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University of Vlora Faculty of Technical Sciences Department of Computer Science

Preface

This book reports the proceedings of the 1st International Conference on Research and Recent Advances in Computer Science and Information Technology. The conference organized by the collaboration of Department of Computer Science, Faculty of Technical Sciences, University of Vlora, Department of Informatics, Faculty of Natural Sciences, University of Tirana and Department of Informatics, University of Elbasan, from June 30-th to July 1-st 2017, in Vlora, Albania.

The main perspective of the conference is to connect the researches, engineers, academicians, practitioners from all over the world in the same place and make them be aware of the recent advancements in Computer Science and Information Technology and provide them with a unique forum to share their experiences. It is the place to support the new academic staff for doing research and publish their work in international standard level.

The topics that are included in this proceedings: E–Systems and Computer Systems, Cloud Computing, Database Systems, Web Services and Technologies, Internet of Things, Artificial Intelligence, Data Mining, ICT for Education, Mathematical Statistics in Applied Sciences, Free Software and Open Source, Security, Theory of Computation, Mobile/Wireless Security.

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A comparative study on sensitivity to outliers of some fuzzy clustering algorithms

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Abstract

Fuzzy cluster analysis is an important exploratory tool with significant applications in a myriad of disciplines. Although the fuzzy approach provides a more realistic depiction of the dataset structures (allowing partial memberships of the instances in the generated clusters), it is significantly affected by the presence of outliers. In this paper we will firstly discuss theoretical aspects of several clustering algorithms and then we will experimentally compare these algorithms assessing their sensitivity to outliers and tuning the parameters which provide better stability.

A hybrid clustering model combining K-means and agglomerative hierarchical clustering algorithms

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Abstract

K-means and agglomerative hierarchical clustering algorithms are two eminent representatives of the clustering algorithms. Despite of their vast success in a myriad of useful applications, they suffer from various drawbacks. In this paper we will firstly discuss theoretically the K-means algorithm, the agglomerative hierarchical clustering algorithm and a hybrid clustering algorithm which combines these two algorithms. In the hybrid model we are intending to take advantage of the efficiency and flexibility of the K-means algorithm and the robustness of the hierarchical clustering algorithm. Later we will experimentally compare the accuracy of the presented hybrid model by applying it on several benchmark and synthetic datasets.

A survey of size optimization algorithms applied in the structural engineering design

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Abstract

The efficient solution that satisfies optimality condition is an important issue in the structural engineering design problem. The new codes of structural design consist in design methodologies that look after the exploitation of the total resources of the construction material. The goal of an optimal design is to achieve the best feasible design according to a measure of effectiveness. This demand emphasizes the need for weight and cost optimization of structures. The design process in structural optimization as announced by professor Uri Kirsch in 80's, can be classified into four stages: formulation of functional requirements, the conceptual design stage, optimization and detailing. Iterative procedures or the application of algorithms are neccessary before the final solution is achieved. There have been developed several review papers in structural optimization during years. The first analytical work was by Maxwell in 1890, followed by the better known work of Mitchell in 1904. The best applications during the years 1930-1950 have been in the aircraft industry, consisting to compressive loads and buckling constraints. Good developments in the optimization sector will follow with Schmit in 1960. He was the first to offer a comprehensible statement of the use of mathematical programming techniques to solve the nonlinear inequality constrained problem of designing elastic structures under a multiplicity of loading conditions. This work offered a new philosophy of engineering design which only in the 1980's began to be broadly applied. Up to now we count more than adozen of algorithms applicable in structural optimization problems. Eventhough there doesn't exist a formal classification of them. There is a widespread knowledge about these methods in the research community and there have been written only a few surveyes about developments, advantages and disadvantages of these algorithms. The purpose of this paper is to analyse and follow an up to date study of size optimization techniques used in the structural optimization design, basing on some highly peer reviewed studies, that were possible to be analyzed by the author. A first classification is made according to the algorithmic processin generating candidate optimal designs. Two maxi categories are identified: deterministic and non-deterministic methods. These are further classified in: Mathematical Programming techniques (MP), Optimality Criteria (OC), Evolutionary Algorithms (EA), Physical Related, Swarm Intelligence, and other Stochastic Algorithms.

