in a database, allowing various uses when needed. Data Mining is the process of extracting and discovering patterns and knowledge from large amounts of data. Web Mining is the extraction of interesting and potentially useful patterns and implicit information from artifacts or activity related to the Web. Web Usage Mining is a main research area in Web mining focused on learning about Web users and their interactions with Web sites. It is the application of data mining techniques to discover usage patterns from web data.

In this paper, we present an analysis and extraction of useful information and patterns from web data based on a deep analysis of web log files, first we start with the presentation of different formats of web log files, then we present the different preprocessing used methods, finally the demonstration of the system "Web content and Usage Mining'' for extracting knowledge from web data and web site analysis using several Data Mining Algorithms Apriori, FPGrowth, K- Means, KNN, and ID3.

Keywords: *Web Mining. Data Mining. Web Usage Mining. Web Log File. Data Cleaning. Preprocessing.*

Experimental approach for a better valorisation of sardine fillets: determination of the isostatic heat and free enthalpy by sorption isotherm

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Abstract— Hygrometric stability is mainly a consequence the relationship between equilibrium moisture content (Xe) and its corresponding water activity (aw). In the study of the drying operation and the storage conditions, it is necessary to know the relation between the equilibrium moisture content (Xe) of the material and the activity of the water (aw). This relationship is called isothermal sorption. It's a process essential for determining the thermodynamic interactions between water and Agri-food products. The objective of this study was to determine the harmonic mean temperature (Thm) and the isokinetic temperature Tβ and the free energy. The moisture desorption isotherms of sardine fillets were determined at three temperatures (30, 40 and 50 °C) in using the static gravimetric method. The general appearance of the isotherms is of the sigmoid II type we noted an average positive value of free energy ΔG = 24,343 KJ / mol for sardine fillets suggests a non-spontaneous desorption process.

Keywords: *water activity, desorption isotherms, sardina pilchardus, isostatic heat, free enthalpy.*

Barriers to the Adoption of SmartGrids in Morocco

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Abstract— In this paper, we identify smart grids in Morocco. We start by describing the Regulatory Frameworks for the Electricity Sector and Moroccan Electricity Power Industry of the Moroccan electric network, then we study the barriers to the development of smart grids in Morocco and in international scale and we finish with recommendations and solutions to remove some barriers from smart grids deployment in Morocco.

Keywords: *Smart Grid,Moroccannetwork, Barriers, Renewable energy (RE).*

Toward a Recommendation-Oriented Approach based on Community Detection within Social Learning Network

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Abstract— The context of this work is around social learning networks through recommendation approaches based on community detection. Indeed, Community detection is considered to be one of the most frequent problems in the social network. Thus, the scope of social networks has known a significant evolution in the last decade, and community detection has emerged to analyse many fields as well as the individual's interactions within social environments. The main sight of this study is to introduce a recommendation approach based on community detection by focusing on both unipartite and bipartite graphs. We outline some prevailing studies in terms of community detection and recommendation systems, and afterwards we suggest our own approach. Therefore, the challenge is defined as highlighting an approach for detecting learners that interact mutually and share the same interests towards content in order to provide relevant recommendations.

Keywords: *Social learning network · Community detection · Bipartite graphs · Unipartite graphs · Recommendation approach*

Toward a new performing recommendation system

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Abstract— Recommendation systems are a part of the personalization of access to information, to give user items that correspond to his expectations, to simplify the navigation, make it fast and to guide the customer to the most relevant elements. In This article we highlight on the different types of approaches already used in recommendation systems, like collaborative filtering, content-based approach, demographic and hybrid recommendation. We discuss the conception of our recommendation system that combine many approaches such as demographic filtering, sentiment analysis in social media navigation traces to upgrade the performance of our system.

Keywords: *Recommendation systems, collaborative filtering, content-based, Navigation traces, Data analysis, Sentiment analysis, Opinion miming, demographic filtering, user profile.*

Personalized E-learning system based on adaptation of learner preferences and characteristics

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Abstract— Every adaptive E-learning system aims to give the opportunity for learners to acquire knowledge using the most efficient way and methods. Thus, several techniques and approaches were proposed to ensure the good guidance of the learners. Generally, the learners involved in the E-learning environment, are heterogeneous so that they have different characteristics, preferences, levels, backgrounds, abilities and needs. Therefore, it is not suitable to use the same sequences of the learning materials and the same learning style for all these learners. The neglecting of the adaptation prevents the high level of understanding of the learning content. These differences lead persons to adapt the learning content and styles by taking into account the learners characteristics and objectives (personalized learning). Moreover, the adaptations of the learning styles and how they can be incorporated in technology enhanced learning have become a very interesting subject of the recent approaches and researches. Our main objective is to propose an adaptive E-learning system that contains multiple layers of adaptation in order to ensure the individual guidance of the learners (personalized learning). In the first hand, the proposed system adapts the sequences of the courses according to the preferences of the learners.

In the second hand, it provides the adaptation of the learning styles (characteristics and presentation). These several layers of adaptation give the best chance to the learners to acquire knowledge using the appropriate learning paths and styles.

Keywords: *E-learning, adaptive learning, learning styles, personalized learning, learning materials.*

Development of deep learning-based facial recognition system

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Abstract— Recently, developed algorithms in the face recognition field that are based on deep learning technology have made significant progress. However, face recognition under unconstrained scenarios that is where illumination, image resolution, background clutter, facial pose, expression, occlusion and other factors are not controlled, still under heavy research. In this paper, we explore the problem of identifying a person of interest under this unconstrained conditions. To this end, we make the following contributions: firstly, we have implemented a Convolution Neural Network model (CNN) based on VGG16 architecture, using a fast open framework for deep learning called Keras. Then, a serie of experiments is conducted on the Labeled Faces in the Wild benchmark dataset (LFW), demonstrating that the proposed approach achieved state-of-the-art results.

Keywords: *Face Recognition, artificial intelligence, deep learning, big data, unconstrained scenarios.*

Exploring the Use of Word Embedding and Deep Learning in Arabic Sentiment Analysis

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Abstract— In the past couple of years, improving Arabic sentiment Analysis systems has been one of the important fields of research. There are several challenges and issues facing existing systems, especially, handling multiple dialects and feature extraction. Most of those systems are generated using linear classification models and traditional bag-of-word features. In this work, we explore the use of word embedding as a modern feature representation, and Convolutional Neural Networks as a Deep Neural Network in a sentiment classification of Arabic texts. The application of our model on five benchmark datasets has yielded results that outperform previous works on 4 out of 5 datasets.

Keywords: *Arabic Sentiment Analysis, Deep Learning, Convolutional Neural Networks, Word embedding.*

The Use of NN to Detect Learning Styles of Children with Learning Disabilities in ELearning System

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Abstract— Every child learns differently and possesses a dominant or preferred learning style in certain ways. The cognitive development of children differs with learning disabilities (LDs). However, understanding how it differs from normal child development is important to understand how learning style identification can assist children with LDs. The aim of this paper is to propose an automatic learning style detection that works by the way of children interaction with the system. In this study, an Artificial Neural Network is used to predict the learning style of children with LDs.

Keywords: *Learning disabilities. VARK Model. Dyslexia. Learning style. Artificial Neural Network.*

Exploring Convolutional Neural Networks and Recurrent Neural Networks for Arabic Question Classification

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Abstract— Questions classification which consists of assigning a category to each question is a crucial process in question answering systems. Deep neural networks have appeared to be effective in several text mining applications such as text categorization, information retrieval, etc. However, these models have not gained much attention in the field of Arabic question classification. In this paper, we propose an efficient Arabic question classification method based on continuous distributed word representation and deep neural networks. First, we opt for continuous distributed representation to capture syntactic and semantic relations between words. Then, we apply Convolutional Neural Networks (CNN) and Recurrent Neural Networks (RNN) to classify Arabic questions into seven categories (or classes) according to Li & Roth [3] taxonomy. We investigate several variations of CNN and RNN where the output layer depends on two activation functions, the softmax and the sigmoid functions.We carry out several experiments and compare different architectures of CNN and RNN trained on our dataset containing 3173 Arabic labeled questions. The obtained results demonstrate that both deep neural network models are promising as they achieve up to 92% in terms of micro average F1 measure.

Keywords: *Arabic question classification .Continuous distributed word representation .Word embeddings. Convolutional Neural Networks. Recurrent Neural Networks*

A new architecture of Service composition-based Context-Aware Mobile Learning System

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Abstract— During recent years, the use of mobile devices has been increased with the big evolution of wireless communications and technologies. In the field of education, mobile technologies can have a great influence on learning. Mobile learning (m-learning) is a new technology which enables learners to acquire learning materials anywhere and at any time using mobile and internet technologies. However, learner mobility implies a permanent change of context. So, the adoption of context-awareness in mobile learning has become a crucial topic in this area.

In this paper, we propose an architecture of m-learning system based on contextualization and service composition using the orchestration approach. This architecture will automatically and dynamically meet the needs of the user and provide him with appropriated learning resources according to the context changes. Thereby, we focus on the main subsystems of this architecture, and then we propose a scenario of electrotechnic lab using our proposed architecture.

Keywords: *Context-awareness· Mobile learning· Contextualization· Service composition· Context-aware system· SOA*

A novel face recognition system based on Gabor and Zernike features

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Abstract— The extraction of invariant features is the core of face recognition systems (FR). In this chapter, we propose a new and efficient facial image representation based on Gabor energy filters (GFs) and Complex Zernike moments (ZMs) in which GFs are used to extract texture features while ZMs are employed to extract the shape features. Most existing methods only use magnitude component of the ZMs (respectively GFs) as features in recognition task. Recently, it has become well-known that the phase component of moments (respectively Gabor Filters) also captures useful information for image representation. Next, the extracted features vectors are projected onto a low-dimensional subspace using Kernel Fisher Analysis (KFA) technique. Then, a comprehensive performance evaluation of these approache is achieved on the most popular benchmark FERET Database for face identification scenarios.

Keywords: *Face Recognition, artificial intelligence, unconstrained scenarios.*

A multiple linear regression-based approach to predict student performance

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Abstract— Predicting students' academic outcome is useful for any educational institution that aims to ameliorate students' performance. Based on the resulted predictions, educators can provide support to students at risk of failure. Data min-ing and machine learning techniques were widely used to predict students' per-formance. This process called Educational data mining. In this work, we have proposed a methodology to build a student' performance prediction model using a supervised machine learning technique which is the multiple linear regression (MLR). Our methodology consists of three major steps, the first step aims to an-alyze and preprocess the students' attributes/variables using a set of statistical analysis methods, and then the second step consists in selecting the most im-portant variables using different methods. The third step aims to construct differ-ent MLR models based on the selected variables and compare their performance using the k-fold cross-validation technique. The obtained results show that the model built using the variables selected from the Multivariate Adaptive Regres-sion Splines method (MARS), outperforms the other constructed models.

Keywords: *Supervised machine learning technique, Educational data mining, Prediction, Students' performance, multiple linear regression, K-fold cross-vali-dation technique.*

An Intelligent E-learning System for autistic children: Multi-agent architecture

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Abstract— E-learning systems are the result of the new era of digitalization, which has affected many areas including education. These systems offer many benefits like ease of access and time management. Therefore, the educational paradigm has been changed. Otherwise, since E-learning systems consider only the cognitive state of the learner regardless of his emotional state, they cannot instruct students effectively. Moreover, if the target learner has non-ordinary cognitive and socio-emotional abilities, such as a child with ASD (Autism Spectrum Disorder). So, the e-learning system must be able to satisfy those needs and propose a suitable content according to his learning rhythm.

This paper proposes a new multi-agent architecture of an emotional intelligent e-learning system, it aims to help ASD children overcome learning impairments. The proposed architecture is based on several agents, endowing to address emotional, cognitive and pedagogical issues intelligently. They are working in a collaborative and cooperative fashion to provide the appropriate content.

Keywords: *Multi-agent Architecture, E-learning, Intelligent Learning system, Affective Computing, Autism*

Improving prediction of MOOCs student dropout using a feature engineering approach

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Abstract— Recently, the realm of education has been revolutionized by open massive online courses (MOOC). They have gained more importance and inter-est and greatly evolved as they provide a way of learning chiefly free online us-ers around the world by millions of participants. Although MOOCs boast sever-al characteristics and benefits, they have a major pitfall associated with high dropout rate. The analysis of MOOC data gives useful tools of shedding light on the characteristics that can facilitate the understanding of the behavior of the learners and accompany them in order to make their learning successful. In this paper, we explore the application of different data science techniques, including feature engineering and predictive modeling, to identify a student who is likely to dropout, utilizing the data from the KDD 15 with several supervised classifi-cation models. Two types of experiments were conducted. In the first set of ex-periments, all the features are used, and passed to the ML, while in the second set of experiments, only high ranked features are used. Our experiment gives the best accuracy in the dropout prediction task with GBDT model with high ranked features.

Keywords: *MOOCs, Dropout prediction, Machine learning, EDM, Big Data*

Improved Grey-Wolf Optimizer for Reliability Analysis

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Abstract— In this paper, we addressed the reliability analysis by com-bining the grey wolf optimizer (GWO) with the first-order reliability method (FORM). To improve the global search ability of GWO, a new position-updated equation is presented according to position update process of accelerated particle swarm (APSO) which can explore the search space quickly and locate the optimal solution efficiently. In the proposed method named IGWO, FORM is used to evaluate the fitness of each agent. In order to investigate the efficiencies of IGWO in reliability analysis, four classic examples, as well as roof truss model are employed. The results are compared to four well-known heuristic algorithms. The results show that reliability analysis by using IGWO is significantly better than the current heuristic algorithms.

Keywords: *Reliability Analysis. Grey Wolf Optimizer (GWO). Accelerated Particle Swarm Optimization (APSO). First-Order Reliability Method (FORM).*

A Multi-Criteria Analysis and Advanced comparative study Between IT Governance references

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Abstract— Information Technology is a business asset that is gaining a lot of importance in the last decades on every industry especially regarding the spread of Artificial Intelligence. However, without a good rudder, every company risks getting lost in a sea of endless and unreachable goals, IT governance help to reach business goals and better business management.

This paper aims to provide a best understanding of IT Governance aspects, and presents a comparative study between best practices and references, in addition a big contribution of this article is to present the forces and weaknesses of each approach based on a multi-criteria analysis method. This is our first step to design and implement concrete and effective solutions for IT Governance issues, Moreover, this study will help the decision-makers by facilitating the choice of the best approach to use according to desired criteria and their importance. Our article goes into a global objective that aims to build an integrated generated meta-model for better approach of IT Governance.

Keywords: *Multi-Criteria Analysis, IT Governance, COBIT, ISO 38500, CMMI, ITIL, TOGAF, PMBOK, PRINCE 2, SCRUM.*

Proposal and validation of a model for predicting the number of injuries due to road accidents in Casablanca city

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Abstract— Despite the efforts made by the National Committee for the Prevention of Traffic Accidents to reduce the number of road accidents, it must be noted that the reported figures are constantly increasing. Available figures show that the number of road accidents increased by 19% between 2012 and 2016 from 65461 to 80680, and the resulting injuries rose from 102350 in 2012 to 119162 in 2016 or 17%. These figures prove the limits of the undertaken plans and express the need for further innovative action for addressing the root causes of road accidents and to remedy their consequences. This paper focuses on the downstream part of road accidents management, the purpose of which is to propose, evaluate and validate an ARIMA model to forecast the number of injuries in road accidents. The objective is to provide hospital decision-makers with a model that makes it possible to forecast the number of injuries from road accidents in order to take the necessary measures to receive and treat victims by the city's hospital network. The case study presented in this paper is based on monthly statistics on road accidents that occurred in Casablanca city between 2010 and 2016. Statistics from 2017 were used to test and validate the model. Results show that time series analysis can be a useful tool for short-term demand forecasting (predicting the number of victim arrivals) for planning and sizing hospital emergency departments. This would undeniably save the lives of a significant number of injured victims.

Keywords: *Traffic accidents, hospital logistics, forecasting, ARIMA.*

A new clustering approach for K-NN algorithm optimization: Application to marketplace profile user prediction

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Abstract— At present, the online marketplace business activities still mainly based on the transactions of their users: sellers and buyers. To gain more control over poor decisions that have a direct impact on revenues, marketplaces took time to invest on their data by starting to include data mining in their strategies using predictive models.
In data mining, supervised classification is a technique of assigning instance to predefined classes. K nearest neighbors (k-NN) is one of the simplest classification algorithms, which is highly used in predictive analysis.
In this paper, the prediction of the professional users profiles is proposed using a new k-NN approach classifier instead of using the classical k-NN algorithm, which is not highly efficient on our dataset case. Our proposed approach consists of two part, the first part is mainly based on normalization data, and the second part focus on cleaning the insignificant attributes before clustering.
The objective is to achieve better classification with a high performance, measured with F-measure and accuracy. The result of the proposed classifier method was very satisfactory compared to the classical classifier.

Keywords: *supervised classification, data mining, K-nearest neighbors, similarity, normalization, marketplace, profile user, prediction.*

Hardware in Loop Application DSP F28379D based Modeling and implementation of vector control for Permanent Magnet Synchronous Motor

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Abstract— The permanent magnet machines have in recent years experienced a boom. It is through improving the qualities of permanent magnets (specifically using rare earth)[1], the power electronics development and nonlinear technical control[2]. In this paper, we present the model of permanent magnet synchronous motor in the coordinate system linked to the rotating field Park for its control. Firstly, we study the control with speed sensor of this machine. PI controllers are used for regulating the motor speed and the currents within a field-oriented vector control[3].by using a sliding mode observer obtained from the electrical quantities measurable (voltage and current) in the vector control.

Keywords: *PMSM, HIL, DSP, Inverter, SVPWM, PARK, Field Oriented Control (FOC, sliding mode decoupling).*

Towards a Passages Extraction Method for Arabic Question Answering Systems

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Abstract— Question Answering Systems (QASs) aim to provide a precise answer to questions written in natural language. Passages extraction is a challenging task that affects directly the performance of any QAS. In this paper, we propose a passages extraction method for Arabic Question Answering Systems. It consists of two steps: (1) formulating the query from the Arabic questions user and (2) extracting candidate passages that contain most probably, the correct answers. First, we describe the querys formulation by using stemmed words and performing a Pos-tagging process. Then, we identify relevant passages from Arabic Wikipedia based on two levels of Information Retrieval (IR). In the first level, we extract relevant documents from Arabic Wikipedia based on both documents titles and Named Entities (NEs) contained in the for mulated query. The second IR level extracts candidate passages from the pages extracted in the first level based on the similarity with the query. This allows to reduce the number of extracted passages and keep the N top-ranked ones. The obtained primary results are promising as they show a high level of similarity between a given question and the candidate passages.

Keywords: *Arabic Question Answering System. Passages extraction. Information Retrieval. Natural language processing. Wikipedia. POS tagger. Named Entity.*

A Semantic Web Solution for Enhancing the Interoperability of Elearning Systems by using Next Generation of SCORM Specifications

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Abstract— E-learning is a very dynamic field, constantly growing, which refers to an educational content or learning experiences provided or made by means of digital technologies. The development of this area has a direct impact on the quality of education and cost reduction.

E-learning is now dominated by learning management systems such as Moodle, to improve the interoperability of these systems; the use of data / resources is a major requirement, this need to push the e-Learning community to seek new approaches to improve this interoperability of systems. On the other hand, semantic Web technologies offers standards like RDF allows to describe Web resources with their metadata. We propose in this work an approach based on Semantic Web technology to improve the interoperability of e-Learning systems like Moodle.

Keywords: *semantic web, RDF, E-learning, SCORM, interoperability, LRS, LMS, Moodle*

INNOVATION BARRIERS CLASSIFICATION: Case of the Northern Region of Morocco

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Abstract— Innovation seems to have become the horizon of all research policies. While the nature of innovation activities varies considerably from one company to another, one observation remains: innovation is nowadays inescapable. The concept of innovation is directly related to the business. Virtually all business projects based originally on an innovation. In addition to operating their first innovation and to prevent the decline and disappearance, companies renew themselves through innovation. This paper is a window on innovation and its barriers especially in the northern region of Morocco.

According to a deep literature review and a survey we carried out in the region of Tangier, Tetouan & Al Hoceima, we classified the main barriers to innovation in the Northern Region of Morocco and we conclude that the three critical barriers that require further study are: the culture of innovation; Resistance to change and unqualified personnel. The focus on those three barriers will allow Morocco to develop its innovation system and will allow it to improve its position among innovative countries around the world.

Keywords: *Innovation; Barriers; Methods; Morocco.*

An Overview on the use of Artificial Intelligence in Adaptive learning : Comparative study

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Abstract— Education system nowadays is facing major difficulties. Pedagogue researchers criticize how learning system does not adapt to technological and industrial changes, also why it doesnt prioritize important factors like creativity, passion, and difference. Some researchers present adaptive learning as a solution for such problematics. This paper aims to give an overview of the use of artificial intelligence technics in adaptive learning, giving a comparative analysis of multiple studies.

Keywords: *Adaptive learning · learning · Artificial Intelligence · Machine learning.*

Intelligent Production of Serious Games in Intelligent Tutoring Systems based on Adaptive Workflows

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Abstract— We propose in this paper a new approach of designing of intelligent tutoring systems that is based on serious games and adaptive workflows. Our objective is to implement a system that allows the intervention of the human tutor to follow up the student progress and solve blocking situations. We also aim to motivate students and make learning fun and challenging through the implementation of serious games in the evaluation process.

Keywords: *Intelligent Tutoring System, Serious Games, Adaptive Workflow, Evaluation, Adaptive Learning, Learning Process.*

From Learning Game to Adaptive Ubiquitous Game Based Learning

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Abstract— Mobile Learning (also known as m-learning) and game based learning (GBL) are two important elements in Technology-Enhanced Learning. By using mobile technology and benefiting from their features we can provide a pervasive learning without being restricted by time and space (Learning anywhere and anytime). GBL over the last decade has played an important role in increasing the motivation of the learner player through the integration of gamification into the learner's learning process. The combination of the two elements gave birth to a new concept of educational system called Ubiquitous Learning Game (ULG). Mobile technologies are very diverse and market demands push the continued development of new technologies and features that present a big challenge in time and development costs. On the other hand creating a nice game for different player profiles requires the addition of the learner's model in the design phase of the game. In this sense the main aim of this paper is to present the new architecture of the <e-Adventure> educational adventure games authoring tool and its implementation by addressing the different challenges already cited in order to generate an adaptive ULG for multiples mobile platforms.

Keywords: *Learning Game; Ubiquitous Learning Game; Authoring Tool; Mobile Learning.*

An Ontological Approach for Service Adaptation in Context Aware Environment

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Abstract— The context-aware environment can dynam- ically load a variety of information's from its external environment of execution, and that information's called a context. Context is stated as any relevant information related to users and to their operating environment which vary dynamically. The main chal- lenge in context-aware environment is context ontolo- gies, it represents the most part for context modeling. In this paper, we propose an ontology-based approach for modeling context-aware in an adaptive mobile learning environment.

Keywords— *Mobile learning, Adaptive learning, Ontol- ogy engineering, Context Awareness, software engi- neering*.

Molecular Docking Studies of Human COX-2 with Selective Terpenoids Inhibitors

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Abstract— The Cyclooxygenase isozymes COX-1 and COX-2 are rate-limiting enzymes involved in the conversion of arachidonic acid into inflammatory prostaglandins. The chronic inflammation predispose to carcinogenesis. The COX-2 is highly inducible during the inflammation. COX-1 inhibitors had side effects as gastric ulceration. However COX-2 selective inhibitors are believed to have the same anti-inflammatory, anti-pyretic and analgesic activities as that of nonselective inhibitor NSAIDs with little or none of the gastrointestinal side effect, but still have cardiovascular side effects. Moreover the rofecoxib is a better selective compound with more than 50-fold COX-2. To find alternative solution studies suggested that natural inhibitors can help to find new drugs and terpenoids are a good candidate to be analyzing for their anti-inflammatory effect. In this paper selective terpenoids namely ursolic acid, bartsioside, aucubin, 8-acetylharpagide, harpagoside, hinokinin, betulinic acid, roburic acid, fomitopinic acid A and fomitoside E was analyzed through a molecular docking study and compared to rofecoxib and their drug like proprieties on the basis of ADMET and Lipinski rules of five. In silico ADMET study was performed to assess drug likeness and toxicity profiles of selected molecules. The experimental analysis of selected terpenoids and rofecoxib exhibited good COX-2 inhibitory activity and selectivity. The prediction of the binding modes suggested interactions with Ile517, Phe518 and Gln192 for the followings iridoids, harpagoside, 8-acetylharpagoside, aucubin and bartioside that are very similar to rofecoxib in the 5KIR COX-2 structure. In addition the described docking showed bartioside lower binding energy (-10,53Kcal/mol) and interactions in the active site with key residues His90 - Phe518 - Ile517 - Ser353. Moreover bartioside was found to be best as far as inhibition of COX-2 is according to the correlation between our in silico results, the experiment data, lipinski's rule and ADMET predictions. This study opens up a new platform for the development of bartioside as a based on natural drugs for treating.

Keywords: *COX-2; inhibition; selectivity; terpenoids; molecular docking; lipinski rule of five, ADMET prediction*

Building Effective Collaborative Groups in E-Learning Environment

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Abstract— Forming effective groups for a high performance achievement is a crucial key in each learning environment. It involves more than just randomly assembling groups without taking in account the learning styles of each learner.

This paper presents an algorithm to build an adequate collaborative learning group based on heterogeneity or homogeneity of learners' profiles. In order to verify the performance of the algorithm, several experiments were conducted in real dataset in virtual environment. The results of our study provide preliminary evidence that the algorithm's performance may be affected by the group size using different similarity metrics.

Keywords: *Forming Groups, Collaborative learning, E-learning, Learning objects, Data Mining*

Smarter Crossing Analytics System to predict and Anticipate the Student Behavior for Self Automatic Adaptation of Academic Learning

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Abstract— In contrast to several domains (such as industry, economy, etc.) that have used the development of Big Data, artificial intelligence approaches and decision support systems, the field of Education does not know a revolutionary development. This is evident in its output, in the number of young graduates finding various difficulties in their professional launch. In this perspective, we propose an innovative approach for observing and analyzing students' behavior during their university studies.

The main objective of our contribution is to create a strategic management and control system that helps students make decisions about their training path by proposing adaptations and reorientations. It is a decision-making system based on a meta-heuristic hybridizing Genetic Algorithm and Bayesian Networks.

This work aims to make the most of massive shared data inspired by the student's entourage, namely: family, friends, neighbors, teachers and educational leaders. The data collected makes it possible to evaluate the student's behavior, moral state, qualities, professional tendencies, and personality, using precise indicators and crossing the data obtained from several heterogeneous sources.

The preemptive test of the system was conducted on a sample of students from Abdelmalik Essaadi University, and it proved 60% accuracy in terms of students' professional trend.

Keywords: *Big Data, Artificial Intelligence, Decision Support Systems, Students behavior, Genetic Algorithm, Bayesian Networks.*

New learning architecture for effective interoperability of learner's data management

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Abstract— Learners of the current generation have grown up with digital technologies. However, these new sets and ability to learn whenever wherever are highly appreciated by learners and educators. In the context of the learning analytics and adaptation, this evolution creates various challenges, such as the learner's data tracking and interoperability between learning systems. In this paper we shortly describe the xAPI, compare it to its predecessor of learner profile standards interoperability and present our proposed architecture to provide an interoperable exchanged learner's profile exploiting the features offered by xAPI. Furthermore, this solution offer adapted learning content to the learner according to his formal and informal activities, which are monitored via xAPI.

Keywords: *Learner profile, Interoperability, xAPI, Learning Management Systems, Informal Learning.*

Combination of DSM and MCDM methods for failure mode and effects analysis

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Abstract— Failure mode and effect and criticality analysis (FMEA) is a safety and reliability analysis tool that systematically identifies the consequences of component failure on systems and determines the impact of each failure mode regarding. Thanks to its effectiveness, it became the principal tool for risk management. However, many researchers. Considers that it has many weaknesses. FMEA need the availability of information and data about the system before starting despite the analysis will be wrong. FMEA give no consideration to the interaction between failures and the analysis will let escape some hidden risks This article proposes an improvement of FMEA by the use of the multi-criteria decision methods and the design structure matrix. The DSM method will be used to identify the interactions between failures and the Fuzzy technique for order preferences by similarity to ideal solution (FTOPSIS) will be used to obtain values for each relationship. In the end, this method will be applied to study failures on a product under development.

Keywords: *FMECA, RPN, DSM, FTOPSIS*

Spitzoid Lesions Diagnosis based on GA feature selection and Random Forest

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Abstract— Spitzoid lesions broadly categorized into Spitz Nevus (SN), Atypical Spitz Tumors (AST), and Spitz Melanomas (SM). The accurate diagnosis of these lesions is one of the most challenges for dermapathologists; this is due to the high similarities between them. Data mining techniques are successfully applied to situations like these where complexity exists. This study aims to develop an artificial intelligence model to support the diagnosis of Spitzoid lesions. A private spitzoid lesions dataset have been used to evaluate the system proposed in this study. The proposed system has three stages. In the first stage, SMOTE method applied to solve the imbalance data problem, in the second stage, in order to eliminate irrelevant features; genetic algorithm is used to select significant features. This later reduces the computational complexity and speed up the data mining process. In the third stage, Random forest classifier is employed to make a decision for two different categories of lesions (Spitz nevus or Atypical Spitz Tumors). The performance of our proposed scheme is evaluated using accuracy, sensitivity, specificity, G-mean, F- measure, ROC and AUC. Results obtained with our SMOTE-GA-RF model with GA-based 16 features show a great performance with accuracy 0.97, F-measure 0.98, AUC 0.98, and G-mean 0.97.Results obtained in this study have potential to open new opportunities in diagnosis of spitzoid lesions.

Keywords: *Spitz Nevus, Atypical Spitz Tumors, Melanoma, Genetic Algorithm, Classification, Computer Aided Diagnosis, SMOTE, Feature Selection, Random forest.*

Automatic localization of supraorbital and infraorbital foramina region on CBCT images

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Abstract— . CBCT (Cone Beam Computed Tomography) has fast become a key to produce 3D images in orthodontic and maxilla-facial surgery. Our purpose in this study is to develop a new approach for automatic localization of the region of supraorbital and infraorbital foramina using CBCT images. 19 CBCT images of Moroccan patients were used to validate the proposed algorithm. The automatic algorithm is based on geometric and anatomic information of maxillo-facial structures. The local priori information of supraorbital and infraorbital foramina was used to design the automatic algorithm. The detection rate for supraorbital foramina was 90% and 85% for right and left sides respectively, while the detection rate for infraorbital foramina was 79% and 74% for right and left sides respectively. This study has shown the relevance of local criteria such as geometric and anatomic knowledge in the automation of localization of supraorbital and infraorbital region. This work has gone some way towards the automation of morphometric and anthropometric measurements using CBCT images.

Keywords: *Supraorbital foramen, Infraorbital foramen, Medical imaging, Automatic detection, CBCT images.*

A Rigid Visual Servoing Approach for Non-Rigid Objects Using Weighted triangular

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Abstract— Visual servoing on deformable objects is a recent and open problem. Many approaches propose to use continuous mechanical models embedded into the interaction matrix and compute corresponding camera visual servoing. These methods are highly parametric and are fine-tuned for every specific type of elastic objects. In this paper, we propose a generic approach that enables rigid camera visual servoing to fit as much as possible visual features of objects subjected to non-rigid deformation. The proposed method uses a triangular mesh representation of the visualized object. It computes a relative camera rigid repositioning for every triangular primitive. A specific proportional gain is used for every triangle. The proportional gain represents the relevance of every triangle in the global repositioning of the camera. This gain depends on the variation of the area of every triangle. This has the advantage of making the gain variation continuous which provides smooth camera repositioning. A global rigid correction of camera pose is computed as the scaled mean of all relative per-triangle rigid repositioning. The scale is taken to be the sum of all weights. We provide simulation results to show that with the weighted triangular primitives we are able to better fit the reference visual cue than if we used a naive approach of global uniform averaging of the per-triangle camera repositioning.

Keywords: *Visual servoing · deformable objects · rigid camera positioning*

A LSTM-based method with Attention Mechanism for Adverse Drug Reaction Sentences Detection

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Abstract— Adverse drug reactions (ADRs) are among the top causes of morbidity, mortality and substantial healthcare costs and thus should be detected early to reduce consequences on health outcomes. Many conventional machine learning based methods have been presented to automatically detect adverse drug effect (ADE) mentions from biomedical texts. However, owing to the complexity of natural language text in the biomedical domain, some ADE mentions might not be detected. In this paper, we propose a Long Short-Term Memory with Attention (LSTMA) which incorporates attention mechanism and LSTM network to address the problem of automatic detection of ADR assertive text segments from biomedical texts. Experimental results on standard ADE dataset show that the proposed method outperforms significantly the state-of-the art methods for ADR class with an F-scores of 0.89.

Keywords: *Adverse Drug Reaction, Pharmacovigilance, Attention Mechanism, Long Short-Term Memory, Text Classification , Natural Language Processing*

Molecular epidemiology of Alpha-Thalassemia in a Moroccan population

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Abstract— Background. Sickle Cell Anemia SCA, caused by a single mutation in the β-globin gene, is a common human monogenic disorder in Morocco. The -158 polymorphism (C > T) of γG-globin (HBG2) gene promoter is associated with increased expression of the γG-globin gene and higher production of HbF, which reduces the severity of these diseases. Aim. Determinate the frequency of XmnI Gγ polymorphism and its association with HbF level in SCA cases in the north of Morocco. Subjects and methods. The study was performed on 55 (29.73%) Sickle Cell Disease patients (SS), 70 (37.84%) cases carrying the sickle cell trait (AS) and 60 (32.43%) healthy subjects as controls (AA). XmnI polymorphism was determined by polymerase chain reaction-restricted fragment length polymorphism PCR-RFLP procedure. The HbF level was determined using capillary electrophoresis. Results. XmnI polymorphism was revealed among 12.72% of SS patients, 20% AS carrier and 31.66% healthy subject. Moreover, the presence of polymorphism was strongly correlated with the increase of HbF synthesis than those without the polymorphism (P

Keywords: *Hemoglobin F; Xmn-1 polymorphism; Sickle cell Disease.*

VRAnat: a Complete Virtual Reality Platform for Academic Training in Anatomy

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Abstract— . The study of anatomy has always been reliant on the imagination as images don't convey enough information and the creation of realistic models can be too expensive. A Virtual Reality (VR) application can be an excellent gap filling solution to this issue. It allows the students to interact with 3D realistic models of any organ. It displays several cases on each organ with minimal cost. In this paper, we propose a fully developed VR platform for academic training in human anatomy. We draw the complete pipeline from organ's data acquisition to multi-user interface in VR environment. The final software allows full interactivity student-organ and student-tutor or student-student.

Keywords: *Virtual Reality, Anatomy, Virtual Classroom, Education in Medicine*

Fast Hyperelastic Deformation with Mooney-Rivilin Model for Surgical Simulation of Liver Deformation

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Abstract— Surgical simulation based on virtual reality requires fast and accurate deforming models for interactive realism. In this paper, we propose a novel method to increase the computational efficiency of the convergence of nonlinear finite element methods encoding hyperelastic deformations. We propose to update a chosen partition of the tangential rigidity matrix instead of the whole matrix as is done in classical methods. This partition corresponds to the deformed area and its close neighbors. We keep constant the remaining elements of the rigidity matrix which are not in the partition. We initialize them before the iterative process with zero displacement. This initialization is justified by the fact that only the parts close to the deforming area undergoes large displacement. We prove experimentally that our method converges and allows us to substantially reduce the computational time when compared to classical solving

Keywords: *Surgical simulation, nonlinear hyperelastic deformation, Mooney-Rivilin model, nonlinear finite element*

Skills Evaluation of Specific Surgical Tasks using Long Short Term Memory Networks

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Abstract— t. In this paper, we are interested in surgical skill evaluation. We present three artificial recurrent neural networks with a Long Short Term Memory (LSTM) architecture with the purpose of providing an objective assessment of surgeons who performed three basic surgery tasks on a workbench : Knot-Tying, Needle-Passing and Suturing. The tasks are represented by sequences of kinematic data recorded from the DaVinci surgical system. We train the three LSTMs with kinematic data of subjects with three different expertise levels : expert, intermediate and novice to which we associate three scores: 1, 0.7 and 0.4 respectively. These kinematic data were taken from JIGSAWS which is a free-to-use public dataset. We designed three LSTMs with the same architecture but each one focuses on assessing performance of surgeons on one of the three surgery tasks. We compare this approach with another one that uses a classic Recurrent Neural Network (RNN) architecture and also with an approach that uses a simple Deep Neural Network architecture.

Keywords: *Surgical Skill Assessment · Deep Learning · LSTM*

Machine Learning Techniques for Breast Cancer Diagnosis: Literature Review

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Abstract— Breast cancer is one of major diseases that cause high number of women's death. To decrease these numbers, early diagnosis is an important task in medical process. Machine learning (ML) technics are an effective way to classify data especially in medical field, where those methods are widely used in diagnosis and decision making. In this paper, we present a review of the most recent publications that employ Machine Learning approaches in breast cancer diagnosis. The classification models discussed here are based on various ML techniques applied on different datasets.

Keywords: *Breast Cancer · Medical Diagnosis · Machine Learning · Classification.*

Comparative study between Artificial Metaplasticity Learning Algorithm and other Machine Learning Techniques : Application for cardiac arrhythmias classification

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Abstract— The Artificial Metaplasticity learning algorithm studied in this paper is inspired by the biological property of neurons. This algorithm is proposed for artificial neural network in general, although results at the moment have been implemented and tested for multi layer perceptrons. During the training phase, the algorithm assigns higher values for updating the weights in the less probable activations than the one with high probability. The MIT-BIH cardiac arrhythmias database is used to test the efficiency of the Artificial Metaplasticity Multi Layer Percetron 'AMMLP'. The obtained results has demonstrated superior performance than several state-of-art systems of cardiac arrhythmias classification.

Keywords: *Artificial neural network ; classification ; cardiac arrhythmias; MIT-BIH ; Artificial Metaplasticity ; AMMLP; plasticity ;Multi layer perceptron.*

Thermal and electrical conductivities of bio-ceramic amalgams based on hydroxyapatite doped by low metal (Co,Ni,Cu,Mn) concentration for dental and orthopedic engineering

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Abstract— This work is a continuous study on structural and vibrational study of Hydroxyapatite bio-ceramic pigments with chromophore ions (Co2+, Ni2+, Cu2+, Mn2+) [1] that show a good matric structure after metal ions incorporations. In this study, we reported thermal and electrical conductivities of same previous materials in order to use them as bio ceramic amalgam for dental prosthesis and try to solve tooth damage after partial remove or carries. Hydroxyapatite powders doped with metal ions were characterized by, UVvisible spectroscopy to determinate the optoelectronic properties of all samples. The results show that the incorporation of the metal ions into the hydroxyapatite has an influence on the gap energy, which affect an increase on electrical conductivity up to 130% and thermal conductivity up to 140% in our elaborated samples. The result of this work concerned the orthopedic application since the hydroxyapatite is also a major constituent in mineral part of bones.

Keywords: *Hydroxyapatite, Dental amalgam, Gap energy, Transmittance, Thermal Conductivity, Electrical Conductivity.*

A Deep Neural Network Classification Approach for Alzheimer?s Disease diagnosis

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Abstract— Alzheimer's disease (AD) is known as one of the most common neurodegenerative diseases which causes permanent damage to the brain cells related to memory and thinking skills. Research in this field aims to identify the most specific structures that directly relate to the changes in AD. MRI is one of the main imaging modalities. It plays a vital role in disease diagnostics of AD. Images produced in MRI give information on anatomical structures in human body especially the brain and can also be used for clinical diagnosis of the disease stages in AD. In the recent years, deep learning has gained huge fame in solving problems from various fields including medical image analysis. This work proposes a deep neural network for the diagnosis of Alzheimer's disease and it is stages using 3D magnetic resonance imaging scans.

Keywords: *Magnetic resonance imaging, Machine learning, Brain, Data modeling, Alzheimer's disease, Image classification, Neural networks.*

Processing and analyzing health data in a big data context: Aspects and implementations

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Abstract— Nowadays, the development of machine learning algorithms and big data frameworks make the processing of data a major asset in different sectors. Indeed, this technology allows us to carry out in-depth analyzes of large masses of data and thus generate very useful results for decisionmaking. Among the sectors where this technology is used is that of health in which analysis and prevention are essential to improving the quality of health care. Our research focuses on improving the application of this technology in the health field. In this paper we will present big data aspects, give some implementations and discuss different big data architectures in healthcare sector.

Keywords: —*Big Data*‖, —*Health Data*‖, —*Relational Databases*‖, —*NoSQL*‖, —*Machine Learning*‖, —*Hadoop*‖, —*Spark*‖, —*Classification Methods*‖

Effect of multiwall carbon nanotube (MWCNT) concentration on thermal and electrical properties of Glycerol nanofluid

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Abstract— The objective of this work is to study the effect of the MWCNT concentration on nanofluid in order to ameliorate the thermal and electrical conductivities of Glycerol nanofluid. Therefore, we used a Glycerol nanofluid with a specific volumetric fraction of MWCNT.The experimental results, about the thermal conductivity that is measured by 3ω method and electrical conductivity, show clearly that the thermal conductivity increases slightly with temperature and the volumetric fraction of MWCNT nanoparticles while the electrical conductivity increased when volume concentration and the temperature were increased. We report the results of Fourier Transform Infrared (FTIR) carried in the range 400-4000 cm-1 to confirm the presence of MWCNT inside Glycerol. Moreover, the adherence and the morphologies structure of MWCNT on Glycerol are reported.

Keywords: *Thermal conductivity, Electrical conductivity , Glycerol nanofluid, MWCNT nanoparticles, 3ω method, FTIR*

Integrating Domain Ontologies in an MDA-based Development Process of e-Health Management Systems at the CIM Level

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Abstract— We all know that the development of e-Health management applications goes through several steps, as hence, several stakeholders are involved in the development of these applications. Therefore, it is recommended to define a common vocabulary to facilitate the understanding of the proposed business processes and requirements between these stakeholders in the early stages of this process. On the other hand, the model driven architecture (MDA) is defined by the object management group (OMG) in order to enhance the development process of applications. This architecture is based on three models: CIM, PIM, and PSM; covering all stages of the software development life cycle. The CIM is the first level in this process, which represents a computation independent model. It describes the basic business and requirements analysis, as well as the application domain model. In light of this level, the MDA based approach is presented in this article integrating domain ontologies as CIM model using ODM standard. The process starts with the ODM model representing an eHealth domain ontology, then we transform it into a Class diagram by applying the QVTo transformation engine.

