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BOOK ABSTRACT

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Preface

On behalf of the organizing committee of the Fourth International Conference on Business Intelligence (CBI2018), we would like to welcome all guests and participants. This conference was held at Beni Mellal city, Morocco, in an effort that was jointly by the Faculty of Sciences and Techniques (FST), the laboratory of Information Processing and Decision Support (TIAD) and the Association of Business Intelligence (AMID).

We received more than 90 papers. These items have been sent to members of the program committe for rigourous evaluation. The topics of accepted papers include software engineering, datamining, datawarehousing, telecommunications, signal and image processing. After the review process, we were able to accept 44 as regular papers and 24 as posters.

For the colleagues coming from abroad, we hope they will enjoy their stay in Morocco. Hoping that by the end of the conference they will establish both professional and personal relationships.

We would like to thank the president of Sultan Moulay Slimane, the Dean of Faculty of Sciences and Technics for their support to the conference and everyone who contributed to the success of this conference.

We are highly thankful to keynotes speakers, authors for sumbitting their work for this conference and the IGI global for accepting to publish a special issue of bests accepted papers.

We would like also to thank our sponsors, USMS, FST and AMID for their support, It was not possible to organize conference without their support. Finally, we thank all volunteers, and reviewers who helped to success this event

Organizing committe Chairs

Mohamed FAKIR Mohamed BASLAM Rachid EL AYACHI

Keynote Speeches

Keynote Speech 1 : Analytics and Knowledge Management

Prof. Suliman Hawamdeh
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***Abstract*---**Knowledge management is an interdisciplinary approach to dealing with all aspects of knowledge processes and practices. Many of these activities are critical to the notion of managing data (Big or small) and the relative importance of data as an organizational asset. The long-term preservation and curation of big data as part of the knowledge retention process is crucial to the knowledge discovery process. New areas such as data analytics, big data, and data science have gained popularity in recent years for a number of good reasons. The most obvious reason is the exponential growth in digital information and the challenge of managing data and information on large scale. Given the complexity associated with managing data, organizations must adopt a knowledge management strategy in which data is viewed as a key organizational asset and must be protected. Recent privacy and security issues surrounding emails, social media data and fake news highlighted the importance of managing and securing personal and organizational data. The shift toward the knowledge economy and the realization of the importance of data as an organizational asset has given rise to the importance of analytics within the context of knowledge management. The process of transforming data into actionable knowledge is a complex process that requires the use of powerful machines and advanced analytics techniques and methods. Analytics provides the basis for knowledge discovery and completes the cycle in which knowledge management and knowledge utilization happen. This talk will examine the role of analytics in knowledge management and the integration of big data theories, methods, and techniques into the organizational knowledge management framework.

***Biography*--**Dr. Suliman Hawamdeh is a Professor in College of Information, University of North Texas. He is the director of the Information Science PhD program. One of largest interdisciplinary information science PhD program in the country. He is the editor in Chief of the Journal of Information and Knowledge Management (JIKM) and the editor of a book series on Innovation and Knowledge Management published by World Scientific. Dr. Hawamdeh founded and directed a number of academic programs including the first Master of Science in Knowledge Management in Asia in the School of Communication and Information at Nanyang Technological University in Singapore. Dr. Hawamdeh has extensive industrial experience. He was the Managing Director of ITC Information Technology Consultant Ltd, a company developed and marketed a line of software development products in imaging, document and record management, engineering drawing management, and library automation. He worked as a consultant to several organizations including NEC, Institute of Southeast Asian Studies, Petronas, and Shell.

Dr. Hawamdeh has authored and edited several books on knowledge management including Information and Knowledge Society published by McGraw Hill and Knowledge Management: Cultivating the Knowledge Professionals Published by

Chandos Publishing as well as a number of edited books published by published by World Scientific. In his professional career, Dr. Hawamdeh has delivered several keynote presentations at various conferences and events around the world, including an invited talk at the United Nations World Summit on Information Society, which took place in Tunis in November of 2005. Dr. Hawamdeh served in the capacity of chair and founding chair of several conferences including the International Conference on Knowledge Management (www.ickm-2010.org) and Knowledge and Project Management Symposium (www.kipanet.org). He was the founding president of the Knowledge and Information Professional Association (KIPA) as well as the Information and Knowledge Management Society.

Keynote Speech 2: Splines & Graphics

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Abstract--Splines provide a significant tool for the designing of computationally economical curves and surfaces. This, in return, plays a critical role in the construction of various objects like automobiles, ship hulls, airplane fuselages and wings, propeller blades, shoe insoles, bottles, etc. It also contributes in the description of geological, physical, statistical and even medical phenomena. Moreover, spline methods have also proven to be indispensable in a variety of modern industries, including computer vision, robotics, medical imaging, visualization, Textile, Designing, Painting, and even media.

The major goal of this talk is to stimulate views and provide a source where researchers and practitioners can find the latest developments in the field of splines from the perspectives of Computer Graphics. Due to speedy scientific developments, there is a great deal of thirst among the scientific community worldwide to be equipped with state of the art theory and practice to get their problems solved in diverse areas of various disciplines. Although, a good amount of work has been done by researchers, yet a tremendous interest is increasing everyday due to complicated problems being faced in academia and industry.

This talk also aims to provide a valuable source on the splines and its applications. It focuses on some interdisciplinary methods using splines. It targets to provide the user community with a variety of spline techniques and their Applications necessary for various real life problems. It also aims to collect and disseminate information in various disciplines including Computer Aided Geometric Design, Computer Graphics, Data Visualization, Data Fitting, Power Systems, Clinical and Epidemiologic Studies, Disease Detection, Regression Curves, Social Media, and Biological Studies. The talk is useful for researchers, scientists, practitioners, and many others who seek state of the art techniques and applications using splines. It is also useful for undergraduate senior students as well as graduate students in the areas of Computer Science, Engineering, Health Science, Statistics and Mathematics.

Biography--Muhammad Sarfraz is a Professor and V. Dean of Research and Graduate Studies in Kuwait University. He received his Ph.D. from Brunel University, UK, in 1990. His research interests include Computer Graphics, CAD/CAM, Pattern Recognition, Computer

Vision, Image Processing, and Soft Computing. He is currently working on various projects related to academia and industry and has been keynote/invited speaker at various platforms around the globe. He has advised/supervised around 66 students for their MSc and PhD thesis. He has more than 330 publications in the form of various Books, Book Chapters, journal papers and conference papers. Prof. Sarfraz is member of various professional societies including IEEE, ACM, IVS, IACSIT, and ISOSS. He is a Chair, member of the International Advisory Committees and Organizing Committees of various international conferences, Symposiums and Workshops. He is the reviewer, for many international Journals, Conferences, meetings, and workshops around the world. He is Editor/Guest Editor of various International Conference Proceedings, Books, and Journals. He has achieved a variety of awards in education, research, and administrative services.

Keynote Speech 3 : Legal protection of copyright in cyberspace

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Abstract --The demands made in recent decades for greater protection of copyright in cyberspace reveal a certain concern about the possibility of the current legal framework to be able to ensure the secure legal protection of digitized works and cultural expressions (computer programs). Computer programming, audiovisual works, etc.). These are now circulating in a new virtual space, without borders and beyond the national legal framework. Thus, the main question asked is that of the capacity of national and international legal rules to ensure the respect of copyright in cyberspace especially after the unprecedented rise of the phenomenon of piracy. In addition, a number of solutions have been proposed to guarantee copyright in the digital age, but according to a new legal architecture that is reshaping the general economy on which traditional copyright protection is based.

***Biography*--**Radouane KHOULAFA is Professor of Law (Public Law specialty) at Sultan Moulay Slimane University. He has a PhD in Public Law (French Section) and teaches in the Law Department of the Polydisciplinary Faculty of Beni Mellal. He is an associate member of the Research Laboratory for International Cooperation for Development at Cadi Ayyad University in Marrakech.