An Integrated Web-GIS Visualizing System

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Abstract

In this article we present how web-based GIS technologies can work in conjunction to produce an integrated visualizing system. Over the last few years, the role of geographic information systems has experienced an immense growth. Data visualization, manipulation and analyzation are some of the most common operations applied over geographic information. Our study is focused on identifying the appropriate technogies for geographic data visualization. We propose a communication model (schema) between technogies, such as PostgreSQL, Geoserver and OpenLayer3. An example of the schema integration is made using the geographic data for the city of Tirana.

Keywords: *GIS, geoserver, web, PostgreSQL, PostGIS, layers, map, tiles, web-gis, openlayer, web-mapping, WMS, WFS, WMTS.*

An iterative presentation of the Geometric Algebra with the CLUCalc software

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Abstract

This article gives a brief overview of the features of CLUCalc's visualization software and how this software can be used in different aspects of the geometric algebra. CLUCalc is an independent software tool that uses the open 3D graphics library to visualize the geometric meaning of geometric algebraic elements.Geometric algebra is the language that expresses old and new concepts in a simpler way.

By defining the bows, multivariate, external, internal and geometric product we construct a set of instruments that consist of dual, inverse, projection and rejection, meeting and potentially much more.

Keywords: multivectors, dual vectors, reflection, rotation in 3D, CLUCalc.

Analysis of Telecommunication Services in Albania

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Abstract

Telecommunication services play an important role in the development of an effective and dynamic market. The role of telecommunication services has changed in years. Information and Communication technologies are essential to increasing the opportunities in economic development. In Albania, the telecommunication sector is liberalized and the number of operators that carry out such activities has increased significantly. Mobile telephony is the most developed branch in telecommunications. In this article, we have done an analysis of telecommunication services in Albania from 1995 to 2015 using statistical models to forecast the coming years. The statistical model used for the analysis and forecasting of telecommunication services in Albania is the Exponential Smoothing model. The services we have taken in consideration are: mobile telephony and fixed telephony.

Application on NoSql database: Classification, Characteristics and Comparison

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Abstract

Maintenance and large data processing in an effective manner, associated with high performance, is becoming indispensable for many organizations of various industries. They do face with high levels of documentation, hence enhancing the need for an effective data management. This paper aims at identifying important research directions, literature review and unstructured data warehouse, focusing on the main goal to achieve outcomes for creating a more efficient environment. Many organization in the word operating face every day with large amount of data, such as documents, e-mails, multimedia and social media. A study on these organizations, choosing the methods and solutions that they have offered for warehousing unstructured data and comparing databases NoSql is another purpose of this topic. The paper is to provide classification, characteristics and evaluation of NoSqs. It also provides the list of popular NoSql and demonstrates the practical use of NoSql database with the main purpose of enhancing, performance.

Key words: NoSQL Database, SQL Database, MangoDB, Cassandra, Database performance

Augmented Reality in Education

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Abstract

Augmented reality (AR) is one of the most exciting technologies around. AR enhances the way people interact with the world in different domains of applications. It has a large number of applications e.g. navigation, sightseeing, military, medical, education, maintenance and repair, gaming, entertainment, advertising and promotion. Augmented reality is the integration of digital information with the user's environment in real time. Unlike virtual reality, which creates a totally artificial environment, AR uses the existing environment and overlays new information on top of it. This paper aims to introduce the AR and the impact of this wonderful technology in education. AR applied to education affects the improvement of the learning process. We will focus on the advantages this technology offers in this field. AR has great potentials in education, more specifically in eLearning. There are many AR applications in use or under development today. Nowadays, the AR technology has become so powerful that it can play a significant role in the academic settings through mobile devices, tablets or any other wireless devices. Augmented reality can create a new era for situated learning by integrating itself with mobile learning and other concepts and technologies. The future of augmented reality is clearly bright.