Keywords: *e-Health, Patient Electronic Health Records, Ontology Modeling, CIM level, UML, ODM, MDA, Ontologies, Requirements Engineering, Business Process Management.*

Management alternatives for strawberries diseases

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Abstract— Powdery mildew of strawberry is caused by the obligate pathogenic fungus Sphaerotheca macularis f. sp. fragariae. The disease affects the leaves, flowers and fruit of this crop. Preharvest use of fungicide sprays may provide an alternative to the control of postharvest Mildew. However, fungicide resistance in Sphaerotheca spp. can result in the failure of disease control. In this study, the resistance of the strain of Sphaerotheca macularis isolated from strawberries was tested in vitro with three fungicides (Mancozeb, Fosetylaluminium and Propineb) enriched with Urtica dioica extract. The Mancozeb - U. dioica extract combination was very effective on seeding and sporulation, and moderately effective on growth. The Propineb -U. dioica extract combination was moderately effective on growth and sporulation but ineffective on seeding. Tests done with Fosetyl-Al alone were ineffective on seeding, growth and sporulation. The effects of different temperatures and relative humidity (RH), on germination and conidial germ tube length were evaluated on detached strawberry leaves. Our results suggest that alternating sprays using different classes of fungicides will be required to control mildew of strawberries, and that U. dioica extract may be an effective bio-fungicide incorporated into a fungicide spray program before the harvest for the fight against mildew of strawberries.

Keywords: *Strawberry; callus culture; Mildew; Sphaerotheca macularis; Fungicide; Urtica dioica, Temperature.*

Measures of Random Forest Pruning: Comparative Study and Experiment on Diabetic Monitoring

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Abstract— In this paper, we propose a comparative study between 3 random forest pruning measures using simultaneously or separately performance and diversity. The measures will be used with a Sequential Forward Selection (SFS) path to reduce the number of initial trees. The methods are applied on a dataset from the UCI Repository and a diabetic monitoring application. The results allow obtaining ensembles of smaller sizes with similar or even exceeding, in some cases, performance of the initial forest with considerable improvements in the case of use of performance and diversity.

Keywords: *Classification, CART Trees, Random Forets, Sélection, Diversity, Performance, Sequential Forward Selection (SFS).*

A hybrid data mining classifier for breast cancer prediction

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Abstract— Classification and data mining methods are an effective way to classify data, especially in medical field, where those methods are widely used in diagnosis and analysis to make decisions. This paper presents a performance comparison between different machine learning algorithms: Support Vector Machine (SVM), Decision Tree (C4.5), Naive Bayes (NB) and k Nearest Neighbors (k-NN) applied to the Wisconsin Breast Cancer (WBC original) datasets. We use classification accuracy and confusion matrix based on 10-fold cross validation method. We also introduce a fusion at classification level between those classifiers to get the most accurate multi-classifiers approach. Experimental results show that the classification using fusion of SVM, NB and C4.5 reached the highest accuracy (97.31 %) while accuracy of using a single classifier SVM is (97.13 %). All experiments are executed within a simulation environment and conducted in WEKA data mining tool.

Keywords: *Big Data; Breast Cancer; Data Mining; SVM; NB; k-NN; Classification; Performance.*

Lean methods from manufacturing to health care amelioration

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Abstract— Lean is still a new concept for Morocco that leads to a lack of maturity of most teams in the hospital, but many experiences of lean implementation in healthcare have been conducted in countries like the United States and Canada. the present study aims to start from the original philosophy of lean in order to understand how it can be applied in the hospital setting, and this through 3 sections: we spent at first time by a review of literature to draw limitations (weak study designs, inappropriate statistical assumptions, insufficient analysis) and deduct conclusions and then improve the points that have not been addressed in these publications These limitations included, the second part will be devoted to answer the question of what adjustment should be made to the hospital sector, in particular that of Morocco, for successful implementation of lean and the last section will be devoted to results that can be achieved by implementing lean in health care.

Keywords: *Lean thinking, healthcare, continuous improvement*

Bio-ceramic amalgams based on hydroxyapatite doped by cobalt, nickel and their toxicity discussion

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Abstract— We report an opportunity to solve a matter of tooth damage after partial remove or carries damage. Innovation on novels bio-ceramic amalgams based on Hydroxyapatite-Metal (HAP-M , M=Co,Ni) with low metal concentration was used to reduce the toxicity risk and increase the mechanical, electrical and thermal performances. The novel bio-ceramic amalgams present a natural tooth sensation. Hydroxyapatite powders doped with metal ions were characterized by X-ray fluorescence (XRF) for chemical elements concentration. The results show that the chemical concentration of cobalt and nickel in our hydroxyapatite samples are lower than international reference level of cobalt and nickel toxicity for health use.

Keywords: *Hydroxyapatite, Dental amalgam, Toxicity, Cobalt, Nickel*

Towards Multi-Approaches Bioinformatics Pipeline Based on Big Data and Cloud Computing for Next Generation Sequencing Data Analysis

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Abstract— Bioinformatics pipelines are an integral component of nextgeneration sequencing. Despite the rapid development in open source software for data analysis, the use of these tools through development of bioinformatics pipelines for sequencing analysis still remains a challenge and tedious task for academic research institutions and clinical laboratories. It requires substantial bioinformatics expertise to select the appropriate analytical software tools, big data storage solutions and cloud infrastructure in order to handle the vast quantities of biological data generated by high-throughput experimental technologies. We propose bioinformatics pipeline framework for DNA sequencing analysis. This pipeline is a solution for rapid and efficient deployment of workflow pipeline to institutions and laboratories, enabling reproducible results basing on virtual machine technologies. It is able to support the reference sequence and de novo assembly genome (without reference genome) for disease studies. The pipeline is flexible and offers the ability to use three approaches for DNA sequencing such as, whole genome, whole exome and targeted sequencing. The pipeline takes into account both whole and exome sequencing to allow significant analysis results while retaining high positive predictions. In case of analysis failure or researchers are spoiled for choice to interpret the results, it involves exploring targeted resequencing. The analyses that are supported include: functional, structural and statistical. Due to data sources disparate, storage requirements and need for scalable analysis of biological data, the pipeline used big data technologies for storage and management and can also be deployed on the cloud, enabling instant access without investment overheads for additional hardware.

Keywords: *Big Data, Sequencing Data, Bioinformatics Pipelines, Cloud Computing, Data Analysis.*

Genetic algorithm for decision system

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Abstract-- Currently, we find that the genetic algorithm (GA) and artificial neural networks (ANN) are massively applied in various fields, especially for complex medical problems. in this study aims to develop an intelligent system in order to monitor the evolution of breast cancer and predict appropriate therapeutic protocol. The objective of this work is to help physicians and guide them to take the decisive decisions and chose the appropriate treatment in real-time. Our predictive model based on the genetic algorithm and neural network for decision-making tasks in a reasonable time in order to enhance breast cancer care in Morocco.

Keywords: *artificial neural networks , breast cancer, Genetic Algorithm, decision-making*

Comparative study of Machine Learning Algorithms using the Breast Cancer Dataset

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Abstract— Breast cancer is the second most common cancer overall and the most common cancer in women worldwide. In order to better diagnose and predict the development of breast cancer, current medicine uses several techniques and tools based on very powerful and advanced methods such as machine learning algorithms. This work consists to produce a comparative study between 11 machine learning algorithms using the Breast Cancer Wisconsin (Diagnostic) Dataset, and by measuring their classification test accuracy. We have elaborated this study to define the best method to create two classifiers that must define benign from malignant breast lumps based on the features of the dataset which have been extracted from diagnostic images of a fine needle aspirate of a breast mass. The results of the classification experimentation show that the best accuracy in this paper was achieved by the Neural Network algorithm, which had, in its best configuration, 96.49% of accuracy.

Keywords: *Breast Cancer · Machine Learning · Accuracy · Neural Network algorithm*

Image processing of X-Ray images of empty and filled bone cavity by calcium phosphate granules using ImageJ

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Abstract— Some traumatic situations, disease congenial or cancer can lead to bone loss which requires the use of graft bone or implants. Bone substitutes prepared from calcium phosphates such as hydroxyapatite (Ca10(PO4)6(OH)2) or Beta-tricalcium phosphate (β-Ca3(PO4)2) are frequently used in orthopedic and dental surgery for their good biocom-patibility and excellent bioactivity. These biomaterials are used with high crystalline structure in diff erent forms: paste, granule or block and their biological integration is influenced by structure and microstructure as well as the architecture, porosity, location and bone / implant connectiv-ity. The aim of this study is analyzing and processing X-Ray images of an empty bone cavity which filled by calcium phosphate nano-biocomposite granules with low crystalline structure. To realize this work, an open de-fect in dead bovine bone is induced and the samples with and without granules were analyzed by an X-ray medical scanner. The images have been analyzed using the ImageJ as an easy and free imaging technique. We have determined the volume of the defect, segmented the granules in the defect, calculate their size distribution and the volume of created porosity.

Keywords: *Biomaterials, Calcium phosphate-granules, Image process-ing, Bone filling*

Real case study of improving Elderly Person Fall Video-Detection Algorithm by deep learning

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Abstract— Recently, the healthcare domain has been witnessing great and rapid development which contributed to the increase in life expectancy and thus the rise of the elderly population. One of the relevant research topics in this field is the development of an automatic fall detection system. It is an important step to avoid any serious injuries. In the last years, the camera-video have been widely used for surveillance, home, and healthcare applications. Since, a smart fall detection system is working more on the analysis of image, audio, video algorithms. For that, our scientific work focuses and studied a real video fall detection system. It gives the satisfactory results, but we've still got room to grow it for making it better. Actually, the system got a very high recall and detect all falls, nevertheless it has a poor precision and generates a lot of false positives (more than 99%).Indeed, because of to the optimal video resolution and the room light condition, some daily activities with certain movements such as mobility on a wheelchair or even the light changing in an empty room can be mistaken for the falls. Thus, we aim to help address this problem and to maximize the precision by proposing an algorithm who combined different image processing techniques: Haar-like features method and Convolution neural network model applied on each alert detected as fall to decide whether to eliminate the alert or confirm it. That will reduce the false positives and then improve the system's effectiveness.

Keywords: *Deep learning application; Convolutional neural network model; Classification; Human detection; Reduce false positives, fall detection systems, elderly healthcare, real case study..*

Medical Use of Deep learning: Malaria Testing using pre-trained ResNet

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Abstract— Forest fire is a disaster that causes economic and ecological damage and human life threat. Thus predicting such critical environmental issue is essential to mitigate this threat. In this paper we propose a decision tree based system for forest fire prediction. The aim being the integration of the decision tree classifier as a part of the smart sensor node architecture that allows fire prediction in automated and intelligent way without requiring human intervention. The fire prediction is based on the meteorological data corresponding to the critical weather elements that influence the forest fire occurrence, namely temperature, relative humidity and wind speed. We have obtained an accuracy about 82.92% regarding the software implementation of the proposed DT based forest fire prediction system.

Keywords: *Data mining; Decision tree; Fire prediction; Smart sensor node.*

Design and Performances Evaluation of a Hybrid WBAN for Medical Applications based on the "Inter-MAC" Layer Concept

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Abstract— Classification and data mining methods are an effective way to classify data, especially in medical field, where those methods are widely used in diagnosis and analysis to make decisions. This paper presents a performance comparison between different machine learning algorithms: Support Vector Machine (SVM), Decision Tree (C4.5), Naive Bayes (NB) and k Nearest Neighbors (k-NN) applied to the Wisconsin Breast Cancer (WBC original) datasets. We use classification accuracy and confusion matrix based on 10-fold cross validation method. We also introduce a fusion at classification level between those classifiers to get the most accurate multi-classifiers approach. Experimental results show that the classification using fusion of SVM, NB and C4.5 reached the highest accuracy (97.31 %) while accuracy of using a single classifier SVM is (97.13 %). All experiments are executed within a simulation environment and conducted in WEKA data mining tool.

Keywords: *Big Data; Breast Cancer; Data Mining; SVM; NB; k-NN; Classification; Performance.*

Resolving Multiple Sequence Alignment Problem Using Metaheuristics

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Abstract— In this work, a novel hybrid model called PSOSA for solving multiple sequence alignment (MSA) problem is proposed. The developed approach is a combination between particle swam optimization (PSO) algorithm and simulated annealing (SA) technique. In our PSOSA approach, PSO is exploited in global search, but it is easily trapping into local optimum and may lead to the premature convergence. SA is incorporated as local improvement approach to overcome local optimum problem and intensify the search in local regions to improve solution quality. Numerical results on BaliBASE benchmark have shown the effectiveness of the proposed method and its ability to achieve good quality solutions comparing to those given by other existing methods.

Keywords:

Comparison between Fuzzy Kernel C-Means, Fuzzy Kernel Possibilistic C-Means and Support Vector Machine in Soft Tissue Tumor Classification

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Abstract— Soft Tissue Tumor (STT) are cell growths, whose existence are not limited to the presence of tumors in soft tissues. Furthermore, they are classified into soft tissue and non-soft tissue tumor and early detection is important to determine the right course of treatment. This research, therefore, aims to compare fuzzy kernel c-means, fuzzy kernel possibilistic c-means and support vector machines on Soft Tissue Tumor dataset, obtained from Nur Hidayah Hospital, Yogyakarta, Indonesia, consisting of 50 STT and 25 non-STT samples. The results conclude that fuzzy kernel possibilistic c-means provides a better running time when using the parameter $\sigma = 0.0001$. However, support vector machines, with the parameter $\sigma = 0.0001$ performs better than other methods in terms of accuracy, sensitivity, precision, and F1-Score.

Keywords: *Soft Tissue Tumor · Classification · Fuzzy Kernel C-Means · Fuzzy Possibilistic C-Means · Support Vector Machines · Kernel Function*

Healthcare Data storage based on HBase

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Abstract— The strongly expanding field of big data has started to play a crucial role in the evolution of healthcare research. It has provided tools to accumulate, manage, analyze, and assimilate large volumes of structured, and unstructured data produced by current healthcare systems. An efficient storage method for reading and writing big healthcare data is still needed. In this paper, we propose a healthcare data storage method based on the HBase and MapReduce. We design a structure of HBase tables to efficiently store and manage healthcare data.

Keywords: *Healthcare, HBase, MapReduce and Big data*

Dietary factors associated with obesity indicators (body mass index and waist circumference) in obese and overweight adults of Tangier (Northern Morocco): a cross-sectional study

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Abstract— Obesity is a chronic disease that results from a positive energy balance. Dietary factors are the most related to this positive energy balance. Therefore, The aim of this work was to study the dietary factors in overweight and obese populations of Tangier.

This was a cross-sectional study of 480 subjects, who were selected according to a precise questionnaire, which included the anthropometric, sociodemographic characteristics and dietary factors.

The mean age of our patients was 45.56±12.23 years, the body mass index (BMI) average was 33.97± 5.84Kg / m² and waist circumference (WC) average was 109.78± 15.42cm. Overweight affected 25.2% of subjects and obesity 74.8%, whose 88.8% of subjects had abdominal obesity. Obesity was caused by bad eating habits which were: hypercaloric diet (40.5%), destructuring of meals (22%) and fast food consumption (27.9%). In addition, 51.5% of subjects had eating disorders (ED), the most manifested were: Nibbling (22%), Hyperphagia (17.9%) and Night Eating Syndrome (11%). The prevalence of dietary factors studied increased with female gender and with age group 18-46 years. Fast food and destructuring of meals increased 2 times the risk of obesity, and hypercaloric diet increased 2.5 times the risk of abdominal obesity. Similarly, hyperphagia and nibbling increased already 2 times the risk of obesity.

The prevalence of bad eating habits and eating disorders were high in our patients, these dietary factors increased the risk of obesity. Therefore, public health programs should consider these dietary factors when planning strategies to prevent or reduce the problem of obesity in Moroccan societies.

Keywords: *WC, BMI, obesity, eating habits, eating disorders.*

A controlled and complete mapping of care processes towards a digital clinic

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Abstract— Today, the new system of hospital governance is requiring healthcare institutions to build and develop new managerial, financial and societal skills outside their public service missions.

It is within this context that information technologies appear to be a key element to support the changes and difficulties in this sector. Information technology is seen as a potential panacea for health- care organizations to reduce the pressure and to improve services ability in response to increased demand.

The implementation of the healthcare information system is challenging and critically reliant on organizational, structural, technological and human factors to succeed. In this perspective, the authors of this article have chosen to work on the organizational and structural side of the healthcare organizations since it is the first cornerstone that affect the implementation of healthcare information systems.

The authors establish the research through efficient data sources in IEEE, Springer, Elsevier, Taylor and Francis, Sprouts, Google Books, and also used studies of experts of the domain from 1995 until 2019.

In this paper the authors have decided to go through a systematic method to analyze and to diagnostic the healthcare processes in Morocco taking into consideration previous articles and reports that have dealt with the same subject and an effective investigation towards health professionals.

The main objective of this paper is to define the real process of healthcare institution and to define a model that will be totally helpful to the conception and the evaluation of healthcare information system.

The results obtained are the result of a mapping that shows a positive functional and organizational impact, particularly in terms of designing a model that will be the basis for the functional design of a hospital information system.

Keywords: *Process mapping; National Agency of Performance Support ; Healthcare information systems ; Healthcare information systems implementation ; Care processes*

Detecting Unhealthy Wheat Plants by Using Transfer Learning Method

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Abstract- Plenty of studies use image processing techniques to detect unhealthy wheat plants, but each disease of wheat have different symptoms. Thus, it is necessary to use different algorithms to have an accurate results, which is so consuming in energy and time and need a very powerful machine to do so. In this paper, we apply an intelligent system which uses transfer learning methods that proved their accuracy in image classification. We use 300 digital images of unhealthy and healthy wheat plants, from different platforms of images on the net and TensorFlow as an intelligent system based on deep learning and transfer learning. Experimental results indicate that: significant classification performance (with an average accuracy of 70.66%) was achieved by the proposed method. Index Terms — Convolutional Neural Networks, Agricultural, production, Data analysis, Weather Data.

Keywords: *Image processing, Machine learning, Deep learning. Transfer learning, Artificial neural network. Wheat disease.,TensorFlow.*

Smart Sustainable Farming Management Using Integrated Approach of IoT, Blockchain & Geospatial Technologies

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Abstract- Agriculture is now a trillion-dollar industry, making significant contributions to the growth of several developing as well as developed countries. The huge rise in the growing demand of food and making it sustainable for people is encouraging the need for smart farming. There is a great potential to transform traditional farming profoundly by integrating Internet of things (IoT), Blockchain, and Geospatial technologies to emerge as Smart Farming. Blockchain based farming provides farmers various instant agricultural data at one secured platform, represents a unique opportunity to bring greater efficiency, sustainable crop production, tackle food scarcity, and adds transparency and traceability to the exchange of data related to farming management. Uses of Blockchain in farming management is not only improving the food traceability but also making farming safer for farmers as well as consumers involved, less uncertain and more profitable to the farmers. This paper describes the use of Blockchain technology in farming to manage the practices in a smarter as well as sustainable way, by presenting the decentralized infrastructure with added immutable geospatial technology and IoT sensors capabilities. Our proposed system architecture will explain how Blockchain technology with GIS & IoT will revolutionize the traditional farming practices. Moreover, Blockchain preserves the stakeholders privacy by enhancing IoT framework with more reliable and secure data. Likewise, geospatial technologies create the greater impact by providing visualization and decision making through analytics by transforming traditional farming into sustainable farming.

Keywords: *Blockchain Geospatial technology Geographic Information System (GIS), Internet of Things (IoT), Smart Farming, Sustainable Farming Decision Making.*

The optimization of the compost formulation using mixture designs experiment

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Abstract— The increasing population size generates an increase in the amount of waste in the landfill. Most of this waste is biodegradable in nature and its removal with the traditional ways has many effects on the environment and public health. However, the demand for bio-products is in continual evolution because of their positive impacts on the health. Indeed, the composting process is one of the biotechnologies which can provide a bio-fertilizer by recycling organic. Despite the environmental benefits presented by this process, it has some difficulties lie to the non-linear relationship of biological and physic-chemical parameters. This non-linear characteristic affects the operation time and the quality of the final product. That is why an accurate optimization of the process is necessary for predicting the process parameters mainly C/N and %OM as well as obtain an efficient process. In order to optimize the process, the mixture-designs have been used in this article. The performance of the fitting models of C/N and %OM as a function of feedstock rate was measured by the coefficient of determination (R2) which is 85,31% for C/N and 71.64% for %OM. The substrate of feedstock used in the present compost was: Poultry Litter (PL), Olive Mill Wastewater (OMW), Olive Mill Solid Waste (OMSW), and Green Waste (GW).

keywords: *Mixture design, The composting process, Optimization, Surface Designs, Poultry Litter, Olive Mill Wastewater, Olive Mill Solid Waste, Green Waste*

Intelligent Management of using Natural Resources in Agriculture

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Abstract—Our study focuses on the production Agriculture is a major source of life that plays a predominant role in the development of the economy in most countries but with the phenomenon of droughts and the decrease of water, we are facing problem in decreasing agricultural production that's why in this work we propose to make an intelligent system of diagnosis and control to improve agricultural production and to optimize the use of naturel resources like water. of vegetables or fruits that live in greenhouses because they have specific factors to give a good performance of the crop yield. Those factors such as temperature, air humidity, soil humidity and brightness. In our work we use the artificial neural networks (ANN) in this system and in particular the paradigm of the counter propagation network (CPN) thanks to its classification capacity and if we talk about the diagnosis of course we talk about the classifications of data for analysis and decision making.

keywords: *Control and Diagnostic System; Artificial Neural Networks; Self- Organizing Map; Grossberg; Counter Propagation Network; Classification; Agriculture field.*

A Novel Low-Cost Conductivity Based Soil Moisture Sensor

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Abstract— Water management for irrigation purposes is especially decisive in places prone to droughts because soil moisture sensors are economically unattainable for farmers. The sustainable usage of water should not be restricted by the elevated price of the system. In this paper, we present a low-cost sensor for the monitoring of soil moisture, which can be part of a smart irrigation system. The sensor is composed of two coils, one is powered with alternate current and the other one is used to measure the induced voltage. It is based on conductivity and uses the method of mutual inductance. We study five prototypes, which have different numbers of turns in each coil. We compare them in order to determine the best model. The best sensor is the one that consists of one coil with 40 turns (which is powered) and one with 100 turns (which is induced). The best frequency is 260 kHz, the coil is induced with 10 peak to peak voltage and the induced voltage, which is measured with an oscilloscope, changes with the soil moisture. At this frequency, the sensor presents the biggest difference in volts. The differences are 1.2 V between 0 and 6% of water volume in the soil; 0.8 between 6 and 8% water volume in the soil; and 1.6 V between 8 and 17% of water volume in soil. Considering these differences, we can safely formulate an equation to extract the soil moisture values with high accuracy.

keywords: *Precision agriculture, Solenoids, Soil moisture, Conductivity sensor, Water management.*

Sensors and Biosorption for Better Reuse of Wastewater

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Abstract— Water is an increasingly scarce resource today due to natural and anthropic factors. Therefore, wastewater treatment and reuse is an important parameter of sustainable development. The necessity of reuse wastewater especially for irrigation becomes evident. Innovative wastewater monitoring and treatment methodologies are finding application as technologies improve. The most talented technological advances include: innovative monitoring techniques based on new sensors, computerized telemetry devices, and innovative data analysis tools. Research on sensor and alarming systems is advancing rapidly. Likewise, new methods for wastewater treatment are continually introduced, including the use dead plants biomass for heavy metals removal from wastewater. In this paper, the use of sensors for monitoring and the application of biosorption techniques for wastewater recycling are discussed and evaluated. We propose biosorption for removing heavy metals from wastewater. Sensors are used before and after the biosorption for check the quality of water and the proper functioning of the biosorption process.

keywords: *Wastewater, Sensors, Water quality, Heavy metals, Biosorption.*

Big Data Analytics and Artificial Intelligence Serving Agriculture

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Abstract- Agriculture is a very important sector in the Moroccan economy. Its contribute more than 15% of Morocco's GDP and it's employs about 45 percent of the total workforce with a similar portion of the population living in rural areas. We find in Morocco three types of agriculture:

- First, export-oriented farms, irrigated, modern and highly capitalized.
- Second, the agriculture in large-scale irrigated areas.
- Third, the Rain-fed agriculture with more and less favorable land in the northeast, south and east.

Knowing that the digital transformation is lever of the industrial revolution 4.0 and Big Data and machine learning are huge in predicting things like when you might want to use certain pesticides, we proposed in this paper an advanced intelligent systems for sustainable development applied to agriculture. We used methodological data to preventing the Cereals production rate in an area characterized by an unstable climate using artificial neural networks. We started our process by collecting, preprocessing of methodological of more than 60 years, and we stared a comparative study to find the most efficient neural architecture in terms of complicity and in terms of recognition rate. And in the end, we presented the results and prospects of the system.

keywords: *Big Data, Artificial intelligence, Artificial Neural Network.*

Towards a Smart Irrigation Scheduling System through Massive Data and Predictive Models

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Abstract- The development of new systems for the governance of water resources in agriculture is at the keen interest of precision agriculture field. These systems combine the advances of various fields such as machine learning, massive data and IoT for building new innovative solutions. Therefore, the integration of forecasting methods is an important component for anticipating changes and guaranteeing its adaptation trough an accurate prediction of environment features. In this paper, we present the architecture of a smart irrigation system with a focus on the integration of two prediction methods auto regressive moving average and the extreme gradient boosting. These represented methods are used for forecasting of soil moisture parameter which is considered as the main parameter for estimating irrigation requirements. The results are discussed for assessing the accuracy of these methods in different conditions.

keywords: *Irrigation, Soil Moisture, Intelligent System, Time-series, ARIMA and XGBoost.*

Nutrient quality and yield potential of some Moroccan Lentil genotypes (Lens culinaris Medik)

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Abstract— Lentil (Lens culinaris Medik) grains are considered as dietary source of proteins, minerals and antioxidants mainly in developing countries. Thus, the interest combining nutritional quality with high productivity in releasing novel varieties. In this context, current study aims on assessing genetic potential of 40 genotypes including advanced lines, improved populations, landraces and varieties. A total of nineteen morphological traits and eleven nutrient components were used. The recorded data were analyzed for ANOVA and a hierarchical cluster was built on the basis of Jaccard similarity and dissimilarity index. The genotypes exhibited significant variability for most of measured traits. The nutritional and morphological analysis showed that some genotypes were excellent sources of proteins, iron and had good productivity. Cluster analysis grouped the studied genotypes in four groups at 78% of similarity. Twenty-two genotypes grouped in cluster I, are characterized with high protein contents level, while cluster III grouped some advance line, landraces and varieties genotypes with high productivity. However, cluster IV regrouped advanced lines, landraces and varieties, which had iron concentrations. The data presented here showed that genotypes N° 34, 32, 27 and 25 could be used as a significant source of yield potential, protein contents and iron concentrations.

keywords: Nutrients components,Morphological traits, Genetic diversity, Lentil, Morocco.

Epidemic models for plants infection under mixed effects of temperature and wetness

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Abstract— This paper deals with modeling and fitting for epedimic mod- els and their applications to the field of plants disease. For this purpose, two models are proposed that are expressed as a blend of two functions which reflect the effect of the temperature and the wetness. In addition, we provide an original method to fit the proposed models by employing simple techniques that can constitute an easy-to-use tool for simulation, prediction and/or control. Moreover, the method accuracy and efficiency are evaluated for some reported works in the literature. Computational results are provided to show the validity and effectiveness of the proposed epidemic models for some plant infections.

keywords: *Plant Infections, Epidemic Models, Fitting, Nonlinear Optimization*

The etiological agent of BCWD and RTFS in salmonid aquaculture ability of adhesion and biofilm formation.

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Abstract— Biofilm formation is of a huge importance to several pathogenic bacterial species, especially those living in water, conferring a selective advantage by increasing their ability to persist under adverse environmental conditions (Duchaud et al. 2007; Sauer et al 2002).

In aquaculture, biofilms can be formed by too many components including the microflora present in water, also they are ubiquitous and colonizing both the surfaces of water and fish, as known bacterial biofilms are frequently resistant to antibacterials and biocides, (Wingender and Flemming 2011).

The main aim of the present study is to evaluate the ability of Flavobacterium psychrophilum. the most important bacterial pathogen currently occurring in the world freshwater especially in salmonid farming to adhere and form biofilms, and to get a better understanding of the survival of this bacterium in the aquaculture environment.

keywords: *Flavobacterium psychrophilum, Bacterial Cold-Water Disease, Rainbow Trout Fry Syndrome, Biofilm formation, Aquaculture.*

Crop Yield Prediction Using Deep Learning in Mediterranean Region

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Abstract— Knowledge of meteorological or climatic data in a region is essential for the successful development of agriculture, energy and sustainable development in this region. The main goal of this article is the proper use of the data mining technique for meteorological and agricultural data to help in the development of agriculture in Mediterranean region. study of meteorological data affected by climate change using a data mining technique such as clustering technique by combining with knowledge base constructed from climate rules adapted to a specific agricultural crop. Using this technique, we can acquire new information that can help predict the future quality of the yield of this crop and sought to improve its production, the model built from the large dataset transfers the information retrieved in usable knowledge for classification and forecasting of climatic conditions. We discussed the use of a data mining technique to analyze meteorological and agricultural data. Various data extraction tools and techniques are already available, but they have been used in a very limited way for meteorological data and are never combined with a knowledge dataset adapted to a specific agriculture culture. In this paper, an algorithm based on a network of neurons to predict the impact of climate change on the production and yields of some agricultural crops for a future time and a given site. We used the back propagation neural network (BPN) for initial modeling. The results obtained by the BPN model are transmitted to a Hopfield network. The performance of our proposed ANN-based method (combined approach based on BPN and Hopfield Network) was tested on a 30-year meteorological dataset comprising 54,000 records containing attributes such as temperature, humidity, wind velocity and rainfall as well as several agro-climatic data derived from the climate rules (Köppen classification). The prediction error turns out to be very low and the learning converges very strongly. Consequently, this article based on predictive data mining, will explore the possibility to extract interesting patterns or knowledge from a huge amount of meteorological and agro-climatic data.

Keywords: *Artificial Neural Network (ANN), Back Propagation Neural (BPN),Network Meteorological data, Data Mining, Agriculture, Climate change, Mediterranean climate.*

The Data Analytics Model of the Chemical Substances for Predicting the Ecotoxicological Effects on the quality of Agricultural Production and Environmental Risk Assessment

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Abstract— This paper aims the study of substances and agricultural submissions lead to environmental pollution and have a negative impact directly on agricultural production. Our final ambition is the realization of a thorough and experimental field research by experts (Applied to the north region of Morocco), and putting in place a comprehensive decision support system helps policymakers and farmers to protect the environment, produce and adapt crops to changing climatic conditions. This system consists of several layer suitably ensures the operation of the process from the collection of real-time data via networks of wireless sensors, geolocation and data transmission via radio waves (5th generation) for possible filtering, cleaning, storage and analysis to define an incremental knowledge base for use in the decision support system. This system can be used as a reference and generalized at the national level.

Keywords: *Big data, internet of things (IoT), Network Meteorological data, Data Mining, Machine Learning, Agriculture.*

A Big Data Architecture to Acquire and Preprocess Satellites Datasets

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Abstract— Currently, many environmental applications take advantages of the remote sensing techniques, particularly the Air Quality (AQ) monitoring, climate changes overseeing and natural disasters prediction. However, Remote Sensing (RS) data are generated in Near-Real Time (NRT) with huge volume, are complexes and come with high velocity and variety. This study aims to confirm that satellites data are big data and come up with a new big data architecture for satellites data processing. In this paper, we focused our explanation, especially in the ingestion layer enabling an efficient Remote Sensing Big Data (RSBD) preprocessing. As a result, the developed ingestion layer removed eighty five percent of the daily unnecessary files. Moreover, it eliminated ninety percent of the erroneous and inaccurate plots, reduces storage consumption, improves satellites data accuracy and integrates RSBD into a Hadoop storage system in NRT efficiently.

keywords: *Remote sensing big data, Ingestion layer, Data preprocessing, Data integration*

Optimization of the coagulant flocculation process for treatment of leachate of the controlled discharge of the city Mohammedia (MOROCCO)

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Abstract— Leachate refers to the meteoric waters that seep through the landfill with pollutants that are both mineral and organic. Physical chemical treatments can be considered alone, or in a treatment compared to a biological treatment.

The process of flocculation of coagulation with lime as coagulant and ferric chloride as flocculent has been optimized for removal. The optimization technique is done using the composite response method 42 central and surface. The effect of the three factors (pH, coagulant dose and flocculent volume) for the elimination of the organic load and in suspension was studied and revealed positive. Optimal conditions achieved by compromising desirable responses such as SS removal, turbidity removal, COD removal and Se elimination represented 15 g/L of coagulant assay, 2.5 g/L flocculent dosage at pH 10.5 The maximum removal of SS, COD, Turbidity and Conductivity in this study reaches respectively 46%, 60%, 45% and 30%, with optimal conditions.

Keywords: *leachate, flocculation of coagulation, suspend in suspense, optimization, plan of experiences, surface response method.*

Environmental Assessment of Water Quality and Heavy Metals Pollution of Seawater in Tobruk Bay - Libya

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Abstract— Due to the scarcity of drinking water, the city of Tobruk depends mainly on desalination of sea water for drinking. The water quality of 16 sites along Tobruk bay was investigated during two seasons (winter and summer). Varying analytical techniques have been utilized to analyze group of environment-sensitive elements, including Al, As, Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn. These tests were performed using the Inductively Coupled Plasma/ Atomic Emission Spectroscopy ICP/AES. To evaluate the suitability of water for aquatic life and drinking purposes the contamination index (Cd) was computed. The results of the present study indicated the bay is affected by intensive load of urban, agricultural and industrial wastewater showed serious deterioration of water quality compared with other sites along the Mediterranean Sea. The studied sites of Tobruk bay showed high Cd values which associated with high risks, where, most of the studied metals often exceeded the drinking water and aquatic life permissible limits as compared with WHO specifications, as well as Libyan specifications.

Keywords: *Risk assessment - Tobruk bay, heavy metals, water quality, Contamination index*

Optimization of opuntia dose asbio-flocculant for oil refinery wastewater using response surface methodology

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Abstract— Oil refinery wastewater is one of the most polluted types of wastewater with a large variety of organic and mineral pollutants, which need treatment before discharge to the receiving environment. The coagulation–flocculation process was used to treat oil refinery wastewater with ferric chloride (FeCl3-40%) as a coagulant and cactus juice was used as a flocculant to reduce turbidity and chemical oxygen demand (COD).

A response surface methodology (RSM) design was applied to optimize the process the three factors coagulant, bio-flocculant doses, and pH. Obtained optimal dosages were:

1.12g/l of coagulant and 11.6 ml/l of bio-flocculant and 9.38 of pH. Removal efficiencies under optimal conditions reached: 97.92±0.66% and 62.41±8.12% for turbidity and COD, respectively. The experiment results showed the capability of ferric chloride as coagulant and cactus as bio-flocculant for reducing the pollutants from oil refinery wastewater.

Keywords: *Oil refinery wastewater, response surface methodology, bio-flocculant, coagulation-flocculation, factorial design.*

Classification of Iris Plant Using Perceptron Neural Network

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Abstract— Classification is a prediction technique from the field of supervised learning where the goal is to predict group of membership for data instances. It is one of the fundamental tools of machine learning. Perceptron Neural Network is the first model of Artificial Neural Network implemented to simplify some problems of classification. In this paper we present an approach based on perceptron Neural Network to classified Iris Plant on the basis of the following measurements: sepal length, sepal width, petal length, and petal width. The architecture used in this work is multiclass perceptron with the One- Versus-All (OVA) strategy and the Stochastic gradient descent algorithm learning for training the perceptron.

Keywords: Iris dataset, Perceptron Neural Network, One-Versus-All, Classification

Ecological Risk Assessment for Sediment and Water of Oil Terminal Operation in Sidi Kreir Coastal Area, Alexandria, Egypt

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Abstract— In this work five surface sediments samples and seven surface water samples were collected from specifically chosen locations in the vicinity of Sidi Kreir area which is considered a hot spot area in the Mediterranean Sea due to presence of power station, The Arab Petroleum Pipelines Company "SUMED" as well as increasing the movement of ships that are transferring oil and its derivatives. A total of thirteen Polycyclic Aromatic hydrocarbons (PAHs) were determined in sediment and water samples in order to study the adverse environmental and health effects. The concentration of total PAH ranged from 249.62 ng.l-1 to 556.56 ng.l-1 dry wt. and from 41.96 ng.l-1 to 292 ng.l-1 in sediment and water respectively.

The molecular ratios indicated a prevalence of petrogenic sources pollution based also on the prevalence of Phenanthrene compound in both sediments and water samples. The ecological risk was assessed by considering the Sediment Quality Guidelines (SQGs). It was noted that all of the individual PAH concentrations are below the ERL (average variation effect), except of Flourene and Phenanthrene.

Keywords: *Sediments· Water· PAHs· Diagnostic ratios· Petrogenic· Ecological risk· Sediment quality guide lines*

Optimization of parameters extraction of natural antioxidant from Moroccan grape pomace

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Abstract— The aim of this work is to quantify the polyphenolic compounds existing in Moroccan grapes skins and to evaluate their antioxidant activity using the response surface methodology in order to optimize parameters influencing the extraction method. The effect of extraction duration (15-155 min), the temperature (27-63°C), the percent of methanol (30-90%) and the particle size (125-425µm) on the polyphenols yields and the antioxidant activity measured by the capacity of scavenging free radical DPPH were evaluated.

Keywords: *Extraction, Total polyphenolic compounds, Antioxidant activity, Experimental design, Response surface methodology.*

Forest Fire phenomena: Vulnerability and Control

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Abstract— In this work, we consider the forest fire problem through vulnerability and protector control concepts using cellular automata ap- proach. We propose some definitions and characteristics of the control used in this approach. The considered control have to protect the vulnerable area against fire. Some simulations are presented to illustrate our approach

Keywords: *Vulerability · Control · Protector Control · Cellular Au- tomata · forest fire.*

Experimental and Predictive Study using Cryoscopy and Calculation code Modeling of Seawater at Different Concentrations and Ice Water- Salts Precipitation

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Abstract— This study aims to determine the effect of composition on the pre- cipitation of sea-salts mineral and ice water recuperation on the Moroccan At- lantic Ocean. The main objective of this study is the determination of the optimal conditions of freezing process through the experimental liquid-solid equilibrium of seawater at different concentrations. Hence, the physicochemical parameters of freezing were evaluated through the calculation codes Frezchem and PhreeqcI3 to quantify the effect of the ionic composition of seawater on salinity and the precipitation of ice water and salts. Moreover, the theoretical results ob- tained were validated by experiment. The experimental results carried out under the determined optimal conditions for different compositions were in good agree- ment with the theory results obtained. Furthermore, the temperature effect on the liquid-solid equilibrium is demonstrated and evaluated by calculation code mod- eling. In addition, for each type of salt precipitated for different composition of seawater at different temperature are depending mainly of the solubility variation. The quantity of ice water recuperated is correlated with Ca2+ and SO4 concen- tration and the experimental results obtained by Freezing seawater process and by calculation code confirmed a negative impact in relation with ice water quality and salts precipitation quantity.

Keywords: *Seawater; Freezing; Precipitation; Salts; Ice water.*

A new approach for the management of an industrial waste: A case study

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Abstract— In recent years, industrial production has significantly increased and with it the amount of waste. For its management, the governments 'strategy is directed towards the reuse of the industrial waste for various benefits. Firstly, it reduces the impact on the environment.

Secondly, the space of the landfills does not get over utilized. Thirdly, the natural resources are preserved and/or the import of the raw materials is reduced. Geopolymer materials have emerged as a possible solution for the valorization of industrial waste, especially the aluminosilicate industrial sludge. The sludge used in this study is generated during the treatment of industrial wastewater of a local ceramic factory. The aim of this paper is to study the relation between the material compressive strength and the quantity of silicon ion dissolved at early stage of geopolymerisation, in order to understand the effect of the dissolution rate on the development of compressive strength of an industrial sludge based geopolymer. To achieve our goal, the geopolymers samples were synthesized by adding sodium hydroxide solutions with different H2O/Na2O molar ratio (10, 11, 12 and 13) to the calcined industrial sludge. The obtained paste was poured into cylindrical PVC molds and cured at room temperature under atmospheric pressure for 7 days, then at 65°C for 20 hours. The reaction of calcined industrial sludge and NaOH leads to the formation of a new phase rich in Aluminum. The dissolution of the calcined industrial sludge increases with the decrease of H2O/Na2O molar ratio. The compressive strength of geopolymer material increases with the increase of the dissolution rate. According to the results in this work, the study proves the possibility of using the industrial sludge for manufacturing geopolymer-based materials.

Keywords: *industrial sludge; geopolymer; dissolution rate; H2O/Na2O; FTIR; waste valorization.*

CO2 carbonation on alkaline materials

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Abstract— Carbon dioxide CO2 plays an important role in global warming because of the greenhouse effect.

Different technologies have been studied for its capture and storage; an alternative pathway called "Mineral CO2 sequestration" is a process in which carbon dioxide CO2 reacts with materials having a high metal oxide composition to produce a chemically stable and insoluble metal carbonate. This work has the results of the reaction of mineral carbonation of natural JT material (CaSiO3). This last is synthesized starting from the calcination with 900 °C of the rough clay which is obtained from a tertiary formation located in Eastern Morocco. The carbonate of calcium (CaCO3) is formed after the submission of the sample to a flow of pure CO2 during 15 min under the normal conditions of the temperature and the pressure. It was assessed by diffraction of x-rays (DRX), electronic scan microscopy (MEB). These techniques of analyzes physics-chemical validate the CO2 collection efficiency by our material.