Papers Abstracts

Session _1.1: Database and Web environment

Chair : Mohamed Baslam

A Hybrid Multilingual Sentiment Analysis Based on Fuzzy Logic and SentiWordNet

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***Abstract*—**Sentiment Analysis is a new research area that is increased explosively, this domain has become a very active research issue in data mining and natural language processing. Sentiment analysis(opinion mining) consists of analyzing and extracting emotions, opinions or attitudes from product's reviews, movie's reviews..etc, and classify them into classes such as positive, negative and neutral or extract the degree of importance(polarity).In this article, we propose a new hybrid approach for classifying tweets into classes based on the fuzzy logic and a lexicon based approach with the use of SentiWordnet. Our approach consists of classifying tweets according to three classes: positive, negative and neutral using SentiWordNet and the fuzzy logic with its three important steps: Fuzzification, Rule Inference/aggregation and Defuzzification.The dataset of tweets to classify and the result of the classification are stored in the Hadoop Distributed File System(HDFS) and we use the Hadoop MapReduce for the application of our proposal.

***Keywords*—**Twitter,opinion mining, Sentiment analysis, Fuzzy Logic,SentiWordNet, big data, Hadoop

Automatic Learning techniques application for prediction in OLAP Cube

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***Abstract*—**Data warehouses represent collections of data organized to support a process of decision support, and provide an appropriate solution for managing large volumes of data. OLAP online analytics is a technology that complements data warehouses to make data usable and understandable by users, by providing tools for visualization, exploration, and navigation of data-cubes. On the other hand, data mining allows the extraction of knowledge from data with different methods of description, classification, explanation and prediction. As part of this work, we propose new ways to improve existing approaches in the process of decision support. In the continuity of the work treating the coupling between the online analysis and data mining to integrate prediction into OLAP, an approach based on automatic learning with Clustering is proposed in order to partition an initial data cube into dense sub-cubes that could serve as a learning set to build a prediction model. The technique of data mining by regression trees is then applied for each sub-cube to predict the value of a cell.

Keywords*—Data warehouses; automatic learning; OLAP; data mining; Clustering; prediction*

A Meta-modeling Approach for Hadoop Storage Big Data layer

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***Abstract*—** The volume of information collected in the context of Big Data has become important, the sources and formats of this data have become very varied. At the level of the Big Data architecture, the storage layer plays a very important role. It allows the storage of different types of data. At this layer, two types of storage can be distinguished: the Hadoop distributed file system (HDFS) and the NoSQL databases. Indeed, this work relies more particularly on our two research studies we have already done in the world of Big Data and its different solutions; and on our first Meta-modeling of the two layers: Data Sources and Data ingestion. Thus, in this article, we shall continue the application of techniques related to model-driven engineering 'MDE' to provide a universal Meta-modeling for the storage layer at the level of a Big Data system.

***Keywords*—** *Meta-model; Big Data; Storage layer; Model Driven Engineering; NoSQL Databases; HDFS.*

Distributed & Scalable RDF management system based on NoSQL

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***Abstract*—** RDF (Resource Description Framework) is a language standardized by the W3C for the exchange of data on the Web. It provides a formal description of Web resources and their metadata. Today a large amount of RDF data is created and is becoming available. The attention of database and semantic Web communities has been shifted to ensure effective and scalable management of RDF data. Several research and solutions have been proposed and realized to efficiently store RDF data. We discuss in this paper the use of NoSQL (Not Only SQL) databases to store massive amounts of RDF data, we also present an overview of state of the art concerning RDF data storage techniques and solutions in different NoSQL database models.

***Keywords*—** *RDF, NoSQL, Big Data, Distributed Storage.*

From Big Data to Smart Data : Analytics Approach for Decision Making

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***Abstract*—**In the socio-economic world, the concept of Big Data is a leitmotiv. It is defined around four characteristics: the quantity of data, the speed of its processing, the

quality of the information and its value. However, zoom the problem only in its technological aspect is not in favor of Data Analytics approaches. It is necessary to develop intelligence around the available data, so think about "smart data" instead of "big data". In this article, we discuss this new "Smart Data" concept by bringing the state of the art and the main differences with Big Data for decision-making based on real-time data analytics.

Keywords—*Big Data; Smart Data; Data Analytics; Decision making****;***

Challenges of ITIL Implementation Approaches

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Abstract—ITIL (Information technology infrastructure library) is a guide for service providers on the delivery of quality information technology (IT) services, processes, functions and other capabilities needed to support them. It contains a wealth of documented knowledge; however in practice we observe many typical challenges of ITIL implementations approaches. The purpose of this paper is to examine some previous studies about the challenges of ITIL implementation approaches in order to select the most important among them.

Keywords— *ITIL implementation approaches, Implementation challenges, IT service management, the delivery of quality IT services, ITIL.*

Improved results of an OCR via NLP using MapReduce framework

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Abstract—This work deals with the orthographic correction of the text that appears in many areas of natural language processing. Optical Character Recognition (OCR) systems are able to convert printed images to written text, but their results still need to be improved. In this context, several correction

techniques were presented and their numerical results were discussed. A comparative study between the technique of the noisy channel model and the proposed technique is carried out. These techniques are applied in a Big Data system using the Hadoop framework working with the MapReduce programming model and the HDFS file system to improve the results obtained by the OCR system. The numerical results

obtained and presented showed the efficiency and the performance of the technique adopted.

Keywords— Natural Language Processing (TLN), Spell Correction, Automated Processing, Optical Character Recognition, Tesseract, Big Data, Hadoop, MapReduce, HDFS.

Session _1.2: Database & Web environment

Chair : Rachid El Ayachi

Big Data Approach at the service of Business Process Management

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Abstract— A business process is a suite of activities designed by humans and systems to achieve one or more business goals. Among perspectives to be considered for Business Process modeling is data flow which is manipulated by activities of process. By the rapid growth of volume of data that enterprise acquires every day, Business Process Management (BPM) will have to face a big challenge if the company need to design business process that treats very big data. Hence, Business Process Management must proceed to big data Approach to analyze data before its manipulation. In this work, we discuss this Bigdata/BPM synergy where we will try to show how the BPM can handle this huge amount of data using the Big Data approach.

Keywords— *Big Data Analytics, Business Process Management, Business Process.*

Application of data mining to the classification of students in the University of BeniMellal, Morocco

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Abstract—Growth of the number of students is the key to success for the development of a university. Different techniques of analyzing data apply to the classification of students in a university. In this article, we apply some techniques of data mining, which allows us to specify the influence of criteria such as track, average, region, gender on the student's result in order to analyze the existing relation between these criteria and the result. The aim is to make the relevant decisions to classify students according to these criteria

Keywords—*Student Segmentation, Clustering, Classification, Decision Support System, University, Data mining*

Data Lake Vs Data Warehouse Comparative study and key differences

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***Abstract*—** Since data is at the heart of information systems, new technologies and approaches dealing with storing, processing and analyzing data have evolved. Data Warehouses are among the most known approaches that tackle data storing and processing. However, they reached their limits in dealing with large quantities of data as those of Big Data. Consequently, a new concept which is an evolution of Data Warehouse known as "Data Lake" is emerging. This paper presents a detailed analysis that compares the concepts of Data Lake and Data Warehouse. It sheds lights on the aspects and characteristics which distinguish each of the two concepts for the sake of revealing similarities and differences. It also emphasizes the complementary aspects of the two technologies by showing the most appropriate use case of each of them.

***Keywords*—** Data Lake, Data Warehouse, Hadoop, NoSQL, Big Data, Distributed databases, Repository, Data Mart, Ad Hoc.

Word clouds for Opinions Analysis of the University Library Readers

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***Abstract*—**in the recent years, opinion analysis become a vital area of search. This article describes our contribution on the opinions fine detection of the university library readers'. The approach adopted for the readers' opinions analysis using a word clouds. We describe method and the construction of the database. Then we present the results of the application by using R software. In this paper, we found that the most of respondents are slightly stratified from the library service and documentation.

***Keywords*—**opinion analysis; R software; survey; word clouds; library; readers; textmining

An Incremental and Distributed Inference Method for Large Scale Ontologies using Hadoop and SPARK

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Abstract **-** The study of the semantic interoperability and the reasoning over big data is today a major challenge for researchers, especially with the birth of semantic web and deep Data. The existing solutions are not yet able to satisfy the requirements of the final user especially in terms of the consistency of the results and the request execution time. To do this we will need an approach based on an ontology and a distributed and scalable system. Several studies have been done on the reasoning over large scale Ontologies, most are based on Hadoop and MapReduce or non-incremental, ie they recalculate the result at the arrival of new data. In this paper we propose an incremental and distributed method of reasoning over very large OWL Ontologies based on SPARK, which offers a reduced execution time as it loads the RDF triplets in memory and not in disk. Our method allows to create Transfer Inference Forest (TIF) and Effective Assertionnal Triples (EAT) to reduce disk space and simplify and accelerate the reasoning process.