Keywords: AugmentedReality, Virtual Reality, eLearning

Barriers to ICT Adoption by Small and Medium Enterprises: Case of Vlora, Albania

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Abstract

Nowadays companies are exposed to high competitive pressure and it is very important for them to understand the importance of information sharing between partners in their supply chain. There are a number of ICT systems that have been adopted by SMEs all over the world. Despite advances in ICT, it is not evident the same level of adoption among SMEs in Vlore, Albania. In this paper I have studied information technologies used in Small and Medium Enterprises. A questionnaire was distributed to top managers of targeted companies during November, 2015. Descriptive analysis is used to analyze the data. The goals of this research are identifying the barriers of adoption information technologies by Small and Medium Enterprises and identifying different technologies used by them. Results of this study confirm that: resistance to change from employees, skills shortages, integration with existing system and integration with customer's system generally isn't problem at all. A significant problem in ICT adoptions are resources shortages e.g. no maintenance and update. Later, in this study will be considered other factors affecting the barriers of using ICT by SMEs.

Better decision making for animal shelters with help of Machine Learning Algorithms

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Abstract

There are many non-profit animal shelters in Albania. Companion animals admitted to shelters usually fall into three categories: stray or lost companion animals caught by municipal dog catchers, stray animals brought to the shelter by their finders, or companion animals relinquished by their original owners. All shelters have the same goals: protect animals and find for them adoptive family. In this study, are used machine learning algorithms to find the relation between animal's physical characteristics such as breed, age, size and pet adoption. The results of the study are beneficial for shelters in terms of providing answers about which pets are likely to be adopted faster. The ultimate objective is to help the shelters formulate strategies to increase pet adoption and assist potential adopters in better decision making during this process.

Big Data Challenges

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Abstract

In recent era, "Big data" has become a new generic term. We find this term everywhere in science, healthcare, finance, engineering, medicine, business and massively in social media. Big data can be divided in four dimensions: volume, variety, velocity and veracity. In this paper we will focus on the fourth V the veracity which refers to the uncertainty of data which changes sharply as the size of the datasets grows. Database systems nowadays form a crucial component of every information system and their role is getting more and more important in big data analytics. To be competitive companies need to handle all types of information. Efficiently handling and storing imperfect information is one of the biggest challenges of information management. In this paper we will introduce different sources of uncertainty and nontraditional database systems which can store and query efficiently unstructured data.

Keywords: Big data, volume, veracity, variety, velocity, uncertainty, fuzzy

Building a Database Application for Maintenance of the Basic Unit Curricula at the University

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Abstract

The academic syllabus of the university is an attempt to create application/database application of university courses, on a wider scale on the internet. The construction and maintenance of basic unit curricula in higher education institutions is carried out manually and in a traditional manner. This methodology is used because until nowadays, the programs are almost completely unused resources for facilitating administrative procedures, for the employees of higher education institutions. The purpose of this paper is to propose a full automatic system that automates the process of creating and maintaining syllabus in a database and accessing them not only within a department of the faculty, but at a wider scale from all universities. This application provides a clearer perception of different pedagogical disciplines and institutional history by talking these data from syllabuses.

Keywords: Database Application, Academic Syllabus of the University Application

Cloud computing

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Abstract

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CLOUD computing has taken the world by storm. It is a term thrown around, especially in IT circles, from support personnel to the development elite. Here, we look to introduce cloud computing to the uninitiated and focus on current aspects that interest those in the field of hardware/software codesign and speculate on future trends and implementations relevant to those individuals. The purpose of this paper is to present a number of issues related to cloud computing, its evolution, its uses, its flaws, its perceptions as well as the dangers of its use.

Detection of cycles in Data Warehouse schemas and converting schemas to snowflake shape

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Abstract

Data Warehouses are cornerstones of Business Intelligence systems and as such require a deep understanding and careful handling of their construction. Unfortunately, not all the principles of data warehousing are considered during the data warehousing conception. Sometimes, the issues are created by providing OLTP databases instead of data warehouses as feeding database to a BI system. In order to provide a correct data warehouse schema, cycles have to be redesigned and snowflake shape designs should replace them at least formally. In this work, it will be tried to address these needs and suggest possible solutions toward such scenarios. The automated solution of the problem will be considered. It will be shown that a cycle detection mechanism in combination with a directed graph representing the database schema will identify fact and dimension tables. Tables split and aliases creation should break the cycles and generate snowflake schemas. Even though an automatic detection can suggest a possible solution, the human interaction will produce the final design. Generally a redesign of the whole data warehouse should be considered.