Keywords: *Carbon Dioxide, Greenhouse Effect, Mineral Carbonation ,Calcium Carbonates.*

Spatio-temporal Evaluation of the Contamination by Metallic Trace Elements of the Surface Waters of Oued Sebou, Morocco.

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Abstract— Several metallic trace elements (MTE) may be present in the surface waters of Oued Sebou given the variety of industrial activities that exist throughout this Oued. The objective of this study is to make a spatial-temporal evaluation of the contamination by Zinc, Chromium, Lead, Copper, Mercury, Cadmium and Nickel according to the grid of classification of surface waters (stopped No. 1275-02, 2002). This would highlight the problem of pollution of this Oued, which is considered as one of the most important water resources in Morocco. In this sense, we carried out three sampling campaigns at 14 sampling points in Oued Sebou, in April, August and December 2018. The results of the analyzes showed that the samples of the water collected are contaminated enough. Important changes in the area and the sampling season. In the same way, a physico-chemical characterization of the collected samples was carried out forth temperature, the dissolved oxygen, the potential of hydrogen and the conductivity.

The interpretation of the results obtained was made based on the Order No. 1275-02, 2002 and the correlation between the various parameters studied.

Keywords: *MTE. Oued Sebou. Evaluation. Classification grid. Surface water. Contamination. Morocco.*

Effect of endomycorrhizal fungi on growth and development of Thuya plants in a forest nursery

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Abstract— The Thuya (*Tetraclinis articulata* Vahl masters) plants consider one of the ecologically and economically interest in Morocco by protecting soil against the erosion and means of people's livelihood. A study was conducted at the nursery to assess the reaction of use of endomycorrhizal fungi to favors the good growth of this species. The Thuya plants were inoculated with an inoculum of AMF, originating from the rhizosphere of Thuya. The growth parameters were observed eight months after the stay in the nursery of Beni Souhane. The best growth in height was recorded in non-mycorrhizal plants (from 20 cm in November to 30.74 cm in July) in comparison with mycorrhizal plants of 14 cm in November to 22.58 cm in July). However, the inoculation with AMF also improved collar diameter growth, our results showed the best collar diameter value observed in mycorrhizal plants compared to non- mycorrhizal plants, respectively, 4.17mm and 3.39mm in July.

Keywords: *Thuya, Endomycorrhizal fungi, Height, Collar diameter, Growth*

High-Volume Fly Ash mortar Solution for Sustainable Development

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Abstract— Utilization of green concrete in modern construction is the better solution for better sustainable development. In fact, the cement industry emits an important quantity of greenhouse gas into the atmosphere and consumes an important amount of natural resources. To govern the exploitation of natural resources and minimize the carbon footprint, it is necessary to reduce cement content. This can be achieved by replacing a part of the cement with wastes, such as fly ash, which is the waste generated from coal firing power stations. This paper presents an experimental research work about improving the mechanical strength of high volume fly ash mortar, by using curing treatment.

Keywords: *Green concrete, Sustainable development, Waste, High volume fly ash, Compressive strength,Curing temperature*

The biodiversity of the ichthyological fauna of the Dayet Erroumi khmisset: use of classical indices for a diagnosis on the evolution of the ecosystem

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Abstract— Lake Dayet Erroumi presents an interesting but poorly known freshwater fish resource. An ichthyological study was carried out to identify and determine the level of specific diversity that is quantified by synthetic indices: the specific richness, the diversity of Shannon and equitability. The objective of this study is to know the current state of fish resources and also to see the impact of anthropogenic pressure in particular the fishing pressure on this resource. Inventory and identification of the fish made it possible to establish a list of 7 species of which 2 species are Origins: it is the *Barbus sp* and *anguilla*, the other 5 species are introduced with the dominance of the species *Cyprinus carpio* and *Gambusia affinis* in terms of numbers they represent respectively 33.33% and 34% of the individuals captured. The other species are comparatively Moderately to weakly represented, for the synthetic indices the equitability, the diversity of Shannon.... They show a state of non- stability of the stand in Lake Dayet Erroumi

Keywords: *Dayet Erroumi Lake, diversity of Shannon, equitability*.

Physicochemical parameters of Moroccan fish salted waste desalting of natural process

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Abstract—The evaluation of the unusable was and still a concern for the humanity; create value for the thing whom does not have it. For centuries, man has only regenerated. But there are many organic wastes that we find it impossible to recycle and we condemn every day in the garbage with huge amounts. The rate of residual salt in some waste for example in fish leaves no choice to manufacturers to recycle their fish bones, trash management. Their evaluation can give birth to a new economic source. This study aims on assessing: Temperature (C°), potential hydrogen (pH), water activity (AW), salt rate (%), histamine level (ppm) on Moroccan's fish. Those parameters analyzes on the batch of salted fish bones Moroccan collection during and after maturation. The batch thus prepared, evolution of the physicochemical characteristics was followed every ten days during six months and every day for eleven days after maturity. The analysis made before and after maturity was on fish bones. The temperature, pH, water activity AW, the rate of salt and histamine levels were controlled during the two stages. The results show that after whose maturation, fish bones experiencing changes in physicochemical parameters after a few days after maturation days and the fish bones become toxic.

Keywords: *Fish waste, Desalting, Salt fish, Waste recycling, Organic material.*

Development of a LoRa-Based System for Air Quality

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Abstract— Pollution is becoming a commonplace term, which our ears have become accustomed to. There are various forms of pollution. Air pollution is one of those forms that refers to the contamination of the air, regardless of whether it is inside or outside. Recently, several systems have been deployed using a number of low-cost sensors via a wireless Internet of Things (IoT) technology for collecting data. The aim of this work is developing a system permitting the measurement of the following parameters: temperature, humidity, PM2.5, PM10, CO, and CO2. The main outcome of this research is supervising the air quality of Tangier using a device composed of gas and temperature sensors, and visualizing these data in a website. This website contains an interactive map in which markers are displayed. For each marker we display a pop-up containing the position, the gas rates, the temperature and the humidity.

Keywords: *Pollution, Internet of Things, System, Collecting data, Sensors, Visualizing.*

Variabilité des séries pluviométriques de bassin versant de la Seybouse du Nord Est-Algérien.

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Abstract— Seybouse watershed experiences climatic variability, particularly rainfall, between 1970 and 2011, which has been demonstrated by rupture detection tests applied to multi-year rainfall series. 13 rainfall stations of the National Water Resources Agency were analyzed. This article aims to analyze annual rainfall data in terms of variability and trends, as well as the calculation of the Standardized Precipitation Index (SPI). The results obtained indicate the non-stationarity of the series of rainfall studied and put in front the hypothesis of the expansion of the northern part of the intertropical convergence zone translated by the instability of the rains to study. Pettitt's tests and Buishand's test show ruptures on all the series of rains, mainly on the north-eastern part of the basin. Unlike the southern part which is average, or all the stations have a tendency to increase. In addition, the interpolation of standardized precipitation indices (SPI) over the Seybouse Basin in GIS allowed the visualization and assessment of the temporal evolution of drought in the region, which should help decision makers to manage water resources, agriculture and other activities likely to be affected by drought.

Keywords: *variability- pluviométry- test- stationnarity- trend.*

Mapping land cover from Sentinel-2A using support vector classifier and random forest regressor in the Souss basin Morocco

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Abstract— The semi-arid to arid area of the Souss basin is vulnerable to flood. This natural phenomenon whose intensity is becoming increasingly alarming. Indeed, the susceptibility of the basin to floods disasters is accentuated by its rapid demographic evolution, uncontrolled land cover, anthropogenic actions and other physical factors. The land cover map represents crucial information for assessing the hydro-meteorological flood hazard as the physical and environmental vulnerabilities to this phenomenon in the Souss region. Therefore, seven optical Sentinel-2A images have been used for this purpose. After a preprocessing operation, different features were extracted from the images, including spectral, morphological, and textural variables to be analyzed using the classification and regression techniques based on the Support Vector Classifier (SVC) and Random Forest Regressor (RFR) algorithms. This operation resulted in the generation of a 10 Land cover classes map and the building density estimation. The two results were merged and enhanced by introducing additional classes from exogenous data to produce a land cover map with 27 classes at 10 m resolution. After field inspection missions, the overall accuracy of this map is 91.6% with a Kappa coefficient of 89% which indicates a very good quality. This map is of great importance for many research projects and for many operational applications. Therefore, the approach developed in this study could be used to understand the current land cover and may update this information over time as an accurate means of monitoring change, which is a vital dimension for land management decision making in the region. This map was also produced under an environmental project on modeling and mapping of flood risk, to develop an integrated management action plan for the Souss basin.

Keywords: *Floods disaster, Souss, Vulnerabilities, Land cover, Remote sensing, Sentinel- 2A, Support vector classifier, Random forest regressor, Kappa coefficient, Risk.*

Deep Convolutional Neural Networks with Transfer Learning for Old Buildings Pathologies Automatic Detection

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Abstract— The automatic detection of structure defects based on computer vision is evolving, especially with constant advances in Deep Convolutional Neural Network. Several image-processing methods have been proposed over the years based on Deep Learning. Nevertheless, the studies are mainly concerned with the crack damage and do not takes into account the other pathologies that can affect a surface structure such as Alkali-silica reaction (ASR), efflorescence, carbonation of concrete, friable plaster, water infiltration, and scaling. In this paper, we propose the method of pre-trained learning Deep Convolutional Neural Networks DCNN model with Transfer learning for the detection of seven classes of old building damage in Medina of Fez and Meknes in Morocco. The robustness of the proposed approach is tested on different architectures and a small set of images not used in learning and validation steps.

Keywords: *Structure defects, computer vision, Deep Learning, Transfer Learning, Artificial Intelligence*.

Response Surface Methodology for the optimization of 4-Nitrophenol degradation by a heterogeneous Fenton-like reaction on Moroccan pillared clays

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Abstract— Heterogeneous Fenton-like reactions on pillared clays were investigated for the degradation of 4-Nitrophenol (4-NP). A Box–Behnken Design coupled with response surface methodology (RSM) was applied to evaluate and optimize the important variables. In this process, copper-pillared clays were prepared by intercalation of a Moroccan Bentonite and tested in the catalytic wet peroxide oxidation of 4-NP. The prepared catalysts were characterized by X-Ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR) and Inductively coupled plasma atomic emission spectroscopy (ICP-AES). A significant quadratic model (P-value < 0.0008, R2 = 0.9526) was derived using analysis of variance (ANOVA), which was adequate to perform the process variables optimization. More than 90% of 4-NP was experimentally degraded after 4h of reaction time under the optimum conditions. The model predicted maximum removal of 98.66 % of 4-NP under the optimum conditions of operational parameters (9.48 mM peroxide concentration, 0.325 g L-1 catalyst dose and 51°C).

Keywords: *4-nitrophenol · Clay based catalysts · Catalytic wet peroxide oxidation · Box–Behnken design · Response surface methodology.*

Shipyard Impact Assessment for a Sustainable Ships' Maintenance and Repair Activity in West Africa

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Abstract— The shipping nations over time have opted to own their ship-docking facilities for the maintenance of their fleets. Several shipyards are located in Af- rican ports, to offer ships maintenance and repair service to ships trading in Af- rican countries territorial waters. The shipowners generally prefer the shipyards which are nearby the trading routes of their vessels to optimize the operational cost. This encourage the governments of the coastal countries located in strategic shipping trading lines to invest in constructing shipyard. Senegal is one of these countries that has a big shipyard, managed by a European shipyard. However, it is important to conduct an assessment of the economic, social and environmental impact of shipyards in order to ensure a sustainable ships maintenance and repair activity and to reduce its environmental impact. This paper addresses this assess- ment, taking as case study the shipyard DAKARNAVE located in the port of Dakar, situated in west African coast.

Keywords: *GHG's emission, Steel work, Ship maintenance and repair, envi- ronmental pollution, Air pollutants, Abrasive blasting, shipyard.*

Biodiversity of the ichthyological fauna of the Dayet Erroumi khmisset: use of classical indices for a diagnosis on the evolution of the ecosystem.

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Abstract— Lake Dayet Erroumi presents an interesting but poorly known freshwater fish resource. An ichthyological study was carried out to identify and determine the level of specific diversity that is quantified by synthetic indices: the specific richness, the diversity of Shannon and equitability. The objective of this study is to know the current state of fish resources and also to see the impact of anthropogenic pressure in particular the fishing pressure on this resource. Inventory and identification of the fish made it possible to establish a list of 7 species of which 2 species are Origins: it is the *Barbus sp* and *anguilla*, the other 5 species are introduced with the dominance of the species *Cyprinus carpio* and *Gambusia affinis* in terms of numbers they represent respectively 33.7% and 33,3% of the individuals captured. The other species are comparatively Moderately to weakly represented, for the synthetic indices the equitability, the diversity of Shannon .... They show a state of non-stability of the stand in Lake Dayet Erroumi.

Keywords: *Dayet Erroumi Lake, diversity of Shannon, equitability*

Life cycle assessment of the headrest manufacturing

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Abstract— Actually, the world's car production is constantly on the increase. Approximately 2.9 cars are produced and sold every second, which is mainly linked to the strong demand for cars in a flourishing market all over the world. Consequently, there has been rapid growth in terms of the implantation of automotive production plants with a view to meeting the market needs. However, this very motor vehicle production currently faces huge challenges, the most important of which are related to environmental issues and how manufactures can produce a sustainable and profitable industry for the future (through adopting more environmentally-friendly technologies such as the use of more sustainable fuel resources and new types of modular design with built-in reclability).Our study will mainly emphasize life cycle assessment (LCA) of a headrest for an automotive seat in Morocco. That is to say, this study is based upon the requirements of the ISO 14040 standards by means of OpenLCA software. Besides, this study aimed at evaluating the environmental impacts while adopting the CML 2001 methodology in order to assessing the impacts of the manufacturing process of a headrest (raw material, cutting, sewing and injection). Therefore, this study will enable us to evaluate different environmental impacts, including ecology, toxicology, ecotoxicology and the depletion of natural resources. What is more, system boundary was fixed on the product manufacturing process (ranging from receipt the raw material to the final product) and the functional unit was selected as 1 headrest. As it turns out, the greatest environmental impact has been associated with the injection process, but, on reflection, we concluded that the manufacture of headrests for a car has negative environmental impacts. Accordingly, this study can be generalized with the aim of evaluating the impact of any headrest being manufactured anywhere in the world.

Keywords: *Life Cycle Assessment. LCA Headrest. Automotive industry. Impact assessment.*

Smart manufacturing Modeling: thermal and residual stress in metal additive manufacturing

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Abstract— Selective laser melting is widely used in building layer-by-layer three-dimensional functional parts for automotive, aerospace and medical application; it has demonstrated significant potential in cost reduction of performance critical components. Modeling the additive manufacturing (AM) processes gives insight into physical phenomena that lead to evaluate the final properties of material and product quality.

The transient nature and small size of molten pool makes the temperature distribution during the SLM very challenging to measure and control. On the other hand, distortion and residual stresses are created as a result of thermo-mechanical nature of the process, due to the thermal gradient, these residual stresses and distortion affect dramatically the mechanical properties and lead to geometrical defects in the final part.

In this paper, a numerical model using the Finite Element Method (FEM) of SLM is investigated to predict temperature distribution and residual stresses taking into account powder arrangement during multilayer deposition of stainless steel.

Keywords: *Additive manufacturing; Selective Laser Melting; Finite Element Method; Temperature distribution; Residual stresses; Distortion.*

Sustainable smart cities: Optimization of demand responsive transport by using data science tools

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Abstract— Faced with the widely demonstrated disadvantages of individual transport, demand responsive transport (DRT) is the solution chosen by companies to ensure the transportation of its employees, however, the growth of industrial activities generates great difficulty in managing this model of transport. This research can be applied to very broad areas, in our case we aim to apply it to the city of Tangier. The objective is to minimize the collection routes of transport vehicles. In this article, we propose an optimization approach in data mining, by using clustering, multidimensional positioning (MDS), as well as a wide range of graph theory techniques. It is a vital element, of the strategies developed within the smart cities framework. We test our approach by a random data set of 40 employee pick-up points. An optimal cycle is founded, optimizing the collection.

Keywords: *optimization, Transport, Demand responsive transport, Smart cities.*

Modeling drying kinetics of Dosidicus gigas undergoing Microwave treatment

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Abstract— Drying kinetics under irradiation microwave is crucial to predicting drying rate and moisture content in order to optimize and designing drying characteristics for new food materials. In this study, modeling the drying kinetics of experimental data was studied for an aquaculture product of jumbo squid (Dosidicus gigas) using microwave radiation as source of energy by measuring the loss of mass and the drying rate. The empirical and semi-empirical thin layer models were tested using nonlinear regression analysis to fit drying kinetics data and determine their most suitability at different levels of microwave power output. The Page model showed the best fitting of the drying curve of Dosidicus gigas. The influence of different level of power output on the extent removal moisture is significant and showed a high increasing gradient of moisture content with increasing power output. The experimental results took 28, 16, 10, 6 and 4 min to pull out 80% of the total moisture content of the product at 90,160,360, 600 and 750 W respectively. The curve shape of the drying rate showed the presence of phase 1 corresponds to the pseudo constant drying rate period steeply reached the maximum values, followed by the falling drying rate period (phase 2).

Keywords: *Microwave radiation, drying kinetics, empirical model, Dosidicus gigas*

Modélisation d'Allocation des Ressources Humaines

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Abstract— Human resources management is a key point of company's competitiveness with a high capacity of production based on operators. The efficient use of these resources is essential to satisfy the company's performance targets. First of all we will present in this article the result of the research on the problem of allocating resources within constraints, specifically works that have taken into account the impact of integrating skills, preferences and the polyvalence or mixed integration of these constraints in this problem. Then a methodology that allows stimulating multi political affectation of human resources in industrial activities scheduling, and that takes the three constraints into account. Finally we have used AHP (analytic Hierarchy process) in order to resolve problems of affectation with its constraints.

Keywords: *Allocating resources, AHP, Skills Preferences Polyvalence*

Comparative analysis of project management methodologies and its tools

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Abstract— The Industrial world is in perpetual change which reflects the technological evolutions and behavioral of our society. Companies indeed have to face one large number of upheavals; so much at the level of the objectives to achieve (produced more and more Complexes processes, deadlines and always less important costs, strong pressure of the customers who want furthermore to be more actively involved in the development of a product, etc.)

To face these challenges, several methods and tools are developed and implemented in practice. One of them concerns project management methodologies.

During the last century, the development of project management has led to the advent of professional clusters that aim to the formalization and standardization of the practice of project management, its methods, processes, and tools.

After reviewing the literature, there are two of the main approaches of project management at a global level; Project Management Institute PMI & Projects In Controlled Environments PRINCE2.

This paper will provide an overview of the PRINCE2 and the PMI methods, and examine the strengths, the limits and differences between PMBOK and PRINCE2, to finally lead us to a holistic approach.

Keywords: *Project management; Industrial Systems; PMBOK; PRINCE2.*

A Novel Modeling Method of NAND device

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Abstract— Flash memory has gained tremendous popularity in recent years. A variant of flash, referred to as NAND flash, is widely used in consumer electronics products, such as cell-phones and music players while NAND flash based Solid-State Disks (SSDs) are increasingly displacing hard disk drives as the primary storage device in laptops, desktops, and even datacenters. Computer architects have recently begun exploring the use NAND flash, from SSD organizations to disk caches and even new flash-based server architectures. In order to study this design space, architects require simulation tools that can provide detailed insights into the behavior of flash memory. This article presents electrical and mathematical models of a NAND device and propose a novel method to resolve the system. Results show that, thanks to the modeling approaches used, the NAND devices are optimized.

Keywords: *NAND device, Flash memory, DAE modeling, Partitioning differential.*

Finite Element Modeling of an optimized liquefier design for 3D printing of CFRTPCs by thermal simulation

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Abstract— This paper aims to propose a design of 3D printer liquefier for continuous fiber reinforced thermoplastic composites (CFRTPCs) by analyzing the performance of its thermal behavior. This new liquefying system is based on the design of the widely commonly used RepRap E3D V6 extruder. The proposed heating system considers the optimization of wire feeding mechanism and fan energies, durability of the 3D printing (3DP) machine and the quality of the process. Thus, the resulted design consists of the main components of E3D V6 extruder and two other parts with relevant shape. This latter ensure the appropriate mixing of polymer/fiber and the vehicling of the both materials simultaneously through the hot end. In particular, this work focuses on the temperature distribution of polylactic acid (PLA) material and its optimum fabrication conditions reinforced by carbon fibers. A parametric study of material and shape was conducted and was led to the final design. The implemented finite element model (FEM) is useful for similar designs with the same working principles.

Keywords: *CFRTPCs, Liquefier, Thermal behavior, RepRap, 3DP, Temperature distribution, PLA, Carbon fiber, Parametric study, FEM.*

A DEVS/MAS-based Framework for Modeling/Simulation of Complex Systems

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Abstract— This paper presents an approach for modeling and simulation of complex systems. This approach is based on the decomposition of the considered systems into sub-systems which appear on two levels: On the lower level; the decomposition concerns the division of a global system into atomic and coupled models based on DEVS formalism (Discrete Event Systems Specification). The system components are then represented using the DEVS mathematical equations. This step allows the formal system checking. At the higher lever, the implementation of the obtained DEVS models is realized using Multi-Agents Systems (MAS) based on Agent/Role/Group (AGR). Moreover, a set of procedures and functions permitting to transform DEVS to MAS models are defined and implemented. The main advantages of this approach are its adaptability for various domains, its flexibility (easy to implement), its extensibility (adding new components). A version of this work will be implemented using a functional extension of the Multi Agent Development KIT platform (MAD-KIT).

Keywords: *Complex Systems, Discrete Event Systems Specification (DEVS), Modeling and Simulation, Multi-Agent Systems (MAS), AGR Model (Agent/Group/Role), MAD-KIT.*

Prediction of Liquid-Liquid Equilibrium Data for a Quaternary System Containing an Electrolyte Resulting from the Dissociation of the Acetic Acid

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Abstract— This work focuses on the prediction of liquid-liquid equilibrium data for the quaternary system composed of {water - acetic acid - cyclohexane - ethyl acetate} at 298.15 K from binary parameters. The dissociation of the acetic acid in the aqueous phase was taken into account in the thermodynamic modeling to study the influence of this consideration on the phase equilibrium data of {water - acetic acid - cyclohexane - ethyl acetate} quaternary system at 298.15 K. In our work, we have used the Extended UNIQUAC model to predict the LLE data of the studied quaternary system. The predicted results for both cases with and without considering the dissociation of the acetic acid in the aqueous phase were compared with the experimental data reported in the literature. The predicted liquid-liquid equilibrium data for {water - acetic acid - cyclohexane - ethyl acetate} quaternary system at 298.15 K were considerably influenced by including the dissociation of the acetic acid.

Keywords: *Electrolyte system, Extended UNIQUAC model, Liquid-liquid equilibrium, Quaternary system, Thermodynamic modeling.*

Structural modification of cubic zinc bismuth spinel induced by lead substitution

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Abstract— The actual work is focused on synthesis of zinc nanomaterials spinel, and the study of structural morphological properties. During this work we synthesized zinc bismuth spinel nanoparticles from Zinc oxide (ZnO), lead oxide (PbO) and Bismuth trioxide (Bi2O3) by solid state method. We noticed that the zinc doping spinel by lead (Pb) affect the morphology in nano-stalks thing which influence its structural and optical properties. We also demonstrated that the lead (Pb) can doped zinc bismuth spinel by low concentration which is an element that offers a protection and reduce the parameters variation during the nanoparticles' elaboration.

Keywords: *Nanoparticles, Spinel, Solid state, Lead, Zinc.*

Drilling Stuck Pipe Prediction in Algerian Oil Fields: Time Series Forecasting Approach

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Abstract— The Companies specialized in oil drilling field make to reduce the cost of digging and optimize the operation time. The Drill string stuck (stuck pipe) is the biggest frequent problem during drilling operation which imposes rises to the drilling cost of services.

The main Goal of the drillers is the minimization of the Drilling Time and Reduce the Drilling Cost with avoiding the Drilling Problems (e.g. Stuck pipe). They are trying to use new Methods based on artificial intelligence to solve these problems.

Generally, the stuck pipe is discovered too late after the accident. The aim of this Study is trying to predict this problem before happening which is possible to provide the best solution to limit the consequences and avoid the danger and its financial loss.

To solve this problem, It is more convenient to propose a new architecture based on time series forecasting for analyzing the huge Algerian oils fields drilling datasets and implement it in the Hadoop Ecosystem.

Keywords: *Stuck Pipe, Hadoop, big data, time series forecasting, artificial intelligence*

A DEA-based hybrid framework to evaluate the performance of port container

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Abstract— This work intends to integrate artificial neural network (ANN) and data envelopment analysis (DEA) in a single framework to evaluate the performance of operations in the port container terminal. The pro-posed framework is based on three steps. In the first step, we identify the performance measures objectives and the indicators affecting our system.

In the second step, a DEA-based oriented inputs model (DEA-CCR) is used to compute the efficiency scores of the system, based on the obtained scores, the data is divided into training and testing datasets. In the last step, an Improved Sine-Cosine Algorithm (ISCA) is employed as a new method for training FNNs to determine the efficiency scores. In ISCA, the so-called Levy flights is used to enhance the convergence rate of SCA and prevent it from getting stuck in local optima. To demonstrate the efficacy of the proposed framework, it is utilized to evaluate the performance of two ports container terminal mainly: Tangier and Casablanca. The results are compared with a standard BBO, GA and PSO-based learning algorithm. The new trainer ISCA is also investigated and evaluated using four different classification datasets selected from the UCI machine-learning repository and on three approximation functions datasets. The experimental results show that ISCA outperforms both BBO, GA and PSO for training FNNs in terms of converging speed and avoiding local minima.

Keywords: *Port Container Terminal (PCT). Performance Measurement System (PMS). Data Envelopment Analysis (DEA). Artifficial Neural Network (ANN). Levy Flights. Sine-Cosine Algorithm.*

Iterative Decomposition for simulating the instability of Nano-Switches

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Abstract— In this paper, the iterative decomposition method is applied to solve the system of nonlinear differential equation arising from Nano Electromechanical Switches (NEMS) modeling. Two types of nano-beam actuators contain cantilever and double cantilever are considered and the effects of Casimir and Vander Waals forces on the deflection of micro- and nano-beam actuators are investigated numerically. The pull-in instability parameters of the switch have been considered and compared with those of numerical solution. It is found that using conventional decomposition method in solving NEMS problems can lead to physically incorrect results. The numerical results for different cases of beam are presented and compared in order to demonstrate the accuracy and capability of the proposed method.

Keywords: *Nonlinear differential equation, Natural decomposition, Nano electromechanical switch (NEMS), Instability*

Numerical prediction of thickness influence on the aircraft wing design

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Abstract— This paper deals with the numerical prediction of the Von Mises and the displacement of the swept back wing can withstand under different pressure conditions. In this study ABAQUS was used as a finite element software, with the help of CAD software Catia V5 to model and assemble each of the 3D wing components.

Keywords: *Abaqus, Aircraft wing, Catia modelling, Displacement, Finite element.*

Investigation of Contact Impact in deep drawing for AA2198 Al-Li sheet using ABAQUS/Explicit

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Abstract— In the present paper, contact between blank and tools is studied, in predicting cylindrical cup deep drawing of AA2198 Al-Li alloy, in order to investigate the influence of friction on the quality of the final product. For this purpose, finite element analysis is used, and a three-dimensional model was simulated using the FE-package ABAQUS software. ABAQUS permits investigating models of real processes including different emphasis produced by complex friction, large deformations and material non-linearities.

As a result, it is obtained that contact between the blank sheet metal and tools has a significant impact on deformation behavior of the sheet metal forming.

Keywords: *Abaqus, Al-Li Alloy, Deep Drawing, Finite Element, Surface Contact.*

Curve Limit of Formation for the isotropic plasticity

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Abstract— This work concerns the rate of independent behavior for metals at large strain. It develops a theoretical study on forming limit diagram, using the two three-dimensional approach proposed by Rice and Cordobois Ladvez. In this context, the critical strain is analyzed in the phenomenological model's framework. The model is presented:

- The isotropic case, with Von Mises isotropic yield function, for which the comparison of instability criteria is presented in terms of the hardening parameters. It was shown that the predicted forming limit diagram was strongly influenced by the type of hardening law and the instability criteria.

Keywords: *Elastic-plastic – Large strain - Isotropic – Isotropic hardening - Plastic instability - Striction - Bifurcation – Localisation.*

Maitrise du processus « cataphorèse » par l'intelligence artificielle

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Abstract— L'industrie automobile est en constante recherché de performance pour rester compétitive sur un marché en perpétuelle évolution. Cet article aborde le sujet de modélisation d'un processus industriel « la cataphorèse » d'un grand constructeur automobile via les réseaux de neurones afin de pourvoir par la suite le maîtriser et l'optimiser pour obtenir les résultats qualité souhaité au moindre coût.

Keywords: *cataphorèse; intelligence artificielle; réseau de neurones ; modélisation ; maîtrise du processus*

Design of a Tourism Recommendation System based on user's profile

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Abstract— Recommender systems have emerged as a powerful tool in addressing the issue of information overload, they allow to filter and select relevant content that fit users' preferences and needs. In this paper we describe the general architecture of a recommender system which uses users' profiles to provide personalized and tailored journey to visitors of the Darâa-Tafilalet region. User profile contains various attributes that characterize the user and reflect his behavior. It helps to recommend the best offers for users and therefore to improve touristic experiences in the region Draâ-Tafilalet

Keywords: *Recommendation, Personalization, User profile, Tourism*

Experience of the Jordanian National Program for Linking Academic Institutions With Industrial Sectors "Faculty for Factory"

''Innovation and Sustainable Goals''

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Abstract— Today, the capacity to generate new innovations that can create business is foundation for any development. Thus, measuring innovation and entrepreneurship is crucial for understanding and planning for national economic development.

First of all, these concern the industry life cycle, since the innovation requirements change over time. Because of this, product and process innovation need to be understood as jointly determined. To enable them to react to this, firms should carefully monitor the market for changes.

The program is distinguished as the first of its kind in Jordan and the region, and one of the best programs in the world. Its idea is characterized as a non-traditional one, applicable to the mechanism of linking academic institutions to the productive community represented by the industrial sector. Development of an applied model of cooperation between industrial companies (SMEs) and academic institutions. This can be achieved through the establishment of a real cooperation between participating academia of different specialties on one hand and participating companies on the other hand. This kind of cooperation will benefit both academia and companies.

The national program "Faculty for Factory" aims to highlight many exciting innovations for sustainable development at the local level. It also begins to assess the scope for scaling up these innovations to make an impact on a larger scale by launched the new session of 2018/19 under the title:

"Supporting creativity and innovation in the Jordanian product, linking sectors and creating new markets".

The current cycle focuses on sustainable development and Innovation of technologies in the areas of water, environment, renewable energy and new materials. It also covers the themes of agriculture, improving the quality of industrial products, developing new products with high competitiveness, Eco-friendly products, products adopt new technology.

In addition to the above Promote partnership between Higher education institutions (HEIs) and the industry National qualification frameworks, accreditation bodies, and various arms of the governments across the HEIs sector emphasize the need for the presence of industry in various segments of the academic system.

Keywords: Linking Academic Institutions With Industrial Sectors and technology transfer,Public-private-Partnership-PPP,SMEs Sustainable Development, Innovation and Entrepreneurial culture, sucess, storie

Using Machine Learning Algorithms for the Prediction of Industrial Process Parameters Based on Product Design

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Abstract— In the present paper, a method of defining the industrial process parameters for a new product using machine learning algorithms will be presented.

The study will describe how to go from a final product characteristics till the prediction of the suitable machine parameters to produce a good quality of this product, and this is based on an historical training data set of similar products with their respective process parameters. In the first part of our study, we will focus on the ultrasonic welding process definition, welding parameters and on how it operates. While in second part, we will present the design and the implementation of the prediction models such as multiple linear regression, support vector regression, and we will compare them to the artificial neural networks algorithm.

In the following part, we will present a new application of Convolutionnal Neural Networks (CNN) algorithm to the industrial process parameters prediction. In addition, we will propose the generalization approach of our CNN to any prediction problem of the industrial process parameters. Finally, we will deploy our models into a physical device with an interactive graphical user interface. This prediction device allows the user to move freely on the manufacturing field and perform process development operations.

Keywords: *Artificial Intelligence, Industrial Process, Ultrasonic Welding, Convolutionnal Neural Networks, Parameters Prediction*

Using Machine Learning for predicting Efficiency in Manufacturing Industry

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Abstract— The overall equipment effectiveness (OEE) is a performance measurement metric widely used. Its calculation provides to the managers the possibility to identify the main losses that reduce the machine effectiveness and then take the necessary decisions in order to improve the situation. However, this calculation is done a-posterior which is often too late. In the present research, we implemented different Machine Learning algorithms namely; Support vector machine, Optimized Support vector Machine (using Genetic Algorithm), Random Forest, XGBoost and Deep Learning to predict the estimate OEE value. The data used to train our models was provided by an automotive cable production industry. The results show that the Deep Learning and Random Forest are more accurate and present better performance for the prediction of the overall equipment effectiveness in our case study.

Keywords: *Machine Learning, Overall Equipment Effectiveness, OEE Prediction, Manufacturing Efficiency*

Investigating the multivariate Granger causality between residential CO2 emissions, population and economic growth in Morocco

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Abstract— This paper examines the causality between residential CO2 emissions, population, urbanization, economic growth and residential energy intensity in Morocco from 1990 to 2016 by using the Toda-Yamamoto and Granger causality tests. The Autoregressive Distributed Lag bounds-test approach are employed to test for cointegration relationship. The results show that there is a stable long run relationship amongst the variables. The causality tests reveal that there is a unidirectional Granger causality from residential energy intensity to residential CO2 emissions. Also, we found that population and economic growth does not directly affect the CO2 emissions of the residential sector. They pass through residential energy intensity to indirectly explain the dynamics of RCO2 emissions in Morocco.

Keywords: *residential CO2 emissions; Cointegration; Causality; Residential sector; Morocco.*

A Novel Automatic Transformation Method from the Business Value Model to the UML Use Case Diagram

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Abstract— Currently, in the field of the software engineering industry, end-users have become extremely requiring; consequently, this industry knew a critical evolution. In this vein, the model generation becomes an awakening and an essential step for many approaches among them we cite the Model Driven Architecture (MDA) approach. The Object Management Group (OMG), the founder of the MDA approach, proposes three different abstraction levels; which are the higher level, average level, and lower level. Until now, most research deal with the transformation at the average and the lowest MDA levels, while ignoring the higher level, which precisely contains the requirements' models. Therefore, our aim in this paper is to construct a sound and more consistent higher MDA level for e-business information systems by automatically generating a higher level of functional requirements model from the Business Value model. Our source Business Value model is represented by the E3value model, whereas the UML Use Case diagram expresses the generated model. The transformation is performed automatically using ATLAS Transformation Language (ATL).

Keywords: *Model-Driven Architecture. Automatic transformation. Computation Independent Model. Meta-model. E3value. Business Value Model. UML Use Case Diagram*

Clustering model of false positive elimination in Moroccan fiscal fraud detection

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Abstract— Every year government faces tax fraud with many methods. Big data and analytics enable government organizations to improve existing processes of detection and engage in entirely new types of analyses to allow tax authority to prevent tax fraud, reduce the cost of managing taxes and optimize public spending. Fraud detection often includes analyzing large datasets to locate irregularities. Anomaly detection helps by exploring every possible path to find fraudsters but it's often results in large number of false positive, that is entries wrongly identified as fraud. When a taxpayer is wrongly flagged, the intervention of an audit agent is necessary and so a big time of investigations to finally lose time, effort and money.

The purpose of this paper is to propose a model of false positive elimination in Moroccan fiscal fraud detection based on clustering.

Keywords: *Anomaly detection, false positive elimination, tax fraud.*

Forecast of The Installed Capacity of Solar Water Heaters and Its Economic and Social Impact in Morocco: A Time Series Analysis

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Abstract— Forecasting studies are fundamental and indispensable to discover how past events influence future events. This paper presents a comparison of the accuracy of the performance of different time series models for SWH capacity installed and SWH market in Morocco. Three types of univariate models are discussed: The Quadratic model, the Holt-Winters model (HW) and the autoregressive intergrade moving average model (ARIMA). This comparison should help decision-makers and marketers in the solar water heater industry to choose the best forecasting method on the SWH market. The comparison indicates that the ARIMA is the best adapted model because it involves the minimum of error. The forecast results give a gradual increase in the installed area of SWH and its market by 2040, which has a positive influence on the created jobs factor.

Keywords: *Forecasting. Time Series Analysis, Solar Water Heater, Quadratic. Holt-Winters, ARIMA.*

Towards a Disciplined Methodology to Generate the E-Business Information System Models from the Business Value Model

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Abstract— Nowadays, the software industry has known significant growth, while the end-users have become very demanding. In this sense, many approaches have appeared among them we have the Model Driven Architecture (MDA) approach, which is initiative of the Object Management Group (OMG), considering the model as the central entity in the software systems development process. Our contribution in this paper is to suggest the idea of a new disciplined methodology based on the MDA approach to generate the whole of E-business Information System (IS) models from the business value model automatically. The purpose is to facilitate and automate the development process of any E-business IS, passing from a level of abstraction to another of the software development life cycle, via the transformation models key.

Keywords: *Model-Driven Architecture. Automatic Transformation. Meta-model. E-business Information System. Business Value Model. E3value.*

The impact of national investment in sustainable development on the performance of SSCM: case of Moroccan automotive sector

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Abstract— Our study focuses on the question of national investment in sustainable development and its impact on the performance of the Sustainable Supply Chain Management. Following a hypothetico-deductive approach, we carried out theoretical analyzes leading to the formulation of nine testable hypothesis, translated in the form of a conceptual model.this model has undergone an empirical verification and validation process in a representative sample of the automotive sector in Morocco. The results confirm a large part of the hypothesis and bring many theoretical, methodological and managerial contributions.

Keywords: *Sustainable Supply Chain Management, sustainable development, automotive sector, hypothetico-deductive approach, regression model.*

E-COMMERCE IN SUDAN(ANALYTICAL STUDY)

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Abstract— This study aims to determine the reality of e-commerce in Sudan, and identified the fundamental constraints that limited the role of e-commerce in Sudan which need to be addressed and resolved in order to enable Sudan to enter the digital global economy. Although Sudan is a very advanced country in telecommunications field and phone network with optical fiber, which is one of the advanced phone networks in Africa and the Arab world. But Sudan still suffers from many problems limited the use of the Internet, and entering to the world of e-commerce. The researcher recommends strongly continuing and expanding this research and adopted further studies to determine the extent of the growth and spread of e-commerce and then eliminated the obstacles and challenges in Sudan. Moreover, develop a strategy to change the recent situations in order to change the perception in the field of e-commerce.

Keywords:

The Influence of the information and communication technologies Regulation Policies in Sudan onElectronic banking usage

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Abstract— Electronic banking, called E-banking hereafter, is an important application of the newly developed telecommunication technologies. Generally, E-banking has a tangible impact on facilitating easy financial operations for both individuals and organizations. Development of an efficient E-banking system requires integrated efforts by various partners within the banking and support systems. This research aimed to study the influence of telecommunication regulations on the development of E-banking. The importance of this study comes from its contribution on accelerating the development of banking applications using the information and communication technologies.

Several sources were used for data collection in order to identify the theoretical framework of E-banking and Sudanese experiences to navigate from traditional banking systems to ICT-based systems. The collected data has considered E-banking regulatory environments. The questionnaire and analytical approach have been used to investigate the influence of regulatory laws statements, guiding policies, infrastructure, and tariff systems in Sudanese banking sector. The sample has been selected randomly form Sudanese banks, namely Central Sudan Bank, Faisal Islamic Bank, National Telecommunications Corporate, MTN company and random E-banking users .

The results showed that e-banking in Sudan has improved at last decades but not the customer satisfactions levels, the telecommunication regulations have not directly influenced the development act at the Sudanese electronic banking. This can be attributed to the reasons that the Sudan Central bank works all layers of electronic banking. The study revealed the need for more reformations at the ICT sector polices to enhance the applications in banking sector by engaging the entire stakeholders, and the need to expand the telecom networks and use recent technologies to cover more areas. The flexibility in laws will elevate the public and professional awareness of the importance of the E-banking and encourage the internet marketing (e-commerce) and that by minimize United State of America sanctions on Sudan to use Internet at E-banking facilities.

Keywords:

Integrate and Apply the recommendation System of Agile Methods

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Abstract— Software development is an organized process that thrives to deliver products in faster, better and cheaper ways. There have been many studies and suggestion in improving the development process. Recently, this interest has paved way to a new software development method called Agile Software Development. Agile methods strive to deliver small sets of software features to customers as quickly as possible in short iterations. As part of this article scope most commonly used methods will examined from the angle of their applicability, strengths and weaknesses and their adoption in industry. This will lead us to find benefits, limitations and difficulties in agile software development.

Keywords: *AGILE METHODS, DEVELOPMENT PROCESS, INFORMATION SYSTEMS, SOFTWARE ENGINEERING, SCRUM, AGILITY*

Automatic Evaluation of UML Class Diagrams Using the XML Schema Matching and the Machine Learning Algorithm

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Abstract— During the learning process, the evaluation of learners' products becomes difficult with immense number of students in universities, and it can be a heavy task for a teacher in such complicated subjects, for this purpose we propose to develop an automatic system for evaluating the learners' product. In this article we present a new method for evaluating the UML class diagram built by the student and compare them with that of the teacher, and also, we compare the commonly used machine learning methods.

Keywords: *Evaluation, UML Class Diagram, XML Schema Matching, Machine Learning.*

Modernization and Orchestration of Security Incident Response tools

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Abstract— At present, information security incidents have become not only more and more diverse, but also more and more harmful. Preventive checks based on the risk assessments results doesn't allow a complete incidents reduction. As a result, an IS Incident Response System is required for detecting and responding to IS incidents, minimizing losses and destruction, and mitigating exploited vulnerabilities. The purpose of this paper is to discuss the importance of integrating security incident response tools, present as well a comparative study of the two leading security incident management systems, in order to identify and implement, according to tests and results, an automated security incident alert response solution that enables the alerts management, threats detection and control, as well as the security incidents response according to the best management practices of information systems.