Keywords-- *Big Data, Semantic Web, Ontology reasoning, OWL, OWL Horst, SWRL, SPARQL, Hadoop, SPARK*

A meta-model for diverse data sources in Business Intelligence

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Abstract— Traditional Business Intelligence (BI) systems were limited to classical data sources: structured and semi-structured. With the manifestation and evolution of Internet, several new types of data have emerged (videos, images, audio files, documents…). These new types of data are a gold mine of information that guarantee a better decision-making if considered into BI process. Therefore, designing a data warehouse that gathers structured, semi-structured and unstructured data sources will solve diverse data types integration and storage problems. For this exact reason, we will turn to Model Driven Engineering (MDE) to propose a meta-model that will describe all sort of structured, semi-structured and unstructured data sources such as relational, multidimensional, XML and NoSQL databases. Models conforming this meta-model will serve as an input for our BI process and for designing and modeling a data warehouse.

Keywords— *Business Intelligence; Data sources; Meta-model; Relational; XML; Multidimensional; NoSQL..*

Multi-agent based approach for address geocoding in poorly mapped areas through public company data.

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***Abstract*—** In this study, we present an original method that enhance geocoding system in poorly mapped areas thanks to public company data and multi-agent system. In contrast with industrialized countries, many developing countries lack formal postal address systems assignments and usage, making the operation of translating text based addresses to absolute spatial coordinates, known as geocoding, a big challenge. We recreated a standard of address as it is perceived and used by local people, a kind of non-official national address standard since there is no official one in these areas. Then, we designed a multi agent system in which agents are assigned different tasks of geocoding process and can perform negotiation to achieve global objective: find the best possible match or approximation of a location based on current knowledge. A verification of the usefulness of the proposed approach is made in comparison with Google geocoding API which shows that the proposed approach has great potential to geocode addresses considering local context semantic issues.

Keywords*—geocoding; multi agent; text mining; knowledge discovery; address standard*

Session_1.3: Optimization and Decision support

Chair : Najla Idrissi

Optimal Cut-off Point of HOMA-IR for Predicting Insulin Resistance among Omani: a Machine Learning Approach.

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***Abstract*—**Chronic diseases in Oman pose a challenging threat to public health and Insulin Resistance is known to underpin many of these diseases such as type 2 diabetes, cancer, cardiovascular disease and neurodegenerative diseases. The “gold standard” for investigating and quantifying insulin resistance is the hyperinsulinemic euglycemic clamp. Given the complicated nature of the "clamp" technique, several alternatives have been sought for measuring the insulin resistance. The most popular of these alternatives is probably the Homeostatic Model Assessment commonly known as HOMA. Several studies showed that the cutoff value for insulin resistance depends on the ethnic. In this study, we use Machine Learning (ML) to determine the best cutoff value for Homeostatic Model Assessment of Insulin Resistance (HOMA-IR) among Omani population living in Nizwa area. It includes 1003 adults (range 14-90 years, 42.5% women) from Nizwa, in Al-Dakhiliya governorate, Oman. First we identified the variables that are significantly correlated to HOMA-IR from which we selected the optimal subset to cluster the population into two reference-groups, representing the insulin resistant and reference groups. The measure of overlapping area in the density curves served as an objective function for selecting the optimal predictors subset. The optimal cut-off value for HOMA-IR is identified as the one sproducing the best match

with the reference groups. Matthews Correlation Coefficient (MCC) is used to measure the degree of matching.

For the population in Nizwa, the threshold for HOMA-IR rises from the popular clinical cut-off value of 2.60 to 2.87. The resulting classification has an MCC value of 0.46 and an AUC of 0.71. Moreover we identified the subset consisting of FPG, 2- hours plasma glucose, VLDL, total cholesterol, waist circumference, leptin, and HB1AC as most relevant predictors to Insulin Resistance (IR) condition. We determined the optimal cut-off point for HOMA-IR and a group of predictors.

***Keywords*—**Insulin Resistance, HOMA-IR, K-mean Clutering, Feature Selection, Machine Learning

Optimization of the logistics system for the distribution of petroleum products with ERP system in Morocco

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Abstract—Physical distribution is one of the key functions in logistics systems, involving the flow of products from manufacturing plants or distribution centers through the transportation network to consumers (service stations). It is a very costly function, especially for the distribution industries. Petrol tankers play a fundamental role in every offshore petroleum supply chain. Its optimization is usually divided in three levels: strategic, tactical and operational. Strategic decisions deal with fleet sizing, facility location and capacity sizing. Tactical decisions deal with production and distribution planning, transportation mode selection, storage allocation and order picking strategies. Finally, operational decisions deal with shipment and vehicle dispatching. In this project, the optimization model of delivery of fuel to the final station can be modeled as a Petrol Station Replenishment Problem (PSRP) with ERP system the aim is to support data "drill down," to eliminate the need to reconcile across functions, and to integrate the working of the operations, service and process functions is intended to enable organizations to compete on the performance along the entire supply chain management.

Keywords— Optimization; logistic system; Fuel delivery; Replenishment; ERP system

Dynamic programming and finite horizon Markov Decision Processes

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Abstract— In this work, we are concerned with a finite horizon discounted Markov Decision Process (MDP), namely, a stochastic process running throughout a finite time horizon and upon which a decision-maker should take the care of imposing, according

to the discounted criterion of optimality. Mainly this study elaborate a correspondence (via a transformation) of a stationary infinite horizon model to the standard non-stationary finite horizon model. Since the finite horizon model has an optimal policy in the class of Markov policies with deterministic decision rules, the corresponding infinite horizon MDP model has an optimal policy. Finally, we compared between the backward-induction algorithm used in dynamic Programming (DP) and the iterative solvers of MDPs, namely, value iteration, Gauss-Seidel value iteration and Pre-Gauss-Seidel-Value Iteration.

***Keywords*.** Finite horizon discounted Markov decision process. Dynamic Programming. Backward-induction. Value iteration. Gauss-Seidel value iteration.

Audit of Information Systems risk-based approach: Between the ambiguity of reference systems and the contribution of fuzzy sets theory

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***Abstract*--** Today business is exposed to most information system risks and threats. This justifie their growing inquiry on their business security. Information systems auditing presents some powerful tools and techniques that can help companies to reduce these risks and threats. But the fast changing and growing of information systems makes the audit missions more complex and uncertain related to experience, knowledge and other quality parameters. For those reasons this paper tries to propose a new field of research that can help auditors to perform their missions. The goal is introducing fuzzy logic based on fuzzy theory in audit discipline to build an expert system that can reduce complexity and uncertainty in information systems auditing.

***Keywords*--** Information systems auditing, risk based-approach, fuzzy logic, complexity, uncertainty, expert system.

Topological Reinforcement Learning Algorithm for Robot Navigation in an Initially Unknown Environment

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***Abstract*--** Accelerating the Reinforcement Learning (RL) process is one of the challenging research problems in Artificial Intelligence (AI). This article presents a new topological RL procedure for robot navigation in an initially unknown Grid's environment based on a new exploration/exploitation strategy. The initially unknown state space (considered as goal states) is decomposed into some levels based on topological neighbourhoods and an online goal oriented algorithm is used in first trials of RL procedure in order to reduce the number of trials needed for convergence. The

propagation of the RL signal throughout the topological neighbourhoods and the online state-action elimination technique are also used to reduce the trials number. The simulation results show the performance of the proposed RL algorithm compared with different RL algorithms in different types of environments.