Keywords: Data Warehouse, Business Intelligence, OLAP, cycles, star, snowflake

Development of a proactive monitoring platform for ISP-s and on-cloud deployment

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Abstract

ISP-s face numerous problems regarding the part of network and service monitoring to the end users due to large network dimensions and various issues of concern. The scope of the monitoring platform should not be confined to the role of monitoring and reacting after the problem has happened (through alarms), increasing the complexity of the work for operators and the time to identify and troubleshoot the problem. The monitoring platform presented in this article plays a proactive role by maintaining quality service status for each end user, service, nodes and notifying the operator before the problem occurs. Also in this platform can easily be integrated various services like CRM and management tools for different nodes. The implementation and deployment of this platform will be performed on-cloud using Amazon web services (AWS), DC/OS Mesosphere as operating system for services based on Docker containers. It was chosen this way because of the low CAPEX / OPEX, rapid implementation and deployment, flexibility, re-dimensioning and on-demand resource utilization.

Development of Android applications based on open source tools

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Abstract

Nowadays Smartphones play an active role in our live. Many applications, useful or not, exist and are developed in different ways. The purpose of this article is to create an app for Android, using the infrastructure provided by Google for anyone who wants to propose and realize his own idea. This will be achieved with the help of open source programs that can easy be found on web. We will design an app that can determinate our geographic position using GPS (Global Positioning System) over Google Maps. The purpose of this article includes developing an app for Android operating system using Google's tools/software and showing how easy is to develop an app with open source tools that works effectively.

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Emotion Recognition using Image Processing and Machine Learning

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Abstract

Facial expression plays significant role for human beings to communicate their emotions. This paper proposes a prototype system used to classify the six universal emotions: Happiness, Sadness, Anger, Disgust, Surprise and Fear. The prototype system for emotion recognition is divided into 3 stages: face detection, feature extraction and emotion classification. After the face is detected, image processing, an algorithm of feature extraction is used to extract a set of selected feature points. Finally, a set of values obtained after processing those extracted feature points are given as input to the neural network to recognize the emotion contained.

Keywords: Image Processing, Facial Expression, Machine Learning, C# Programming, EmguCV, Bayesian Network

Evaluation of interference effect at the radio performance of LTE eNode-B

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Abstract

In a multi-cell network the key to improve the average throughput achieved by the user is to reduce the interference caused by the use of the same frequency in adjacent cells. To achieve this, a study of positive and negative factors is carried out on a continuous basis so that optimization plans can be implemented. In this paper are presented the impacts that have on LTE radio performance the interference between cells. Through the simulations carried out, some of the key parameters related to the interference affecting the growth or reduction of the final throughput are highlighted. Furthermore, by analyzing them, the values for which these parameters would bring improvements are also determined. To perform the simulations is used MATLAB R2016a.

Fuzyy Logic Control for Washing Machine

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Abstract

For the past few years, different types of control techniques are being used in various fields of industry. Fuzzy logic based control system is one of them. Fuzzy logic uses statements instead of mathematical model for solving a given problem. The paper describes the procedure that can be used to get a suitable washing time for different cloths. The process is based entirely on the principle of taking non-precise inputs from the sensors subjecting them to fuzzy arithmetic and obtaining a crisp value of washing time. Both the simulation and the control of the aforementioned device have been done by using MATLAB's fuzzy logic toolbox.

Keywords: Fuzzy Logic, Washing Machine, MatLab, Membership Function, Rules of the System, Surface of the input output relations

GPGPU (General-purpose computing on graphics processing units) In CUDA

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Abstract

Modern Gpu-s (Graphic Processing Units) are the future of computation .They became widely used to increase the performance of a computer on the graphics calculations but now they are a very good component of parallel computing. This paper shows CUDA and its architecture. CUDA® is a parallel computing platform and programming model that enables dramatic increases in computing performance by harnessing the power of the graphics processing unit (GPU). Programming a graphics processor to perform general parallel tasks is simple. But after understanding the various architectural aspects of the graphics processor, it can be used to perform other tasks as well. The paper also list some true statements about CUDA.