Keywords: *security incident, Incident response system, vulnerabilities.*

An Advanced Intelligent Support System for Multimodal Transportation Network Based on Multi-Agent Architecture

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Abstract— Nowadays, the demand for public transport and the need for travel are increasing more and more. This growth is due to the increase in population density, traffic congestion, lack of information and all the problems that the transport network is facing. The complexity of traveling in a multimodal network has necessitated the development of an intelligent solution that will facilitate decision-making and route planning. The aim of this work is to design a multi-agent architecture of an advanced intelligent support system for multimodal transport, in order to provide users with the optimized route to follow and to avoid consulting multiple transportation websites for plan their trip.

Keywords: *Information system, Multi-Agent system, Multi-Agent Architecture, Multi-modal itinerary, Multi-objective optimization, Trip planning.*

Anomaly Detection in Credit Card Transactions

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Abstract— We live a significant increase in the use of credit cards which leads to a high number of fraudulent transactions. The detection of fraudulent transactions carried out by the credit card is an important application in anomaly detection. The use of the credit card has not only several advantages but also losses and damages that may reach billions of dollars. However, existing approaches and methods are not optimized for detecting anomalies. When facing large volume of data, these methods remain limited resulting in a very high percentage of unsupported anomalies. The purpose of this paper is to compare these different techniques in order to choose the most adequate one to detect real-time anomalies in credit card transactions. We have opted for Isolation Forest which not only achieved a high-level of detection accuracy and AUC Score but also increased the rate of fraudulent transaction detection and minimized the percentage of incorrect fraud classifications. In this paper, we propose an anomaly detection model in order to predict and detect fraudulent transactions over time.

Keywords: *Anomaly detection, Credit card fraud, SVM, Decision Tree, KNN, Isolation Forest.*

Machine Learning Approach for Smart Self-Diagnosing Autonomic Computing Systems

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Abstract— While modern systems and networks are continuously growing in size, complexity and diversity, the monitoring and diagnosing of such systems is becoming a real challenge. Technically and economically, more automation of the classical diagnosing tasks is needed. This has triggered a considerable research initiative, grouped under the terms self-management and Autonomic Compu-ting. In this paper we propose a new model for smart self-diagnosing systems based on Autonomic Computing principles and Machine Learning techniques.

Keywords: *Autonomic Computing, Machine Learning, Self-Diagnosing, wireless networks.*

Towards a Maturity Model for Digital Strategy Assessment

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Abstract— Information Technologies (ITs) lead to creativity and innovation in education, business, and management. Creativity and innovation improve the growth and profitability of organizations and the quality of their products and services. Many of today's social, business, economic and political problems can be solved using ITs. To take advantage of the digital revolution, there is a need for having a digital strategy and evaluation system of digital transformation. Many works show that the strategic alignment between business and ITs is the key element for successful digital projects.

This work presents a Maturity Model for Digital Strategy Assessment (MMDSA). MMDSA has been introduced as a guide and reference framework for digital transformation management within different industries and sectors. Its objective is to master and improve digital transformation processes and consequently to control the quality of the products and services resulting from these processes. The proposed model allows assessing IT-businesses alignment, helps organizations to determine where they stand in terms of their digital transformation and provides strategic components and guidelines to help organizations to move up from the current maturity level to the next one. The paper illustrates a software solution allowing to create customized maturity models to assess digital strategy progress and evaluate the business value of the digital transformation.

Keywords: *Digital Strategy · Strategic Alignment · Maturity Model · Digital Strategy Assessment · Smart City Assessment.*

Using NMAP for data collection in Cloud platform

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Abstract— Cloud computing provides on-demand services over the Internet using methods that manages the amount of virtual storage. The key features of cloud computing are that user has no expensive IT infrastructure and the cost of their services is lower. Today, cloud computing integrates with industry-leading companies and other domains, encouraging the researcher to look for new technologies for advanced cloud computing. We discussed the basic features of cloud computing, security issues, threats and their solutions. It also describes several key cloud-related topics: cloud architecture structure, service and deployment model, cloud technologies, cloud security concepts, threats and attacks. In addition, Denial of Service Attacks, an emerging threat for large cloud infrastructures, discuss many open search issues related to cloud security. And a collaborative model consists of the Intrusion Detection and Prevention System functions based distributed IDS and IPS, with the use of a hybrid detection technique for addressing the problems of attacks encountered, specifically distributed attacks such as port scanning attacks and distributed internally established within a Cloud Computing environment.

Keywords: *Cloud computing, cloud framework, cloud security, IDS, IPS.*

A Lightweight Cellular Automata-based Cryptosystem evaluated with NIST statistical tests

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Abstract— The lightweight cryptosystem presents a real challenge due to its special criteria, as high throughput, low-power consumption, and less memory space. During the past decade, many cellular automata (CA) based cryptosystems have been released, and different scientific contributions have shown that CAs are a promising tool in lightweight cryptography. CA are evolving on dynamical systems and producing chaotic behavior, making their related algorithms secure, simple, fast and desirable for applications requiring the least amount of resources and constraints.

In this context, we propose a block cipher operating on 64-bits block size,128-bits keys size and eight rounds. The encryption and decryption process of our algorithm are based on Reversible Cellular Automata, while the key scheduling is inspired from Rijndael design. To evaluate the robustness and the security of our cryptosystem, we demonstrate that the NIST Statistical randomness tests are well satisfied when applied to our algorithm.

Keywords: *Lightweight cryptosystem. Block cipher. NIST Tests. Cellular Automata. Rijndael Design.*

Developing a Decision Support System for Seaport (Case Study: Elmergib Seaport)

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Abstract— Coutieners coming to the seaport, scheduling and managing there information to come out with right decision is a tedus job, therefore a system which can maintain those information and support a right decision was required. This paper introduces a decision support system for Seaport Management (DSSSM). The DSSSM consists of three main components: User Interface, Model Base Management System and Database Management System. The main characteristic of DSSSM are: the simplicity of use, high efficiency, quick response for critical situations and generating a dynamic query and reports. The DSSSM is a portable it can easily configured to work with various databases, and it can be integrated with other systems in the seaport such as the management container yard system and the vessel traffic system. Implementing the DSSSM system give good results in term of facilating seaport management and quick information retrieve.

Keywords: *vessel traffic system , Database Management System, Decision Support System, Model Base Management System.*

Hierarchical Dimensionality Reduction based Fuzzy C-means Methods for Change Detection in Temporal Satellite Images

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Abstract— Automatic land-cover change detection from satellite images becomes an important research topic. It is crucial to understand the changes in the environment and the impacts of natural disasters. Based on this assumption, this paper goes through suggesting a process of detecting changes in spatial remote sensing images. Hierarchical dimensionality reduction (HDR) followed by electrical fuzzy c-means (EFCM) methods are used to reach this purpose. First, the difference image is generated by the log ratio of the two images acquired at two different times. Then, HDR is applied to reduce the dimensions of the input image to keep its important features. Furthermore, changed and unchanged pixels are determinate and mapped by using the Sub-pixel-based technique (EFC). For the considered application, three datasets images are used to evaluate the performance of the proposed approach. The obtained experimental results denote the effectiveness and reliability of the proposed method and its capability to get the least overall error among the compared methods in this work.

Keywords: *Change detection, Electrical fuzzy clustering, Hierarchical dimensionality reduction, Satellite images, Segmentation, Land cover classification.*

Elector Relationship Management: Concepts, Practices and Technological Support

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Abstract— Election abstention is generally high during political campaigns and it is widely recognized that one of the ways to promote successful elections is to put in place mechanisms to track the assessment of their success.

To support electoral campaigns, it is essential to gain knowledge about citizen- electors. This knowledge will enable the adoption of adequate and effective actions and decisions to closely monitor elector behavior. For such procedures to be possible, this paper proposes an Elector Relationship Management (ERM) system. This system will support the ERM concept and practices and will be implemented using the concepts and technology infrastructure supporting Business Intelligence systems. The concept, practice and architecture of the ERM system is presented in this article and its main purpose is to provide a technological tool that helps political parties to acquire the essential knowledge to the decision-making process. The prototype of the ERM system proposed, once implemented, will be validated by the execution of a set of demonstration cases in different political parties in Morocco.

Keywords— *Costumer Relationship Management, Business Intelligence, Elector Relationship Management (ERM), Data Warehousing, Data Mining.*

Risk Assessment of Oil Spills at Alexandria Port, Alexandria, Egypt

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Abstract— Alexandria Port is the main port in Egypt, handling over three quarters of the foreign trade. Daily operations involving vessel berthing and maneuvering of ships that are transferring oil and its derivatives has the potential to cause oil spills. Oil spill mathematical model was used to predict the trajectory and the fate of oil spills in Alexandria Port in order to assess the risks associated with oil spills at this area and to highlight the vulnerable areas to be a support tool for decision making in future emergencies. Two simulations were performed for each month as regular-case and worst-case scenarios depending on the amount of oil spilled and the meteorological environmental conditions based on real time data. Weathering processes of spreading, evaporation, natural dispersion and emulsification were studied at regular intervals and compared for the regular-case and the worst-case scenarios illustrating the difference in behavior of the oil spill. Results of the modeling were compared with samples allocated from the area under study to indicate the points of intersection between expected route of the oil spill with concentrations of PAHs, n-Alkanes and TOC%. Relatively high concentrations of n-alkanes were detected at the offshore sediments near the SPM station. PAHs in the surficial sediments of El-Max Bay show pyrogenic origins. From the study, El-Max Bay was found a vulnerable area in case of oil spill in the area under study.

Keywords: *Alexandria Port · El-Max Bay · Oil spill · Weathering · Modeling · Risk assessment · PAHs · n-Alkanes · TOC%.*

Oil Spill Modeling at Sidi Kreir SUMED Oil Terminal, Alexandria, Egypt

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Abstract— The Arab Petroleum Pipelines Company "SUMED" is a joint stock company that owns and operates two parallel pipelines Ain Sukhna on the Red Sea to Sidi Kreir on the Mediterranean. A huge tanks farm at each oil terminal, which serves operation. Daily routine operations may cause some environmental risks. Although relatively rare, major accidental oil spills do happen and can potentially cause a major impact on marine environment.
In this study, the licensed SL-Ross oil spill prediction model is successfully used as a response and decision support tool to investigate the fate, the trajectory, and likely beaching of oil nearby at Sidi Kreir oil terminal. The model operates on a spill scenario basis; accordingly, forty-eight spill scenarios were prepared and run based on different inputs parameters.
Depending on the modeling outputs and the geographical nature at Sidi Kreir oil terminal, the fate/behavior of spilled oil depends mainly on its properties and the environmental conditions. Trajectories showed that, the nearby areas at Sidi Kreir oil terminal is considered as vulnerable areas in case of oil spills. The early detection and combating of oil spill within the first few hours of the oil leakage may lead to effective control of the marine environment contamination.
The potential impacts from accidental and operational oil spills at Sidi Kreir oil terminal can cause disturbance, damage and/or death to marine habitats and species depending upon the type and quantity of oil, location of spill, hydrodynamic conditions, proximity to sensitive marine habitats and species.

Keywords: *oil spill simulation; oil spills modeling; SUMED oil terminal, Sidi Kreir; Risk assessment; oil spill prediction model; trajectory; Fate / Behavior of the spilled oil*

Detection and Control System for automotive products applications by Artificial Vision using deep learning

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Abstract— Object recognition is among the most important subjects in computer vision, it has undergone a huge evolution during these last decades, but in the last years artificial intelligence has seen the appearance of Deep Learning, and through the efforts of researchers, Deep Learning is having great success, its applications have touched on different fields, such as robotics, industry, automotive ...

In this context, in collaboration with an Automotive components manufacturer and FST faculty of sciences and technologies of tangier (UAE University) have taken the initiative to develop and implement an object recognition and inspection system for automotive products application that requires a good accuracy of image classification using the Deep Learning which is the purpose of this paper. This report summarizes the work done within this Company concerning the development and implementation of a system aims to realize an artificial vision system for the inspection of automotive products based mainly on the "Deep Learning" method. Before, during and after manufacturing, many products in automotive sector (electronic components, …) are subjected to a visual inspection phase, in this context we have replace this phase by our vision system so that the piece will be accepted or not accepted, as well as to act to parameters (for example: winding shape, welding quality ...) in the case of not accepted.

The convolutional neural networks have become advanced methods for classification and detection of objects over the last five years.

At present, they work better than conventional image processing method set, on many image classification data sets. Most of these datasets are based on the notion of concrete classes.

In this paper, we present a new set of image classification data as well as object detection data, which should be easy for humans to solve, but its variations are difficult for CNN. The classification performance of popular CNN architectures is evaluated on this dataset and variations of this dataset may be of interest for future research.

Keywords: *Dataset; AI; CNN; ML; ReLu;*

Design of a Mini Robot for the Automation of 3D winding machines axes and Self-Correction by artificial vision using deep learning

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Abstract— Object recognition is among the most important subjects in computer vision, it has undergone a huge evolution during these last decades, but in the last years artificial intelligence has seen the appearance of Deep Learning, and through the efforts of researchers, Deep Learning is having great success, its applications have touched on different fields, such as robotics, industry, automotive ...

In this context, in collaboration with an Automotive components manufacturer and FST faculty of sciences and technologies of tangier (UAE University) they have taken the initiative to develop an object recognition and self-correction system for a winding machine that requires a good accuracy of location of the needle using the Deep Learning which is the purpose of this paper.

This report summarizes the work done within this Company concerning the development and implementation of a system for automating and self-correcting the location of the needles of winding machines using artificial vision with Deep learning.

The convolutional neural networks have become advanced methods for classification and detection of objects over the last five years.

At present, they work better than conventional image processing method set, on many image classification data sets. Most of these datasets are based on the notion of concrete classes.

In this paper, we present a new set of image classification data as well as object detection data, which should be easy for humans to solve, but its variations are difficult for CNN. The classification performance of popular CNN architectures is evaluated on this dataset and variations of this dataset may be of interest for future research.

Keywords: Dataset; AI; CNN; YOLO; ML

Front and Rear Vehicle Classification

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Abstract— Most of the systems either detect (classify vehicle or background) or classify vehicles in categories such as cars, trucks, buses etc. Unfortunately, there is not too much research on vehicle view classification. This paper presents a classification system of vehicle's front and back. This system consists of two main phases: feature extraction phase and classification phase. In the first phase, we used two descriptors: HOG (Histogram of Oriented Gradient) and LBP (Local Binary Patterns). In the second phase, we used two types of classifiers SVM (Support Vector Machine) and kNN (k Nearest-Neighbor). The experimental results reveal that the system can recognize robustly the views of the vehicles. The system was tested using Matlab. The accuracy of the system is about 97,47%.

Keywords: *Vehicle View Classification · Machine Learning · SVM · kNN · HOG · LBP*

A literature review of steering angle prediction algorithms for self-driving cars

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Abstract— A crucial requirement for intelligent, driverless cars is to maneuver without moving out of its drivable region of the road. It is well known that steering angle calculation plays an important role in maintaining the vehicle in the center of the road or within the boundary lanes to meet safety critical requirements. This paper presents a review of autonomous steering techniques for self driving cars which is a relatively unexplored task in the fields of computer vision, robotics and machine learning. Our principle aim is to find out the state-of-the-art models in traditional computer vision approach and end-to- end Deep learning approach. Subsequently we have analyzed and compared the performance of each model based on the reported experimental results. Our research investigations lead us to conclude that ResNet50 Deep network combined with event cameras can be assumed to give better prediction of the due wheel angle in comparison to the use of traditional cameras. An overview of future research direction and applications is also given.

Keywords: *Driverless cars. Steering angle. Computer vision. Deep Learning*

Deep ConvNet for facial emotion recognition

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Abstract— Facial expression recognition has made great progress over the last two decades. The growth in the use of deep learning has contributed significantly to this advance. In this work, we proposed a Deep ConvNet architecture for facial expression recognition based on the RaFD dataset. Results show that the best setup is the combination with different parameters like the convolution layer number, activation function in hidden layers, optimizer, 2 fully connected layers…etc. The best architecture gives over 97% accuracy which is promising compared to the state-of-the-art results and confirms the effectiveness and robustness of Deep ConvNet with batch-normalization.

Keywords: *Emotion recognition, Facial expression, Deep ConvNet.*

Predicting Forest Fire in Algeria using Data Mining Techniques: Case Study of the Decision Tree Algorithm

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Abstract— Forest fire is a disaster that causes economic and ecological damage and human life threat. Thus predicting such critical environmental issue is essential to mitigate this threat. In this paper we propose a decision tree based system for forest fire prediction. The aim being the integration of the decision tree classifier as a part of the smart sensor node architecture that allows fire prediction in automated and intelligent way without requiring human intervention. The fire prediction is based on the meteorological data corresponding to the critical weather elements that influence the forest fire occurrence, namely temperature, relative humidity and wind speed. We have obtained an accuracy about 82.92% regarding the software implementation of the proposed DT based forest fire prediction system.

Keywords: *Data mining; Decision tree; Fire prediction; Smart sensor node.*

Stock price forecasting: New model for stocks selection and price forecasting based on Convolutional neural network.

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Abstract— Stock price forecasting is a difficult task given the high volatility of data, at the same time investors always need to anticipate price changes to maximize profit or minimize losses, which justifies the number of works carried out or in progress in this field. In this paper, we present a new model for selecting profitable stocks with low risk and forecasting close prices for a given horizon. Our model is a succession of three phases: first phase is purely dedicated

to data cleaning preprocessing and return calculation, then the second phase of selecting profitable stocks with relatively low risk based on Sharpe ratio. The last phase is for training and testing the CNN model we start our training by a small number of epochs and control the error rate for each stock price prediction, stock with an error rate above the error threshold will be discarded and we will increase the epoch number and reduce the threshold error to keep only stocks that the model predict with high accuracy. The model is designed for short term forecasting. The obtained results are very satisfactory and error rate is very reduced.

Keywords: *Financial times series; Deep Learning; Convolutional Neural network CNN; Machine Learning; Sharpe ratio, volatility*.

Comparison of Modified Hierarchical Clustering Based on Density Peaks using Kernel Function with Support Vector Machine in the Classification of Sinusitis

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Abstract— There are two classes of sinusitis, acute and chronic. This research compares the modified hierarchical clustering based on density peaks (HCDP), using kernel function with support vector machine, utilizing dataset taken from Cipto Mangunkusumo Hospital, Indonesia. This collected detail consists of 102 acute and 98 chronic sinusitis samples. The results of this research therefore conclude that HCDP, using Gaussian radial basis kernel function, with the parameter σ = 0.01 possess an accuracy of 72.69% and has a better running time. However, the average accuracy of support vector machine is 98.53%.

Keywords: Sinusitis · Classification · Hierarchical Clustering · Density Peaks · Kernel Function · Support Vector Machine

An online framework for earlier cancer diagnosis:Association rules and decision tree based approach

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Abstract— Cancer is a major problem worldwide. It is a deadly disease that affects our lives and will continue to affect it. For example, breast cancer, the most common cancer, is the second leading cause of cancer. Its incidence has increased considerably in recent years. Machine learning applications to cancer have also received a great deal of attention in clinical decision support. It is important to detect cancer as early as possible, health professionals need a reliable forecasting methodology to diagnose cancer and distinguish its different stages. The classification is a mining function that assigns elements of a collection to groups or target classes. This paper presents an adaptive online learning (OL) framework for supporting the clinical breast cancer diagnosis. Unlike traditional data mining, which trains a particular model from a defined set of medical data, the framework offers adaptive predictive models that can be updated continuously according to new data sequences and newly discovered features. The framework is based on a two-phase approach to classifying breast cancer using supervised learning. The first phase consists of selecting relevant features to develop predictive models using the association rules. The second is to define the predictive model using decision tree algorithm C5.0 to classify benign and malignant mass tumors contained in breast mammography images whose characteristics are archived in a database. This work can be generalized and applied to the classification of cancers other than breast cancer.

Keywords: *Diagnosis of Breast Cancer, Breast Cancer Database, Association Rules, Decision Trees, C5.0 Algorithm, Adaptive Model.*

Application of a discrete to continuous approach based-alignment algorithm for Capillary Electrophoresis DNA sequencing correction

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Abstract— This work presents an application of an alignment algorithm for correction of data obtained from capillary electrophoresis sequencing experiments. Generally, most existing methods, used in this field of application, suffer from a high computation cost. Our method is based on the principle of the discrete to continuous "DTC" approach and tries to find the superposition between the input signal and the reference signal by looking for a transformation based on Euclidean metric. Our algorithm was able to successfully align capillary electrophoresis sequencing data of an HIV gene and correct ambiguities. These results demonstrated that with our approach can achieve high percentage correction with good alignment rates.

Keywords: *Signal alignment, DNA, Sequencing, capillary electrophoresis, Ambiguity correction, Bioinformatics.*

Towards a SaaS Contracts Negotiation Model Based on a Multi Agent System

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Abstract— A SaaS contract is the formalization of an agreement, the terms of which are applied based on a transaction protocol. These contracts specify not only the service and its quality, but also any changes in the conditions of the contract during performance. Although, contracts, built automatically, offer great flexibility. So, it is much more difficult to analyze their compatibility and conclude agreements with this dynamism, due to the freedom of customers and suppliers to formulate their needs/ offers.

Based on the principle that a reliable and performing negotiation mechanism requires an effective negotiation protocol, the objective of this work is to propose a negotiation model adapted to the context of Cloud Computing. It is used to discuss the parameters of a SaaS (Software As a Service) contract, to exchange proposals and counter-proposals and to arrive at a possible solution between suppliers and customers.

Keywords: Multi-agent system, Negotiation, SaaS Contract, Cloud Computing, Contract Net Protocol, Multi-Attribute Utility Theory (MAUT), Constraint Satisfaction Problem (CSP).

Predictive Natural Language Processing Analysis Applied to Arabic

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Abstract— This paper aims at applying Recurrent Neural Networks (RNN) to Natural Language Processing using old texts such as sacred books. The objective of this work is to generate a text that follows the same structure and semantic of the studied corpus written in Arabic. This is done through various networks such as vanilla RNN, LSTM (Long Short Term Memory) and GRU (Gated Recurrent Unit). After training, the quality of the generated text is measured using BLEU scores. Besides, an exploratory analysis of the corpus is presented to exhibit some interesting findings at the words and chapters level.

Keywords: RNN, LSTM, GRU, NLP.

Unsupervised Feature Reduction Techniques with Bidirectional GRU Neural Network for Aircraft Engine RUL Estimation

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Abstract—Prognostics and Health Management (PHM) of an aircraft engine is a predictive maintenance process which offers several advantages. It allows to predict the engine future behaviour as well as its Remaining Useful Life (RUL). The RUL estimation is difficult in the most robust way based on the raw data. In this work, a data-driven approach for aircraft engine RUL estimation is proposed. It consists of two main phases. In the first phase, feature reduction technique is applied for reducing the data dimensions without losing relevant information, namely, Principal Component Analysis (PCA) and Truncated Singular Value Decomposition(TSVD). Then, a Bi-directional gated recurrent unit (BDGRU) is presented in the second step. Finally, the proposed methodology is validated by using the popular C-MAPSS dataset for aero- engine prognostic. The obtained results show the effectiveness of the used model and its prediction performance compared to the state-of-the-art methods.

Keywords: PHM · PCA · TSVD · RUL · BDGRU· Feature Reduction · Predictive Maintenance

Predection of Waiting Time of Bus in Smart Cities using Machine Learning with The Internet of Things

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Abstract— Waiting time at a bus station is sometimes long, or can seem very long for travellers. This feeling is caused by the multiple stops in the bus route as well as the time interval between the different stations. Indeed, people are always looking for the best way to plan their trips in the city and do not like waiting long hours at bus stops to reach their destination. In this paper we will present a solution to predict bus waiting times using the Internet of Things, ITS and machine learning techniques. Several algorithms are used to give an accurate estimate of waiting time at bus stops.

Keywords: Intelligent Transport System (ITS), Smart City , IoT , Waiting time , Machine learning

Facility location problem for reusable containers distribution system

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Abstract— In such a variant market, establishment of fixed warehouses for a company remains very risky. Short or medium-term rental warehousing is therefore an effective solution. In this study, we are working on the optimization of reusable containers management in Closed-Loop Supply Chain where warehouses localization is variable during a multi-period planning horizon. We proposed an integer-linear-programming model considering, in an original way, the reusable containers management as Assignment Problem, Dynamic facility Location Problem and Dynamic Lot-sizing Problem. The numerical results show the accuracy of the model and the advantage of considering variable warehouses.

Keywords: Assignment Problem, facility Location Problem, Lot-Sizing Problem, integer-linear-programming, reusable container

Elephants Herding Optimization for Solving the multiple Travelling Salesman Problem

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Abstract— This paper proposes a novel metaheuristic called Elephant Herding Optimization (EHO) to solve the Multiple Travelling Salesman Problem (MTSP) which is a generalization of the classic Travelling Salesman Problem (TSP) classified as NP-Hard. The EHO algorithm is bio-inspired from the natural herding behavior of elephant groups, that had prove it efficiency in solving the classic TSP. So, to extend the application of this algorithm, we had proposed to adapt it to solve the MTSP, the EHO was applying to solve some benchmark instances of TSPLIB. The result shows the performance of the novel proposal method.

Keywords: Travelling Salesman Problem, multiple Traveling Salesman Problem, Elephants Herding Optimization, combinatorial optimization, metaheuristic, nature-inspired.

Developing a combined model using AHP and DEMATEL for evaluating logistic hubs location factors: a case study of Morocco

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Abstract— Logistic hub facilities work as consolidation /deconsolidation, switching and connecting for flows between origins and destinations demand nodes. They are represented as the linchpin of the supply chain, and are designed as a solution to reducing transportation cost, and diminishing CO2 emissions.

The selection of an optimal location of logistic hubs is a multi-criteria decision making problem that involves a set of quantitative and qualitative decision criteria. The aim of this paper is to develop a decision support system by combining the Analytic Hierarchy Process (AHP) and the Decision-Making Trial and Evaluation Laboratory (DEMATEL) approach to select the most appropriate location of logistic hubs. Initially, various criteria that can effect on the choice of location of logistic hubs are selected from the literature and experts opinions. Seven main perspectives and twenty-one sub-factors are identified and categorized according to PESTEL (Political, Economic, Socio-cultural, Technological, Environment and Legal) model and accessibility factor category. Subsequently, the AHP method is used to determine the relative importance of the logistic platforms location factors. While the DEMATEL method is used to indicate the interactive relationships among the factors, and to analyses them by constructing a causal effect mapping.

To the best of our knowledge, this model is introduced to the literature for the first time. The results show that the proposed system is able to provide more accurate location place.

The proposed model is tested with a case study of logistic hubs location in Morocco. The results show that the multiple criteria decision making model can be used to explain the evaluation and decision-making procedures of a logistic hub location. The results give greater importance to the aspects considered in the classical theories of industrial location, which are accessibility and economic factors.

Keywords: Logistic hub; Hub location; PESTEL; Multicriteria Decision Analysis; AHP; DEMATEL.

MRI Brain Images Classification using Convolutional Neural Networks

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Abstract— The purpose of this paper is to build an automatic system for extraction and classification of brain tumor in medical images. The system is able to process Resonance Magnetic Images (MRI) most quickly with a high detection rates. Indeed, based on Convolutional Neural Network (CNN) method for classification and a thresholding algorithm for image segmentation, the system has been developed. Moreover, many experiments were conducted to evaluate the performance of our approach using different optimizers with a huge dataset of MRI brain images. Results showed that the Root Mean Square Propagation (RMSprop) optimizer converges faster with a highest accuracy comparing to other optimizers.

Keywords: Classification, Convolutional Neural Networks, Deep Learning, Resonance Magnetic Images, Big Data

Optimization time and path for employee transportation

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Abstract— Finding the employee pickup location plan is a hard work for transportation companies because it is a manual task that takes hours of work with the possibility of error. In this context, we propose an adaptive decision system that allows transport companies to find the optimal path. The proposed system is based on an optimization process that maximizes the fill rate and minimizes pickup time.

In this article, we present the process of time optimization and the path for personnel transport. The process generates a plan for the points to be visited and the number to be transported for each vehicle. The proposed process consists of four stages: the first one allows to model the real situation in directed graph; the nodes are the pickup location and the arcs are the roads. The second step is to represent the graph in the form of a square matrix of order (n * n) knowing that n is the number of pickup points. The third step generates all possible paths with the number of each trip. Based on the results of the third step, we assign vehicles to each journey based on type and capacity, starting with the path that has the most manpower in order to transport the maximum number of personnel. After having specified the points to be visited, we use the Dijiksra algorithm to find the optimal route to follow taking into account the traffic jam.

Keywords: *Optimization, Decision support, Employee transport, Adaptive system, Graph*

An optimized Iterative Partitioning Model For Predicting Computer System Failures based on Deep Learning

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Abstract— Computer systems are becoming increasingly complex, they are growing dynamically due to the mobility of their devices, multi-operating environments, frequent updates and upgrades. Conventional reliability theory and conventional methods rarely take into account the actual state of the system, thus, they are not able to reflect the dynamics of the execution systems and the failure processes. The variety of models used illustrate the lack of consensus on how to apprehend this phenomenon, especially the difficulties to formulate a general model of interpretation. Moreover, this diversity of approaches has been developed mainly to diagnosis computer systems. Thus, the nature of the information available on these systems and the type of defects to be detected lead to the implementation of specific strategies. The main objective of this paper is to use an Iterative Partitioning Log Mining algorithm (IPLOM) to cluster logs events before they are processed further by an optimized deep learning model to detect anomalies form large amount of IBM BlueGene/L collected data. ALL the features are classified by the score and also selected to be saved or even removed from the dataset. The procedures are frequently univariate and consider the feature independently, or with regard to the dependent variable. In such methods, the subset selection process is independent of the learning algorithm, and it is a pre-processing step. Generally, this work describes how to optimize deep learning models in different types of machine learning problems. We started by developing a mining model, and then apply a filter to the input data in order to eliminate the correlated information. Then, we compared the results of these different models using an elevation curves graph. Finally, we extracted additional knowledge from the underlying mining structure. This leads to optimize learning features and to reduce the classification time and even improve the performance of systems' rules, particularly in resolving complex problems involving a large number of input data.

Keywords: *Anomalies detection, Datawarehouse, Classification, Deep Learning, Iterative Partitioning Log Mining algorithms, Data mining.*

Towards a Recommended Documentation System Using Data Traceability and Machine Learning in a Big Data Environment

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Abstract— In this article we describe our recommended documentation system, which allows organizations to take the information adapted to their objectives with a search engine set, in order to make results and prepare reports according to the organization approaches documentation. We use for the recommendation, data traceability based on the information retrieval techniques to load data (traces) with processing jobs; to give the useful information by analyzing and filtering the documentation most adapted to the rating of the search engine objectives. We propose four levels of the recommended documentation system; the first one is to collect data by using a multimedia management system with an automatic classification of files dragged and dropped on the first interface (API) after authentication, the second is the search engine and the information needed that let system to clean and to format the mass collection of data saved and stocked on Hadoop Distributed File System (HDFS); that keeps growing exponentially, with a machine learning (MLlib) based on apache Spark like a third level, to adapt and analyze traces by making some processing jobs with respecting the search objectives, and the last component consist of making results and more measures on a dashboard (Mobile App and Desktop App). Our work therefore is to propose a conceptual study of the recommended documentation system using data traceability and machine learning in a big data environment in order to implement and evaluate the proposed method in our next work.

Keywords: *big data, machine learning, documentation, recommendation system, data traceability, information retrieval, Hadoop distributed file system (HDFS), apache spark, MLlib,*

An Adaptive Control Approach for Performance of Big Data Storage Systems

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Abstract— With the explosion of data volume, and technological evolution of Big Data in data management, several data storage platforms are currently available to meet this need, the question often arises is what are the most appropriate stor-age concepts to support large-scale analytical process. In fact, several competing technologies in this field today, sometimes some better suited to certain types of treatment than others. Each approach has its own strengths and weaknesses. And in general, the use of one does not exclude the other. To effectively deal with this issue, this study presents an approach for ranking the alternative solutions based on ideal values of criteria. For this purpose, a multi criteria decision making (MCDM) model is presented with combination of Analytical Hierarchy Process (AHP) to solve multiple criteria decision-making problems. The proposed model is capable of finding optimal solution for high-dimensional problems with simple and manual calculations.

Keywords: *Big Data, data storage platforms, AHP model, Multi criteria deci-sion making.*

Improving collaborative filtering approach by leveraging opposite users

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Abstract— Collaborative filtering is a widely used recommendation approach that aims to predict for a target user the most appropriate items. This approach uses the ratings given by users who share similar tastes and preferences to predict ratings for items that haven't been rated yet. Despite its simplicity and justifiability, CF approach stills suffering from several drawbacks and problems, including sparsity, gray sheep and scalability. These problems affect the accuracy of the obtained results.

In this work, we present a novel collaborative filtering approach based on the opposite preferences of users. We focus on enhancing the accuracy of predictions and dealing with gray sheep problem by inferring new similar neighbors based on users who have dissimilar tastes and preferences. For instance, if a user X is dissimilar to a user Y then the user ┐X is similar to the user Y. The Experimental results performed on two datasets including MovieLens and FilmTrust show that our approach outperforms several baseline recommendation techniques.

Keywords: *Recommender system; Collaborative filtering; Gray sheep, Opposite neighbors; Similarity Measure.*

Big Data and Interactive Visualization: Overview on Challenges, Techniques and Tools

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Abstract— The data visualization makes for analysts easier to perform the exploratory analysis and research process. Unlike traditional data, other features mark the data in the Big Data context, namely their ex-tremely high volume, their variety in terms of collection sources and types, and the need for speed in their processing. Therefore, the data visualization in this field presents other issues to be considered. In this paper, we are interested in studying the data visualization progress in the Big Data domains. For that, we briefly describe the diff erent con-cepts, issues, challenges and tools that are related to the Big Data tech-nology. Then, we highlight the data visualization constraints followed by an overview of the most relevant work of data visualization in this field. We also propose a classification that allow to well position oneself when thinking to Big Data visualization strategies. Finally, we look at a promising path to propose an architecture that will cover the multi-level data interactive visualization process in a Big Data context.

Keywords: *Big Data · Interactive Visualization · Apache Spark · Hadoop MapReduce · Visual Analytics · Volume · Variety · Velocity.*

Multimedia Ontology of the Tunisian Archaeology Field

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Abstract— For an information retrieval project, we are in the process of developing an ontology of the Tunisian archeology, a termino-ontological resource that ensures a) the model role of the domain that list all the relevant concepts and b) the link between the concepts and the way they are named in the archaeologist's documents. This double function allows the annotation and the indexing of images of an archaeological site and the search for information in annotated images. The development of ontology will be realized in 6 steps among of which we describe the principal ones in this paper. This project shows that (1) the viability of such resource presupposes a precise articulation of the concepts and terms, and (2) such prerequisite can be attained by the implementation of procedures based on the architecture of meta-modeling, which enables to model the set of the Knowledge Organization Systems and the structures of the necessary knowledge.

Keywords: *Archaeology, Concept, Ontology.*

Role of Interaction Flow Modeling Language (IFML) in the Development of Ubiquitous Web Applications (UWAs)

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Abstract— During the revolution of web applications Webs and web applications a number of modern web application appeared. After developing electronic devices UWA becomes an important part of web applications. Ubiquitous web applications (UWA) are a new type of web applications which are accessed in various contexts, i.e., through different devices, by users with various interests, at any time from anyplace around the globe. The problem is UWA features made challenge during the process development of web engineering methods. Interaction Flow Modeling Language (IFML) is the latest modeling language has many concepts for developing interactions in web application compared with other web engineering methods. In this paper, we present the role of IFML method to develop UWA features through analyzing IFML and designing a case study. The result of this paper become a guide for developers and increase the usability of IFML.

Keywords: *IFML, UWA, Modern Web Applications, Web Application Features.*

The measurement of consumers Feel Data using Neuromarketing and a Scoring Board: Conceptual Model

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Abstract— By considering the consumer's emotion as a separate data, we are now talking about Feel Data, which Neuromarketing provides us with the necessary tools and technologies to observe and measure in real time. It would be interesting to see and measure the emotion caused by the persuasive messages included in digital advertising, even better, to predict it. In this article, and based on the emotion theories with successful use in marketing, we propose a theoretical model of a scoring board, which would allow the analyst to assign a score to the emotion experienced by the consumer, to make a prediction of its nature (positive or negative), before checking its validity by Neuromarketing tools.

Keywords: *Neuromarketing, Persuasive messages, Feel Data, Emotions, Scoring Board.*

Comparative and analytical study of Big Data technologies: A survey

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Abstract— The Big Data era still refers to large amounts of data that must be targeted in order to understand, plan and act effectively. Thus, its evolution has been accompanied by the evolution and/or appearance of a set of technological solutions allowing management of this type of data which in turn presents a set of challenges as these huge amounts of data come from different data sources, and specially the security challenges. Hence the need for a powerful and efficient system that ensures the security of Big Data during all its processing phases. This paper aim presenting a survey on different technologies that are able to ensure a distributed processing of Big Data, through a comparative and analytical study based on their characteristics, strengths and weaknesses.

Keywords: *Big Data challenges; MapReduce; Storm; Samza; Spark; Flink.*

Current state and challenges of Big Data

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Abstract— Big Data is the complex, bulky, growing set of data coming from independent sources. In today's modern age Big data has an essential part in nearly every field of human life including science, engineering, social, biological and biomedical departments. In the following paper importance of big data, stream learning, deep learning, Hadoop and its application are discussed.

Keywords: *Big Data, Machine learning, Stream Learning, Hadoop*

The influences of technology and social networks on social change

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Abstract— Social networks have an impact not only on customer relationships and sales but also on all areas of social change. This medium has been instrumental in creating many changes. The means of communication have changed dramatically with a multitude of devices that are now available to the public.

In the light of these mutations, it proved to be necessary to contribute to the collective debate around topic « technologies and stocks ». The objective is to stop on mutations procreated by these technologies. It is also a question of examining tendencies and attitudes of certain social categories, particularly young persons, opposite roles of numerical technologies in their life, their job, their communication, and their entertainment. Besides, it is a matter to define the impact of these technologies on attitudes and stocks, which constitute the foundations of the food - together with such as solidarity, tolerance, freedom, equality, fairness, job, power and social link.

Social mass media is ubiquitous and touch all circles. Social networks became a practical means to stay in contact with friends and the family to be used to have a real impact on society.

The growing relationship between technologies and values is today the subject of extensive international discussion. They focus on major changes in cultures, policies, and ways of dealing with the material, social and psychological aspects of life. Faced with the very rapid progression of the use of these technologies.

Keywords: *Social networks, Social change, Technologies and stocks, Numerical technologies*

A comparative evaluation of classification algorithms for sentiment analysis using word embeddings

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Abstract— Sentiment Analysis is an increasing field of research that lies at the intersection of many fields such as Natural Language Processing (NLP), Computational Linguistics and Machine Learning. It is concerned with the extraction of sentiment polarity conveyed in a piece of text. Furthermore, one of the most influential recent development in NLP is the use of word embedding or word distributing approach, it is a current and powerful representation to capture the closest words from a contextual text. In this paper, we investigate enhancing sentiment analysis system tailored to the Arabic language by applying word embeddings and evaluating 9 classification algorithms performance (Gaussian Naïve Bayes, Nu-Support Vector, Linear Support Vector, Logistic Regression, Stochastic Gradient Descent, Random Forest, k-nearest neighbors, Decision Tree, AdaBoost). Then the report obtained improved accuracy for Arabic Sentiment Analysis on different datasets. We find that Logistic Regression classifier followed by SVM and AdaBoost classifiers outperforms the other classifiers.

Keywords: *Sentiment Analysis (SA), Machine Learning, Word Embedding, Arabic language.*

A New Approach of a List of Items for Search Retrieval Systems

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Abstract— Information retrieval systems help to have search results page (also called SERP) is a web page automatically generated by a search engine. The displayed search results are generated automatically according to the keywords entered by the net surfers but challenges are Internet users they have ideas but it saves well the word suitable. The results are presented in the form of a list and the most relevant results for the search engine are at the top of the list. The ranking of the results for some requests the presentation of the results can be different. It is the taking into account of the need for precise information of the user that motivated the emergence of such systems. system can be opposed to an Internet search engine like Google or Yahoo! Wiki Answers, Answers and domain-specific forums like Stack Overflow. On certain specific points. Although the idea of receiving a direct and targeted response to an issue seems very attractive, the quality of the question itself can have a significant effect on the likelihood of obtaining useful responses. Such an information retrieval paradigm is particularly appealing when the problem cannot be answered directly by the search engines due to the unavailability of relevant online content. A good understanding of the underlying purpose of an issue is important to better meet the information needs of the user. In this paper, we propose a new approach to detect the user's intent by the method of recommendation of a list of items without calculation of prediction based on the co-dissimilarity and the tree covering minimum weight based on the theory of graphs. To improve the ranking of a website in organic search results to increase visibility and quality

Keywords: *Search engine optimization (SEO). Intent User. Information search. Ranking of search results. search retrieval.*

A Supervised Method for Extractive Single Document Summarization based on Sentence Embeddings and Neural Networks

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Abstract— Extractive summarization consists of generating a summary by ranking sentences from the original texts according to their impor-tance and salience. Text representation is a fundamental process that af-fects the eff ectiveness of many text summarization methods. Distributed word vector representations have been shown to improve Natural Lan-guage Processing (NLP) tasks, especially Automatic Text Summariza-tion (ATS). However, most of them do not consider the order and the context of the words in a sentence. This does not fully allow grasping the sentence semantics and the syntactic relationships between sentences constituents. In this paper, to overcome this problem, we propose a deep neural network model based-method for extractive single document sum-marization using the state-of-the-art sentence embedding models. Ex-periments are performed on the standard DUC2002 dataset using three sentence embedding models. The obtained results show the eff ectiveness of the used sentence embedding models for ATS. The overall compar-ison results show that our method outperforms eight well-known ATS baselines and achieves comparable results to the state-of-the-art deep learning based methods.