***Keywords*--** Reinforcement Learning, Markov Decision Process, Decomposition, Robot Navigation

Convolutif Neural Network And Random Forest of the Recognition Image Obtained by Camera Phone

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***Abstract*—** In this paper; we introduce a system of automatic recognition of Arabic characters based on the Random Forest Method and Convolutional Neural Networksin non-constrictive pictures that are stemmed from the terminals Mobile phone. After doing some pretreatments on the picture, the text is segmented into lines and then into characters. In the stage of characteristics extraction, we are representing the input data into the vector of primitives. These characteristics are linked to pixels' densities and they are extracted on binary pictures. In the classification stage, we examine four classification methods withtwo different classifiers types namely the convolutional neural network (CNN)and the Random Forest method. We carried out the experiments with a database containing 2800 samples collected from different writers. The experimental results showthatour proposed OCRsystem is veryefficientand provides good recognition accuracy rate of handwriting characters images acquired via camera phone.

***Key-Words*--** Pretreatments, Arabic characters, Mobile phone, OCR, CNN, Random Forest

A comparative Study on Indexing Techniques

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***Abstract* --** Document indexing is one of techniques whose facilitate access to a set of documents in electronic form (corpus), and allows a user to find the contents which matches with the information needs of the user (query). Without indexing, the search engine would scan every document in the corpus, which would require considerable time and computing power.

Over the past 20 years, the experimental evidence collected shows that text indexing systems based on the assignment of appropriately weighted terms produce good retrieval results. These results depend crucially on the choice of effective term weighting techniques. The purpose of this work is to make a comparative study between different techniques of automatic text indexing based on weighted terms and with others indexing techniques.

***Keywords*--** Document indexing, weighted terms, indexing technique.

Graph based Multiple Classifier System for Offline Tifinagh OCR

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***Abstract*--**In this paper, we present an off-line Optical Character Recognition (OCR) system for printed Tifinagh characters (Amazigh language alphabet). Using a proposed key point extraction algorithm, character skeleton is divided into several segments. The length and orientation of every segment are stored into a feature vector, then the relationship between these segments and key points are represented by a graph in the form of an incidence matrix. Classification is done by searching for similarity between test images and their counterpart in the reference database by comparing their incidence matrix. Alternatively, feature vectors are classified using normal distance when the search result produce more than one class. The system prove its efficiency throught experiments done a Tifinagh character database.

***Keywords*--**Character Recognition, Key point extraction, Exact matching, Multiple Classifier System, Graph Theory, Incidence Matrix

Session _2.1:Telecommunication&Networking

Chair : Hicham Zougagh

When Bargaining Game is Key in the Internet Content Delivery Chain

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Abstract-- This article examines the economic utilities in a two-way market where Content Delivery network (CDN) providers charge content providers (CPs) for distribution of contents to end-users. We offer new models that involve CPs, CDN providers and end users. We formulate interactions between CPs and CDN providers as

a non-cooperative game after bargaining on some common decision parameters. After formulating the game and theoretically studying the existence and uniqueness of the Nash equilibrium, our numerical analysis shows that negotiation is an exceptional solution to fight against the marginalization of the decision that can behave in CPs or CDNs. In terms of profit, we have shown that when the bargaining game exists the two actors share the gain and that allows them survival in the market.

Keywords-- CDN, CP, Content Distribution, Bargaining Game, Nash Equilibrium, Price of Anarchy.

Impact of the Selfish Behavior of Users in a Stackelberg TCP Connection Game

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***Abstract*—**We propose in this paper a solution to the network resource allocation problem in the presence of the selfish behavior of TCP users with multiple connections to a several bottlenecks having a limited resource. A Stackelberg TCP connection game is proposed to resolve the conflict of interest in networks, there are two types of players, bottlenecks and TCP users. The system model is characterized by a hierarchical structure where: on one side, each bottleneck minimizes its strategy based on the amount of connection and keeping its capacity purely utilized, on the other side, TCP users maximizes the number of connections by each bottleneck in order to increase its total goodputs. We prove the existence and uniqueness of Nash equilibrium in function several parameters of both levels, then based on price of anarchy, we measure the losses of efficiency of Nash equilibria. We find that the loss of efficiency of Nash equilibria can be arbitrarily large if users do not have resource limitations, but it is upper bounded if users do have resource constraints. This may partly explain why there may be no congestion collapse in the Internet if many users use multiple concurrent connections.

Keywords*—TCP, Multiple connections, Network resource allocation, Stackelberg*

Proposal for a Secure Data Sharing and Processing in Cloud Applications for Healthcare Domain

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***Abstract*—** Information Technology (IT) services have become an inherent component in almost all sectors. Similarly, the health sector has been recently integrating IT as to meet the growing demand of medical data exchange and storage. Currently, cloud has become a real hosting alternative for traditional on-permise software. In this model, not only do health organizations have access to a wide range of services, but most importantly they are charged based on the usage of these cloud applications. However, especially in the healthcare domain, cloud computing deems challenging as to the sensitivity of health data. This work aims at improving access to medical data and

securely sharing them across healthcare professionals, allowing real-time and access control. Subsequently, this system typically guarantees that only authorized users can view or use specific resources in a computing environment. To this aim, they use eXtensible Access Control Markup Languag (XACML) standard to properly design and manage access control policies. In this study, they opt for (Abbreviated Language For Authorization) ALFA tool to easily formulate XACML policies and define complex rules. The simulation results show that the proposal offers simple and efficient mechanisms for a secure use of cloud services within healthcare domain. Consequently, this framework is an appropriate method to support collaboration among all entities involved in medical information exchange.

Keywords— *Cloud computing, medical data, security, access control.*

Contribution to the improvement of the Quality of Service over Vehicular ad-hoc Network

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Abstract—Nowadays Vehicular Ad hoc Network represents an interesting part of intelligent transportation system (ITS). This latter attempt to answer the question of how to improve road safety, to maintain best-effort-of service, and to provide better conditions for drivers and passengers. Indeed, connected vehicles will operate in a connected/smart city. It then becomes necessary to implement solutions to manage urban traffic while responding as accurately as possible to road traffic and congestion problems. However, the Quality of service is an important consideration in vehicular ad hoc networks because of rapid development in network technology and real time applications like multimedia, voice, video streaming, etc.

In this paper, we propose a new approach for road traffic management in smart cities which maintain shortests paths, based on graph theory in order to facilitate traffic management, through using a specific algorithm. In order to improve the quality of service over vehicular ad hoc network, a new method is then presented, which ensures vehicle safety by minimizing the number of interchange between vehicles, minimize energy and lifetime of the sensors.

Keywords--*component: Graph theory, Video straming, ad-hoc network, VANET, QOS.*

Competition over reputation in social networks

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Abstract—With the increasing use and rapid development of information technology, people became more dependent on virtual social networks. Those environments constitute an important area where users interact and create a communication tie to maintain their relationships. Furthermore, the time life of these relationships is based on reputations of the users. Every source (information provider) has a reputation which

depends on his rate of publishing but also the opinions given by the observers(users) has an important impact on the determination of this reputation. Since, everyone is trying selfishly to keep a good reputation, a competition is met within these networks. This paper aims to solve this kind of competition through a game theoretic approach; we formulate the said competition as a non cooperative game, demonstrate the uniqueness of the existent Nash Equilibrium which seems to be the convent solution in this case, then present results clarifying and illustrating the proposed modeling method.

Keywords-- Social networks, game theory, Nash Equilibrium, best response, utility function, concave game.

Intrusion Detection in MANETs using Machine Learning Approaches

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***Abstract*—**Mobile Ad hoc NETworks (MANETs) are a collection of wireless mobile nodes forming a temporary network without any major infrastructure. However, they are vulnerable to malicious network attacks, especially in the routing layer because of the mutual trustworthiness among the nodes and also their open environment. Therefore, it is indispensable to design new approaches and mechanisms to increase the security of these networks and protect them from attacks. In this paper, we study two Intrusion Detection Systems (IDS) that utilizes Support Vector Machines (SVM) and Artificial Neural Network (ANN) to identify the nodes performing black hole attack in MANET. Our IDS uses extracted features from the trace file that was generated by using Network Simulation version 2 (NS2) as auditable data.

Keywords— *Security; Mobile Ad 1Hoc Networks; Intrusion detection system; ANN; SVM.*

Cache replacement algorithm based on popularity prediction in content delivery networks

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***Abstract*—**In Order to improve the Quality of Service in Content Delivery Networks for the end users, the choice of an efficient strategy of caching is an asset. Caching is at the heart of content delivery network (CDN) services. Caching works by selectively storing website files on a CDN's cache proxy servers, a CDN moves websites content to powerful proxy servers optimized for accelerated content distribution. This paper focuses on a predictive strategy of caching based on forecasting number of requests on video content to estimate popularity in future. For that purpose, models called experts, compute future demand value of each video content. Request values generated by each expert are evaluated by a loss function in aim to discuss the accuracy of expert's prediction. The main goal is to build an efficient caching algorithm that compares to

other benchmark algorithms such as LRU and LFU in term of Hit Ratio and Update Ratio.