Keywords: *GPU*, *GPGPU*, *CUDA*, *grid*, *block*, *thread*, *OpenCL*, *Direct Compute*, *data parallelism*

Helping kids manage diabetes with mobile games

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Abstract

Diabetes as one of the most common chronic diseases worldwide is rapidly increasing in children and teenagers in many countries. Despite the increasing number of patients suffering from diabetes, the information about its self-management remains largely un-communicated, making the lives of the children even more difficult. Therefore, it is almost impossible for young children to understand the changes type 1 diabetes brings to their lives such as glucose monitoring, insulin injections, and food restrictions. Children with type 1 diabetes experience not only typical social and emotional struggles associated with growing-up, but they also face hormonal changes that affect their diabetes management. This paper proposes a mobile phone-based educational game for children with diabetes. The game is expected to provide basic diabetes-related knowledge and help children improve their self-management skills.

Keywords: game, mobile technologies, diabetes, disease, children.

How Software Engineering Methods Support Successfully ICT Projects Development

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Abstract

The work is focused on studying how software engineering knowledge can be very useful to enhance project on ICT products and services development through methodologies and techniques according to the software system applications domain and their requirement specifications also. This paper described the role of people, process and technology during software system projects stages staying at the requirements specification and architectural design. We will try to show a guide from planning to analyzing, designing and implementing as activities of the project depended from a set of factors interconnected that ensure the success of the project objectives. The implementation of software development is a journey or continuing processes of improvements. There are a lot of ICT projects that are destined to fail because of the insufficient managerial skills of them. It would be very important to avoid the failure of these projects selecting carefully a new methodology called decomposed software development methodology (DSDM). The changes in style of work do not depend to the system application but more to the software engineering models used. It will be more effective if the people understand the project goals and their role using the system decomposition. Only with this framework, ICT technology can be applied to ensure the project results.

ICT Inclusion in the Division of Knowledge in Teaching and Learning

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Abstract

Studies conducted in recent years have concluded that the use of ICT may significantly affect the exchange of knowledge in knowledge-sharing organizations. Likewise, the implementation of information and communication technology has given another dimension to education by directly influencing learning and teaching as well as in their methods. This thesis aims to study the issue of the inclusion of knowledge sharing in the learning process and to answer questions such as: how much is practiced in our schools and how does knowledge sharing influence the learning process? How motivated do teachers feel and how much they and students benefit in this process? The study was conducted using questionnaires and interviews, findings and results showed that if ICT involvement is effectively used in knowledge sharing, it has a very positive impact on the learning process, bringing many benefits both in time and space, in developing critical thinking. It gives rise to ties and collaboration between teachers by making them more prepared and motivated in their work.

Increase timing performance of a Java application using multithreaded programming

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Abstract

In this paper is introduced a comparison of an application's performance, once programmed through multiple threads and once programmed through only one thread to complete a specified task. In this case, the application will download 15 images from a website, it will count the time needed for this in the two cases, compare them and lead to the conclusion of an evident time increasing performance, which for the end user means a faster app.

Integration of Different Information Systems in Local Government

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Abstract

Technology has been seen as a major promoter of e-government services. Local Government through e-government wants to make a cohesive and centralized set of government services for end-users. The aim of this paper is to integrate various information systems that can be used to develop strategic links within and between different departments of local government. The work of this paper offers a possible approach to the integration of different information systems used in municipality, in two aspects. Firstly, it consists in Single-Sign-On authentication via an external authenticator for citizens, in function of receiving the service. Secondly, in data exchange and integration of workflow between different systems using web services.

Keywords: IntegrationofInformationSystems, Single-Sign-OnAuthentication, WebServices, E-Government, SmartProcesses.

Issues and Challenges for Big Data in Cloud Computing

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Abstract

The democratization of information technology has not only affected the cloud space, but big data as well. Big Data is a data analysis methodology enabled by a new generation of technologies and architecture which support high-velocity data capture, storage, and analysis. Cloud computing has been accepted by many organizations, but research on big data in the cloud remains in its early stages.

In this paper will describe how cloud computing is an enabler for advanced analytics with big data. Cloud computing and big data, while still in constant evolution, are proving to be the ideal combination. Together, they provide a cost effective and scalable infrastructure to support big data and business analytics.