Keywords: *Extractive Single Summarization · Natural Language Pro-cessing · Word Embeddings · Sentence Embeddings · Deep Neural Net-works .*

Semantic Oriented Data Modeling Based on RDF, RDFS and OWL

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Abstract— The original aim of RDF and OWL data models was to encourage the semantic web to get a web of interlinked data. Many efforts have also been done to make data of existing enterprise applications available to the semantic web by converting associated data models to equivalent RDF and OWL ones. The majority of such applications are however developed using classical relational modeling methodologies. In this paper we propose the use of RDF and OWL frameworks as a basis for data modeling for the development of enterprise applications. Furthermore we propose an approach for an efficient semantic data modeling and show its effectiveness by giving a comparison of our approach with the classical relational data modeling.

Keywords: *RDF, RDFS, OWL, Data modeling, Semantic data modeling, Conception, Analysis, Data integration, Triplestores.*

Big Data for Context-Aware Computing

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Abstract— In the last few years, we have witnessed a big explosion of the data volume available on the web. Of particular interest in this work is how context-aware computing systems which derive context from data and act accordingly, deal with such huge amounts of data. In this paper we propose a distributed storage based on HBase, which is column-oriented database modeled after Google's Bigtable. Our generic approach is based of classifying RDF instance by class, we create tables to store the instance data of each class in the ontology.

Keywords: *Big data, RDF, HBase, Context Awareness.*

Analyzing social media opinions using hybrid Machine Learning model based on Artificial Neural Network optimized by Particle Swarm Optimization

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Abstract— Sentiment Analysis (SA) is one of the concepts of Natural Language Processing, also called Opinion Mining. This area of computer science is used to extract the feeling of a text to give useful information about the author's tendency towards a specific subject. This paper presents an implementation of a sentiment analyzer for Twitter. We analyze tweets to extract feelings on a specific subject. We used a data set of 100000 tweets with 98469 unique values, collected on Twitter. The collected tweets were analyzed using a hybrid Machine Learning model based on Artificial Neural Network optimized by Particle Swarm Optimization (PS-ANN). The results are compared with three algorithms, Artificial Neural Network (ANN), Support Vector Machine (SVM) and Naïve Bayes. The results obtained by cross-validation on the same data set confirm the effectiveness of the proposed approach (PS-ANN) compared to existing methods.

Keywords: *Sentiment Analysis; Machine Learning; Natural Language Processing; Particle Swarm Optimization; Artificial Neural Network.*

Intelligent Urban Transport Decision Analysis System Based on Mining in Big data Analytics and Data Warehouse

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Abstract— This paper conduct a study on the augmentation of the current capabilities of the intelligent urban mobility and road transport in terms of the analytics dimension focusing on the data mining and big data analytics methodologies. A federated or a hybrid approach leverages the strengths and mitigates the weaknesses of both data warehouse and big data analytics. We discuss the challenges, requirements, integrated models, components, scenarios and proposed solutions to the performance, efficiency, availability, security and privacy concerns in the context of smart cities. Our approach relies on several layers that run in parallel to collect and manage all collected data and create several scenarios that will be used to assist urban mobility. The data warehouse and big data analytics can serve as means to support clustering, classification, recommending systems, frequent item set mining. The challenge here is to populate the repository architecture with the schema, view definitions, metadata and specify/integrate the types of this architecture (Centralized Metadata repository, Distributed Metadata repository, Federated or Hybrid Metadata repository).

Keywords: *ITS, urban mobility, Big data analytics, data mining, data warehouse.*

A communication on maritime surveillance using image processing

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Abstract— Maritime surveillance has become an important task due to the traffic density, variety of vehicles and activities. Maritime surveillance helps to in-crease security, manage traffic in strait regions and preserve the maritime envi-ronment. Several technologies are used for this purpose, especially radar and sonar, both of which have constraints that can be alleviated by integrating EO (Electro-optical) sensors. However, algorithms using EO data are prone to many errors due to the dynamics of the maritime environment, which gave rise to several research areas. The idea of an algorithm selector is exposed in this communication, which aims to perform the suitable algorithm in the most con-venient situation through the use of a condition detector that can be a weather sensor or even a software based detector.

Keywords: *Maritime surveillance, Radar, Sonar, EO sensor, Algorithm selec-tor, Condition detector, Weather sensor.*

On the Neutrosophic Counterpart of Bellman-Ford Algorithm

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Abstract— With the development of computing technologies, the methods of network flows and linear programming have been significantly applied. The shortest path problem has been always one of the most practical problem in network analysis. By the development of various mathematical models, different algorithms have been proposed for optimal routing, given the parameters, characteristic and structure of network. During the years 1950 to 1960, various successful algorithm were proposed by Bellman, Dijkstra, Johnson and Floyd, suggested the shortest path problem as considering a central position in a network. One of the good sounded algorithm is bellman- Ford algorithm, which has been applied in fuzzy network, since the last some years. Here in this work, we have proposed the neutrosophic version of bellman's algorithm based on the trapezoidal neutrosophic numbers. Also, one numeric example is presented.

Keywords: *Bellman's algorithm. Trapezoidal neutrosophic numbers. Ranking method, Shortest path problem. Network*

An efficient method for character segmentation in Moroccan license plate images

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Abstract— Automatic license plates identification (ALPI) is an important element of intelligent transportation systems. Most of ALPI systems are usually tackled in three stages: license plate detection/localization, character segmentation and character recognition. Character segmentation (CS) plays an important role in ALPI systems: the performance of the segmentation algorithm has a heavy impact on the final recognition accuracy. In this work, a simple approach for segmentation of characters in Moroccan license plate images is proposed. Experiments on a challenging dataset including 60 images confirm the robustness of the proposed method against severe imaging conditions.

Keywords: *License plate · Character segmentation · Morphological operations · Watershed transform.*

Comparative study of Incremental Conductance and Fuzzy Logic MPPT Algorithms for a New and Mobile Desalination Unit

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Abstract— The increasing demand for water and the depleting fossil fuels for its treatment make renewable energies a better alternative source for feeding water desalination units. However, photovoltaic (PV) energy is considered as an important source of renewable energy that could be an alternative to satisfy the broad energy needs in the future. In this context, the authors are working on a project, which concerns a realization of a desalination mobile unit of brackish water based on solar energy. It will serve as a prototype for developing many scientific research axes. This prototype will engulf three blocks: DC/DC conversion, DC/AC conversion and water desalination and treatment. Before proceeding to the stage of realization, different simulations on each block remain essential in order to choose the best solution to implement. This paper will focus on the DC / DC conversion block. Hence, the authors will proceed to many simulations in order to compare among three MPPT algorithms. These simulations are accomplished under MATLAB/Simulink environment.

Keywords: *Desalination· Photovoltaic Panel· MPPT Algorithms· Fuzzy Logic· Incremental Conductance· MATLAB/Simulink· DC / DC Buck Converter*.

A Novel CNN for Traffic signs Detection

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Abstract— Traffic signs detection play an important role in traffic assistance driving systems. It is a difficult problem and various methods were proposed in order to solve it. Convolutional Neural Networks (CNNs) performance is better than traditional features extraction methods. That is why CNN seems a good solution to deal with traffic signs detection problem. However, the CNN performance is related to its deeper. In this paper, a novel CNN architecture for traffic signs detection is proposed. The experimental results conducted on public database show that the proposed architecture gives results comparable to deeper CNN structure. With a highest 96.83% accuracy rate, the proposed model is concurrent to other state-of-the-art CNN structure.

Keywords: *Traffic Signs Detection, Convolutional Neural Networks, Traffic Assistance Driving Systems.*

A Cultural Scavenger Hunt Serious Game Based on Audio Augmented Reality

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Abstract— Augmented Reality is one of the most rapidly spreading technology used in several areas such as healthcare, education, entertainment, industry. For tourism and travel, visual augmented reality has been used for guidance, entertainment and exploration, etc. However, its main drawback is that it distracts the visitor from the main real attractions. In this paper, we present a scavenger hunts based on audio augmented reality and serious game concepts. The aim of this game is to create an interactive and immersive visit in order to guide visitors through different attraction places. We used audio augmented reality and some gamification elements to motivate the visitor to explore the main places in "Jnan Sbil" historical garden in Fez, Morocco.

Keywords: *Serious games · Cultural heritage · Audio augmented reality · Scavenger hunt*

Improved brain tumor segmentation in MRI images based on thermal analysis model using U-Net and GPUs

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Abstract— This paper aims to improve brain tumors segmentation in Magnetic Resonance Imaging (MRI) using thermal analysis of brain tumors. As we presented in our recent works, brain tumors generate more heat than healthy tissues and based on tumor temperature profile we can determine tumor borders and reinforce segmentation in conventional MRI sequences such as T1-weighted, contrast-enhanced T1-weighed, T2-weighted, and Flair images. In this work, we segment brain tumors using U-Net architecture based on the tumor temperature profile. The results were compared to segmentation with U-Net in Flair images. The temperature distributions of the brain with tumors were generated using the Pennes bioheat transfer equation solved using Finite Difference Method (FDM) and converted to grayscale thermal images, 2% of additional Gaussian noise was added to the generated images. Next, U-Net was applied to segment tumors from thermal images. A dataset 276 images were used to train the U-Net model, and 25 images were used to test the model. The dataset is containing thermal and Flair images with the ground truth of tumors of the same patient at the same level. As the process of training the model is time-consuming, we used massively parallel architecture based on Graphics Processing Unit (GPU). The training time of U-Net in thermal images was 15 hours and 42 minutes in the NVIDIA GTX 1060 GPU. The obtained segmentation from thermal images was compared to segmentation of tumors from Flair images using U-Ne in 10 images. An average of 25.27% of tumor cells detected only in thermal images, and an average of 1.83% of the rest of the images detected only in thermal images. The obtained results prove the effectiveness of deep learning and thermal analysis of brain tumors to reinforce segmentation using MRI (Magnetic Resonance Imaging) to increase the accuracy of diagnosis.

Keywords: *: MRI, Bioheat transfer, U-Net, GPU.*

Static analysis of piezoelectric multilayered plates: Polarization effect

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Abstract— A generalized approach for the electromechanical analysis of laminated piezoelectric structures is obtained by Stroh formalism. The laminate consists of an homogeneous elastic or piezoelectric laminate of arbitrary thickness. The three dimensional differential equations of equilibrium of the multilayered are exactly satisfied at every point in the body. The continuity conditions at the interfaces between adjoining laminate are satisfied by the propagator matrix methodology. Various types of electrical and mechanical loading may be considered. Numerical results of stresses, electric potential and electric and elastic displacement for some multifunctional multilayered plates are presented.

Keywords: *Multilayered plates, Piezoelectric, Stroh formalism, polarization*

Conditional assessment of uncertain parameters using Palm probabilistic approach and Kriging interpolation

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Abstract— The present paper is devoted to a probabilistic generation of random fields for some uncertain parameters related to mathematical models, described usually by non linear partial differential equations, and commonly used to describe complex systems in geosciences, biology, industry, etc. This work focuses on probabilistic methods to study physical phenomena in purely heterogeneous media; it represents a continuity of the works already published in [1],[2]. More precisely, we define and implement a conditional generator based on Palm process coupled to a kriging interpolator. Indeed, this conditional generation plays a key role in achieving a more realistic numerical simulation. Finally, the main challenge is to obtain a fast and efficient parameter generator when compared to existing methods.

Keywords: *Partial differential equations · Conditional generator · Palm process · Kriging interpolator · Autocorrelation.*

Human Activity Classification Using Convolutional Neural Networks

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Abstract— Visual Lifelogging (VL) usually refers to a technique used by lifeloggers to acquire their information through a wearable sensor (such as a wearable camera) in varying amounts of details. In other words, VL represents a complete and comprehensive black box of human's daily activities and can offer a great potential to mine or/and extract accurate and opportune knowledge on the way people live their lives. With the advent of sensing technology that allowing efficient sensing of personal activities, both the amount of data available and the ability to process this data had increased. This is well seen in the popularity and growing interest given and lent by the scientific community to the two emerging fields of lifelogging and deep learning. Using features that clearly separate between activities is vital for human behavior understanding and characterization. In this paper, we emphasize more particularly on human activity classification (HAC) captured by a low temporal resolution wearable camera. For this goal, we use a Deep Convolutional Neural Network (DCNN) trained on the large Dataset ImageNet, which contains millions of images and transfer this knowledge to classify automatically the daily human activities into one of the categorized activities. The numerical results of the proposed approach are very encouraging with an accuracy of 98.78%.

Keywords: *Lifelogging; Daily Activities; CNNs; Transfer Learning; Activity Classification.*

FPGA-based system for road signs color segmentation

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Abstract— We present an FPGA-based system for color segmentation for our road signs detection algorithm. Our method using to detect (red, yellow and blue) colors is considered powerful on real time systems with simple operations and thresholding. We use the high-level synthesis and system generator from Xilinx to implement our algorithm.

Keywords: *Color detection, FPGA, ADAS, Road signs detection, Xilinx System Generator*.

Ischemic stroke lesion segmentation based on thermal analysis model using U-Net fully convolutional neural networks on GPUs

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Abstract— Ischemic stroke lesion segmentation from MRI (Magnetic Resonance Imaging) is the process of separating normal and abnormal pixels. In clinical practice, stills a challenging task, due to the complicated structure of the ischemic stroke lesions. This paper aims to present a new approach for segmentation of brain ischemic stroke lesions from temperature distribution. Ischemic stroke is the consequence of the lack of blood perfusion and metabolic heat generation; therefore, the temperature distribution in the ischemic area is less compared to healthy tissues. In this work, we segment brain ischemic stroke lesion using U-Net fully conventional neural network based on temperature changes in the lesion zone. The temperature distributions of the brain with the ischemic stroke were generated using the Pennes bioheat transfer equation and converted to grayscale thermal images. Next, U-Net was applied to segment ischemic stroke from thermal images. A dataset contacting 270 thermal images was created to train the model. As the process of training the model is time-consuming, we used massively parallel architecture based on Graphics Processing Unit (GPU). We tested the model in six thermal images, we obtained a precise segmentation with Accuracy = 0.9966, Precision = 0.9433, Recall = 0.9983, and F1 score= 0.9399. The training time was 3 hours in NVIDIA Geforce GTX 1060 GPU. The obtained results will be used to reinforce segmentation from MRI for a more accurate diagnosis.

Keywords: *MRI, U-net, CNN, Pennes bioheat equation, ischemic stroke lesion, GPU*

FPGA-based implementation of Optical flow for object detection

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Abstract— . In this paper, we describe a FPGA implementation of the optical flow (OF) algorithm. LucasKanade (LK) approach has been chosen to meet the real time estimation of moving objects from a video sequence of a road scene. In our approach, to allow accurate calculation, we adopt a high level synthesis approach to increase the accuracy of the system and simplify the tasks. Hardware designs of the architectures are performed using Xilinx System Generator from Xilinx (XSG) and validated by a hardware co-simulation.

Keywords: *Optical Flow; Lucas-Kanade; Xilinx System Generator (XSG); FPGA*

Pity Beetle Algorithm to solve VRP variants

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Abstract— To solve an NP-complete problem we automatically cerebrate of metaheuristic methods, which are in the majority of times inspired from natural phenomena, for example, genetic algorithms, ant colony algorithms, and bee colony algorithms, then they are the logical and algorithmic representation of an optimal solution of a complete problem called NP-complete. In this paper, we will study an incipient method pity beetle algorithm (PBA), this method is an evocation of the comportment of Pityogenes chalcographers who probe for their apertures and their foods. We will apply the PBA to solve two variants of the VRP: the DVRP and the CVRP which fall into the categories of problems arduous to solve.

Keywords: *vrp, dvrp, cvrp, metaheuristics, beetle, optimization,*

CSO to Solve the Shop Scheduling Problem: Survey

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Abstract— The Shop scheduling problem is a class of scheduling problem used in different area application as industry, characterized by some of job that should be executed in determined number of machines, that the aims is found the optimal schedule to rich the minimal makespan. This paper present the Cat Swarm optimization to solve the three class of the problem in study, which are the Job Shop Scheduling problem (JSSP), the Flow Shop Scheduling Problem (FSSP) and the Open Shop Scheduling Problem (OSSP), the result obtained by the application of this method to solve the Three problem, are collected and compared with the existing to conclude the efficiency of this methods to solve the real problem based the problems in study.

Keywords: *shop scheduling problem, .*

Thing-based Service-Oriented Architecture for Industry 4.0

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Abstract— The evolution of ICT helps the organizations to step forward and generate value. In fact, Internet helps businesses to break down physical and technological limitations and establish global networks that incorporate their machinery, warehousing systems and production facilities in the shape of Cyber-Physical Systems (CPS). In the realm of manufacturing, this technological revolution follows tree stages to industrialization, therefore it can be described as the fourth stage, or Industry 4.0. Industry 4.0 concepts are perceived as highly complex because upgrading smart manufacturing requires new digital strategies and processes and the use of IoT devices supporting automatic and remote management. The development of these approaches imposes the need of a reference architecture offering strong capabilities of scalability, security and optimized business processes.

Firstly in our research we aimed to discover the multiple Industry 4.0 projects started by the greatest manufacturing countries such as USA, UK, France, China, Russia and India. In addition of worldwide projects, we have also exposed the Moroccan initiatives to follow this industrial revolution. Then we have presented different I4.0 dimensions and principles. Industry 4.0 supports the integration of Cyber Physical Systems (CPS) and Internet of Things and Services (IoTS) based of Wireless Sensor Networks capabilities to enhance productivity, efficiency and flexibility of production processes and thus economic growth.

After, discovering the resulted complexity of these new systems, a new reference architecture is required to ensure scalable systems and solutions with high-availability, security and optimized processes. For this purpose, we proposed a thing-based architecture, SOA friendly. The SOA paradigm is an advance methodology that allows the construction of loose-coupled distributed systems, standards-based, and protocol independent distributed computing. For SOA implementation, we need to use an integration platform, called ESB (Enterprise Service Bus). An ESB, viewed as a new generation of EAI (Enterprise Application Integration), is actually a middleware providing integration facilities built on top of industrial standards such as XML, SOAP, WSDL. A service can be exposed as an API (SOAP or Rest) so that other components can communicate with it.

Traditional SOA involves three main actors that interact directly with one another: a Service Provider, a Service Consumer, and a Registry for services. Therefore, we propose to adopt this architecture to a bigger scale to implement IoT services and provide high availability smart systems able of collecting, integrating and processing real time Data. This Integration will allow to easily and securely connect factories to its external collaborators, in addition of managing the Data flows for internal business services purposes.

We have adapted this architecture responding to the industry 4.0 challenges regarding a reference architecture providing SOA capabilities of Interoperability, Transformation, Routing, Monitoring and Security. Hence it ensures implementing a high availability systems , Easy to plug-in / plug-out and loosely coupled, Scalable, Distributable and Reusable, Cost-effective to ensure high availability and scalability, Format and business validations and controls, Reduce siloed systems which require duplication of data and greater ability to expose services to personal devices.

Keywords: *Internet of things(IoT), Industry 4.0 (I4.0),Cyber-Physical Systems (CPS), Service Oriented Architecture (SOA), Integration, Middleware.*

Better Routing Strategies for Optimizing Energy in Wireless Sensor Networks

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Abstract— Wireless sensor networks (WSN) is an active research domain. The evolution in the fields of antennae and transmission is a big motivation to improve the use of energy and communication management of WSN. However, new wireless sensor network topologies must make more effort to consider this approach. This paper presents better routing strategies for optimizing energy in Wireless Sensor networks.

Keywords:

Services Search Techniques Architecture for the Internet of Things

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Abstract— As we are moving towards the Internet of Things (IoT) with web services and cloud computing, we will have thousands of connected sensors and their data to handle and benefit from their services. With the enormous number of sensors available in the IoT environment, effectively and efficiently searching and selecting the best sensors regarding the user's requirement has recently become a crucial challenge. In this paper, we propose an effective context-aware method to cluster sensors in three categories in the form of the Semantic category (SC). Firstly, sensors of each SC are grouped based on their type to create Semantic Type Sensor Network (SSTN), in which sensors with similar context information are gathered into one cluster.

Keywords: *IoT, sensors, searching and selecting, context-aware, context information, user's requirement*

The benefits of SDN integration on 5G mobile network

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Abstract— The current growth in wireless network proof that there is no signs of slowing down. The 5G technology is in its first steps research, in this way researches are currently in progress to explore different architectural designs to address their key challenges. SDN technology have been seen as promising enablers for this new motivation of networks development, which will play an essential role in the design of 5G wireless networks. Existing wireless networks are starting to be insufficient in meeting the actual data demand, for the reason of their inflexible and expensive equipment as well as complex and non-agile control plane management. The gain of Software-Defined Networking (SDN) technology has increased in recent years, in the process to change networking ecosystems. It has already been applied to data center networks and wide area networks. This paper found that the software-defined approach is thus a reasonable candidate architecture to offer, in part data demand as well as the quality of service for these data. We considered that software defined networks (SDNs) is the best solution. As the simulation evaluation results suggest, the proposed architecture can effectively improve the quality of service in terms of: time insertion, Latency and throughput.

Keywords: *SDN, 5G technology, QOS.*

Self-Driving Cars: Level 2

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Abstract— According to the World Health Organization (WHO)[4] , more than 1.25 million people have died in a car accident caused by the driver's lack of attention, sleeping or tiredness. Almost half of those who have died on the world's roads are "vulnerable road users": pedestrians, cyclists and motorcyclists.

In this work we present an approach where we detect roadsides, then we seek objects located on the road area to prevent driver.

Parallel to this, we provide a system for detecting the driver's drowsiness.

In some critical cases, we have built an Arduino microcontroller to take control of the car when the driver falls asleep or an obstacle appears in a way and a collision is imminent. We choose the 2nd level of autonomous driving for our system. Levels are de_ned by experts where they categorize the evolution of autonomous driving in 5 categories. Each level describes how the car and driver interact.

Keywords: *Object detection. help driving. road edges. Gesture recognition. arduino*

Self-optimization of wireless systems: an approach by the game theory

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Abstract— The evolutionary game theory, adapted mathematical biology, is used to describe and predict the properties of dense populations, whose evolution depends on a large number of local interactions, each involving a finite number of individuals. The evolutionary game theory can be related to Darwin, which introduced the concept of natural selection and therefore competition between the genotypes and phenotypes of individuals. It was J. Maynard Smith who truly defined the evolutionary games, and in particular their possible solution, by introducing the fundamental concept of Evolutionary Stable Strategy (ESS). In particular, as regards access to a common medium. In an Ad-hoc network, mobiles share the same limited frequency band. This frequency band is divided into physical channels, and each channel is assigned to a single communication. When two mobile simultaneously send the same channel, an interference phenomenon occurs and sent packets will be lost.

Keywords: *game theory, utility, power control, modelization, access to medium, equilibrium, wireless systems*

Optimization and evolutionary games, stochastic equilibrium application to cellular systems

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Abstract— LTE systems are designed to serve different classes of traffic through the IP-based packet-switched networks. Because of the inconsistent QoS requirements for each traffic class, LTE systems have scheduling mechanisms to support service differentiation when allocating block resources. As the 3GPP standard does not require the adoption of a particular approach, the schedulers design is left open to researchers and designers. This work focuses first on a study of some research that has addressed the management of resources in LTE networks. The study presents a classification of schedulers in the uplink and is interested in the class of schedulers based QoS because of the importance of delay parameters and flow in optimizing the management of resources. Then, some scheduling algorithms in the downlink are exposed in order to make a complete analysis of the different aspects adopted in the scheduling. Secondly, the resource optimization algorithm in the uplink in fixed WIMAX networks is presented. The algorithm defines a priority management policy to improve the low priority traffic service without affecting the high priority traffic QoS. Finally, an evaluation of existing solutions is carried out to a design of a robust scheduling mechanism.

Keywords: *LTE, resource allocation, schedulers, Uplink, equilibrium, QoS.*

Investigation and Performance Analysis of Two Identical Grid-Connected Photovoltaic Installations in Two Moroccan Cities Using a Monitoring Systems

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Abstract— This work presents a daily performance analysis of two identical grid connected PV systems (1.86 KWP amorphous silicon), placed on the roof of two institutional buildings, the Faculty of Sciences Ben M'sik of Casablanca (FSBM) and the Faculty of Science and Technology of Mohammedia (FSTM). The performance evaluation based on the monitoring systems and under two daily climatic condition (sunny and cloudy day) includes: PV, inverter and system efficiency, reference, array and final yield as well as the performance ratio and the monthly and annual production of the two installations. The results show that the maximum values were in a sunny day at Mohammedia in inverter (Ƞinv) and system efficiency (Ƞsyst) , reference (YR), array (YA) and final yield (YF) as well as the performance ratio (PR) with values of 94.9%, 8.24%,7,28 kWh/kWp/day, 6,08 kWh/kWp/day and 83.49% respectively. The minimum values were in a cloudy day at Casablanca in Ƞinv, Ƞsyst, YA, YF and PR with values of 90.03%, 7.17%, 2.19 kWh/kWp/day, 1.98 kWh/kWp/day and 72.60% respectively. The investigation of the annual productivity shows that the installation under Mohammedia climate conditions delivers an energy of 1650.71KWh/KWp, while under Casablanca climate conditions it delivers an energy of 1584.77 KWh/KWp. Not affected by the increase of the ambient temperature and the temperature of the modules, the use of amorphous technology is recommended in hot climate.

Keywords: *Grid-connected; Silicon; Amorphous; Performance analysis.*

Performance and Complexity Comparisons of Polar Codes and LDPC Codes

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Abstract— Polar codes can be considered serious competitors to LDPC codes in terms of performance and complexity. This paper provides a description of the Polar codes and the LDPC codes used by channel coding. Then, we undertake a comparison of Polar codes and LDPC codes based on several factors: BER performance, encoding complexity and decoding computational complexity. The performance of newly obtained codes is evaluated in term of bit error rate (BER) for a given value of Eb/No. It has been shown via computer simulations. They are employed as the error correction scheme over Additive White Gaussian Channels (AWGN) by employing Binary phase shift keying (BPSK) modulation scheme.

Keywords: *Channel coding, Polar codes, LDPC codes, Coding, Decoding, Successive Cancellation algorithm, BP algorithm.*

Energy Management in WSNs

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Abstract— The new technology had created "Wireless sensor". This micro device allows measuring a physical quantity from the environment and transforms it autonomously into a digital value that can be processing. The deployment of several wireless sensors communicating by wireless radio, form a Wireless Sensor Network (WSN). This system can collaborate and collect information from its environment and send them to a Base Station (BS). The collection, processing and transmission of data are the main factors of the dissipation of the energy for the wireless sensors, since these Battery-powered sensors is limited in energy, and it is usually impossible to recharge or replace it, knowing that sensors are generally distributed in places which are difficult to reach. Indeed, the lifetime of the network is one of the major constraints facing in WSN. Therefore the energy consumption of the sensors plays an important role in the network lifetime. Among scientific research developed to improve the lifetime of wireless sensors network is the integration of a new techniques of routing protocols existing. In this paper, we propose a new routing protocol called EDE protocol (Equitable Distribution Energy) based on clustering. The purpose from our protocol is to guarantee an equal distribution of the energy across the network and eliminate the energy holes (black area), without reducing the service life of networks. The Comparisons will be made and studied in order to validate the evaluation of the performances of the proposed technique.

Keywords: *Wireless Sensor, Clustering, Leach, Equitable distribution energy.*

Software Defined Networking for Improved Wireless Sensor Network: A Survey

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Abstract— The expansion of Internet of Things (IoT), the promising technology for new intelligent applications, and its fundamental platform Wireless Sensor Networks (WSN), would require a flexible layered architecture to interconnect an increasing number of heterogeneous sensor nodes. The Software Defined Network (SDN) which is an emerging network paradigm that separates control logic from the network device; and brings flexibility and simplicity of network management; has proven extremely useful to cope with WSN defies and to improve its performance. The SDN-based WSN (SDWSNs) have been introduced to reorganize the WSN functionalities according to the SDN model. This paper highlights the importance of adopting SDN in WSN networks, presents the common SDWSN architecture, reviews several contributions on SDWSN architectures and functionalities, analyzes and compares them with focus on aims, architecture design and employed features to ensure improved WSN.

Keywords: *Software Defined Networking (SDN), Wireless Sensor Network (WSN), Software Defined Wireless Sensor Network (SDWSN).*

A Novel Route Discovery Mechanism Based on Neighborhood Broadcasting Methods in VANET

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Abstract— Vehicular Ad-hoc Networks (VANET) are considered a promising application in Intelligent Transport Systems (ITS). It is characterized by a high mobility, a high density of nodes, and a very constrained topology that require a more suitable and more reliable routing protocol. Hence, the need to optimize the current routing protocols used in Mobile Ad-hoc Networks (MANET), in order to increase their performance in VANET. Broadcast communication method remains a very important step to adapt the broadcast information to other nodes and to select the routes in better conditions. In this article, we propose a new broadcast approach based on the neighborhood broadcasting methods. Based on this solution, we present an improving Ad-hoc On-Demand Distance Vector Routing (AODV) to reduce the number of lost packets, and minimize network overhead. The simulation shows encouraging results of our proposed approach.

Keywords: *VANET; ITS; AODV; MANET; Broadcast; Routing protocols.*

Benefits of Electric Vehicle Penetration in a Smart Distribution Network

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Abstract— The Smart Grid is regarded as the next generation power grid. In fact, this system uses information, two-way cyber-secure communication technologies, and computational intelligence. Due to the growing penetration of plug-in hybrid electric vehicles (EV), electric vehicles places significant impacts on grid, either as electric loads or potential valued vehicle-to-grid (V2G) services. The increasing penetration of electric vehicles for the rapid growth in load demand and especially electric vehicle can be a smart solution for the islanded nanogrid or in an emergency outage case. The electric vehicle is not a new concept and has been conceptually and practically available for the last century and will change the financial as well as environmental attractiveness of on-site generation (e.g. PV, or fuel cells). In islanded mode, based on the power balance between renewable electric sources and loads, the energy management and dispatch of EVs and PV are optimized to minimize the operational cost and maximize the benefit of islanded microgrid. This paper present an efficient power management based on mobile power stored in electrical vehicle and focuses on the analysis of the optimal interaction of electric vehicles with householders network.

Keywords: *smart grid; distribution; Energy Resources; Electric vehicle; energy management system, Vehicle to Grid.*

Smart Distribution Newtork in Islanded MicroGrid Using renewable Resources

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Abstract— Energy plays an important role in economic and social development of the society. The demand of the energy has been increasing rapidly because of agriculture, industrial and domestic uses/activities in the developed as well as in developing countries. These higher demand/uses has been increasing the prices of fuels and also playing a vital role in emission of green house gases. Price and pollution caused by the conventional fuels are the main driving forces in the utilization of renewal energy sources more effectively. Wind energy, Solar energy, Hydropower, Bio-energy, Geothermal energy, etc, falls in the area of renewable energies. Renewable energy has many advantages over conventional energy such as: lower or no generation cost, lower emission rate, higher availability, etc but also have some disadvantages such as: higher initial or investment cost, non availability throughout the year and dependency on the climate and geometric conditions etc. These disadvantages of renewal energy has increased the cost of energy storage systems and also increased the demand of hybrid energy system. The problem is to how optimize energy distribution and distribute smartly the exiting energy produced or stored in the local region with integration of prosumers for an efficient power management. We propose in this paper a smart approach for an advanced balancing of powers based on dynamic selection algorithm to collect real time information and select entities that will be powered. The selection is based on some parameters like geographic position, obligatory load, optional load, level of priority, and local selfproduction if exist. The selection is dynamic because parameters can be changed and the information is detected by controller installed in each entity all connected to the regional data center to analyze and make decisions to manage and improve reliability of power supply by supplying load during power outage. As result of emergency strategy we obtain a smart outage distribution network for the intentional islanding. An intelligent algorithm is developed as proposition of solution to the problem with discussion results of the distribution model simulation.

Keywords: *Microgrid, Outage, islanded operation, smart distribution, emergency, Distributed energy resources, power planning, efficiency, resiliency.*

Design of a Miniature Microstrip Antenna with DGS Structure for RFID Tag

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Abstract— This paper presents a miniature microstrip antenna at 915 MHz in the ISM "Industrial Scientific and Medical" band. This microstrip antenna is designed for RFID tag system, using the DGS (Defected Ground Structure) and the slots technique, on FR4 substrate. The simulation is performed using CST Microwave Studio. The total area of the final circuit is 49.3 x 55.57 mm2. The validated antenna has a good matching input impedance range from 909 MHz to 921 MHz with a stable radiation pattern, a loss return of -23.72 dB, a directivity of 1.85 dB, and a gain of 1.21 dBi.

Keywords: *Microstrip Antenna; RFID Tag; Miniature Antenna; DGS; Slots Technique; 915 MHz; UCODE G2IL.*

Access control models for smart environments

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Abstract— The Internet of Things (IoT) is the extension of the internet to our daily life where common objects, from toothbrush to watches, collect information and interact with their environments with no or little human intervention. These different smart objects interact directly with their physical environments. They collect and transfer sensitive and private data from various users. This puts security and privacy issues at the forefront: the ability to manage the digital identity of millions of people and billions of devices is fundamental for success. As most of the information contained in IoT environment may be personal or sensitive data, there is a requirement to support anonymity and restrain access to information. This paper will focus on access control and authentication mechanisms as well as supporting the cryptography algorithms in constrained devices.

Keywords: *IoT, Access control, Security, Privacy, Capability-token, Distributed-capability based access control.*

Big Data for Internet of Things: A survey on IoT frameworks and platforms

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Abstract— Ordinary objects that we use in our daily life have become now connected to the Internet and are getting even smarter. Wearable devices, thermostats, cars, door locks, lights, and more appliances are now connected over the Internet of Things. Therefore, the number of these smart things increases remarkably. At the present time, we talk about billions of connected devices and it is expected that this rapid growth will carry forward in an exponential way. This development has led to the investment in IoT applications that allow users interacting with all their devices, monitoring and controlling them remotely. Furthermore, the massive amount of data generated by connected devices and sensors should be transformed into actionable insights and predictions thanks to Big Data technologies for better user experience automation. In the interest of developing and implementing IoT applications, many Internet of Things frameworks and platforms are now designed. This paper provides a review of several available IoT frameworks and platforms. For each one of them, we discuss its architecture and its important features. Moreover, these frameworks are compared to each other depending on several criteria, such as: Security, data analytics, and support of visualization.

Keywords: *Internet of Things. IoT. Big Data. Framework. Platform. Security*

The Impact of Mobility Speed over Varying Radio Propagation Models using Destination-Sequenced Distance-Vector Routing Protocol

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Abstract— Mobile Ad hoc Network (MANET) is temporary network shaped for a particular function such as transferring data from one node to another that can change locations dynamically without any network architecture. This paper primarily focuses on three propagation models used in mobile ad hoc network. These propagation models are examined and evaluated through changing mobility and traffic parameters. The results of varying radio models are analyzed over DSDV (Destination-Sequenced Distance-Vector) routing protocol. The simulation is carried out using Network Simulator-2 in terms of average network delay, delivery ratio, throughput, and packet drop ratio over mobility parameter speed. The results show that these three models perform differently by using same traffic and mobility factors. The research reveals that the effect of varying mobility speed has more impact on the throughput of all the models especially Shadowing and Two Ray models. However, Shadowing model shows better data sending ratio at higher mobility speed than other models. Shadowing model tends to show longer and consistent average delay and drop more data packets than other models at high mobility speed.

Keywords : *MANET. Propagation Models. DSDV. Random Way Point. NS-2. Mobility Speed.*

MIMO-OFDM for Wireless Systems: an Overview

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Abstract— Orthogonal frequency-division multiplexing (OFDM) effectively mitigates inter-symbol interference (ISI) caused by the delay spread of wireless channels. This paper describes the combination of MIMO system along with Orthogonal Frequency Division Multiplexing (OFDM) system which offers important features of both the system. Also, a comprehensive survey on OFDM for wireless communications. We address basic OFDM and related modulations, as well as techniques to improve the performance of OFDM for wireless communications, including channel estimation and signal detection, time- and frequency-offset estimation and correction, peak-to-average power ratio reduction, and multiple-input–multiple-output (MIMO) techniques.

Keywords: *multiple-input multiple-output (MIMO), Inter-symbol interference, orthogonal frequency division multiplexing (OFDM), Space-time code, peak to average power ratio (PAPR).*

Implementation and evaluation of an Intrusion Detection System for IoT: Against routing attacks

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Abstract— The intensive growth of technology and devices connected to the Internet has made the Internet of Things (IoT) an essential element in all sectors of activity. It can be found in our watches, houses, cars, refrigerators, industrial machines, etc. Simply put, The Internet of Things is the future of technology that makes it easier to collect, analyze and distribute data that some person can implement them to achieve information or knowledge. Despite these advantages, this evolution suffers from a major security problem. This is due in particular to their heterogeneous nature, as well as the constraints of these objects (Memory, Processing Capabilities and limited energy...) are the main vulnerabilities of the IoT that are the origin of various attacks. Thus, many solutions have been developed to secure the IoT, but this remains insufficient because of the limitations of these mechanisms. This document is dedicated to the implementation and evaluation of an intrusion detection system (IDS) against attacks targeting the routing protocol in the IoT environment. The evaluation of the IDS is carried out with an emphasis on energy consumption, and detection rate. To achieve this, we have selected Cooja software as the simulator.

Keywords: *Security, IoT, Intrusion detection system, IDS, RPL, sinkhole.*

Estimation of the Best Measuring Time for the Environmental Parameters of a Low-Cost Meteorology Monitoring System

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Abstract— Meteorology monitoring is crucial for implementing smart agriculture systems. These systems should employ as few power as possible in order to avoid workers going to the fields to replace batteries. Thus, the collection and forwarding of data should be reduced as much as possible. However, the time interval to be employed should be large enough for the data to be accurate and so as to avoid data loss. In this paper, we examine different time intervals for data acquisition utilizing our proposed algorithm for our low-cost meteorology monitoring system. Real data has been analyzed with time intervals from 5 to 60 minutes. Results that the best time interval is 25 minutes for temperature, 45 minutes for humidity and 5 minutes for light.

Keywords: *Precision agriculture · ESP32 · Algorithm · Low-cost · Decision making*

An AODV-based routing scheme with layered clustering to enhace energy efficiency and QoS in WSNs

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Abstract— The evolution of computer networks and the development of wireless technology have opened up new opportunities in the field of telecommunications and intelligent environments. Wireless sensor networks are large-scale ad hoc networks that consist of several sensors spatially dispersed to measure environmental parameters and to send the collected data to the Sink through a wireless connection. In this context, minimizing energy consumption represents the most important design factor since each sensor node is powered by a limited and generally irreplaceable source of energy. This paper presents a new energy-efficient data routing approach specifically designed for WSNs based on the combination of an extended AODV routing scheme and on network hierarchization in several layers while maintaining low complexity, high scalability and good QoS. Evaluated under the Network Simulator (NS-2), simulation results showed the effectiveness of the proposed approach in terms of energy efficiency and network lifetime.

Keywords: *WSNs, Data routing, Network hierarchization, Energy consumption, Load balancing, Network lifetime, QoS.*

Planar Hexagonal Antenna Array for WLAN Applications

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Abstract— In this work, a new antenna array developed for ISM 2.4 GHz applications is introduced. The structure is composed by associating four elementary antennas of hexagonal form using fractal geometry. The antennas are powered using the quarter-wave transformer. The designed structure has been optimized with CST Microwave Studio, it has a good input impedance matching in the validated band with a high gain of 8.4 dBi and an aperture angle around 60°. The total dimensions of the structure are 150 x 75 mm².

Keywords: *Planar • Fractal • DGS •WLAN • Hexagonal • Antenna array.*

Implementing and Evaluating an Intrusion Detection System for Denial of Service Attacks in IoT Environments

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Abstract— The Internet of Things (IoT) is very successful in different fields: industry, health, logistics, smart cities, smart home.. . Despite this success, this new technology suffers from a big security problem. Much of this problem is due to the constraints of connected objects (Memory, Processing Capabilities and limited energy ...) that are the cause of various attacks, mainly denial of service attacks (DOS / DDOS). In this paper we propose the implementation and evaluation of a system of intrusion detection DOS attacks, based on the verification of the abnormal use of the energy consumption of connected objects in IoT environments. The implementation of the proposed algorithm is carried out in the Contiki-Coja simulation environment and the experimental results show that the IDS was able to detect DOS attacks with a 87.5% rate.

Keywords: *DOS, Security IoT, Intrusion Detection System (IDS).*

Decision system dedicated to IT services in a multi-context environment

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Abstract— Ubiquitous computing evolved tremendously and became an integral part of many fields and application domains. It not only causes maximized availability for users with wired or wireless networks but also supports any information technology equipment such as cell phones, PDAs, car navigation terminals and consumer information appliances as well as desktop computers and mobile PCs. Therefore, the behavior of ubiquitous applications depends on the state and availability of entities (software and devices) that make up the environment in which they evolve, the latter characterized by a dynamic availability of function-alities and a heterogeneity of hardware and software devices, and depends on us-er preferences and locations. In addition, these applications must adapt according to the context of the user.

This new computing paradigm also brings along modern and unique challenges regarding vulnerabilities and appropriate solutions

this paper presents a decision system dedicated to IT services in a multi-context environment to share and control extracted data according to users needs and analyze them to make decisions using data processing algorithms Data Mining.

Keywords: *multi-context environment, Data Mining, decision system*

Trust weighted based cluster head selection in mobile ad hoc network

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Abstract— Mobile ad hoc networks (Manets) consist of a large number of mobile nodes communicating in a network using radio signals. Clustering is one of the techniques used to manage data exchange amongst interacting nodes. Each group of nodes called cluster and has one or more elected Cluster head, where all cluster heads are interconnected for forming a communication backbone to transmit data. Moreover, cluster heads should be capable of sustaining communication with limited energy sources for longer period of time. Misbehaving nodes and cluster heads can drain and reduce the total life span of the network. In this context, selecting the appropriate cluster heads with trusted information becomes critical for the overall performance. In this paper, we analyze the existing trust based clustering solutions, and highlight their advantages and drawbacks. Besides, we propose an efficient trust based cluster head selection.