Keywords—*CDN; prediction; popularity; caching; Double exponential smoothing; LFU; LRU; Bayes; Video content*

Session_2.2: Signal, Image and Video processing

Chair : Cherki Daoui

Content Based Medical Image Retrieval Combined SIFT Descriptor and SVM Classifier

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Abstract— A hospital that can perform tens of thousands of medical examinations a year, and with rapid advance in the digital storage media, image capturing devices like scanners, radiography, echocardiography..., and rapid development in internet provide a huge collection of multimodal images. The images stored in databases are may be of interest for diagnostic assistance. We propose a generic scheme for content based image retrieval (CBIR) medical. A proper combination of the extraction features by Scale-Invariant Feature Transform (SIFT) with the Support Vector Machine (SVM) which enables a robust similarity-based classify phase, The SIFT features descriptor is constructed to describe the relevance between the query and images of database. The proposed system is evaluated on various databases consisting of images of various modalities; we obtain some encouraging results which reveal several important insights for improving the performance of medical CBIR.

Keywords— *CBI;, SIF; SVM; medical image; similarity measure*

Image denoising using efficient diffusion coefficient and suitable adaptive threshold

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Abstract—Image restoration is one of the most important and is a necessary pre-processing step for many applications in image processing and analysis. PDE-based approaches are one of the greatest methods that are developed a geometric model of the face based on a set of characteristic features extracted from facial used to remove noise of the image, while protecting the important detail information. Among other models,

the classical Perona-Malik (PM) is widely used in PDE-based noise suppressing algorithms, which suffer from undesirable artifacts such as staircasing. To address these problems, a nonlinear diffusion approach based on a new version of diffusion coefficient function for stronger noise suppressing ability and better detail information protection. Based on the analysis of the flux function, a new flux function has been developed using Hermite-Interpolation. It is proved to be stable numerically and experimentally. Then, the simulations results and the comparative study with other recent techniques are showed that the proposed method performs efficiently in both edge preservation and noise removing. This improvement has been shown objectively in terms of image quality assessment: Peak Signal-to-Noise Ratio (PSNR), Structural SIMilarity (SSIM) and Visual Information Fidelity (VIF).

Keywords—*Image restoration; Image denoising; Partial Differential Equation (PDE); Nonlinear diffusion; Diffusion coefficient; Perona-Malik; Stability; flux; Hermite-Interpolation.*

A geometric method for facial recognition in a joint paper

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Abstract-- Currently, human face recognition is considered one of the most important tasks to take up the challenge of pattern recognition. The ease and accuracy with which one can identify friend and foe, even under adverse conditions, are some of the most amazing capabilities of the human visual system; the purpose of face recognition is to design computer systems capable of matching human beings in this area.

In this work, we present an implementation of a system of people identification through recognition of human faces. We have image. In fact, it is a geometric method based on measurements concerning three important organs of the face namely: the eyes, the nose and the mouth.

The choice of these characteristic features is based on the results of cognitive psychology research concerning the human visual system. Given that the eye, nose and mouth areas are particularly important for identification, the features used cover all such three areas. Among key measures that have been taken, there are particularly the following: the distances separating these organs from one another, the position and width of the nose, the position and width of the mouth, the thickness of the eyebrows etc.

Key terms: Face Recognition; Hybrid Method; Template Matching; geometric Method; Neural Networks**.**

Classification of Islamic Geometric Patterns

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Abstract-- This paper proposes a rational classification of Islamic Geometric Patterns (IGP) based on the Minimum Number of Grids (MNG) and Lowest Geometric Shape (LGS) used in the construction of the symmetric elements. The existing classification of repeating patterns by their symmetric groups is in many cases not appropriate or prudent [Joy97]. The symmetry group theories do not relate to the way of thinking of the artisans involved, and completely has ignored the attributes of the unit pattern and has focused exclusively on arrangement formats. The paper considers the current symmetric group theories only as arrangement patterns and not as classifications of IGP since they have a "global approach" and have failed to explore the possibilities in the construction elements of IGP. The Star, a central Rosette, which is the most important element of IGP, forms the core of our study. The paper proposes new nomenclature to be used in the description of the unit pattern based on the MNG and LGS used in the construction of a Star/Rosette pattern that can be used to achieve the final design. We describe and demonstrate procedures for constructing Star/Rosette unit patterns based on our proposed classification in a grid formation dictated by the final design of the unit pattern.

Keywords-- IGP, MNG, LGS, Grid, Classification, Group Theory, Star/Rosette.

A Comparative Study of Generalized Regression Neural Network Approach and Adaptive Neuro-Fuzzy Inference Systems for Predicting Greenhouse Climate

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Abstract—This paper proposes and validates regression artificial intelligent approaches, namely the Generalized Regression Neural Network (GRNN) and Adaptive Neural Fuzzy Inference System (ANFIS) tools for modelling the internal temperature and humidity within an experimental greenhouse. For this purpose, recorded values of the external temperature and relative humidity, heater and ventilator action signals were collected from an experimental greenhouse in order to construct the climate database. The database covered 72 hours and was used to develop and validate the proposed models. The performance of the two models was evaluated using three statistical measures which are the Root Mean Squared Error (RMSE), Coefficient of Determination (R2) and Variance Account For (VAF). The results showed that the proposed GRNN model demonstrates good performances in terms of the training and validation datasets. We conclude that the GRNN model gives a very close prediction to the observed values better than the ANFIS model.

Keywords—*greenhouse climate; Data-driven modelling; Generalized Regression Neural Network (GRNN); Adaptive Neural Fuzzy Inference System (ANFIS).*

An Automatic Detection and Classification of Mass from Mammograms using NSCT, DWT and GLCM

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***Abstract*—**This paper presents an evaluation the performance of the feature extraction using Gray-Level Co-occurrence Matrix to all the detailed coefficients the Discrete Wavelet transform and Nonsubsampled Contourlet Transformation of the region of interest (ROI) of a mammogram for classification the breast tissues as normal, benign or malignant by character of background tissue as F - Fatty, G - Fatty-glandular and D - Dense-glandular. A classier system based on K nearest neighbors (knn), Support Vector Machine (SVM) are used. The accuracy measures are computed with respect to normal, abnormal for MIAS database these accuracy measures are 94.12% and 88.89% respectively for SVM and KNN by Nonsubsampled Contourlet Transformation but The accuracy measures are 76% for SVM and KNN by Discrete Wavelet transform.

Keywords—Mammogram; NSCT; DWT; GLCM; Mass

Automatic Detection of Microaneurysm in Fundus Images

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***Abstract*--** Diabetic retinopathy (DR) is one of the most serious and frequent eye diseases in the world, it is the leading cause of blindness. Microaneurysms (MA) are the most frequent and usually the first lesions to appear as a consequence of DR. Therefore, their detection is essential for the detection and follow-up of this pathology. This paper presents an automatic method for detecting MA in retinal fundus images. The proposed technique consists of five main steps: preprocessing, MA candidate extraction, elimination vessels, feature extraction and classification. The proposed method has been evaluated on two public databases: ROC and e-optha. The experimental result demonstrates the efficiency and effectiveness of the proposed methodPerformance, simplicity, and robustness of the proposed method demonstrates its suitability for diabetic retinopathy screening applications.
***Keywords*--**Image processing, Medical image analysis, Diabetic retinopathy, Microaneurysms detection, Retinal fundus images

Comparison of SVG path transformations using Bezier approximation and Hausdorff Distance

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***Abstract*—** In this paper, we propose a new method to show the utility of the Bezier approximation to solve the problems of transformation, which can have a SVG path. For this reason we will start with an approximation of the elements of a SVG path with the quadratic Bezier curve an cubic Bezier curve, and in the second one, we have proposed to calculate the Hausdorff distance to compare these representations. Results obtained on test image are promoted.