Keywords: *Manet, clustering, trust, cluster head.*

Comparative Study of ZigBee and 6LoWPAN Protocols: Review

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Abstract— Several types of research have been made on short-range and low-level wireless networks energy consumption since their appearances until today. To examine the specificities of each, we have done a comparative study to highlight the strengths and weaknesses based on energy consumption, scope and reliability of mesh architecture to conclude open international standard, and more adapted to industrial needs. This paper addresses the low power mechanisms provided by 6LoWPAN and the ZigBee Protocol with their two version (ZigBee-Pro and ZigBee IP), providing comparative assessments based on the results obtained by available in specialized literature and different researchers. The results shows that ZigBee IP can be the most appropriate protocol in case we want to connect multiple nodes with fast communication and optimized power consumption

Keywords: *6LoWPAN, ZigBee, ZigBee-Pro and ZigBee IP*

Genetic Algorithm for Shortest Path in Ad Hoc Networks

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Abstract— The decentralized nature of ad hoc wireless networks makes them suitable for a variety of applications, where the central nodes cannot be invoked and can improve the scalability of large map networks, the topology of the ad hoc network may change rapidly and unexpectedly. Mobile Ad hoc (VANET) are used for communication between vehicles that helps vehicles to behave intelligently during vehicle collisions, accidents…one of the most problems confronted in this network, is finding the shortest path (SP) from the source to the destination of course within a short time. In this paper Genetic Algorithm is an excellent approach to solving complex problem in optimization with difficult constraints and network topologies, the developed genetic algorithm is compared with another algorithm which contains a topology database for evaluate the quality of our solution and between Dijkstra's algorithm. The results simulation affirmed the potential of the proposed genetic algorithm.

Keywords: *Genetic algorithm, population size, shortest path, ad hoc, optimal routing, VANET.*

Analysis and evaluation of Cooperative Trust models in Ad Hoc networks: Application to OLSR Routing Protocol

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Abstract— Mobile Ad Hoc Networks are wireless networks, of which the installation does not require any existing infrastructure, this property has induced the philosophy of "all distributed " and distributed control. The departure and arrival of a node is autonomous and does not interfere with the continuity of services. These advantages allow the deployability of these networks in situations where the use of wired networks is expensive, difficult or even impossible. However, with these advantages, some security concerns are emerging. Indeed, with a shared communication medium and in the absence of a central entity or a fixed infrastructure, traditional security solutions are not adapted, it is now difficult to manage encryption keys, certificate distribution, and trust management between nodes. As a node does not necessarily have knowledge about others when the network is growing, trust a priori may not exist. We are interested in this paper to study security problems in Manets in general, and more particularly those related to trust management. This paper details the principle, the constraints, and the challenges of deploying suitable trust models, to deal with Manets constraints. An example of a light trust model for enforcing security in OLSR routing protocol used for Manets, is presented and evaluated.

Keywords: *Ad Hoc network, Distributed control, deployability, security, trust models, OLSR*

The development of a three-dimensional cellular automata model for wind flow

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Abstract— In this work, we are interested in the problem of modeling the wind flow using a three-dimensional cellular automata approach. In this context we consider a 3D cellular discretization of the considered domain (real territory). For each cell we consider the attributes that affect the wind flow: relief, land use, vegetation cover... etc.

The results of the simulations presented in this work were run under software that was developed in Java Object oriented programming language. The software offers many features including data import and export, integration of simulation constraints, real-time tracking of 2*D* and 3*D* view of wind flows, and data pro- cessing tools for the output. Input data for the regions that we consider were acquired and processed by the Optical and Radar remote sensing methods and tools.

Keywords: Cellular Automata , Wind flow , 3D modeling.

Spatial Distribution and Assessment of Heavy Metals Pollution in Sediments of Tobruk Bay (Libya)

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Abstract— The Tobruk Bay represents great commercial and economic importance as a result of population growth, urban development, economic and industrial activity. Large quantities of municipal and industrial waste are disposed directly in seawater. Heavy metals are the most important and most serious problems in aquatic environments. This study was conducted to evaluate the concentrations of heavy metals contamination and their distribution in the sediments. Sixteen sites were selected and identified accurately representing the study area. Samples placed in self-closing polyethylene bags andstored in ice boxes then transfer to the laboratory,they stored in the refrigerator at -20° C in the dark until analysis. The ICP-OES instrumentwas used to detect the desired heavy metals (Al, As, Cd, Cr, Cu, Fe, Mn, Ni, Pb and Zn) in the surface sediment samples. The ranges of TOC and the fine fraction (clay and silt) contents of analyzed sediments are 2.2%–4.7% and 0.2%– 1.7%, respectively. Their average values are 3.3 % and 0.8%, respectively. The comparison of heavy metal concentrations in this study with that of previous studies in other regions shows that the concentration of heavy metals in surface sediments of Tobruk bay is lower than concentrations of heavy metals in Western Xiamen Bay, China, New York Harbor, Bremenn Harbor Germany, Izmir Harbor, Turkey regions. The calculated results of Igeo values indicated that all the sampling stations were extremely polluted with As, also enrichment factor revealed the same results.

Keywords: Assessment of heavy metals, Sediment, Tobruk bay, Spatial Distribution, Geostatistical Analysis, Geoaccumilation index, Enrichment factor, Pollution Load Index

Distributed Spatio-Temporal Voronoï Diagrams : State of Art and Application to the Measurement of Spatial Accessibility in Urban Spaces

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Abstract— Irregular development and rapid changes are largely used to contribute to the production of large and uncontrollable data, making the management, analysis, processing, storage and interpretation of these massive spatial data extremely efficient. As a result, the displacement at the level of urban spaces becomes noticeably difficult. In this article, we are implementing a new approach that uses spatiotemporally voronoï diagrams based on a distributed architecture to solve large data processing problems on the one hand, and spatial accessibility in urban areas problems on the other hand.

Keywords: Big data, voronoï network diagram, Distributed computing, Spatio- temporal modeling, Short path.

Assessing NoSql approaches for spatial big data management

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Abstract— Since the advent of social networks, Iot and Smartphones, spatial data are taken by storm by the Big Data phenomenon. Their management and analysis is a real challenge for traditional geographic information systems. Indeed, these solutions don't respond effectively to big data constraints as they still rely on relational databases to manage and process spatial data.

In this paper, we compare, from a qualitative and quantitative point of view, three families of NoSql databases with geospatial features: Key-value, column and document oriented. We explore the ways offered by these three NoSql paradigms for efficient management and analysis of massive spatial vector data and then we analyze the performance of two of them. The empirical evaluation is performed on two clusters based on an open data datasets and gives some advantages and limitations of these approaches.

Keywords: *Spatial Big data, Distributed Spatial Computing, Accumulo, Elasticsearch, Redis-Spatial, Vector.*

Monitoring the urban sprawl of the city of Tangier from Spot and Sentinel2 images

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Abstract— The city of Tangier, the ultimate economic hub and tourist destination, has experienced in recent decades various changes and dynamics of land use including the establishment of industrial and tourism units and the redevelopment of the port of the city port of pleasure.
A diachronic remote sensing study was carried out on multispectral Spot images of 1995 and 2005 and on a Sentinel2 image of 2018. It aims to follow the urban sprawl at the scale of the agglomeration of Tangier and more particularly on coastal municipalities of the city to measure the impact of anthropogenic pressure and the artificialization of coastal areas on the stability of the coastline and the exposure to the risks of erosion and marine submersion.
For each of the dates, multispectral indices (NDVI, MNDWI, ...) were gathered in a decision tree for a hierarchical classification by association of spectral bands at thresholds deduced empirically from their histograms. The built class thus extracted shows that littoralization has tripled since 1995 until 2018.

Keywords: *Urban sprawl, diachronic monitoring, remote sensing, GIS, artificialisation of the coastal zone.*

A low-cost maximum power point tracking method based on PI controller Arduino implementing

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Abstract— This paper aims to present a method to improve the conventional perturb and observe (P&O) maximum power point tracking (MPPT) algorithm for buck converters, which is based on a proportional-integral (PI) controller to solve the main P&O MPPT drawback, which is the presence of the ripples in the output power of the converter. Currently, many electronic devices (FPGA, dSPACE...) are used to implement the MPPT methods, but they remain relatively expensive. For this reason, the Arduino board is used in this paper to implement the suggested MPPT algorithm. To validate its function, a comparative study between the proposed P&O algorithm and the conventional one is developed in MathWorks software, and an experimental setup using hardware components is given at the end of the paper.

Keywords: *Arduino; PI controller; Voltage-Current sensors.*

A case study of virtualization used in Mixed Criticality Systems

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Abstract— When multiple functionalities are integrated in the same embedded platform, it is highly likely that some of them will be more critical to the survival of the system than others. Mixed criticality systems (MCS) are based on the concept of allowing applications with multiple levels of criticality to seamlessly interact and coexist on the same platform. Criticality designates the level of assurance against failure needed for a system component. Methods to achieve such a separation include kernel separation and virtualization. At the same time, these platforms are migrating from single-core to multi-cores. Most of the complex embedded systems found in, for example, the automotive and avionics industries are shifting into MCS in order to meet strict non-functional requirements relating to cost, space, weight, heat generation and power consumption. XtratuM is a bare metal hypervisor that was designed to meet safety critical real-time requirements. In this paper we will present the difference between these methods. We will also introduce an architecture based on this hypervisor. We have implemented a simple architecture to test out the performances of communication channels provided in this hypervisor. We will also discuss challenges surrounding MCS in embedded systems and the difference between two mechanisms employed in MCS.

Keywords: *MCS, Virtualization, Security, XtratuM, x86.*

A Centralized Voltage Control System for Low Voltage Distribution Networks in Morocco with the Presence of Distributed Generation

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Abstract— This paper presents a centralized system to control voltage of LV distribution systems in North Africa with the presence of distributed generation, the proposed system is based on the use of sensitivity analysis of each regulators and their impact on the voltage of system busbars. The proposed system is designed to be installed in MV/LV distribution system, to control LV network outlet from it. The load flow and sensitivity analysis used in the proposed method is based on the use of the backward/forward sweep method. The main aim of this paper is to present a system able to control the voltage of LV distribution systems in North Africa with the presence of distributed generation, in order the facilitate the integration of renewable energy in LV systems and to study the feasibility of the mutation of the conventional North African LV distribution systems into a Smart Grid.

Keywords: Voltage control, Distributed generation Conventional distribution system, Smart Grid, Environmental impacts, renewable energy, distributed generation resources, plug-in Hybrid Electric Vehicles**.**

Optimal Power Flow Dispatch using Trust Region Based Multiplier Method

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Abstract— This work presents the computation technique called Trust- Region Based Multiplier Method (TRMM) to solve the practical Opti- mal Power Flow Dispatch (OPFD) problem. The proposed approach is tested and examined using the standard IEEE 30-bus test system. The several objectives functions such as fuel cost minimization, power losses minimization and voltage profile improvement are considered . The sim- ulation results prove that the resolution approach gives better-quality solution in terms of convergence and accuracy, when compared to other methods to solve the OPFD problem.

Keywords—*Optimal power flow Dispatch · Fuel cost minimization · Power losses · Voltage profile improvement · Trust-Region Based Multi- plier Method · Convergence.*

Conversion of sunlight into electricity based on new colored triphosphates: Elaboration and characterization

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Abstract— Our study focused on triphosphates AlMP3O10 using three series by substituting metal (M) with manganese (Mn), cobalt (Co) and nickel (Ni). We elaborated these new materials by reaction in the gel process with egg white at 1000 °C for 24 hours conditions. The solid solutions exhibit bright coloration due to the pyramidal crystal field around the M2+ chromophore. The original coloration found is the yellow nickel-doped compounds and the bright cyan cobalt-doped compounds or the azure manganese-doped compounds. Optical properties of thin films were investigated and characterized by UV-visible spectroscopy using the transmittance T(λ) and the absorbance A(λ) influential factors. As known, the values of the optical gap energy specify insulating, conductor or semi-conductor materials; therefore, our results showed that we obtain only semiconductor material based on triphosphates according their optical gap energy. Moreover, the Urbach energy (band tail width) found has significant values of these materials. The potential application could be achieved by using new solar cells based on studied materials in which they absorbed the light's energy to excite the electrons and thus generate an electric current.

Keywords: *Conversion, Sunlight, Electricity, Triphosphates, Egg white, Solid solutions, Chromophore, Optical gap and Urbach energy*.

Peer-to-peer energy sharing using cellular automata approach in a Microgrid system

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Abstract— In this work, we propose a model of cellular automaton for Peer to Peer Energy Trading. The model allows us to identify the state of the user (con-sumer or prosumer) according to various defined states (creation, transmission, storage or energy consumption) in order to ensure a balanced power flow. The change of states is regulated by several input parametrs and dynamics attributes such as demand, occupancy, temperature, irradiation, voltage, current and SOS of the battery. The neighborhood considered is the generalized Moore neighborhood with a dynamic radius, of which the links between nodes can change dynamically during the simulation. This radius change is governed by an algorithm for explor-ing the nearest user. Simulations illustrating our approach are presented.

Keywords: *Microgrid · Cellular automata · Prosumer · Solar energy.*

Comparative Study of Three Phase Grid Connected Photovoltaic system Using PI, PR and Fuzzy Logic PI Controller with harmonic analysis

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Abstract— This paper presents a three phase grid connected photovoltaic system with a comparison between three different control strategies; the conventional PI controller, the proportional resonant (PR) controller and the Fuzzy Proportional Integral controller. The Maximum Power Point Technique (MPPT) called Perturb and Observe is used for tracking the maximum from the PV panel. The three phase inverter is controlled by the Pulse Width Modulation (PWM) technique. PI, PR and Fuzzy logic controller are used as a current controller for regulating the current and finally a comparison of Total Harmonic Distortion (THD) is made between the different types of controllers. In order to examine the effectiveness of the suggested control, a simulation using the Matlab/Simulink software has been done and the simulation results show the effectiveness and the good performances of the proposed designed system especially with variation load which ensure a better energy transport to grid with fewer harmonics.

Keywords: *PV inverter, Grid, Fuzzy logic controller, PR controller, PI controller, THD.*

Study, Metrology and Supervision of the Energy Production of a Photovoltaic Installation

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Abstract— For the implementation of a physical and meteorological data of photovoltaic technologies and to homogenize the data between all measures performed by sensors and the data calculated by the simulation software. Our work is divided in two parts, in the first part we will simulate the electricity production of three photovoltaic technologies connected to the grid in the middle of Morocco, particularly in the province of Khouribga with a PVSYST Software. The three units are each equipped with a different silicon technology: monocrystalline, polycrystalline, and amorphous for examining the productivity of the three types of panels, an inclination angle of 31° and an azimuth angle of 180°. The second part highlights the centralized supervision of a station for the three photovoltaic technologies: monocrystalline, polycrystalline and amorphous silicon used in the first part by the use of an Android Operating System terminal. The measurements of physical and meteorological variables can be performed using various sensors. The acquisition of data is ensured using an Arduino card based on a microcontroller. This card is equipped with a Bluetooth antenna allowing it to transmit data of different measures to the terminal. With 3G network or a local WIFI and the net, the collected data is sent to a server centralized system that processes information.

Keywords: *Photovoltaic, Solar radiation, PVsystem simulation, Metrology, Data transfer, Android.*

Using CFD simulation and Taguchi approach to optimize the parameters influencing the performance of PEM fuel cell with the serpentine flow field

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Abstract— In this paper, a simulation investigation was carried out to optimize three parameters, such as GDL porosity, cathode inlet relative humidity and cathode inlet velocity to improve the performance of PEM fuel cell with serpentine flow-field. ANSYS Fluent 15 was used to build our proposed model. This paper is based on an application of Taguchi orthogonal L9(33), in which the three factors are varied at three different levels. The three factors are arranged in descending order according to the delta value; cathode inlet relative humidity, GDL porosity and cathode inlet velocity respectively.

Keywords: *PEM fuel cell · Taguchi method · ANSYS*

Numerical investigation of hybrid Darrieus-Savonius wind turbine performance

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Abstract— Vertical axis wind turbines (VAWT) as energy saving devices can be used in many engineering fields. There are two types of rotors in VAWT. Savonius rotors require a low torque for starting, but their efficiency is very low and Darrieus rotors have high efficiency, but they are difficult to start up. The hybrid wind turbine obtained by combining these two technologies, has the self-starting ability and high efficiency. A Darrieus-Savonius combined rotor aiming at a high aerodynamic performance with a low start-up requirement has drawn the attention of many researchers. In this paper, the effect of Darrieus-Savonius combined wind turbine performance is investigated in order to improve VAWT efficiency by a CFD (Computational Fluid Dynamics) approach. Unsteady simulations solving the Reynolds Averaged Navier-Stokes equations with standard k-ω SST turbulence model were conducted to obtain the static torque and the power coefficient. This numerical study focused on Darrieus-Savonius wind turbine with Savonius rotor placed in the middle of the Darrieus rotor at different tip speed ratio of 0.4, 0.6, 0.8, 1.0 and 1.2. The commercial CFD software Fluent 15.0 is used for the numerical study. The torque and power coefficient results of single Savonius turbine are compared and validated against experimental and numerical data based on the literature.

Keywords: *Wind energy. VAWT. CFD. Savonius rotor. Darrieus rotor.*

Need for using Artificial Intelligence in the evaluation of new industrial Project

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Abstract— Our research work aimed to provide a new intelligent decision support approach able to reproduce partially the human's decision making.
This paper proposes a new relational Multicriteria K-means algorithm. The originality of this work is due to the use of the research resulting from the clustering approaches and the preference concept to build new model able to assist stakeholders in their decision-making. The main idea of this new method is to split the projects into hierarchical levels, classified over time. In each level, the criteria are weighed, and a mathematical relation function is developed. In order to demonstrate the usefulness and efficiency of the proposed approach, it was chosen to apply this method to the evaluation of 8 Moroccan Concentered Solar Power (CSP). The obtained result has matched the CSP's strategy

Keywords: *K-Means Algorithm, Relational Clustering Algorithm, Artificial Intelligence, Multicriteria Decision Analysis, Decision Support System.*

Decision Support System Architecture for Smart grids Hardening Against Weather Hazard

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Abstract— Weather hazards are nowadays threatening the resiliency of electric power grids, causing a limitless number of blackouts in different parts of the world. Therefore, predicting the imminent failure resulting from grid disturbances would improve the quality of those grids. Even though some investigations have been conducted by researchers in the field to create new strategies of predicting outages and restoring power, extreme events can still provoke extended blackouts due to the liability of the existing distribution power grid. This paper suggests the enactment of a Decision Support System Architecture that works on resiliency feature hardening against weather hazards.

Keywords: *Smart grid, Power grid, Blackout prediction, Power restoration, Deep learning, Decision Support System.*

Computational fluid dynamics simulation of nozzle dimensions used in a pulse-jet system of baghouse phosphate dust collector

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Abstract— There were many parameters that have an important influence on the system of pulse jet cleaning using in baghouse dust collectors. This study investigated the feasibility of optimizing the nozzle height and diameter parameters during pulse jet cleaning. A two dimensional numerical model of a pulse jet system was used to analyze the effect of the nozzle height by using computational fluid dynamics (CFD). For simulations, we took into consideration the cleaning characteristics of the pulsed air jet system in the baghouse phosphate dust collectors of the UB (Drying unit of Beni-Idir) situated in Khouribga (Morocco). The pulse jet air around the cleaning nozzle was simulated to predict the effect of nozzle dimensions on the cleaning performance in terms of velocity distribution and pressure distribution. The influence of the nozzle height and diameter was discussed. Results showed that the pressure profile depends on both changes in height and nozzle diameter. The pressure increased with increasing nozzle height and decreased with larger nozzle diameter. Moreover, we found that the velocity is proportional to the nozzle diameter. Test results concluded that a lower nozzle height and a larger diameter are recommended for improving the pulse jet cleaning in the baghouse phosphate dust collector.

Keywords: *Pulse air jet, Nozzle height, Nozzle diameter, Computational fluid dynamics.*

An intelligent power distribution management with dynamic selection in smart building based on prosumers classification and an Intelligent Controller

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Abstract— Technologies enable us to make buildings smarter, more energy-efficient, or in general more resource-efficient and sustainable. We design buildings with high-performance appliances that reduce the use of resources. We invest more in distributed energy resources that allow the building to produce more energy than it uses. And we install smart sensors/meters and integrate the Internet of Things to analyze big data on the efficiency of the building operation and process this information in the cyber-world to make smart decision for an efficient energy management. Smart buildings represent a prototypical cyber-physical system with deeply coupled embedded sensing and networked information processing that has increasingly become part of our daily lives. In this paper, a proposed smart building architecture based on main controller to resolve the issue of islanded building in outage case and to ensure a smart dynamic selection of costumer's loads response through specific parameters like real time consumption measurements, batteries level charge, real time distributed energy production, costumer classification, uninterrupted loads, interrupted loads, costumer production. The cyber physical manager control information transmission with the main grid and also manages the power distribution into building based on parameters analyzing of some parameters. A simulation is done with results discussion for more optimization and to check the effectiveness and superiority of our autonomous power management system through on-site distributed generators within buildings to operate in islanding mode. Finally, This paper present a solution for new building generation that can have a self-supply based on distributed renewable energy and thereafter reduce costs for both government and costumers and create smart living space that becomes an important trend of future.

Keywords: *Smart distribution system, Outage, Emergency situation, Prosumers, Cyber physical system, Storage System, Classification, Smart building, Smart cities.*

Effects of back contact on CZTS solar cell?A Numerical Simulation Approach

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Abstract— In this study, a numerical investigation of the effects of the back contact on the performance of CZTS solar cell by using SCAPS-1D. In the first step, we have study the effects of variation of metal work function on the band energy and cell performance. Next, the role of p-MoS2 interfacial layer between CZTS/Mo interface to improve the cell characteristics, where the efficiency is increased by using MoS2 with small gap 1.3eV, thickness 50nm and high carrier concentration 1017 cm-3, where this layer realizes an ohmic contact.

Keywords: *CZTS solar cell, Back contact, Metal work function, p-MoS2, SCAPS.*

Parametric and non-parametric wind distribution model for Tangier region

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Abstract— To analyze the wind characteristics of a region in order to quantify the maximum wind potential at a specific site, a precise statistical analysis of wind data is needed since wind speed fluctuates randomly over time, some critical differences might occur between the estimated and the actual energy output. This paper explores wind speed distribution to arrive at the most accurate predictive estimation of the power density energy by carrying out a comparison between non-parametric and parametric distribution (Weibull) Based on measured maximum daily mean wind speed data in times-series of Tangier from 2013 to 2017.

Keywords: *Wind speed; Wind potential; Wind variation; Statistical analysis; Weibull distribution; Probability density function, Non-parametric distribution.*

Synthesis of silver nanoparticles by microwave irradiation and their effect on the gap energy of nano-composite based on MWCNT

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Abstract— The Silver nanoparticles with high stability and fine sizes were prepared by wet microwave irradiation with a mixture of silver nitrate, ethanol and a copolymer. The copolymer acts both as a stabilizer and a reducing agent. An observation followed by the effect of concentration on the physical properties of silver nanoparticles. The confirmation of the formation of the silver nanoparticles has been done by several analyzes such as UV - Vis spectra, scanning electron microscopy (SEM), Transmission Electron Microscopy (TEM), Energy Diespersive Spectroscopy (EDS) and X'Ray Diffraction (XRD). The range of 405 to 425 nm of the UV - Vis spectra of the surface plasmon resonances (SPR) are marked by the characteristic absorption band. When analyzing the SEM and TEM images, the silver nanoparticles were spherical shape and nanosize diameter of about 15 nm.An increase in gap energy was observed during the increase in concentration of silver nitrate.

Keywords: *Silver nitrate (AgNO3), Silver Nanoparticles, Surface plasmonic resonance (SPR), Reducing copolymer, Irradiation by microwaves.*

The effect of gas diffusion layer(GDL) porosity variation on oxygen distribution along the PEM fuel cell

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Abstract— In this paper, a PEM fuel cell with straight single-channel was simulated using the ANSYS Fuel Cell Module. The cell used in this work consists of anode and cathode, gas channels, gas diffusion layers, catalyst layers and membrane. The pressure of hydrogen inlet is set at 1 bar gauge and the hydrogen mass fraction is set at 0.455. The pressure of oxygen is set at 1 bar gauge and the oxygen mass fraction is set at 0.212. The temperature is fixed at 353 K. Three different values of the gas diffusion layer(GDL) porosities were examined, ranging from 40% to 80%. The results showed that with an increase in GDL porosity, it becomes very easy for the oxygen to permeate through the GDL and reach the catalyst layer.

Keywords: *PEM fuel cell · Porosity · Cell voltage*

Ship Main Engine Waste Heat Recovery for an Efficient Energy Management

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Abstract— The main engine internal combustion and friction of moving parts gen-erate great amount of heat. This heat should be maintained within maker temper-ature thresholds. This is ensured by main engine fresh water-cooling system which circulate the fresh water in a closed loop and which is cooled in its turn by the seawater cooling system, using seawater as cooling fluid media. Then the hot seawater is thrown overboard ship. The heat generated by friction of the moving parts is absorbed by the lubricating oil system. This cooling process represent a great heat loss that is originally produced by consumption of fuel oil. This leads to the increase of fuel consumption and production of greenhouse gases. This paper proposes one of the design measures, to recover the waste heat, by using the hot main engine fresh water outlet for the heating of the accommodation san-itary water and quantifies the reduction of the greenhouse gases resulting in, for and efficient energy management and to comply with international maritime or-ganization ship energy efficiency plan requirements.

Keywords: *Energy efficiency, GHG's emissions, Calorifier, Waste heat recov-ery, cooling system, main engine.*

Enhancement of Biogas Production from Plant Biomass Using Iron Nanoparticles

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Abstract— Biogas production from plant biomass (Pharagmites australis and Eichornia crassipes) inoculated with fresh digestate from Daqahliyah Sugar Beet factory - Egypt bioreactors in the presence of iron oxide nanoparticles capped with ascorbic acid were investigated. The substrate was charged into batch digesters (syringes 20 ml) and 50, 100, 150, 200, 250 and 300 ppm of iron nanoparticles capped with ascorbic acid working suspension were added further and subjected to anaerobic conditions. The produced biogas was collected by the water displacement method and subsequently measured (ml). Results obtained showed that, maximum biogas production from Pharagmites australis was (31.10 ml/3.4g P. australis) with 100 ppm of Fe3O4 NPs compared to control (18.07 ml/3.4g P. australis), with enhancement percentage 72.11 %. While maximum biogas production from Eichornia crassipes was (16.33 ml/3.4g E. crassipes) compared to control (10.83 ml/3.4g E. crassipes), with enhancement percentage 50.78 %, after 25 days of incubation at temperature 35 °C and pH 7.2. It could be concluded that, biogas production from P. australis and E. crassipes in the presence of iron oxide nanoparticles capped with ascorbic acid have an important role and efficacy in the biogas generation quantity, unwanted biomass recycling and in terms of environmental pollution control and management that might have resulted from the domestic disposal of these unwanted plant biomass.

Keywords: *Biogas, Iron Oxide Nanoparticles, Pharagmites Australis, Eichornia Crassipes, Anaerobic Digestion, Unwanted Plant Biomass.*

Poster Session

New approach for managing profiles in the MOOC system

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Abstract— The world of education and vocational training is in turmoil with the rise of MOOCs (free online courses accessible to all) offered by prestigious universities and schools around the world thanks to the offer of a large flexibility in terms of pace, location and learning time.

In Morocco, some universities have already begun to integrate in the field of e-learning, as in the case of the Cadi Aiad University in Marrakech which started to broadcast courses and to take online training on the subject. EDX famous platform to process the overload problem among its facilities, access is particularly open because of the strong demand for specific specialties and the fact that most fl u dents prefer to pursue their studies at the university more close to places of residence.

The acronym MOOC is then considered as a solution to the problems reported because it addresses a very large number of students and develops by reinforcing the principles of open pedagogy by promoting quality education in open access through the online course proposal containing several types of re s sources, such as videos, activities, downloadable materials and assessments, accessible to all pe r sounds enrolled in training through the platform and access to a connection Internet. In addition , we have synchronous and asynchronous communication tools that allow the exchange of information and documents between different actors. Despite the different services offered, there are always problems to overcome.

Given the massiveness enrolled in a MOOC, the problem of the diversity of learners' profiles arises .It is difficult for a teacher to meet the needs of each of them. As a matter of fact , students who visit a MOOC come from different countries, have different ages, and knowledge. To solve this problem of diversification of the profiles of the learners we find two approaches presenting profiles of the learner comprising different facets [CARCHIOLO et al. 07] [SAMPSON et al. 02].

In this work, we propose an approach that provides for the development of a way to classify learners' profiles using classification tools that are theoretically approved taking into account the Clustering techniques that are used to break up groups of students. learners according to their learning interests based on the characteristics of the learner. So, are the artificial neural networks are powerful ways to dévelloper systems intelligent able to classify profiles according to their characteristics and to orient them towards the apprenticeship which answers their needs of apprentices, their courses and their preferences ....

Keywords: *MOOCs, Edx, learner profile, Clustering method, learner characteristics*

Adaptive MOOC supports the elicitation of learners' preferences

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Abstract— Given higher education in Morocco suffers from the increasing number of students in institutions with open access policy, the issue of language and communication, the heterogeneous academic level of students, the inability to adapt schedules for students, the evolution of new technologies, etc., innovative pedagogy has become a necessity to address these challenges. Additionally, new modes of adaptive learning need to be designed to develop innovative training programs. Many authors agree that "innovation in pedagogy concerns everything that is not part of formal education"[Lison et al., 2014].

In 2016, the Ministry of National Education, Vocational Training, Higher Education and Scientific Research in collaboration with GIP FUN MOOC, and the French Embassy signed an agreement to establish a platform MUN " Morocco Digital University". The purpose of the agreement is to encourage Moroccan Universities to develop Massive Open Online Courses(MOOCs), Small Private Online Courses (SPOCs),and other forms of online courses and to reinforce partnership with French Universities in e-learning.

MOOCs were developed in 2008, and after four years of operation, the New York Times considered 2012 "The year of the MOOC". Since then, new features of MOOCs have motivated decisionmakers in higher education from across the world to create a number of online courses in their institutions. However, the weakness of MOOCs as a pedagogical innovation is the high dropout rate. Despite being massive courses, of thousands of enrollees, 50% quit after one week, 10% finish the course after completing all the modules, and only 4% obtain a certificate (Perna & al, 2013).

Given MOOCs are large-scale learning platforms that have failed to meet learners' individual needs, considering this innovative pedagogyeffective enough is conditional on adaptinginstruction to enhance student learning, learner's characteristics, for example, knowledge or personal interests.

In fact, why not implement adaptive learning techniques to further customize MOOCs?

The purpose of this study is twofold. First, it aims to uncover the feasibility of adaptive learning on MOOCs in higher education in Morocco. Second, this investigation seeks to address the effects of adaptive learning on student learning outcomes, student engagement, and drop-out rates.

My objective is to present an intelligent model of adaptation support to the elicitation of learners' preferences applied to the MOOCs of the Sidi Mohamed Ben Abdellah University in order to make higher education of the future more personalized and effective and to allow as many learners as possible to assimilate a range of knowledge.

Keywords: *E-learning, MOOC, Abandon, Adaptive MOOC, Higher education*

Toward a smart vulnerability assessment tool : case of project management in automotive industries

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Abstract— The projects risk management system plays a key role in the sustainability of the company's operational and managerial functions. Indeed, the main concern of project managers is to identify the vulnerable processes that generate disruptions to the progress of a project. This article recalls previous research work on our qualitative model named "H.I.K" concept, which deals with the three operating factors (Human, Information, Knowledge). Thus, the latter are fundamental elements to assess any development of a new project may be contaminated by weakness links to different processes in a project management system, as in the case of international companies in the industrial context in Morocco.

The basic question that arises is then, how to protect our managerial system from the major risks that are connected to the lack of evaluation or ignorance of the factors of the HIK model ? On this basis, the evaluation of these factors became an obligation that will have to be imposed by the management of the company and which can be assured by the delineation of the so-called vulnerable or risky processes.

We consider, as in the first phase of our approach, a qualitative methodology in order to highlight a qualitative assessment of the elementary and global factors of our concept. Then, in a second phase we present our smart tool model fitting into the vulnerability modelling approach using the qualitative parameterization of the studied factors.

Later we present an implementation of our tool through experimental studies in a Moroccan automotive industrial environment.

Keywords: *Project management; risk; Process; Vulnerability; Concept (H.I.K).*

Smart learning : concepts, strategies and approaches

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Abstract— Smart learning can be defined as an intelligent, innovative and engaging technology-based environment that requires a smart pedagogy in a smart classroom of a personalized and adaptive learning for smart and ready learners. Adopting this modern education will provide learners with an interactive and a flexible environment that can be characterized by a) Knowledge that allow learners to access, add and modify different contents b) Task support which refers to the ability to perform a task, c) Learner sensitivity that helps customize the learner's profile by timely choosing the right task to the right learner based on its past experiences, d) Context sensitivity as a way of predicting the learner's need for assistance and e) Reflection and Feedback that generates meaningful critiques and constructive feedback (Spector,2016). Moreover, Uskov (2017) proposes a non-exhaustive list of teaching and learning strategies (1) learning-by-doing, (2) flipped classroom, (3) games-based learning, (4) adaptive teaching, (5) context-based learning, (6) collaborative learning, (7) learning analytics, (8) "bring your own device" (BYOD) strategy, (9) personal enquiry based learning, (10) crossover learning, (11) robotics-based learning. This poster seeks to identify related concepts to smart learning, its strategies and approaches based on reviews and papers of pioneers and researchers. This topic is continuously receiving attention from researchers and it will be constantly developed in the future 10 years.

Keywords: *Smart learning, smart learning environment, smart classroom, personalized learning, smart pedagogy, adaptive learning, smart learning characteristics, smart learning strategies.*

Addressing Stemming Algorithm for Arabic text using Spark over Hadoop

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Abstract— Hadoop and Apache Spark are two popular big data frameworks that make two things different by working on two different logics. Hadoop is framework for distributed scalable calculation as well as it is strong in distributed storage and hardware commodity for a non-expensive system, it distributes large amounts of data across multiple nodes which makes it not expensive in terms of hardware. Spark is made for a distributed in-Memory computation, it works with distributed data but does not rely on a distributed storage system. In this perspective we try to optimize existing popular Stemming Algorithm representing an essential step for language processing and analysis by reducing words into their base or root.

We will focus on Analyzing the results obtained using Spark over Hadoop, we interest in imple-menting a merger between the two frameworks, highlight this combination, and comprehending their con-cepts of working. In addition, we expose all possible synergies between the two frameworks and the ben-efits of each framework to complete our process. A system based on spark can integrate Hadoop whose Spark can read and write the data through HDFS. Another combination can be done by enriching a pro-cess based on Hadoop by integrating Spark with Hadoop MapReduce, where Spark is 100 time faster than Hadoop MapReduce in execution.

In this paper will provide an interoperability based on the too framework, all we stay focus on our purpose that aims optimizing code side and to keep the persistence of the results provided by the essential algorithm in terms of precision of the basic words in output, as well as to minimize the execution time and the use of the material by implementing the clustering approach.

In comparison with our first optimization test using the Hadoop MapReduce model, it turns out that our work has revealed a lot of parameters in operation for the two frameworks in the phase of combi-nation, as well as the success in arriving at the results described in the main objective and also giving de-tail of our algorithm steps by untwisting the phases of the MapReduce model.

Towards the end of this paper a clear perception will be designed to benefit from advantage of the characteristics and performance of the two frameworks. the results of our work include visualizations on the consumption aspect of the CPU and the memory as well as the logical side of parallelism minimizing the parameter of time of execution.

Keywords: *Stemming Algorithm, Spark, Hadoop, Clustering*

Study of marine macroalgae: production of extracts and perspectives of applications in the Biological control of phytopathogens

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Abstract— Macroalgae research conducted during the past years has emphasized the development of culture techniques which both maximize organic matter yields, minimize the energy costs associated with cultivation and have adopted special relevance for its content in bioactive compounds used for both foods, medicinal and agricultural purposes. The techniques for characterizing these compounds are very diverse, influenced by numerous factors both of the individual and their habitat, so it is often necessary to adjust the methodology regarding the species under study and the tests necessary to analyze its biological activity. Algae collection took place in the Cape Spartel region. Cape Spartel is a promontory on the coast of Morocco, located at the southern entrance of the Strait of Gibraltar, 14 kilometers west of Tangier. Their environmental conditions differ from those of the Mediterranean and make this a very favorable environment for the development of numerous macroalgae. Their environmental conditions differ from those of the Mediterranean and make this a very favorable environment for the development of numerous macroalgae. The Ulva lactuca and Bryopsis plumosa algae are widely distributed in Cape Spartel with other native algae of the lagoon phycoflora. Its rapid proliferation is due to the existence of constituent compounds that allow a better defense against herbivores and microorganisms with respect to other algae in its environment. This uniqueness makes those species of maximum interest for the study of compounds with antifungal activity for application in biological control and bioremediation processes, because today the principal method for controlling crop pests and diseases has been through the use of chemicals. But, problems of environmental contamination which have Adversely affected the biodiversity in agroecosystems, as well as health and public safety problems inherent to the production and inadequate use of agrochemicals, have led to the search for and implementation of ecological alternatives. This project aims to study marine macroalgae in order to find a way to add more value to this seaweed by proposing a rational and sustainable management as well as potential applications based on water-soluble antifungals extracts. The main aim of this work was to optimize the separation and characterization of compounds with antifungal activity of U. lactuca and B. plumosa, for which extracts were made with organic solvents by Soxhlet extractor, optimizing their separation by chromatographic techniques. Thin Layer Chromatography (TLC) and High Performance Liquid chromatography (HPLC). The biologically active compounds were selected for their activity against Botrytis cinerea and Podosphaera macularis (formerly Sphaerotheca macularis) pathogens of strawberry plants by biological inhibition assays in TLC plates. The selected compounds were analyzed by mass spectrometry and nuclear magnetic resonance, giving a triterpenes structure. The production of these purified compounds is being tested as potential Biological control agents for Mildew and Gray mold in greenhouse strawberry crops.

Keywords: *triterpenes , macroalgae, mildew, gray mold, biological control*

Study of the rheological behavior of phosphate slurry and its derivatives products

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Abstract— The aim of this work is the elaboration and modeling of the rheological behaviors of the phosphate slurry and its derivatives products, such as the phosphogypsum and the phosphoric acids. Phosphoric acid H3PO4 is a fundamental element for the manufacture of P-fertilizer, this acid is obtained through various processes. In this work we focus on the study of the rheological behavior of the phosphate slurry, and the phosphogypsum slurry generated during the attack of phosphate rock by sulfuric acid H2SO4, this slurry is a mixture between crystals of calcium sulphate dihydrate CaSO4.H2O and phosphoric acid 29% in P2O5 and some impurities occurring from crude phosphate. Experiments were conducted to determine the effect of solids concentration, crystals size, temperature, and chemical composition on the rheology of the phosphogypsum slurry. Concerning the modeling, we try to adjust the experimental rheological behavior of the phosphate slurry, the phosphogypsum slurry and the phosphoric acids in the 4 rheological models, Casson, Bingham, Power Law and Herschel-Bulkley, to identify the most suitable theoretical model for the description of the rheological behavior for these materials. The adjustment of theoretical models to experimental rheological data allows us to predict the viscosity and yield stress of phosphate slurry, phosphogypsum slurry and phosphoric acids.

Keywords: *Rheology, phosphate slurry, phosphogypsum slurry, phosphoric acids, rheological models, viscosity, yield stress.*

The Way Forward to Breast Cancer detection using Deep Learning approach

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Abstract— Deep learning algorithms have rapidly become a methodology in the analysis of medical images.

In this paper, we provide an overview of the applications of deep learning for Breast cancer detection and diagnosis and then provide an overview of the progress made in this field. The main objective is to provide an overview of the deep learning and popular architectures used for Breast cancer detection and diagnosis.

Keywords: *Breast Cancer, Deep learning, medical images*

Epidemiological study and data processing analysis of diabetes in the El-ksar El kebir population with R

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Abstract— Diabetes "silent pathology" in all its forms imposes unacceptable human, social and economic costs on countries, whatever their level of income. This plague weighs heavily on the health budget in Morocco. To this end, the Ministry of Health mobilizes an annual budget of about 156,700,000 dirhams for the purchase of insulin and oral antidiabetic drugs and 15 million dirhams for the acquisition of medical-technical equipment and medical devices. reagents for diabetes screening and metabolic monitoring of diabetics. In addition, according to the report of the National Agency for Health Insurance, for the year 2016, 48% of total expenses are generated by long-term illnesses and diabetes represents 11% of these expenses. Based on this observation, the idea of this work aims to contribute to establish an epidemiological profile of diabetes in the population of El-Ksar el Kebir and its municipalities located in the region of Tangier-Tetouan-Al Hoceima, North from the country. The objective of this study is to highlight the main risk factors and to analyze the data based on the association rules using R. The data management under R is not as obvious as there is appears at first sight. This is mainly due to the fact that we do not "see" the data as on an Excel spreadsheet. However, R offers powerful tools for variable recoding and reformatting of data tables, and allows you to read almost any data file format used in the statistical domain. The study characteristics significantly related to diabetes for both sexes (91 women and 60 men) are the heredity factor, stress, age (aging), overweight, obesity and the geographical gradient (72 urban areas 79 urban areas). Our work demonstrates that the fast algorithms offered by association rules facilitate the retrieval of relevant information in an acceptable time by allowing data to be analyzed for different types of diabetes. As a first step, a questionnaire was used. Our study is based on a sample of 151 patients between 32 months-84 years of age, including (11) type 1 diabetics, (57) type 2 diabetics, (2) genetic diabetes mellitus and (81) controls profiled subjects at high risk of diabetes in the El-Ksar el Kebir region and its communes, whose prevalence is higher in urban than in rural areas. The long-term goal of this work is to help reduce the prevalence of diabetes in our population through awareness-raising campaigns on the role of the environment and lifestyle in the fight against this scourge.

Keywords: *diabetes, R, data extraction, association rules, El-Ksar el Kebir.*

Agroforestry: Smart Practice for Sustainable Agricultural Development

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Abstract— Agroforestry is a set of agricultural practices whose coherence is based on the use of ecological processes and the valorization of agro-biodiversity. It is often a question of combining one or more woody species with annual crops to obtain a mixed farming system, managed in the long term to produce and protect the environment. These cropping systems are an integral part of traditional Mediterranean and also Moroccan agriculture including systems based on olive trees. This work aims to study the effect of distance from the olive tree on soil fertility at different intercrops in comparison with the olive tree in monoculture.

The study was done in an olive orchard in the Sais region. The orchard is planted at a density of 12*10 m² where the trees (Moroccan picholine) are old than 22 years. Three annual crops (fababean, spring chickpea and lentil) are cultivated as intercropping crops with olive tree in the study area. After harvesting annual crops in June 2018, soil samples were taken from the 0-30 cm layer in the different plots in the olive orchard at different distances from the olive rows (0, 1, 2, 6, 10, 11, 12m). These samples were subjected to chemical analyzes to determine their fertility levels.

The soils studied are calcareous with neutral pH and electrical conductivity. According to the distances studied, the results showed that in the different annual crops parcels the soil organic matter content was important near the olive trees. The results of this study are in agreement with several studies that contribute to the increase of soil organic matter returns to intercropping systems, due to the above-ground biomass residues of associated trees and intercrops and the in situ decomposition of their roots. For nitrate levels in the fababean and lentil plots, initial soil characterization recorded higher values than post-harvest analyzes. This may be due to the character of atmospheric nitrogen fixation related to legumes that have already been installed during the first sampling period. The results of variance analyzes, performed by the SPSS software, showed that soil parameters, have not been affected by the distance from the olive row for all the systems studied. On the other hand, for the olive tree in monoculture, the distance from the olive row affected the soil phosphorus contents.

The soil parameters measured in the different intercropping systems give different results relating to the effect of the distance studied.

Keywords: agroforestry, olive tree, soil fertility.

Evaluation of Strawberry seed Treatments with Biological control Agents Bacillus amyloliquefaciens

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Abstract— The treatment of seeds is important to ensure the health of those seeds and the seedlings they generate, allowing full expression of the genetic and physiological potential of the crop. Furthermore, seed treatments can be useful in reducing the amounts of pesticides required to manage a disease, because effective seed treatments can eliminate the need for foliar application of fungicides later in the season. Although the application of fungicides is almost always effective, their non-target environmental impact and the development of pathogen resistance have led to the search for alternative methods, especially in the past few years. In this work, two bacterial isolates of Bacillus amyloliquefaciens (B3 and B24) selected as antagonistic strains of Botrytis cinerea in previous study were used for strawberry seed treatments. The efficacy of seed treatments with B. amyloliquefaciens strains against the B. cinerea pathogen was evaluated based on germination proportion of seeds. When applied as seed treatments, the percentage of germination of seeds treated with B. amyloliquefaciens B3 and B24 was much higher than that of seeds treated with the conidia of the pathogen B. cinerea, and it approaches that of control seeds.

Keywords :*Botrytis cinerea, Bacillus amyloliquefaciens, Seeds, Fragaria x ananassa, Germination*

Geotechnical investigation of clay under heat treatment

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Abstract— This article deals with geotechnical investigation and physical behavior of clay material under heat treatment from various Moroccan zones. As known, clays are composition products of siliceous rocks, as crude raw material, mixture of minerals and crystalline impurities. Local clay is examined by various technics such as thermal, optical, X-ray diffraction, ATG, XRF and IR toward establishing its dependence with temperature. Our samples were taken from various Moroccan zones and then were processed by grinding, sieving, drying. The results almost showed change in composition of material's elements and physical properties which were strongly influenced by the high temperature.

Keywords: Clay, temperature effect, characterization, physical properties

Employing weather-based disease model and machine learning techniques for optimal control of wheat stripe rust in Morocco

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Abstract—Wheat stripe rust (WSR, caused by Puccinia striiformis Westend) is among the most important crop diseases causing a continuous threat to wheat production worldwide. In most seasons in temperate countries, environmental conditions during spring and early summer are conducive to the production of large quantities of spores of P. striiformis, which are dispersed from distances of a few centimeters to thousands of kilometers, where they might reach a susceptible host plant. Weather-based systems, or weather-based systems combined with other disease or agronomic variables have been implemented in decision-support systems (DSS) to determine whether fungicide sprays should be applied to prevent the risk of epidemics that might otherwise lead to yield loss. Given WSR is becoming a major threat in wheat-producing regions in Morocco, a DSS integrating a disease risk model would help limiting potentially harmful side effects of fungicide applications while ensuring economic benefits. The main objective of this study is to develop a threshold-based weather model for predicting in-season WSR progress in selected wheat-producing regions (i.e., Sais, Gharb, Middle Atlas, Tadla, Zair, Zemmour, Pre-Rif, High Atlas and Oasis) in Morocco. The threshold-based weather modelling approach has been successfully applied for predicting WSR in Belgium and Luxembourg. Data collected during two consecutive crop seasons in 2010-2011 at the selected sites will be used to test the modelling approach in Morocco. Machine learning techniques including Random Forest, Multivariate Adaptive Regression Splines, and Naïve Bayes Algorithm will also be investigated to improve the model. The reproducibility of area-specific modelling approaches is often a hurdle for their application in operational disease warning system at a regional scale. As such, this study is a validation case study of the threshold-based weather modelling approach. Moreover, it explores the potential utility of coupling artificial intelligence algorithms with plant disease models in decision support systems as an effort to improve sustainable wheat production in Morocco.

Keywords: *Wheat stripe rust in Morocco, Weather-based diseases, Artificial intelligence forecasting model.*

Study of growth and yield parameters of two cultivars of blueberry in Loukkos region

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Abstract—Fruits are one of the essential elements for a balanced diet and are known for their role in the maintenance of the vital functions of the human organism. The nutritional, dietary and therapeutic value of fruits is unanimously accepted. They are often considered "functional foods" thanks to the rich content of various micronutrients such as phenolic compounds (recognized for their strong antioxidant properties), minerals, vitamins, etc. The beneficial effects of blueberry fruits on human health have always been recognized. Fresh blueberry production and export is one crop enterprise identified as a promising new agribusiness for Moroccan growers and exporters. This crop has production, post-harvest and marketing management practices that complement strawberries and fit well with the existing Moroccan export strawberry industry. Blueberry farming in Morocco began in 2008 with 150 ha, and it has currently expanded to over 1900 ha with 19 655 tons of production in 2018. The aim of our work, is to identify good cultivars for the Lokkous region, on term of yield and fruit quality. For this, we have studied the growth and yield of two new cultivars, Gupton and Alix blue and compared to star, one reference cultivar of blueberry. Different parameters have been studied such as the number of bunch, length of shoots, yield, fruit size and fruit quality. The results have shown significant difference between cultivars, and good adaptation of the two cultivars in the region.

Keywords: *blueberry, gupton, alix, growth, yield, fruit quality, Loukkos*

Agriculture analytics in the era of big data

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Abstract—For decades, agriculture has remained one of the most promising sectors in the economies of countries. In addition to its socio-economic impact, it is at the center of sustainable development and food security concerns. Like other economic sectors, agriculture has undergone major changes in the last ten years. Today, agriculture is highly driven by new technologies and digital tools: sensors, robots, and drones are increasingly used in farms around the globe. In the context of this agricultural technological revolution, we are witnessing the emergence of new sources of data. In parallel, a huge amount of data is produced constantly. We can conclude that these two characteristics: variety and volume give a clear indication that agriculture has entered the era of big data and therefore, traditional tools and techniques are unable to handle this large amount of data.

In this paper, we will try to address these issues by proposing a distributed framework implemented a parallel external memory logistic regression algorithm. The main goal of this framework is to build a predictive model of a crop disease by examining the history of climatic conditions that have already implemented its occurrence. Therefore, this model will help farmers to take the necessary precaution to protect their farms and increase their profitability.

The proposed framework starts by collecting data from various sensors; each one of these sensors monitors a parameter for the growth of the crop: color, temperature, humidity, height, width, steams…etc. After the collection, data are cleaned and normalized in order to be uploaded on a Hadoop cluster for distributed storage.

In the next step, data stored in Hadoop are used to build a predictive model using logistic regression machine learning algorithm implemented through the Revolution Analytics new package called RevoScaleR TM, which delivers high performance and capacity for statistical analysis via his two major paradigms:

1. The new file format .xdf designed to handle large data set by chunking.
2. External memory implementations of the statistical algorithms, therefore there is no need to hold all data in memory and all cores in a CPU can be used via threads.

The results obtained highlighted the efficiency, low latency, and model accuracy of our proposed framework and provide a path in predictive crop disease using big data analytics. In addition, our framework can be implemented in other application domains like: log analysis, sentiment analysis, and road traffic monitoring. The further enhancement of our work involves improving the proposed framework to handle real-time data.

Keywords: *Agriculture, Crop disease, Big data, Hadoop, RevoScaleR, Logistic regression, Hadoop, Predictive analytics.*

Valorisation de souches de Carnobacterium en Biopreservation : Application dans l'inhibition anti-Listeria dans des produits fromagères

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Abstract— La présence de bactéries pathogènes dans les aliments est une problématique de santé publique majeure. En particulier la présence potentielle de Listeria monocytogenes dans le secteur fromager qui peut mettre en jeu la santé du consommateur et la stabilité économique des acteurs de la filière. D'où l'intérêt de trouver des solutions innovantes permettant de mieux maitriser ce danger. Les cultures microbiennes bio-préservatrices présentant des propriétés anti-Listeria sont largement commercialisés. Toutefois, la présence de L. monocytogenes subsiste, très probablement parce que les cultures proposées sont des bactéries lactiques classiques ne permettant pas d'apporter une protection optimale et durable tout au long de la vie du produit alimentaire.
On a identifié plusieurs souches de bactéries lactiques atypiques de l'espèce Carnobacterium maltaromaticum aux propriétés anti-Listeria. Le caractère fortement innovant de cette bactérie est son caractère psychrotrophe lui permettant de se multiplier à de basses températures et son caractère alcalophile, lui permettant de se développer à des valeurs de pH alcalin. Ces caractéristiques permettent à cette bactérie d'exprimer ses propriétés anti-Listeria durant toute la vie du produit fromager, y compris durant les phases d'affinage et de stockage. Ces souches de C. maltaromaticum aux propriétés anti-Listeria sont ainsi des candidats très prometteurs pour l'innovation dans le secteur de la bio-préservation alimentaire.
Des essais sont réalisés pour vérifier la neutralité de ces souches sur la technologie, la microbiologie et la qualité du produit fini. Et des challenge-tests sont réalisés sur des modèles de fromage pour permettre de valider la robustesse du procédé à l'échelle pilote et les doses d'inhibition efficaces.
L'objectif final de ce travail est de développer un auxiliaire technologique de bio-préservation à partir d'une souche bactérienne présentant une activité anti-Listeria au cours de toute la durée de vie du produit et n'ayant pas d'incidence sur la technologie fromagère et les caractéristiques organoleptiques du produit.

Potential impact of the latest developments in the Bouregreg estuary

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Abstract— The Bouregreg wadi is one of the main rivers in Morocco. Its estuary is located on the Atlantic coast between the capital Rabat and the city Salé. The anthropogenic factor had a negative impact on the estuary via solid and liquid waste discharges and releases from the SMBA dam, which contributed to the disruption of fauna and flora. In order to restore the ecological balance in the Bouregreg estuary and to promote the development of the area, His Majesty King Mohamed VI launched the work on the Bouregreg development project in 2006. This project focused on : - Liquid sanitation consisting of the installation of an interceptor system, the transfer and collection of effluents to a treatment point, the construction of a treatment plant and a marine outfall. - Solid sanitation that allows the establishment of the OUM AZZA landfill and subsequently the closure of the Oulja and Akreuch landfills. - Urbanization: the project extends over 30 ha, the sequence realized concerns Bab El Bahr. It includes a city of arts and crafts, a business district and tourist and commercial establishments. The infrastructure implemented concerns the TramWay network, the Moulay el Hassan bridge and the Oudayas tunnel. - Tourism: the realization of a Marina on the mouth of Bouregreg, which has been the seat of various tourist activities.
The Bouregreg estuary development project has had major cultural, socio-economic, biological and hydraulic impacts. As part of this project, a restoration of the degraded historical heritage has been carried out for the Qasbah monuments of the Oudayas, Chellah and the river and sea façades of the medina of Rabat and Salé. This development has led to significant socio-economic development through job creation, the creation of facilities and infrastructure and subsequently an improvement in citizens living standards and the development of the tourism sector. In general, the Bouregreg Valley development project had a positive impact on the environment, especially since a large budget was allocated to solid and liquid sanitation, which contributed to improving water quality (overall depollution of the site and significant reduction of pollution sources). The negative impacts are relatively small compared to the positive, this is manifested by the discharges of shipyards and hydrocarbons from navigation vessels, measures to mitigate these impacts and their follow-up have been considered in the action plan of the Bouregreg development agency. The various constructions of the Bouregreg project and the infrastructure put in place required protection against overflows of the river. By carrying out the necessary hydraulic studies for flood protection. Overall, this Bouregreg Valley development project allows Morocco to support at the level of the Mediterranean country.

Keywords— *Bouregreg Estuary, potential impacts, facilities.*

Study of the clogging of a pozzolanic packing plant filter for wastewater treatment

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Abstract— The scarcity of water resources in Morocco is accentuated by two deleterious factors, which are pollution and waste. Faced with this situation, alternative solutions are proposed for a best protection and rational management of these resources.

The project we are developing in this study, concerns the design of a prototype for the purification of a part of the waste water of the Aïn Chock Faculty of Sciences of Casablanca, by a pozzolanic packing plant filter [1]. The goal is to reuse this purified water for watering green spaces, cleaning premises,… [1]

The method is based on a kinetic study of the purification performance of the planted filter, by testing its efficiency with respect to the particle size of the pozzolanic filter and the degree of clogging. To do this, we designed a prototype supplied with wastewater from the establishment, previously decanted and whose organic pollution parameters (COD, BOD5 and MES) were measured [2]
This prototype includes nine mini-supports or filters each containing pozzolan with a different grain size. They are all solicited identically, that means, with the same waste water, at the same time and with an identical flow rate in order to determine the influence of the duration of the flow on the clogging of each. This experiment was reproduced three times, for three different flow rates and each time, we evaluated the rate of abatement of the physicochemical parameters of the filtered water. The curves obtained by the least squares method allow, according to the desired rate of abatement and the quantity of treated water, to choose the appropriate granulometry of the pozzolan while taking into account the degree of clogging.

keywords— *Pouzzolan, watertreatment, kinetics, granulometry,clogging*

Rehabilitation of drinking water system: optimization by phasing of installation

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Abstract— The rehabilitation of drinking water supply pipes is an unavoidable dilemma in the life of a drinking water system. Thus rehabilitation is defined as the replacement of a section of drinking water pipe due its failure (breakage, leakage, clogging by the limestone or planting roots) or for reaching the end of its lifecycle. Network rehabilitation consists of the replacement of pipes with the same or larger diameter.
This case study highlights the phasing of the rehabilitation of drinking water distribution pipe in two localities bouderbala and souk Elgour (PROVINCE OF ELHAJEB, KINGDOM OF MOROCCO). The installation was carried out in 2006. Since then, network yields have been declining in an increasing manner, with an abnormal number of leaks. The rehabilitation is thus decided. For administrative, financial and regulatory reasons, the rehabilitation is divided into several phases.
This study summarizes the result of a partial rehabilitation and its impact on the yield, distribution of drinking water and on the population since clean water in sufficient quantities becomes a more pressing problem. Intangible improvements have been observed. Indeed, before the total rehabilitation of the network, the hydraulic yield is resented unsatisfactory and below the inspirations of the operator, but a clear improvement as regards the yields by sector also the leaks are concentrated in the non-rehabilitated areas which facilitates the repair intervention and a satisfaction of population's demand.
In conclusion, the total rehabilitation will be the ultimate solution to improve the yield and to satisfy population's demand in clean water (quantity, quality, pressure).

Keywords— *Rehabilitation, Drinking water system, optimization*

Fish Farming in Enclosure System for the Production of Juveniles Atlantic Bluefin Tuna (Thunnus thynnus)

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Abstract- The world tuna fishing rate is around 3.5 million tons per year. Atlantic bluefin tunas (Thunnus thynnus) is among the highly valued species whose commercial value can reach the highest prices on the fishing market. On average, it is sold for 45 US dollars per kilogram and the price goes up to 150 US dollars per kilogram for the most exceptional specimens. The growing interest in this species has led to overexploitation of natural populations, resulting in significant increases in fishing rates since the 1970s (ICCAT 2014), which favoured the expansion of fattening farms based on the capture of wild specimens. This abuse has led to a significant decline in natural stocks, placing Atlantic bluefin tuna as "endangered". Faced with growing commercial demand and endangering of the species, the idea of taming the Atlantic bluefin tuna was born. The purpose of this domestication is to obtain a complete life cycle in a controlled environment, from the egg stage to the adult stage, as it already exists for Pacific bluefin tuna (Thunnus orientalis) (Sawada et al., 2005). Individuals from self-sustaining fish farms could be sold on the market thus meeting the global demand, reducing the fishing pressure within the natural environment, hence allowing the survival of this species.
Fish aquaculture production remains low in Morocco. Still underdeveloped, aquaculture offers very interesting development prospects. Among these fish, bluefin tuna is one of the most coveted species in the world. Its exploitation reaches today a level never equalled: all over the Eastern Atlantic Ocean and the Mediterranean basin, it is estimated that the volume of bluefin tuna fishing is around 50 to 60 000tons/year for the last decade, which is equivalent to two to three times the current potential production of the stock. To evaluate the capacity of the employed systems to produce competitive merchantable fish, we try to test the production of juvenile Atlantic bluefin tuna (Thunnus thynnus) in enclosure system which relies on a water recycling system used in breeding ponds. Before reintroducing into the circuit, the water pumped at the outlet of the basins, filtration techniques treat the waste: a mechanical filtration eliminates solid waste (MES) and by nitrification, a biological filtration oxidizes the ammonia produced by the fish. Carbon dioxide from the breathing of fish is removed by air injection into the biological filter and if needed oxygen is brought into the breeding ponds. By establishing a closed-circuit breeding system that is constantly monitored, optimal larval rearing conditions can be provided for juvenile production of Atlantic bluefin tuna.

Keywords: *Fish farming1, Atlantic bluefin tuna2, Overexploitation3, Juvenile4, Enclosure system5*

Characterization of organic waste: a primordial step for efficient valorization by anaerobic digestion

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Abstract— Anaerobic digestion is the process by which organic matter such as animal or food waste is broken down to produce biogas and biofertiliser. This process happens in the absence of oxygen in a sealed oxygen- free tank called an anaerobic digester.
In order to overcome the problems associated with the management of organic waste (food waste, green waste and septics tank's waste), on a small scale, the development of the anaerobic digestion process could see a potentially significant growth.
The nature of the organic waste can considerably differ according to several factors such as the producer, the season, the territory, etc... .It is therefore better to know the characteristics of waste for an efficient valorization by anaerobic digestion.
Results from several papers and studies conducted worldwide have been compiled and statistically analyzed to determine the variability of organic waste characteristics and the influence of these variable values on the anaerobic digestion process.
Then, a characterization of the organic waste, through the analysis of samples taken from the field of study, was carried out in order to compare the experimental results with the literature and to complement the latter's data with physical-biochemical characteristics and to relate them to the anaerobic biodegradation potential.
The results showed that, in general, the characteristics studied remain within the range of variations of the data compiled in the literature. The waste is rich in biodegradable components with high levels of MV, total COD and C / N ratio.
The results show also that the amount of different mineral elements present in these organic waste is sufficient and non-toxic; therefore bio-methanisation of this type of waste remains favorable, and even codigestion is possible at suitable ratios.
The performance of anaerobic digestion is linked to the biochemical composition of biowaste, hence the need for codigestion with a mixture of these to optimize the production of biogas.
We used a statistical tool, the mixing plan, to define the mixtures to be tested. The problem that arose was to know, among the waste to be mixed, what proportion of each mono-substrate would give the best Biochemical Methane Potential (BMP) and whether it was possible to highlight synergetic effects between wastes.

Keywords— *Organic waste, Characterization, Mixing Plan, Anaerobic Digestion, Biochemical Methane Potential*

Analyze and optimization of reverse osmosis desalination system in khenifra

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Abstract— The growing demand for fresh water in the world motivated scientists to develop new technologies for the production of drinking water from seawater and brackish water. These new techniques, called membrane processes, are currently considered as the most effective method of desalination. The following study aims to analyze and to optimize the technical performances of a desalination plant, based in the central region of Morocco, using reverse osmosis process in order to treat the water of the river Oum ErRiaa. However, this plant has the peculiarity of treating a water whose quality is not constant. This fact led us to engage the present study, with the aim of highlighting this variation and its impact on the performances of the reverse osmosis plant, and also to identify potential ways of optimizing the management of such plants. The purpose of this plant is to reduce the chloride content of the raw water from 866 mg/l , to values lower than 250 mg/l.
The results of analysis of the river raw water quality, have confirmed that it requires first, a conventional treatment to reduce its turbidity and then, a specific treatment to reduce its chloride content. These results have also shown that this chloride content varies over time, without exceeding the threshold of 866 mg/l frequently, which represents the design reference of the desalination plant. Faced with the decrease of the salinity of the river water, the operator was forced to reduce to the third, the operation of this plant, which consists of three reverse osmosis units functioning every two days alternatively. Moreover, the monitoring of the technical indicators of the plant, revealed the absence of membranes fouling. This is due to frequent rinsing of trains during stops. As a result, the plant performances as defined during the design cannot be verified. It was then important to identify other approaches to analyze the performances of this station. The questioning of desalination plant design, led us to make simulations with two different softwares, on a new basis, which is the current quality of the river water, characterized by a conductivity value of only 1230µs/cm instead of 3013 µS/cm, which was the one taken to design the plant. The results obtained indicated the possibility of reaching a better conversion rate of around 88% for low mineralized waters compared to 78% for the quality of water taken into account for the desalination plant design. This is also reflected in the energy consumptions that decreased by 0.09 kWh/m3.

Keywords—*Surface water, desalination, reverse osmosis, membrane fouling, plant design*

Quantification of soil erosion rates using the model SWAT in El Hachef watershed (North-Western Morocco)

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Abstract— Soil erosion is becoming acute in northern Morocco. It recognized as the most dangerous form of land degradation, which causes serious environmental problems, for agriculture, for road infrastructure and for dams.
Natural conditions in the whole province of Tangier-Tetouan-Al Hoceima promote an increase in erosion and its consequences for both, soil and water potentials.
A quantitative identification of potentially most erodible areas, associated with a spatial and temporal distribution of erosion rates remain a necessity, to optimize the means implemented to combat this phenomenon. It is in this context that the use of mathematical models and computer systems are of growing importance.
Analyzing large amounts of data relating to the factors involved, and the evaluation of their contributions to soil losses, are made possible. This is due to the joint use of spatial hydrological models and geographic information systems.
The purpose of this research was to study the capabilities of SWAT to simulate land losses in the watersheds of northwestern Morocco. It's a semi distributed model, physically based, that requires large amounts of spatial and daily weather data (topography, pedology, land use, precipitation, temperature, wind, relative humidity and solar radiation) previously structured. SWAT simulation is based on a spatial discretization of the watershed in homogeneous hydrological units HRUs. Each HRU represents surfaces of the same type of soil, the same land use and the same degree of slope. The land, on which the model is implemented, is El Hachef watershed. SWAT model performance, as well as the dynamics and spatial disparities of soil losses at the watershed scale are illustrated and discussed.
The simulation of the earth loss, at a daily time step, over the period from 1959 to 2011 shows that the average annual rate of soil erosion in the El Hachef watershed is 26.65 t / ha / year. It also made it possible to describe the spatial and temporal variation of the quantities of sediments transported by runoff, at the watershed level. The highest rates exceeding 50t /ha/ year are recorded in the sub- watersheds located in the northeast part of the watershed.
Temporal analyzes of erosion rate variation have been used to formulate the watershed response to rainfall events, and to compare the dynamics of monthly erosion rates for each subwatershed. An even more detailed analysis was possible, by reproducing the daily variation of erosion rates by subwatershed. This exposed its response in terms of soil erosion, rain events and daily variations in weather conditions.
This initiative makes it possible to accomplish a realistic soil loss modeling in El Hachef watershed, and highlights the performance of the tool for different processes.

Keywords— *Hydrous erosion, hydrological model SWAT, GIS, El Hachef, Northwestern Morocco*

Carbon paste electrodes modified with Bismuth film and organic activated carbon for the detection of lead in wastewater

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Abstract— Heavy metal pollution is one of the most severe environmental problems, and regulations to con- trol it are necessary in that respect. Many efforts have been made to develop sensors for monitoring heavy metals in the environment.

In this work, we used the carbon paste electrodes modified with Bismuth film and organic acti- vated carbon (CPE-AC) in 0.2 M HCl solution at pH 2.0 in order to detect the lead ions using square wave voltammetry (SWV), cyclic voltammetry (CV) and electrochemical impedance spectroscopy (EIS). The electrode surface morphology has been characterized by scanning electron microscopy (SEM) and the activated carbon has been characterized by infrared spectroscopy (IR).

The morphology of the activated carbon shows more void space and higher porosity on its surface. To optimize the electrochemical experimental parameters, many experimental and instrumental variables were investigated such as scan rate, electrolyte solution, and effects of square wave voltammetry parameters. The results obtained with these conditions are good, and we can use it to analyses trace concentration. The best conditions were found to be: electrolyte support HCl 0.2 M at pH 2.0, the accumulation potential should be at -1.1 V, the accumulation time at 120 s, with a frequency at 25 Hz, amplitude at 50 mV, and potential step at 5 mV. The calibration plots were linear in the range of 3.02×10-6 mol.L-1 to 3.02×10-8 mol.L-1, with a limit of detection of 1.35×10-9 mol.L-1. The method shows a good repeatability at 1.61% (n=3).

Keywords— *Electrochemical sensor, Heavy metals, Square wave voltammetry, Modified electrode, organic activated carbon, Bismuth*

A Review of Research on the Treatment of Metallic Pollution by using a Green Construction Material

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Abstract— Nowadays, the treatment of industrial effluents polluted by heavy metals is a major challenge due to their threat for health and the environment. The immobilization of metal pollutants is one of the most widely used methods for treating this problem. Geopolymers are inorganic aluminosilicate polymers used as good binders for heavy metal immobilization due to their high efficiency, good surface properties and amorphous structure. This paper is an overview of research on the immobilization of heavy metals using geopolymer binders. The performance of geopolymers in heavy metal immobilization depends on several parameters, mainly source materials, nature of metals, geopolymer synthesis method and leaching medium. Future research should therefore focus on using other industrial waste as a geopolymer binder in the immobilization process.

Keywords— *heavy metals, geopolymers, immobilization, pollution.*

Synsedimentary tectonics and Paleostress of Ordovician Middle-Upper and Carboniferous (Viseo-Namurian) age in the Hercynian Massif of Tazekka (Eastern Morocco)

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Abstract— The two sectors which are the subject of this study belong successively to the western and eastern areas of the Tazekka massif (Hoepffner, 1978). The outcrops correspond to alternations of middle-upper Ordovician micaceous sandstones and gray pelites and a volcano-sedimentary complex formed by pyroclastic and epiclastic products of Viseo- Namurian age (Chalot-Prat 1985, Hoepffner 1983). All of these sedimentary and volcano- sedimentary formations recorded intense synsedimentary tectonic activity during sedimentation. The microtectonic analysis that we carried out, allowed us to reconstruct the paleostress of the following constraints:

1-the NE-SW extension of mid-upper Ordovician age, manifested by normal synsedimentary (sealed) faults oriented N120 to N150. Near the plans of these faults, alternations of micaceous sandstones and pelites contain resedimented blocks of yellow micaceous sandstones resulting from the erosion of the surrounding reliefs. Also, we observed flexure-faults in these Ordovician layers. The directions and dips of the synsedimentary faults, as well as the pitch of the streaks, are determined after stereographic switching of the S0 stratification horizontally. Thus, the paleostress of constraints which characterizes this time, comprises a minimum stress σ3 horizontal and oriented N35 associated with a maximum stress σ1 vertical ;

2-the NW-SE to NNW-SSE extension of Viseo-Namurian age, materialized by normal synvolcanic and synsedimentary (sealed) faults oriented N30 to N50. These limits the structures in grabens and half-grabens with pyroclastic acculumation (tuffs and tuffites) and lava effusions (andesitic basalts). In the middle part of the basin, these accumulation are marked by large effusions of rhyolitic ignimbrites which are organized locally in progressive discordances. Faults N30 to N50 sometimes have a significant dextral component whose mirrors show intact striatal elements. The paleostress is characterized by a minimal stress σ3 horizontal is oriented NW-SE with NNW-SSE (σ1 vertical).

Keywords – *synsedimentary tectonics, microtectonics, paleostress, Tazekka, Morocco*.

Marine sponges as a potential Bioindicator species of Environmental Stress in the western Mediterranean coast, Morocco

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Abstract— Nowadays, the implementation of new tools for monitoring and evaluation of the state of the marine environment and the fight against pollution related to human activity have become global issues. Many biological contaminants and chemical pollutants are found in sea water, therefore in aquaculture products. This context fact sea professional are looking for solutions to preserve or even improve the quality of their waters. Filter-feeding invertebrates are often selected to assess contamination by chemical pollutants and the biological impact of pollution. Among these, sponges represent a good biomarker thanks to some of their characteristics. Sponge was largely used worldwide tomonitor coastal ecosystems. In Morocco few studies have been carried out on trace metal concentration in marine sponges and limited almost exclusively to measurements of chemical parameters of water and sediments. In this area of interest, the Mediterranean sponge *Petrosia ficiformis* will be chosen as a model for our study. The first step of this thesis work was to establish an inventory of biodiversity and distribution of sponges on the Mediterranean coast of the Tangier-Tetouan-Al Hoceima region, in order to select the most interesting species for bioindication. Indeed, it was necessary to ensure that the chosen species is known to accumulate significant levels of pollutants, that it is accessible, naturally present and abundant on the Mediterranean coast of the Region Tangier-Tetouan-Al Hoceima to avoid introduce a non-endemic species, and finally be original from a chemical point of view in a valuation objective. For this, we conducted pilot field studies and sponge prospecting campaigns along the Mediterranean coast of the Tangier-Tetouan-Al Hoceima Region. Five sampling stations were selected between Tangier and Al- Hoceima. The choice of sampling sites was based on the presence of the reference species, the technical feasibility of collecting sponges and their proximity to sources of pollution, such as: fishing activity, urban agglomerations, areas industrial, etc. All samples taken (24 samples) were identified. Species identification has been confirmed by Jean Vacelet, CNRS, (France) and Nicole de Voogd, Researcher, NBC (Netherlands). Samples harvested (24 samples) were identified in 7 species of sponges belonging to 5 different orders, distributed in a non-homogeneous way. The species *P. ficiformis* has the widest distribution; it is the only one to find in all sampling sites. Due to its omnipresence on the Mediterranean coast of Morocco, its potential to bioaccumulate pollutants such as ETM and organic compounds *P. ficiformis* is the species we selected.

Effects of Two differents Formulations on Growth, Digestibility, Excretion of Phosphorus and Nitrogen in Rainbow Trout (Oncorhynchus Mykiss Walbaum, 1792)

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Abstact— The increase in world population and average per capita fish consumption, is the result to improved quality life of people in developing countries, has led to an explosion in demand for fish. To meet this need and conserve marine resources, global aquaculture has developed strongly over the last 30 years. the carnivorous and omnivorous fish farm requires the distribution of the foods whose composition is in accordance with their nutritional needs, a nutritionally ideal diet would consist of small wild fish from sea fishing, the plants have become the main source of protein and oil for farmed carnivorous fish and contribute to the development of sustainable aquaculture.
The fish farming has an impact on the environment, like all human activities. The main changes induced by aquaculture are related to basic biological processes in live animals. The main causes of impact are associated with food and nutritional waste. In general, when farms are properly located and managed, the environmental impacts are low and reversible. There are now tools to reduce or avoid negative impacts, be it by prediction of retention capacities, nutritional improvement and water treatment. Significant efforts should be devoted to reducing releases outputs from aquaculture operations in order to lower the environmental impacts of aquaculture in many parts of the world. Since most fish releases is food-based, the reduction of releases production should first be through improved formulation and feeding strategies.
The reduction of fish releases can then be achieved through careful selection of the ingredients to improve apparent digestibility and the nutrient balance of the feed. Phosphorus releases outputs can be reduced through careful selection of the ingredients and optimization of the digestible phosphorus content of the diet to meet the requirement of the fish but avoid greatly exceeding this required level. The comparative trial of the three diets (A, B and C) resulted in the selection of food B, which had specific characteristics (low waste and better zootechnical performance). In this sense, the recommendations of this test is the interaction between the economy and the environment have made it possible to continue the research, the company Ain Aghbal in Azrou is thinking of developing its own ideal and ecological rainbow trout diet which includes the criteria for sustainable development Two extruded diets of rainbow trout (F1 and F2) have been formulated and prepared using a variety of animal and plant-derived raw materials.The first diet (F1) was formulated with fish meal as the main source of protein and the 2 nd diet (F2) with a high percentage of corn gluten.The results obtained from this experiment show that the formulations elaborated have better zootechnical performance results and growth for a short time than that obtained from the imported feed B.

Keywords— *Extruded, diet, rainbow trout,formulas,zootechnical performances, environment, phosphorus, sustainable development.*

Effects of climate change on land degradation in Northern Morocco

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Abstract— During last decade in the Mediterranean region, land degradation has become a major problem including soil degradation, soil loss, water logging and pollution according climate change. In order to slow down this degradation resulting mainly from the loss of soil productivity, it is necessary to develop a method for its quantification. Modelling is one of these methods. The aim of this research project is the development of a watershed hydrological model in Northern Morocco by applying the SWAT model (Soil and Water Assessment Tool) to identify the most vulnerable areas to erosion, to estimate the sediment yield and to evaluate the hydrological cycle.This model is distributed on a physical basis and developed by the USDA, it is widely used in such a study because of the reliability of its results. SWAT uses a daily or monthly time step and requires a large spatio-temporal database constitute of the digital elevation model, land use, soil layers and its characteristics and daily meteorological and hydrological data.The preparation of input data will be madein a tool of SIG as well as SWAT arranges an extension on ArcMap «ArcSWAT2012» who facilitates the use of the prepared data. In SWAT, the basin will be divided into several sub-basins which will be subsequently subdivided into small hydrological units of response (HRUs) which consists a homogeneity for the three components, land use, slope and pedology.The planned results will be the flows and the concentration of sediments during the period of study, which should be calibrated with field measurements to optimize the parameters of the SWAT. A validation step would be subsequently made by comparison of the results obtained with observed in another different period from that of the calibration, by using the parameters to optimize during the phase of the wedging.

Keywords—*climate change, land degradation, SWAT model, watershed, North of Morocco.*

Home design for flood prevention

Smart home in the cities

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Abstract— Before a disaster disrupts the functioning of a society, the majority of people likely to be affected by the event are engaged in routines. Unless a specific event comes to reactivate the memory, the eventuality of a catastrophe is not envisaged. Natural disasters are relatively rare in the course of a lifetime. The application of an adequate measures must essentially involve the relay of the public authorities, but also supposes that the exposed populations feel concerned by the problem.

Indeed, the involvement of the populations remains an essential element for the effective operationalization of the means on the ground.

Keywords: *component; Design, flood, smart, home, model, prevention, cities*

Numerical study of a non-isothermal refrigerated truck

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Abstract— In Morocco, road freight transport of perishable goods is characterized by a low price / quality ratio. For many Moroccan companies, this is not a problem as it is inexpensive. Indeed, with the liberalization of the economy and the arrival on the market of major European distributors, these imperatives of quality and speed should emerge. For this reason, Moroccan regulations in force on all types of refrigerated vehicles require the application of compliance agreements to the ATP (Agreement on the International Transport of Perishable Goods and Special Equipment for Use in this Transport) for the traffic.

However, the respect of the cold chain is fundamental for the good conservation of perishable goods; hence, the need to monitor the temperature of this chain from the place of production to the place of consumption. This need must be carried by reducing the time between harvesting, slaughtering, catching or milking and cooling of products. It is widely accepted that on a global production of these cold-sensitive products, estimated at 450 million tones, 10% are traded internationally. This type of trade imposes particular constraints on the refrigeration techniques to which against them.

Perishable goods are considered sensitive goods and must be subjected to cold early and continuously. These two conditions are binding on all transport links to maintain their future value on the market. The transportation and marketing of these products requires the implementation of appropriate techniques to protect them, as continuously as possible, against changes in the outside temperature. In this context, this work presents a numerical study of the heat transfer in a refrigerated truck.

This study was conducted in COMSOL Multiphysics to simulate asymmetric turbulent flow using Unsteady Reynolds-Averaged Navier-Stokes Equations (URANS). Integrating the heat equation as a function of time into the URANS equations, so we combine two phenomena, fluid dynamics and heat transfer, to analyze air velocity and temperature distribution. To achieve that, we are interested in the insulation of truck mainly intended for the transport of products over a period of a few hours. The walls of the simulated truck consist of multilayer insulating panels (polyester, polyurethane and plywood).

Keywords: refrigerated truck, RANS, non-isothermal flow, heat transfer, forced convection.

Assessment of mechanical and thermal performances of a ceramic product incorporating an industrial waste

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Abstract— Green building materials have recently attracted attention due to sustainability issues. Sludge generated by the treatment of industrial wastewater from a sanitary ceramic manufacturing industry was used in this study as an alternative raw material in the manufacture of construction products, in particular fired clay bricks.

This work has two main objectives: the first is environmental and the second is rather economic. This research is based on the study of the thermal and mechanical properties of the new prepared construction material.

The brick samples were prepared by substituting 10% to 70% of clay by sludge, i.e. a range of sludge contents from 0 to 70%, and heating to a temperature of about 920°C. Tests were carried out to determine the thermal and mechanical properties. These tests showed that the mechanical and thermal properties of the bricks depend on the amount of sludge incorporated.

Therefore, it concludes that the amount of sludge that can be incorporated is approximately 50%. It has been shown that the incorporation of sludge into the mixture considerably reduces thermal conductivity and diffusivity. Thus, the thermal insulation capacity has been improved. Samples containing up to 50% sludge still have high mechanical strength values compared to control bricks.

Keywords: industrial waste, conductivity, diffusivity, mechanical strength, fired bricks.

Sales manager-coach: literature review

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Abstract— The sales manager plays a vital role in either the success or failure of an organization (Good,1993; Phillips, 2014). To improve performance, organizations are increasingly tending to replace sales force management with sales coaching (Levine & al., 2003). Indeed, coaching provides a competitive advantage (Pousa & Mathieu, 2015) that allows companies to differentiate themselves from each other with better business performance (Eaton, 1999; Manukutty, 2005). Several organizations such as AT&T and IBM have replaced the word "manager" with "coach" to demonstrate their commitment to evolve towards a culture where development and growth are highly valued (Warah, 2005).

At first, we seek to define coaching and sales coaching. Subsequently, we analyze the different research conducted on managerial coaching in the sales field and see how the sales manager coach influences the sales performance of his team.

Historically, coaching was used for the first time in England in the 1500s to designate a particular type of transportation since it originally consisted of a practice designed to facilitate the passage of people from one place to another, but without carrying them (Warah, 2005). Later, organizations adopted coaching after noting its exceptional impact on athlete performance (McNutt & Wright, 1995; Shannahan & al., 2013). Sales coaching is defined by the Corportate Executive Board- CEB as a continuous and dynamic series of interactions between a sales manager and his subordinate, designed to diagnose, correct or reinforce the behaviors specific to that individual.

Coaching adopted by managers has become increasingly popular with Cutterbuck (2009) who reports that most studies of organizations have shown that line managers can be effective coaches to very effective. Many studies have demonstrated the importance of the coaching approach in the managerial process. In fact, almost 94% of people recommend that their new managers receive training on coaching before they start managing them (Medland & Stern, 2009). The best way for managers to learn coaching is when they, themselves, have been coached through effective managerial coaching programs; such as the practice of senior managers coaching junior managers in management, for example (Wade, 2004; Longenecker & Neubert, 2005).

Literature review shows that the sales team needs to be accompanied and directed in real time in the field. In this way, the sales manager coach controls not only the amount of work but also the quality of achievement. Several studies highlight the importance of managerial coaching in the development of individuals and the impact it has on their professional performance (Marsh, 1992; Starr, 2004; Pousa & Mathieu, 2014, 2015).

Keywords: *coaching, sales coaching, managerial coaching, sales performance, saleforce management, goal achievement, sales manager coach, style of management.*

Impact de la décentralisation fiscale sur le niveau de développement au niveau local au Maroc : Une analyse empirique à l'aide l'approche ARDL en séries chronologiques

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Abstract— L'objectif poursuivi dans le présent papier est d'évaluer, durant la période 2002-2017, l'impact de la décentralisation fiscale sur le niveau de développement au niveau local au Maroc, approchée par la variable PIB/habitant. A cet effet, nous avons calculé deux indices de décentralisation fiscale (recettes (IDFR) et dépenses (IDFD)) qui sont alternativement les variables exogènes des deux modèles estimés en utilisant les techniques économétriques en séries chronologiques. Les variables de contrôle retenues sont la formation brute de capital fixe (FBCF) et le taux de croissance de la population (TxPOP). Les résultats empiriques de l'étude montrent que le modèle de décentralisation fiscale mesurée par les dépenses n'est pas significatif. Toutefois, la décentralisation fiscale mesurée par les recettes a un impact significatif et négatif sur l'inclusion sociale. Ce constat indique que le processus de décentralisation fiscale n'a pas abouti au Maroc. La mobilisation des recettes fiscales locales pourrait dépendre non seulement du système de décentralisation fiscale adopté, mais d'autres facteurs politiques, socio-économiques, démographiques, etc.

Keywords: Décentralisation fiscal, développement, niveau local

Logistics information systems and traceability of pharmaceutical products in public hospitals in Morocco: what solutions to improve the supply chain?

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Abstract— The availability of medicines in hospitals is an essential component in the care of patients. Indeed, pharmaceutical products are an important focus of the 2012-2016 action plan of the Department of Health in Morocco.

Our communication will begin with a bibliographical research on the relationship between information systems and logistic traceability more specifically pharmaceutical products in state hospitals in Morocco. Thereafter, we will diagnose the general situation of pharmaceutical supply chain management in Moroccan hospitals in order to present the mapping of the logistics chain of medicines and distribution in Morocco to understand the different flow and main actors intervening during the passage and the traceability of the drugs on a classification of 3 categories of malfunctions namely: Organizational, human and technical, which will help us to pose solutions well adapted to our problematic.