***Keywords*—** SVG; Path ; Distance; Bezier Curve; Hausdorff

Session_2.3: Telecommunications & Networking

Chair : Abdellatif Hair

Analyzing the Customers Confusion in Telecommunication Networks: A Game Theoretic Approach

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Abstract--In this paper we have studied the impact of customer confusion on the decision-making strategies of internet service providers in the network and telecommunications market. This confusion can come from several factors, for example incomplete information on the offer, nontransparent advertising, the ability of the analysis, ... etc; but that sure it varies over time since today's customer is no longer tomorrow's. In this work, we have developed a simple oligopolistic model, using non-cooperative game theory, to formalize the interactions between service providers and end-users by considering that the rationality of customers varies over time. We assessed the impact of the dynamics of consumer confusion on the competition and profitability of service providers who are considered rational and competitive with one another to maximize their respective gains in the face of a confused fraction of consumers while others are not confused. We have shown the existence and uniqueness of the Nash equilibrium. We used the best response dynamic algorithm for learning Nash equilibrium. One the one hand, we have shown that when the number of confused customers is large, the ISP interest this and they offer moderately high prices with low quality of service. On the other hand, over time, rationality increases, forcing the ISP s to change their strategies by offering better services so that their demand increases. I also add that when customer behavior changes quickly, the ISP s follow clearer strategies with customer satisfactory services.

Keywords-- Pricing, QoS, Customer Confusion, Network Communication, Nash Equilibrium , Price of Anarchy.

A dynamic duopoly game with CPs bounded rationality

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***Abstract*—**The paper investigates the dynamical behaviors of a duopoly model with two content provider. Competition between two Content Providers (CPs) is assumed to take place in terms of their pricing decisions and the Credibility of Content they offer. According to the CPs' rationality level, we consider two schemes:

1) Both CPs are rational, and 2) One CP is rational and the second CP is bounded rational. Each content providers apply a gradient adjustment mechanism to update their strategies in each period. We compute explicitly the steady states of the dynamical system induced by bounded rationality, and establish a necessary and sufficient condition for stability of its Nash equilibria (NEs). We prove that there exists exactly one NE which is fair whereas remaining equilibria are unfair. Numerical simulation is made to show the influence of the parameters on the convergence speed of the dynamics. The general finding is that the Nash equilibrium becomes unstable as the speed of adjustment increases.

***Keywords*—**Pricing, Credibility of content,Nash equilibrium, bounded rationality, delay, Stability.

Programmable logic controller, output type relay, based on Arduino

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***Abstract*--** This project stems from the need to reduce the cost of automating a process, allowing more users to use an alternative model of PLC in applications that require it. The project is to adapt the programmable board "Arduino" to work under the same parameters as a commercial PLC; this is achieved by using basic and power electronic devices, also including galvanic isolation for protection Arduino, preventing the transfer of charge carriers. The essences of this new controller design is the ease of programming language "Arduino" the large number of projects already undertaken in this language, the versatility of the board, the number of inputs and outputs board, low cost and ease the get programming cables, plus the large number of modules and sensors compatible with different versions of the board.

Keywords-- Arduino, PLC, Cost, Automation, Versatility, Plate

Blind Channel Estimation and Equalizationof Radio Mobile channel

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***Abstract*—**This paper presented the problem of blind identification of a non-minimum phase system from third and fourth order cumulants. i.e. we describes two algorithms based on higher order cumulants (HOC), for blind impulse response identification of radio mobile channels (Bran A, Prokis B). Thus we study the equalizer algorithm based on ZF and MMSE, the adaptive filtering algorithms LMS and RLS to estimate the parameters of the equalizer channel that is to say, move to the channel estimation and therefore reflect the temporal variations of the channel, and reduce the error in the transmitted signal. The simulation results in noisy environment and for different signal to noise ratio (SNR) demonstrate that the proposed algorithms are able to estimate the impulse response of these channels blindly. In the part of equalization, we use the zero forcing (ZF) and the minimum mean square error (MMSE) for the equalization of the radio mobile channel. Thus we test the performance of the adaptive filtering LMS and RLS algorithms.

***Keywords*—**Adaptive Filtering Equalizer, Blind Identification Higher Order Cumulants (HOC), LMS, RLS Bran A, Proakis (B) MMSE, ZF.

The implementation of a laboratory for online practical work using smart sensors: project charter and applications

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***Abstract*—** Dropout in higher engineering education is a worldwide problem, online tools could be used to attract students and motivate them for learning remotely. Remote learning in engineering education becomes a useful approach as a great challenge to solve this problem. With our research we contented that a change in learning style is needed. Integration of new online tools into modern student learning activities offers novel chances to boost students' creative learning in engineering education: developing self-reactive and distinct learning skills motivate and reach curiosity and new ideas. This paper gives an overview of a remote laboratory in electronics engineering learning using very cheap and smart sensors, an attractive web platform to prevent students' dropout.

***Keywords*—** *remote laboratory, student dropout, smart sensors.*

Enabling heterogynous QoS sensitive service discovery for smart ambient systems.

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***Abstract*—**The proliferation of pervasive devices, intelligent objects, service producers and customers has generated various level of complexity and heterogeneity for both application developers and consumers ; in the literature, many Web services Quality of Service (QoS) based solutions has been proposed for different scopes. In this paper we propose an end-to-end heterogynous Quality of Service discovery model based on functional and non-functional requirements. The proposed QoS Model should provide transparent parsing, comparing and selection for heterogynous service providers and QoSspecification languages.

***Keywords*—** services discovery, quality of services, QoSspecification languages, pervasive device, ambient systems.

Comparative Uplink Throughput of IEEE 802.11ah and LoRaWAN Networks in NS-3

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***Abstract*—** The Internet of Things (IoT), powered by the Low Power Wide Area (LPWA) wireless technologies targeting the Machine to Machine (M2M) communications has one concept, provide the wide range by using the license free low frequency air carriers while reducing the battery energy consumption. We focus in this paper on the evaluation of the uplink packet rate of two modern network systems: IEEE 802.11ah and LoRaWan. Therefore, we exploit two novel modules developed in NS-3 simulator for obtaining throughput measurements. As a result, the study can help formulate decisions about the choice of IoT network type, number of nodes and coverage distance.

***Keywords*—** *IEEE 802.11ah, LoRaWAN, NS-3, LPWAN, IoT, ALOHA, Game Theory*

Iteratif Decoding of GPCB-Codes based on RS codes using adapted scaling factors

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***Abstract*—**In this paper, a generalization of parallel concatenated block (GPCB) codes based on RS codes is presented. The effect of various component codes, interleaver sizes and patterns, and the number of iterations are investigated using simulations. The simulation results shows the relevance of the adapted parameters to decode generalized parallel concatenated block codes based on RS codes. The results obtained by using adapted parameters outperform those obtained with empiric parameters.
***Keywords*--** RS codes, Chase decoding, Modified Chase-Pyndiah Algorithm, iterative decoding, generalized parallel concatenated codes.

Posters Abstracts

Poster Session PS1: Telecommunications & Networking

Chair : Mohamed Erritali

Supervised Identification and Equalization of a Linear Systems Using Reproducing Kernel Hilbert Space

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***Abstract*—**This work concerns the problem of the supervised identification of the parameters using a new mathematic tools based on a Positivedefinite kernel on a Hilbert space using a Gaussian kernel. The input sequence is assumed to be independent and identically distributed (i.i.d), zero mean and must be non-Gaussian. The developed method is tested for different channel models. Simulation examples are provided to verify the performance of the developed method. The obtained results chowed the efficiency of the developped method. Indexing terms/Keywords: Wirless, networks, FIR channel, Reproducing Positivedefinite kernel, Hilbert space, Gaussian kernel, code-division multiple access, MCCDMA, Equalization, identification, wirless communication, Spreading, Reproducing Kernel Hilbert Space.
***Keywords*—** MCCDMA, a Gaussian kernel, Hilbert space.

Impulse response identification for frequency radio channels and equalization MC-CDMA systems using kernel algorithm

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***Abstract* —** In this paper, we propose an algorithm based on positive kernel that permits to identify the impulse response for frequency radio channels and equalization MC-CDMA systems. We used two practical channels of frequency selective fading known as Broadband Radio Access Network (BRAN A and BRAN E) normalized by the European Telecommunications Standards Institute (ETSI) and Proakis channels (channels A, B and C). The simulation results and comparison with RLS methods show the appropriateness of the proposed algorithm for different Signal to Noise Ratio (SNR) On the one hand. On the other, we use the Zero Forcing algorithm (ZF) and Minimum Mean Square Error Algorithm (MMSE) in the equalization part. The simulation results show that the proposed algorithm is efficient and applicable in equalization MCCDMA domain.
***Keywords* —** Channel, Identification, Positive Kernel method, Equalization, MC-CDMA systems, BRAN Channel

VANET: Algorithms and applications

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***Abstract*—** Vehicular Ad-Hoc Network (VANET) is a new communication model creating a mobile network on the roads. VANET has attracted the attention of many researchers to find solutions to various challenges, especially in terms of security, quality of service and routing; these challenges puzzled researchers to choose a perfect algorithm, an algorithm that surpasses all other algorithms in different experiments. Because of the highly change of scenarios (tunnel, urban environment, highway…), the vehicle high speed, frequent disconnection..., it is not easy to develop an effective protocol; there is no routing protocol that outperforms all other protocols.
So it is therefore necessary to make a study of the Ad hoc routing protocols used in VANET like AODV, DSR, DSDV … and also to offer a suggestion that could contribute to designing an efficient routing protocol to overcome the challenges.

Keywords*—VANET, DSDV, OLSR, AODV, DSR, DYMO, TORA.*

Measurement of the security for an information system

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***Abstract*--**The information system takes a strategic place within a company or in an organization. It allows the different actors to convey their information and to communicate through a set of hardware, human and software resources. An information system makes it possible to create, collect, store, process and modify information in various formats. For this, the security of this system has become a source of concern for companies. In this paper, we propose a solution of security and protection of access to the information system as well as we provide access control and monitoring solutions for the infrastructure of this system. This proposal is made by exploiting cryptography techniques, security protocols, setting up firewall for filtering exchanged packets and controlling access and access control. We also operate the implementation of an open source intrusion detection system to monitor an information system.

***Keywords*--** cryptography, network attack, security protocols, intrusion detection system (IDS)

A Multi-Parameters Spatial Biasing Technique with Monte Carlo Method used in Neutron Transport and Transmission through Protection Shields

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Abstract **--**Frequently, the neutron transmission through the shields used for protection against radiation is an unavoidable phenomenon [1;2], so we have interested in this work to study the neutron transmission through shields [3;4]. We have considered an infinite homogenous slab witch characterized by his scattering probability noted Ps, with a different thickness and an infinite plane source of neutrons which arrived on the left side of the slab and on the right side detector with fixed window is placed to detect transmitted neutrons and evaluate the neutron transmission probabilities [5;6]. We used the simulation Monte Carlo method for sampling the neutron history in the slab [7] and in order to accelerate the calculation convergence [8] we have developed a new multi-parameters spatial biasing technique with 4 parameters. For each thickness of the slab and for several values of Ps we have determined the detector response and calculated the neutron transmission probability. We compared our result by results obtained with the spatial biasing technique with 2 parameters [9;10] and 1 parameter [11]. Then we have determined the FOM (Figure Of the Merit) for each method. We can also notice that our method presents bests results by obtaining the greatest FOM for a large thickness of the slab having high scattering probability Ps.

Keywords--- Visualization, Simulation, Neutron, transmission, Protection Screen

Analysis of Caching Game between Selfish Content Providers

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Abstract**---**In this work, we study the content caching problem. Using the game theoretic approach, we analyze the replication of resources by server nodes that act selfishly. Each node is equipped with a caching server, capable of storing copies of data objects. Objects can be either accessed from any other cache that contains a copy. The problem consists of deciding on the contents of all cache servers so as the value of network utility is maximized. We provide an extensive numerical study to compute Nash equilibria solution for this game and discuss price of anarchy that quantify how this NE is performant

Keywords**--**Caching Problem, Content Providers, Nash Equilibrium, Price of Anarchy, Game Theory

A new Approch Based on Higher Order Statistics Applied to Blind Identification and Equalization of a Transmission Channel

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***Abstract*—**Blind techniques play a crucial role in digital signal processing, especialy in identification and equalization, in termes of observed informations with acceptable precision in noisy environment, mainly this field of sciences has already been one of the most powerful technologies, it had a revolutionary changes in the last century. In this work, we propose and implement a new algorithm based on blind techniques for channel identification and signal equalization. Our algorithm is a mixture between two established algorithms obtained previousely, Some numerical experiments are presented to clarify performance of our approach under different channels, it was tested for different cases and for different type of channels: BRAN A et BARAN E. Our results, compared to priviously published works, gives better channel estimation and signal equalization.

Keywords: signal processing, blind identification and equalization, symbol sequence, channel impulse response, intersymbol interference, Transmission channel, telecommunication systems, higher order cumulants, wirless telecommunication, channel parameters.

Poster Session PS2 : Optimisation and image processing

Chair : Youssef Mbrabet

Detecting and Tracking a Moving Object in a Dense Environment

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***Abstract*—** Currently, motion analysis in videos has proven to be an indispensable tool for applications as diverse as video surveillance. Indeed, the motion areas of a video sequence often correspond to events on which a vision system must focus. The purpose of this work is the detection and tracking of moving objects in a dense environment from a video sequence. Our article proposes an approach based on fuzzy logic for locating and tracking an object set. Tracking an object in a video stream consists in

determining the position of the object of interest in the current image from its position in the previous image. The tracking system created in this article is based on a fuzzy approach to have high accuracy in a dense environment. Detection and monitoring is done in four stages. In the first step, all the objects of the scene are detected at time t. Then, in the second step, we distinguish mobile objects. In the third step, we introduce the characteristic vector of each object in the fuzzy controller to know the trajectory of each object. Fuzzy logic has allowed us to solve several problems in tracking a moving target in a dense environment.

Keywords— *Moving target; Fuzzy logic; Tracking object; Segmentation;*

Arabic Text Classification using Deep Learning Technic

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Abstract—Text classification is the process of gathering documents into classes and categories based on their contents. This process is becoming more important due to the huge textual information available online. The main problem in text classification is how to improve the classification accuracy. Many algorithms have been proposed and implemented to solve this problem in general. However, few studies have been carried out for categorizing and classifying Arabic text. Technically, the process of text classification follows two steps; the first step consists on selecting some special features from all the features available from the text by applying features selection, features reduction and features weighting techniques. And the second step applies classification algorithms on those chosen features. In this paper, we present an innovative method for Arabic text classification. We use an Arabic stemming algorithm to extract, select and reduce the features that we need. After that, we use the Term Frequency-Inverse Document Frequency technique as feature weighting technique. And finally, for the classification step, we use one of the deep learning algorithms that is very powerful in other field such as the image processing and pattern recognition, but still rarely used in text mining, this algorithm is the Convolutional Neural Networks. With this combination and some hyperparameter tuning in the Convolutional Neural Networks algorithm we can achieve excellent results on multiple benchmarks.

Keywords*— Text mining; Term Frequency-Inverse Document Frequency; Deep learning; Convolutional Neural Network; Classification; Categorization; Natural Laguage Processing; Arabic language*.

Deep learning based segmentation of Multiple sclerosis Using Convolutional neural networks

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***Abstract*---**This paper presents a fully automated analysis of Multiple Sclerosis (MS) lesions on tissue volume analysis. Here, we present a process of feature extraction and classification of MS daisies from magnetic resonance images (MRI). Convolution Neural Network (CNN) is used for feature extraction and segmentation, where a multilayer neural network for classifying images into two classes: Normal and MS. The empirical results on used dataset show that the proposed method outperforms the state-of-the-art algorithms.

***Keywords*--**MRI feature extraction, Convolution Neural Network, Deep Learning, Multiple Sclerosis, Magnetic Resonance Images.

A new Approch of Natural Language Processing to correct the Result of an OCR

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Abstract*—*Optical Character Recognition (OCR) is a recognition system used to identify the contents of a scanned image. Sometimes, this system gives erroneous results, which necessitates a posttreatment, called Natural Language Processing (NLP), for the sentences correction. In this paper, we propose a new method for syntactic and semantic correction of sentences; it is based on the frequency of two correct words in the sentence and a recursive technique.
Keywords*—*OCR, NLP, sentences correction, recursive technique, correction center.