Pharmaceutical supply management is a process that is at the center of optimization concerns at the hospital because it is vital to the act of care, as Hassan (2010) states.

In addition, the logistics chain linking the various players through links creates an integrated information system connecting the different partners of this chain. In addition, we know that an information system (IS) is a subsystem of the organization whose purpose is to collect information, store it, process it and disseminate it in the operating system and in the steering system.

Then we will be based on the analysis and the treatment of the results of a questionnaire on the reverse logistics traceability of pharmaceutical products in Morocco. Given that the supply chain of medicines in Morocco is experiencing several problems in the distribution between depots and health facilities, especially in terms of the lack of information systems to manage the processes of internal procurement. total absence of reverse logistics at the level of drugs. This is why we are going to try to set up information system modeling between health facilities in the Casablanca region.

However, the efficient use of resources and the search for optimal patient service stimulates the search for an effective solution for hospital management. Difficulties in optimizing flows and stocks make it necessary for managers to find difficult balances and to look for new ways to rationalize expenses and provide refined solutions to these new problems. In this context, this research aims at proposing solutions aimed at reducing the financial impact of product consumption, managing inventories, limiting waste and providing better inventory tracking and traceability of service products.

Keywords: *Information system, reverse logistics, hospital logistics, medication management, logistics traceability.*

The ERP, for effective governance of the tourism sector

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Abstract— At the beginning of the 21st century, the challenges of business in general and particularly of the tourism sector are related to the issues of good management practice that relates to strategic planning, efficient management practice and quality assessment of all services of the company.

The definition of all of these good management practices summarized in good governance comprises several elements: the transparency, the coherence, the stakeholder participation and coordination, the evaluation of results and making appropriate corrections as well as the accountability of each actor. With regard to the world of tourism, this concept applies to the three aspects of their mission: the production of knowledge, the transparent management of resources and budgets, and innovation. The effective use of an ERP system is a major project for tourism companies to achieve in excellent conditions its governance. The complexity of this project lies in the close link between the organization and the information system.

For this, we propose in this presentation a contribution to a methodology and modeling to support the companies of this sector in the study and the analysis of their organization in order to specify their needs with an approach of the architecture of ERP.

Keywords: *ERP, Gouvernance, Tourisme, processus fonctionnel, Système d'information, modélisation,SOA,BPM*

DDoS defense in SDN-based Cloud

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Abstract— Cloud computing has becoming increasingly popular, both among the public and businesses. Moreover, with the adoption of cloud services, the rate of DDoS attacks against cloud infrastructure increases since the traditional DDoS attacks defense techniques are unable to protect the large-scale network of cloud. During the past years, software defined networking (SDN) has emerged as a new and promising net- working paradigm. In the SDN-based cloud, the primary functions of SDN, including software-based traffic analysis, centralized control over the network, and dynamic network reconfiguration, etc. may greatly defend cloud environment against DDoS attacks. However, SDN itself can be a target of DDoS attacks; while exhausting the SDN controller resources or initiating flow-table overloading attacks at the switch level. In this paper, we first discuss the SDN capabilities which make it an appropriate technology for cloud networking management, and then we present some proposed SDN-based cloud frameworks. Further, we discuss the new security issues and particularly the new trends of DDoS threats introduced over the integration of SDN and cloud computing. In addition, we evaluate some of the existing SDN- based DDoS detection and mitigation solutions, and then we present the proposed frameworks and programming languages to address the challenges of these solutions.

Keywords: *Cloud computing, software defined networking (SDN), Network Security, DDoS attacks, DDoS mitigation*

Recommendation system combined with unsupervised machine learning for decision making in polls

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Abstract— Polls are being used more and more by companies to improve their sales force. With the development of new technologies the piloting of these polls is digitized in a partial way.

Piloting these polls often involves the expertise of a human agent in order to make a judgment onthe results obtained from polls. This is a tedious task for the decision-maker, as it faces a huge and heterogeneous amount of data.

This problem may be mitigated by using a recommendation engine based on the unsupervised machine learning algorithm. This recommendation system (RS) will be oriented towards two axes: decision-making (DM) and machine learning (ML).

In our approach, we use RS for consistency between the user and the recommended items. ML will allow us to include in our list of recommendations, unexpected items, items that are not derived from the algorithmic logic of the recommendation system and to make the system partially autonomous on decision-making (to less involving the recommendation engine). Our approach is divided into a) the recommendation process for decision-making, b) unsupervised ML and c) partial "empowerment" for decision-making.

Keywords— *recommender system, machine learning, polls, unsupervised learning, decision making*

Simulation of the Tsunami risk in the Moroccan coastline: Preliminary results

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Abstract— The coastal zone is a highly complex area because of its location at the interface between land and sea and as a preferred location for many forms of development.
A mega tsunami from the Canary Islands will hit not only the Atlantic coasts of Morocco, but also Spain, Portugal, Great Britain and even reach US shores.
A slight earthquake or possible volcanic eruption can trigger one of the most violent natural disasters in history. Indeed, according to Steven Ward and Simon Day (2001) the west flank of the Cumbre Vieja volcano, located on the island of Palma is unstable and could, as a result of a future eruption, collapse into the ocean. It would be in the worst scenario of a huge piece of 25 km long, 15 wide and 1,400 meters thick that would come off, a total of 500 cubic kilometers of land and rocks. This wave could reach 50 meters of height, once arrived on the Moroccan coasts. In this study, a numerical inundation and vulnerability models are used to identify the location and nature of current and future hazards and risks on the Moroccan coast to better understand the tsunami hazard and vulnerability along the Moroccan coast. We have been working on the correction of coastlines from satellite imagery on Google Earth and the digitization of bathymetric and topographic maps, in order to create digital elevation models (DEM) and have a result on marine flood risk.

Keywords— *Morocco, Atlantic coasts modeling, geohazard, tsunami, mapping.*

A proposal for a multimodal emotion recognition system using deep learning

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Abstract— In our daily life, the use of human machine interfaces has greatly increased. We are surrounded by intelligent machines, virtual assistants and robots, so it's important to make a better relation between these technological advancements and human. For this reason affective computing (AC) become one of the research topics that attracts researchers from different fields such as computer science, psychology and cognitive science. Affective computing (AC) was invented by Rosalind Piccard 1995, which aims to allow intelligent systems recognize and interpret human feeling and emotion. This field has passed in a short time from conventional unimodal analysis to complex systems multimodal. Multimodality is defined by the use of at least two modalities. A majority of research papers in this area describe methods based on visual (facial expressions, gaze, posture …), audio (speech) and physiological dimensions (temperature changes, hear rate variability). There are many applications for the use of emotions in computer science such as telemedicine, e-learning, games, generally artificial intelligence, instant messaging systems, and other forms of telecommunication.

Automatic emotion recognition requires the extraction of essential patterns from the data collected, that's why a class of methods called machine learning has proved effective in the treatment of the desired perception task, since 2010 deep learning techniques begins explore they are increasingly applied in this area and it gives a better results in performance and accuracy. Nowadays, most of research interested by the multimodal emotion recognition, because the data fusion gives supplementary information about the emotion that implies a good accuracy of the result or global decision, several application shown the potential and high performance of data fusion, so in our study, we used a bimodal system based on the recognition of facial expressions and heart rate variability using just a simple webcam. Our aim is the recognition of the six basic emotion defined by Paul Ekman (joy, sad, surprise, angry, neutral, disgust, fear) and stress levels. Our contribution is the proposition a convolutional neural networks architecture (ConvNet, CNN) which is the most popular neural network model being used for image classification problem to use with two large publicly databases: the Japanese Female Facial Expression (JAFFE) Database and Radboud Faces Database (RaFD).

First, we will keep focused on each data alone. To produce a specific setup that gives the best accuracy. Next, we plan to merge the data and improve the architecture for more accuracy and robustness, finally we will make a comparison and discussion between the results obtained from unimodality and multimodality.

Keywords— *Emotion, stress, multimodal, deep neural networks***.**

Intelligent Observatory System on Information Technologies, Social Networks and Infrared to Analyze and Predict Social Mutations

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Abstract—The use of new technologies and industrialization in everyday life have a direct impact on the consequences of cultural, scientific, and demographic change that diversifies and densifies social relations, and makes individuals more interdependent and complementary. The large amount of data (Big Data) derived from the use of New Technologies solutions to generate a knowledge emphasizes the emergence of new values born of Protestantism and which encourage individuals to search for perfection in economic and social activities. The main objective of this paper is to set up an Intelligent Observatory System on Information Technologies and Social Networks to Analyze, Predict, Explain and Better Understand Social Mutations. Therefore, the system that we propose in this paper puts forward social indicators through learning systems and data mining solutions, for qualitative measures and optimized intelligent calculus based on the behavior and interaction of individuals and / or and social groups. Allowing to take all the necessary measures to foresee the risks and to quantify the rate of the negative impact on the social mutation, and to understand the stakes of the social relations in a given society (For example: the passage from an ideology to a other, disappearance of cultures and appearance of others). This article discusses challenges and role of Big Data Analytics in Social Mutations sector through the use of the new technologies. Following a qualitative approach, this paper reveals the actions currently undertaken by the two categories in the Morocain societies in order to understand their internal and external behaviour.

Keywords—*National Observatory, Social Transfer, Information Technology,Social Networks, Big-Data*

Seismic vulnerability assessment of reinforced concrete buildings and establishment of fragility curves as a structural damage prevention criterion for the Moroccan real estate

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Abstract— Earthquakes are one of the most feared natural disasters by their nature and their unpredictable violence. Until now, it is still impossible to predict earthquakes in an acceptable way. The nature of the data needed to predict the exact date, magnitude and location of an earthquake is still unpredictable, but this can be assessed by taking appropriate measures to limit the loss and material damage caused by earthquakes.

The prediction of damage to a building during an earthquake is the major concern of engineers and researchers in earthquake engineering. The use of a mechanism to identify the dispersion of damage to a reinforced concrete structure according to the ranges of values and parameters calculated for several earthquakes is necessary.

Thus, Incremental Dynamic Analysis (IDA) which is a non-linear dynamic analysis that offers an immense opportunity to evaluate seismic responses of the structure while combining these results with fragility curves to predict in a probabilistic way the effects of an earthquake on the structure. This work therefore makes it possible to evaluate the ability of these indicators to predict the damage of two projects of structures buildings of reinforced concrete frames, the first is a typical project of the Moroccan real estate park and the second is a structure that allows studying the height setting of the structure and number of floors. In conclusion, determine an order of magnitude of the dispersion of the damage that a structure undergoes during an earthquake characterized by its indicators and parameters.

Keywords— *seismic vulnerability, earthquake, IDA, Nonlinear dynamic analysis, fragility curves, Moroccan real estate stock, sustainable development.*

Addressing Stemming Algorithm for Arabic text using Spark over Hadoop

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Abstract— Hadoop and Apache Spark are two popular big data frameworks that make two things different by working on two different logics. Hadoop is framework for distributed scalable calculation as well as it is strong in distributed storage and hardware commodity for a non-expensive system, it distributes large amounts of data across multiple nodes which makes it not expensive in terms of hardware. Spark is made for a distributed in-Memory computation, it works with distributed data but does not rely on a distributed storage system. In this perspective we try to optimize existing popular Stemming Algorithm representing an essential step for language processing and analysis by reducing words into their base or root.

We will focus on Analyzing the results obtained using Spark over Hadoop, we interest in imple-menting a merger between the two frameworks, highlight this combination, and comprehending their con-cepts of working. In addition, we expose all possible synergies between the two frameworks and the ben-efits of each framework to complete our process. A system based on spark can integrate Hadoop whose Spark can read and write the data through HDFS. Another combination can be done by enriching a pro-cess based on Hadoop by integrating Spark with Hadoop MapReduce, where Spark is 100 time faster than Hadoop MapReduce in execution.

In this paper will provide an interoperability based on the too framework, all we stay focus on our purpose that aims optimizing code side and to keep the persistence of the results provided by the essential algorithm in terms of precision of the basic words in output, as well as to minimize the execution time and the use of the material by implementing the clustering approach.

In comparison with our first optimization test using the Hadoop MapReduce model, it turns out that our work has revealed a lot of parameters in operation for the two frameworks in the phase of combi-nation, as well as the success in arriving at the results described in the main objective and also giving de-tail of our algorithm steps by untwisting the phases of the MapReduce model.

Towards the end of this paper a clear perception will be designed to benefit from advantage of the characteristics and performance of the two frameworks. the results of our work include visualizations on the consumption aspect of the CPU and the memory as well as the logical side of parallelism minimizing the parameter of time of execution.

Keywords: *Stemming Algorithm, Spark, Hadoop, Clustering*

Analysing social media opinions using the ANN classifier optimized by PSO and ABC

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Abstract— Sentiment analysis deals with the identification and classification of opinions or feelings expressed in texts. Microblogging has become a very popular communication tool between Internet users. Millions of messages appear daily on known websites that provide micro-blogging services such as Twitter, Facebook, LinkedIn, Google+. The authors of these messages write about their lives, share opinions on a variety of topics and discuss intellectual issues. The purpose of this work is to analyse feelings on Twitter in real time using Artificial Neural Network (ANN) optimization by Particle Swarm Optimization (PSO) and Artificial Bee Colony (ABC) Classifier to identify positive, negative or neutral feelings of Internet users. In this paper, the accent was on monitoring Internet user's satisfaction on the proposal of an architecture for analysing feelings.

Keywords: *Sentiment analysis, Machine learning, Particle Swarm Optimization, Artificial Bee Colony*

The optimization of resources within the implementation of a big data solution

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Abstract— Every day we notice and witness the creation of a very significant volumes of data from user-data generated automatically on the internet. These data are present in the current information environment in different forms: confidential commercial or government data, large quantity of data, government open data, and linked open data of the Semantic Web. To control and analyze a large amount of data we need powerful tools and varied skills that can give us the ability to store and process big data. Moreover , a problem will arise when we start the procedure on large amounts of data in parallel because clustered computing platforms are complex and difficult environments to manage

In addition, there is a lack of tools to better analyze and optimize such platforms that are therefore an essential element in the implementation of a big data solution. This directly leads to underutilization of available resources and application failures in such an environment. One of the most important challenges is to find the best paralleling method for a particular application running on a parallel computing environment. Large data platforms like Hadoop and Spark use distributed virtual machines along the cluster to perform complex calculations.

While users face the challenge of monitoring and analyzing this complex platform, there is a very significant lack of tools to simplify the management of this infrastructure. Furthermore we find some tools like YARN and Hadoop help to decouple the programming platform from the resource management. However, they do not address the problem of optimizing the performance of applications and clusters. One of the most important challenges is to find the best parallelization strategy for a particular application running on a parallel computing environment

As the information technology field grows and the execution of large amounts of data paves the way, it is important to develop concrete methods to reduce wasted resources and optimize usage at each stage of execution. In particular, new solutions will be needed to simplify the management of Big Data technologies and generate mechanisms to optimize its resources.

In this article , we propose a method based on machine learning algorithms that recommends a parameter of task parallelism in big data workloads. As a solution , we propose a method based on optimizing the parallelism of tasks in clustered applications and by borrowing methods of machine learning. in order to optimize the numbers of the clusters in the implementation of a solution Big Data.

Keywords: *big data, machine learning, yarn, cluster, parallelism, spark*

QoS-CM: An Enhanced Version of QoS-CMS and its Integration in BGP for an End to End Quality of Service

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Abstract— The Internet is in continuous development and the amount of traffic flowing through it is constantly increasing. Indeed, with the development of the Internet of Things, there are tens or even hundreds of millions of devices that will connect to the Internet and exchange data through it. Also, with new technologies like the Web of Data, called Semantic Web, the web is gradually becoming a gigantic database of distributed knowledge. The access to this knowledge database by applications and algorithms using machine learning technologies or "deep learning" will generate additional traffic on the Internet.

Likewise, the Web Real-Time Communication (WebRTC) that is based on the exchange of flows not only between a client and a server but also directly between two clients through applications such as webconferencing or video streaming, is increasing the internet traffic significantly.

To deal with this evolution and to be able to efficiently manage this large amount of Internet traffic, QoS management is crucial. Operators must adapt and develop QoS management techniques initially proposed for IP networks. Ensuring end-to-end QoS in an inter-domain environment is currently the subject of several research work, and creates various on-going challenges. To ensure the interdomain end-to-end QoS, we proposed a new mechanism QoS-CMS. This mechanism introduces a Class Manager server (CM) on each AS, and then, CM servers of neighboring ASes communicate to exchange information about the required QoS. In previous work, we have shown that this mechanism is efficient and allows traffic, that crosses multiple domains, to have a QoS similar to that assigned to it in the initial domain. However, we have noticed that having a CM server for each AS could affect network performances.

In this paper, we propose a new mechanism called QoS-CM, which is an enhanced version of QoS-CMS. QoS-CM avoids some security issues as well as some limitations showen in QoS-CMS's operation. In addition, it is easier to implement our new mechanism than QoS-CMS in routers. A description of QoS-CM as well as a detailed process to integrate it into the inter-domain routing protocol BGP are given.

Keywords: *Inter-domain QoS, End to End QoS, QoS-CMS, BGP Protocol.*

Context Ontology for Semantic IOT Representation

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Abstract— The Internet of Things (IOT) is a new paradigm where everyday Things can be equipped with identifying, sensing, networking and processing capabilities that will allow them to communicate with one another and with other devices and services over the Internet to accomplish some objective. One of the main concepts of the Internet of Things is Machine-to-Machine (M2M) communication. M2M is the association of information and communication technologies, with communicating machines in order to provide them with the means to interact without human intervention. Domains of application are thus very broad: energy management, medical diagnostic aid, comfort of life, ….etc. Eventually, IoT devices will be ubiquitous, context-aware. Then, Things in this domain are sensitive to the context and must be able to perceive it to adapt their behaviors to this context, taking into consideration data that deals with the context of use. The notions of semantics have a growing place, because more than ever they appear as a solution to problems: of interoperability, of heterogeneity, and interpretation of data and services.

A real challenge is to define a generic approach for the semantization of data in the objectives: (1) promote interoperability between things, (2) make the data exploitable automatically, (3) And manage the context of the things and the sensitivity to the latter. The challenge now lies in the use of these data. The best approach seems to be to associate semantics with these contextual data through ontologies. In this paper, our proposal focuses in particular on the use of a Context Ontology for the semantic representation of things of IOT. Some proposed solutions to resolve conflicts that may arise between the contexts of things are also presented in this paper.

Keywords: *Internet of Things (IoT), sementic, Ontology, Context, Ubiquitous Environment, Context-aware.*

Cloudification of IoT : Security Issues and Challenges

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Abstract— Internet of Things has become one of the most emerging technologies now days, which is growing rapidly in the telecommunications field. It is a network of physical objects, peoples, vehicles, buildings, and other items, which are having a unique identity and are able to interchange data using embedded electronics, sensors, and software equipment to reach common goals. The large scale of real time information collected and exchanged between things or objects can represent a gold opportunities for organizations to make better decisions regarding customer satisfaction. In the other hand, private users can benefit from the data collected in different ways for different fields such as e-health, enhanced learning, and assisted living. However, the amount of data col-lected from different objects in IoT grows exponentially which represent a big challenge in term of storing and processing. Cloud Computing has emerged as a key technology to solve the problem of IoT data storage and processing as it offers a multiple choice of resources provided by cloud service provider including storage, processing, memory and network bandwidth. In this paper, we present a state of art for security issues and solutions proposed for data integration of IoT and Cloud Computing.

Keywords — *Internet of Things, Cloud Computing, Security, Data.*

An Improved Swarm Intelligence Algorithm based big data analytics for IoT devices

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Abstract— Internet of Things is a new technology, based on the combination of embedded devices and intelligent software connected to the Internet, which opens new perspectives for the development of applications and services. The quality of these services depends largely on the processing of IoT data. Due to the wide range, huge volume and high speed of IoT data, swarm intelligence algorithms such as ant colony optimization algorithm (ACO) can be made the processing of these data much faster and effective.We gift the present swarm intelligence-based algorithms with their main applications, then we have a tendency to gift existing IoT-based systems that use SI-based algorithms. Finally, we have a tendency to discuss trends to gather swarm intelligence and IoT-based systems. This review can pave the trail for future studies to simply select the suitable SI-based formula for IoT-based systems. For this, we will try to propose a swarm intelligence algorithm with a flexible parameterization to optimize the IoT processes

Keywords: *Internet of Things, big data, swarm intelligence algorithms, ant colony optimization*

Protection of the Internet of Things devices based on TPM technology

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Abstract— Nowadays, the Internet of Things (IoT) is achieving more and more importance, since networks of physical objects embedded with electronic components, software and sensors are gaining popularity. The connectivity of such objects becomes crucial for the services and functionalities provided by the Internet of Things, which can be used for a great range of purposes: a network of cars sharing traffic information, a network of medical services, etc.

However, security and privacy for IoT is receiving a lot of attention within the research community. Due to the upcoming broad use and importance of these application in daily life, similar trust and security requirements are coming up, where the application of TC or at least the integration of a Trusted Platform Module (TPM) could increase system security and performance. The objective of this thesis is to solve this problem. Nevertheless, it has been mathematically proven that this problem cannot be solved via software-based solutions; i. e. software cannot protect software. The way to address this issue is through trusted element-based solutions. the .Trusted Platform Module. (TPM), with which it will be possible to establish a chain of trust, which not only gives trust in the platform integrity, but also delivers a trust reference for applications and operating systems and can also support safety for critical applications.

Keywords: *Internet of Things (IoT), Security, Trust, Trusted Platform Module (TPM).*

The blockchain use for the security of deployments of the Internet of Things

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Abstract— The abstract is a mandatory element that should summarize the con- tents of the paper and should contain 15-250 words. Abstract and keywords are made freely available in SpringerLink.

By 2020, the Gartner Institute, the renowned information technology research company, estimates that the number of connected objects on the market could reach 50 billion. Smart homes, as a typical IoT application, provide devices with various practical applications, but are facing problems of security and privacy. The Blockchain (BC) technology has provided a potential solution to the problem of IoT security. The emergence of this technology has brought about a shift in decentralized management, providing an effective solution for protecting network security and privacy. In this paper, we propose a blockchain modeling by hypergraph theory. The objectives of this model are to reduce storage consumption and solve additional security issues.

Keywords: *Internet of things, hypergraph, security, smart home, blockchain*

REMOTE SENSING/GIS FOR INTEGRATED WATER RESOURCE MANAGEMENT IN DOUKKALA ABDA

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Abstract— Moroccan agriculture represents one of the main sectors of the national economy, one concentrates almost 40% of the job offers, that is why Morocco launched several projects which aim to save the water resources and to facilitate the access for farmers through the regional agricultural development offices which are responsible for the management of large-scale irrigation schemes and for our case at the Doukkala Abda scale. And The traditional management of irrigation projects, as well as the multitude and diversity of issues to be managed are the main obstacles to evaluation of this profession. Indeed, in order to better control the irrigated area and manage the water resources intended for irrigation, it is necessary to integrate the computer technologies and more particularly the geographical information systems since the spatial dimension presents itself an element basic in this business.

Through the spatio-temporal, and as well of study of Sentinel 2 satellite image, and through study the impact of climate change on water resources in the Oued Oum Rbai Watershed which is considered one of the most important water resources in this region,and as will of conceptual data model and logical model of the data for to analyze geospatial data.

The classification of geospatial data is an important step in the geo-treatment of the geographic database in order to correctly model the watersheds of the Doukkala study area Abda.This study of integrated water resources management represents a graphic presentation of spatial and attribute data, and in the form of thematic maps and spatial-temporal maps analyzes summarize in the last years the evolution and the change up to current state of hydrographic networks.This study allows decision-makers to conserve these water resources, and includes this study in projects that meet environmental and sustainable development standards.

Keywords— *GIS, Remonte Sensing, Doukkala Abda, Water Resources Management, geo-spatial database*

Decision support system for water resources management in the West Mediterranean area – Morocco

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Abstract— Sustainable management of water resources has become a major concern in many countries. Morocco has implemented a water resources management policy that has allowed a relatively efficient mobilization of conventional, surface and underground resources available to it. The main purpose of this study is to diagnose the area of action (West Mediterranean area) to compare the state of water resources over a period of 20 years based on geographic information systems (GIS) and remote sensing. To achieve this goal, the methodological approach adopted is summarized as follows: different data were collected and processed for the design of the maps (Land cover map, map of the different systems, map of water requirements ...), These data will be subject to some geo-processing, this can be considered an addition for interpretation and decision-making. The comparison results were transposed on digital maps to find a decrease in water resources due to several factors such as urbanization.

Keywords— *Water Resources, GIS, Remote Sensing, Maps, Interpretation, Decision-Making, Comparison.*

Smart Geoportal for efficient governance: a case study municipality of M'diq

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Abstract—The land management has seen the implementation of innovative new digital tools to enhance urban development in cities and improves their governance. The Smart governance is based on the federation of new technologies while allowing interoperability between different urban services, and offering free access to data and information. It is based on the close and real- time interaction between citizens and decision-makers to ensure a performance of urban services while allowing the capitalization of skills.

To do that, digital tools like GIS platforms and Geoportals, have been widely used to improve the performance of public services and the degree of citizen satisfaction.

In this paper we consider a smart Geoportal project of the city of M'diq as a decision-making platform covering:

•Territorial data layers: basic infrastructure (utility networks: water, waste, electricity, telecommunication), urban planning, tourism, heritage, renewable energies (solar cadaster), transportation and mobility, agriculture, environment (DTM, hydrology, land use and occupation, ...). All this geographic data is superimposed and visualized in interactive digital map format with enabling navigation and spatial research.

•3D model: an interactive 3d model offers a three-dimensional representation of our city, this dimension is very useful for several applications such as risk management (flooding, landslides…), solar cadastre (solar potential of roofs), urban planning (implementation of a building) ... for this reason a 3d model must be a basic support for any smart Geoportal.

•BI management tools for municipal decision-making: a set of geo-decisional tools analyze and reduce the big geographical data of public services in the form of reports, dynamic dashboards, graphs, statistics, etc.) to facilitate the process of decision-making for managers and municipal decision-makers.

The M'diqGeos Geoportal consists on several interactive modules, each module represents one of a public service with an own business functionality, a geospatial analysis tools and dashboards.

This platform is a demonstration of the use of geoportals for smart governance in the implementation of smart city projects that require complex interactions, which need to be simplified between government, citizens and public services through these tools.

Keywords— *Smart city, Smart Governance, Geoportal, Web-GIS, public services, decision-making*

Ambulance Detection System

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Abstract— Nowadays, with the increase of vehicles on road, ambulances must wait in traffic which delays their arrival at their destination. The excellence of the emergency service depends on how fast the emergency vehicles can reach the incident location. If the emergency vehicle gets stuck in a traffic jam and its arrival at the incident location is delayed, it can cause the loss of lives and property. There is a need of an automatic ambulance detection system which plays an important role for priority systems by managing traffic signal networks. This system can be also used in monitoring traffic rules and regulation systems to allow, for example, accessing speed limits for these emergency vehicles without sending an alert for violation law. Ambulance detection system can be also used in self- guided vehicles.

In this review, we present a concise overview on many machine learning models we used in building this system. These models are based on two main stages: feature extraction step and classification step. Several techniques can be used for each stage. In the first step, we used three different kinds of descriptors: Local Binary Patterns, Histogram Oriented Gradient and Gabor filter. In the second step, we used two classifiers: SVM (Support vector machine) and kNN (k Nearest-Neighbor). In fact, the principle of SVM classification is to find a hyper plane, which makes the classification of multidimensional space maximized. In k-NN classification, the output is a class membership. An object is classified by a plurality vote of its neighbors, with the object being assigned to the most common class among its k nearest neighbors. For experiments, we implemented these algorithms in Matlab on a Lenovo ThinkPad with a processor Intel Core i5 7th Generation CPU @2.50GHz 271GHz, RAM 8Go. We've gathered a data set of ambulance images from ImageNet database. This data set includes ambulance images from different views. This step is very important because the quality and quantity of data that you gather will directly determine how good your predictive model can be. Furthermore, the parameters are set as follows: the kernel function of SVM is the linear kernel, the parameter k of kNN classifier is set to 4 and 1 (by default) and the distance metric is either Euclidean (by default) or cosine. To evaluate the performance of our models, we calculated many parameters: True Positive, False Positive, False Negative, True Negative, accuracy and runtime. Evaluation allows us to test our models against data that has never been used for training. In fact, our achieved results show that the ambulance detection system can be successfully exploited for the previous applications.

Keywords— *Machine learning, Ambulance Detection, Emergency vehicles, Medicine, Classification, Feature Extraction*

On the integration of dynamic inductive charging in the electrical network

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Abstract— The struggle for limiting the greenhouse effect has led to deep transformation in both industries and residential sector. Even tough, transportations are still very oil dependent and a high penetration of Electrical Vehicles (EV) could be a way to overcome this concern. In recent years, many efforts made by academic researchers and automobile manufacturers resulted in the development of new all-electrical vehicles but they are still facing autonomy matters and even if these issues has to be solved, the current electrical network would not be able to afford the new electrical demand during charging cycles ; A system integrated with the road infrastructure that allows a continuous energy supply with limiting the use of heavy and bulky batteries could optimize the design of the vehicles and effectively allocate the electrical demand on the network.

Dynamic wireless charging technics under hypothesis of high penetration rate of electrical vehicles appear to be a sustainable solution to be integrated in transportation systems for lowering carbon dioxide emissions in long distance rides. Wireless charging on highways not only represents a very interesting option with the characteristics presented above but it seems more realistic than systems integrated on urban areas because it remains less expensive and easier to build.

Many works have been done to provide both theoretical basis and concrete Proof of Concept of these systems with encouraging results in terms of efficiency and dynamic response. Even tough, none has tried to study the impact of such systems on the electrical network and how far it represents a good alternative to static charging (wireless or by cable) essentially because the researches focuses more on the design of the system rather than on its grid impact by making assumptions of a unique vehicle running on the road. Additionally, current works also focuses on systems designed for a specific car with specific characteristics.

Our paper aims to go further by analyzing how a dynamic wireless charging system integrated on a highway with different car traffic scenarios (low, normal and high) and with different car and road characteristics (size, speed, acceleration, etc) would drive the electricity demand on the network. Our works also explores how the massive recourse to power electronics devices such as inverters in wireless charging infrastructure constrains the electrical power quality that flows to the system. The results of this study allow thinking on grid constraints to sustainably host dynamic wireless charging systems.

Keywords— *Contactless Charger, Dynamic inductive charging, smart grid, Electrical Vehicle*

Temperature-electrical resistivity dependence of CdAs2 in view of variable range Hopping mofels

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Abstract—In this study, we present the temperature dependent of electrical resistivity in four samples of n-type CdAs2 semiconductors in order to identify the dominant conduction mechanism. The experimental data have been measured at low temperature down to 1.6K on the insulating side of the metal-insulator transition. The measurements investigated show variable range hopping (VRH) conduction law $\rho = \rho 0 \exp(T0/T)p$. In two samples (1) and (2), Efros-Shklovskii (ES) variable range hopping (VRH) is observed with p=0.5 at very low temperatures. This is assumed to occur because of the creation of the Coulomb gap (CG) in the vicinity of the Fermi level. With increasing temperature, the CG vanishes and the measured conductivity can be described by the Mott VRH model with p=0.25, where the density of states is constant. The criterion of the crossover from ES to Mott VRH is assessed by extracting the related parameters. In the other two samples (3 and 4), we have observed another crossover for hopping process indicating a new contribution appears in the resistivity. This finding may highlight and explain, in a way, the relationship between temperature and the electrical resistivity and may find potential applications in semiconductor material.

Keywords—*Semiconductors, transport mechanisms, electrical resistivity, variable range hopping, Coulomb gap.*

Electrochemical Determination of cadmium (II) using car- bon paste electrode modified by an organic coal

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Abstract— Heavy metals are major contributors to the environmental pollution because of their involvement in many natural and industrial processes.

Prolonged exposure to Heavy metals especially cadmium, can cause kidney damage, bone fragility, respiratory disturbance, disorders of reproduction as well as an increased risk of cancer.

The aim of this work is to develop electrochemical sensors able to detect cadmium ions, in several matrices; These sensors are characterized by their sensitivity to the Cd2 + even at low concentrations.

For this finality an electrochemical system used carbon paste electrodes modified by a coal synthetized by an organic waste has been employed. The analyses were conducted by cyclic voltammetry, SWV and impedance spectroscopy. Maximum current intensity are obtained when Optimum conditions take place. Such as the deposition potential and time, buffer solution Types, and pH.

The results of these analyses showed that our electrode represent a good sensitivity of cadmium ions detection, with a very low detection limit. Which achieves the concentration of 10-6mol/l.

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Keywords— *Cadmuim (II), coal , square wave voltammetry, Tape water*

Introduce artificial intelligence in controlling a solar tracker

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Abstract— According to the report on the global status of renewable energies 2016 published by REN21 (RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY) the production of solar photovoltaic energy for the year 2015 reached 227GW with more than 50GW compared to the year 2014 that was 177GW this rapid growth is due to research and dedicated scientific developments for this type of energies all these last have the same goal to improve the energy production capacity of these panels.

In order to increase the efficiency of the solar panels, we have thought about the design and the realization of a two-axis solar tracker, which will allow the panels to follow the sun and to have the optimal position where there is the maximum of solar power that our panel can acquire.

In principle, our system consists of three cards, the first one is the acquisition card or the sensors card it delivers the information on the position of the sun, the second is the control card where we have programmed our algorithm which is responsible for continuously regulating of the position of our tracker, the third is a power card that acts as the intermediary between the control board and the actuators (the two motors of the two axes).

By using a PID algorithm and after a real test of our solar tracker it was found that the regulation is done in a correct way but we noticed that the actuators consume a lot of energy to keep the optimal position and we lose the information after the position change, this is why we introduced the notion of artificial intelligence through the development of an algorithm based on advanced fuzzy logic with adaptable rules.

Our algorithm will replace the old algorithm (PID) to control the movement of the axes of our tracker as well to find the optimal point where there is the maximum of solar irradiation. Our algorithm will also memorize all the optimal points found during the day for used as much as references and to add it's as the elements that constitute these rules taking into account also the energy consumption of the system. Our system is developed from such a fate to be reliable, fair and tough

Keywords: *Static DC / AC Inverter, Renewable energies, Electrical mobility, artificial intelligence, Machine Learning, average probability of failure on request PFDavg,*

Power Quality Improvement of Grid Connected PV Systems with Non Linear Controller

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Abstract— The proposed system is shown in Fig.1 consists of a photovoltaic panel and boost converter, a NPC three level inverter connected to the grid and a non-linear load consisting of a diode rectifier bridge supplying the RL load.

The proposed system consists of a photovoltaic panel connected to the boost converter, a NPC three level inverter connected to the grid and a non-linear load consisting of a diode rectifier bridge supplying the RL load.

The control of photovoltaic panel must ensure the extraction of the power, a maximum point tracker (MPPT) accomplishes this. In this paper, an approach for peak power tracking using the sliding mode control (SMC) is proposed (equations 1). The stability and robustness of the controller are addressed. The performance of the controller is verified through simulations and compared (Fig.3) with Fuzzy Logic (FLC).

Keywords: *mppt, fuzzy logic, sliding mode, boost converter, grid, fuzzy logic controller, npc inverter, multilevel inverter, power quality*

DSP based Emulator of permanent magnet synchronous motor used in electric mobility

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Abstract— The permanent magnet synchronous machine (PMSM) is widely used in electric traction, given its performance in terms of torque, inertia and mass power. The development of power electronics and programmable circuits (Microcontrollers, DSP, FPGA) facilitated its order, which remained difficult for a long time to implement.

Experimental validation of the control algorithms of the synchronous machine remains difficult because of the lack of hardware. In this paper, we demonstrate the possibility of making an emulator of the PMSM based on a DSP.

We have established the electrical and mechanical model of the PMSM from the equations governing its operation, the model is programmed and validated under the Matlab / Simulink® environment and PSim. The model is then implemented in the Texas Instrument® DSP. The emulator receives control voltages from a three-phase inverter, calculates currents, velocity, position, magnetic flux, and electromagnetic torque, and transmits the values in analog form to its DAC outputs.

The emulator thus produced allows the testing of PMSM control algorithms without the need for a real machine. In order to adjust the parameters of the machine, we have developed a communication interface with the DSP in real time, which also allows the visualization of all the quantities of the machine: voltages, currents, torque, ...

Keywords: *Modeling; permanent magnet synchronous machine PMSM; emulator; electric traction; DSP.*

Efficiency energy standards and labelling for residential appliances in Morocco

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Abstract— The emergence of new electrical appliances is the origin of the exponential increase in energy demand per capita in Morocco. The present paper focuses on improving energy efficiency for residential equipment in Morocco, through the requirement of a minimum energy performance standards and a labelling system that will guide the consumer to buy performant equipment. Detailed study of labelling scenarios as well as performance standards are elaborated for Tree appliances: televisions (TVs), refrigerators and air conditioners. For each considered product, we estimated the real consumption and the gain by introducing higher energy efficiency relative to a specific efficiency energy indicators and baseline technology. The results show that this project constitutes a Major source of energy conservation and affects the goals of Moroccan strategy in efficiency energy.

Keywords: *Energy efficiency, labeling, MEPS Minimum Energy Performance Standards*

Theoretical study of New Compounds (D1-BT-EDOT-BT-D2-A) based on (3, 4-Ethylenedioxythiophene) (EDOT) and Benzothiadiazole (BT) for dye sensitized solar cells

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Abstract— Dye-sensitized solar cells (DSSCs) have increasingly attracted research interest for their abilities to convert solar light to electricity, at a low cost since the breakthrough in conversion efficiency that Grätzel and co-workers made with Ru-based photosensitizes. In general, at the heart of DSSCs lie sensitizers composed of dye molecules due to their function in light absorption and injection of photo-induced excited electron into the conduction band (CB) of TiO2 semiconductor. Organic photovoltaic devices (OPVs) have excellent advantages such as low cost of large-volume manufacturing, flexibility and lightweight. The electron-donating and accepting strengths have been proven to be major control variables for increasing the energy conversion efficiency. In this paper, a novel theoretical tool for some new low-band-gap copolymers has been developed on the basis of density functional theory (DFT) quantum chemical calculations to model their optoelectronic properties. We investigated the effects of substitution of various electron-donating substituents on the structural and optoelectronic properties of (D1-BT-EDOT-BT-D2-A) structure, bearing the central donor unit (3,4-Ethylenedioxythiophene) (EDOT), same Benzothiadiazole (B) as -acceptor and different donor unit constituted of Thiophene (T), Phenylene (P), Carbazole (C), Fluorene (F) and Antrhacene (A), The cyanoacrylic acid (A) anchoring group leads to more red shift of absorption bands.

The optimized structures and optoelectronic properties of these dyes were investigated by using the Density Functional Theory DFT/B3LYP/6-31G (d, p) method and Time Dependent Density Functional Theory (TD/DFT) calculations. The LUMO and HOMO energy levels of these dyes can ensure a positive effect on the process of electron injection and dye regeneration. In order to predict the band gaps for guiding the synthesis of novel materials with low band gaps, we applied quantum-chemical techniques to calculate the band gaps in several oligomers. The calculated HOMO-LUMO (Egap) gaps and the wavelength of absorption spectrum (max) were compared with the experimental data. A low band gap will be expected in polymers containing Thiophene repeating units. Furthermore, several quantum chemical properties such as ionization potential (IP), electronaffinity (EA), electrophilicity index ( ), hardness ( ) and chemical potential (μ) were also calculated and thoroughly discussed in the paper. The electrophilicity of this compound is lower than that of the other counterparts, which results in higher open circuit voltage (Voc) value in the photovoltaic device. The calculated results of these dyes demonstrate that these compounds can be used as potential sensitizers for TiO2 nanocrystalline solar cells.

Keywords: *Low band gap, Benzothiadiazole, TD/DFT calculations, Donor-Acceptor, bridging effect, solar cells.*

GENERATION OF Photovoltaic output power forecast using artificial neural networks.

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Abstract— An artificial neural network (ANN) model is used for forecasting the power provided by photovoltaic solar panels using feed forward neural network (FFNN) of a photovoltaic installation located in the city of Mohammedia (Morocco). One year of hourly data on solar irradiance, ambient temperature and output PV power were available for this study. For this, different combinations of inputs with different numbers of hidden neurons were considered. To evaluate this model several statistic parameters were used such as the coefficient of correlation (R), the Root Mean Squared Error (RMSE) and the Mean Absolute Error (MAE). The results of this model tested on unknown data showed that the model works well, with correlation coefficients lying between 96% and 99% for sunny days and between 90% and 95% for cloudy days.

Keywords: *photovoltaic installation, feed forward neural network, artificial neural networks*

A Special Application of Power Electronics to the Field of Photovoltaics

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Abstract— Recent studies and forecasts warn us that the massive use of conventional resources (fossil, coal, hydrocarbons, natural gas) will certainly lead to the total depletion of these reserves. In addition, the world is convinced by the danger of this process on the environment. Solar energy can be considered as an inexhaustible alternative solution, very clean for the environment and important in a sunny country such Morocco. In this paper, authors focus on a special application of power electronics to the field of photovoltaic, which is called MPPT or Maximum Power Point Tracking. Indeed, MPP is dependent on the ambient conditions, if the irradiance or temperature change, the current-voltage and the power –voltage characteristics will change as well, and hence the position of the MPPT may shift. Therefore, changes in the Current-voltage curve have to be tracked continuously such that the operating point can be adjusted to be at the MPP after changes of the ambient conditions. In this context, solar tracking systems are the best devices for maximizing the collected energy by the PV panel whose purpose is to keep the PV panel perpendicular to the incident solar radiation.

The proposed prototype is based on a dual axis solar tracker controlled with a smart mote and MPPT techniques, by using four LDR, Light Dependant Resistors, sensors and two servomotors that will help the movement of the solar panel in both directions (vertical and horizontal), in order to have an optimal angle of incidence on the plate for better performance. In addition, the microcontroller computes the output power and sends it to the computer. Then, the data are displayed in Excel format, which can then be processed and plotted in real-time in graphical form.

Keywords: *MPPT, Solar energy, solar panel, Light Dependant Resistor, servomotor, Arduino uno, angle of incidence.*

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