Classification of Brain Tumor from Magnetic Resonance Imaging Using Convolutional Neural Networks

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***Abstract*--**Deep learning methods gained a huge popularity in segmentation and classification of medical imaging. In this paper we present a process for segmenting brain tumor regions from magnetic resonance imaging (MRI) using Deep Learning (DL). The main task for this method is using a public dataset containing 3,064 T1-weighted contrast enhanced MRI (CE-MRI) with different abnormalities from different

planes. Training neural networks on this dataset has proved to be efficient than well known methods.

Keywords-- deep learning, convolutional neural network, brain tumor, classification of MRI.

Poster Session PS3 : Databases and Web environnment

Chair : Mourad Nachaoui

Semantic web of things for sharing knowledge between distributed systems and IOT component.

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Abstract— Today the world of smart object is awash with sensors. However, they are typically locked into unimodal closed systems. Many efforts are currently going let all this smart object to speak the same language, This talk will introduce what we call the Web of Systems or Semantic Web of things, in a Web of Systems sensor nodes and machines will decide themselves where to process and who to share data with. There exists significant amount of re-search focusing on applying RDF data model, OWL Ontologies and Reasoning in different Web of Systems scenarios, such as home automation, Industry 4.0, healthcare, intelligent agriculture and etc. But so far this approach didn't get wide adoption beyond research community. In this paper we describe our vision and architecture of a Semantic Web of Things to solve one of the critical communication problems such as interoperability.

Keywords— *RDF; OWL Onthologies; Reasoning.*

Apriori and FP-Growth algorithms in generating association rules

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Abstract—In this article we present a performance comparison between Apriori and FP-Growth algorithms in generating association rules. The database used in the development of processes contains a series of transactions belonging to an online .

Keywords—*Apriori algorithm; fp growth algorithm; association rule; item set; comparison; frequent item set;*

Arabic word2vec model based on big data

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***Abstract*--**Methods of learning in the field of natural languages processing are increasingly based on vector representations of words (Bag of words, TF-IDF, SVD, etc.). These techniques, already successfully used in many tasks for the Arabic language (sentiment detection, summarization of documents, etc.). They are able to represent words as well as the relationships linking them. In general, these methods use representations that process all the words in a context equally. This work proposes a method that relies on continuous context models by integrating the relative position of words into a context and Big data techniques to build a word2vec model to Arabic. The results show that the use of Big Data techniques can save up to 70% of execution time to build an Arabic word2vec model from a corpus taken from Wikipedia.
***Keywords*--**Big data, apache storm, RDD, word2vecapache spark.

Using Galois Lattices for IT Resource Management as a pillar of Information Systems Governance

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***Abstract*--**IT resources management is considered as one of the main pillars of information systems governance in the company, according to IT governance institute of ISACA. In this study, we propose an original holistic approach centred on the enterprise metamodel (ISO/DIS 19440) extended in 2007. This meta-modeling incorporates specific structures borrowed from best practices for driving IT process and IT resources of COBIT. Such a structure can bring Galois lattices as systemic tools from the structural paradigm f or IT resources optimization. This approach has been validated and we intend to deploy it through a case study in a Moroccan company.
***Keywords*--**Galois Lattices, IT resources, Information Systems.

Multi-agent focused web crawler, Design and implementation

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***Abstract*--**In recent years World Wide Web has become the richest source of information, billions of web pages are published every second. With this phenomenal growth of online information, there is a need to develop new methods in order to extract and mine useful knowledge from the web. But due to the variety of web page's structure and the huge amount of information, retrieving targeted contents and mining it is a difficult task. Web mining is the field of study that deals with these issues. In this paper our focus is on large scale web content mining, we present the design and the implementation of a Multi-agent focused web crawler that collects effectively data from

the web and prepares it for further analysis like Web opinion mining, Web search, Web document representation, and topic extraction.

***Keywords*--**Multi-agent web crawler**,** Jade crawler**,** Focused web crawler**,** Distributed web crawler.

Ontological approach for the management of competences

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***Abstract*--** With the advent of the movement of the immaterial economy which leads us towards an economy and a company of knowledge, the importance is given to the concepts of knowledge and competences for better immaterial capital developement. Consequently, the management of the "human capital" became both a necessary and a complex matter for the Human Resources professionals who must be concerned about employee's intellectual capitals (knowledge management) all along with their competences).

The management of competence is a topic that has always interested several research teams and was the object of several publications of scientific work. The research of qualified staff is one of the most important axes of this work. It lies the scope of the decision-making aid for the selection of one person starting from a group of candidates, in order to achieve the ogoals of an employment with well defined characteristics.

In this context we will present the various approaches referring to a competence, to its definitions, its characterizations and its methods of treatment. Our first contribution will be directed towards the proposal of a typology and a characterization of a job and competences and a system of evaluation of the level of these competences.

This contribution will be in conformity with the recommendations of the Ministry of the Public Modernization of the Sector in Morocco. This knowledge will be represented in the form of ontology that will be treated with the external resource WordNet, in order to guide the research of having candidates with the qualified skills to occupy a given job. We chose the algorithm of k-nearest neighbor algorithm, or quite simply k-NN. Languages R and SPARQL are used for the implementation of this contribution.,

***Keywords*--** *Human Resources, competences, knowledge, ontology, KNN, Language R , Language SPARQL.*

Clustering using k-means and Apriori Algorithm

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***Abstract*—** In today's world there is rapid development in every field which contains bulk of data and different types of data. In order to distinguish sample data from the

other data mining techniques are used in combination with many useful algorithms. Combining frequent patterns algorithms with clustering is very effective for android. In this paper the work is done in two levels, initial stage focuses on implementing the k-means clustering algorithm and final stage calculate the frequent pattern in the clusters.

***Keywords*—**Clustering, Transaction id,Items

Poster Session PS4 : Optimisation

Chair : Hicham Zougagh

Contrained Discounted Markov Decision Process : The decomposition method

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***Abstract*---**In this paper we consider a constrained optimization of Markov Decision Processes with _nite state and action spaces, which accumulate both a reward and costs at each decision epoch. We will study the problem of _nding a policy that maximizes the expected total discounted reward subject to the constraints that the expected total discounted costs are not greater than given values. Thus, we will investigate the decomposition method of the state space into the strongly communicating classes to compute an optimal or an _-optimal stationary policy. The discounted criterion has many applications in several areas such that the Forest Management, the Management of Energy Consumption, the _nance, the Communication System (Mobile Networks).
***Keywords*--** Discounted Markov Decision Processes, Strongly Communicating Classes, Optimization

Discounted Markov Decision Process With Fuzzy Rewards

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Abstract--In this work, we consider the model Markov Decision Processes where the information on the rewards includes imprecision. The fuzzy reward is represented by the fuzzy number set and the in_nite horizon discounted reward from any stationary policy. We will compute a stationary optimal policy that maximize the total fuzzy discounted reward by a new approch based on some standard algorithms of the Dynamic Programming. The last criterion has many applications in sevral areas such that the Forest Management, the Management of Energy Consumption, the Communication System (Mobile Networks), ...
Keywords-- Fuzzy Optimization, Discounted Markov Decision Processes, Ranking function

A Genetic Algorithm for QoS-award web Services composition using Pareto dominance

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***Abstract*--**Service oriented architecture based on the concept of construction of new value-added services, named service composition, constructed by the selection and integration of existing web services. In the composition process, several web service with identical functionality can be considered as candidate services, but with different quality of services (QoS) attributes. Therefore, the QoS-award web Services composition problem aims to select a one service for each of the component Web services of the composition, in such a way the overall QoS of the constructed composition be optimal. However, in this work we propose an approach based on genetic algorithm using Pareto dominance and a QoS model to calculate its values, and define the fitness and mutation policy of genetic algorithm. The aim is to resolve this problem of composition more efficiently, by reduce the set of candidate services and consequently reduce the complexity of algorithm. Experimental results demonstrate the effectiveness of our improved genetic algorithm compared to the standard one.

***Keywords*--**Genetic Algorithm, QoS-award web Services composition, service composition, Pareto dominance, QoS model, skyline.