Keywords: big data, cloud computing, big data issues

Local Tax Administration focusing on citizen

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Abstract

The way in which revenues are collected and spent defines the symbiotic relationship between the state and its citizens, strengthening the former and making it more accountable to the latter. Efficient and effective revenue collection is a key driver for financing development and strengthening good governance. Information technology has a great potential to improve revenue collection by automating processes, better servicing taxpayers and increasing compliance. The developed system is a local solution to move away from a confrontational dialogue to more constructive engagement with taxpayers, to adapt program functionalities to enhance the quality of service, increasing transparency, reducing time and cost of receiving service, and increasing the efficiency of the administration in providing services to the citizen.

Keywords: *tax administration, local government, financial services, web systems, taxpayers, citizen, revenue collection, public services, information systems.*

Model an Intelligent System to support a Tourist Agency

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Abstract

Tourism is a very important area for a country's economy. Tourist agencies play a major role in attracting tourists. The aim of the study is to create an intelligent system that helps a tourist agency to improve the services it offers in order to increase the number of tourists. Machine Learning algorithms will be used to analyse historic data gathered by tourist agencies to find useful patterns or models that can be used to improve their services.

Key Words: Intelligent System, Machine Learning, tourist agency.

Model and implement a recommendation system for farmers

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Abstract

Farmers face difficulties in selling their products. On the other hand, consumers also show uncertainty about the agricultural/bleary products they consume. Knowing consumers' willingness to pay would help farmers make decisions about the products they would offer. The purpose of this study is to model a system that offers recommendations to farmers about the products they offer by analyzing past data on consumer solvency for specific products. Data will be provided through questionnaires addressed to consumers and farmers. The model will be created using machine learning algorithms.

Keywords: machine learning algorithms, consumers' willingness to pay, recommendations system, agricultural products, agriculture.

Modeling and Forecasting Exchange Rate

Roneda Mucaj

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Abstract

The exchange rate forecast is one of the most challenging applications today in the time series field. This series is chaotic, basically noisy, and non-stationary. This makes it very difficult to recognize the dependence of future coefficients with those of the past.

In this paper, we demonstrate four different learning algorithms of Neural Network used for forecasting the exchange rate of Euro/ALL. We used the data from 2000-2016, taken by the Bank of Albania. We train this series with different learning algorithms and we study their performance based on their accuracy and speed of training. Based on the results, Levenberg –Marquardt algorithm is found to be very efficient for modeling and forecasting the time series of exchange rate. A comparison was made with the known conventional forecasting model ARIMA and the ANN model.

The results show that ANN method has better forecasting accuracy with respect to the seasonal ARIMA.

Keywords: time series, forecasting, exchange rate, ANN, ARIMA

Optimized Dual-Band Low Power and Noise Low CMOS Amplifier For Biomedical Applications

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Abstract

In this paper, a optimized of dual-band Low Power and Noise Cmos Amplifier (LPNA) for Neural Recording Applications is proposed. This new structure is able to operate concurrently at frequency of 1.2 and 1.57 GHz. Parallel and series resonance parts are employed in the input matching in order to achieve concurrent performance. With respect to used pseudo-differential structure, LPNA is basically a single-ended-to-differential conversion and it consequently has no need to balun. In addition, an inductively degenerated cascode approach is employed to have better simultaneous matching and Noise Figure (NF). Simulations are performed with TSMC 0.18 µm technology in ADS software. Results analysis present that LPNA achieves input matchings of -11.024 and -13.131 dB, NFs of 2.315 and 2.333 dB, gains of 26.926 and 27.576 dB, P-1dB of -15.3 and -13 dBm, IIP3 of -0.9 and 2.2 dBm at 1.2 and 1.57 GHz, respectively. Besides, LPNA consumes 8.32 mA DC current from a 1.8 V supply voltage.

Keywords—Dual-Band, Biomedical, Impedance Matching, LPNA, Noise Figure.

Optimizing Wireless Devices Using Genetic Algorithms

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Abstract

The evolution of communications technology as well as the demand for ubiquitous connectivity has made the number of wireless nodes growing much more quickly than the number of wired nodes in modern communications networks. In today's world there are a number of both wired and wireless networks providing the same services, but using different technologies. One of the biggest challenges currently being faced by the telecommunications community is the integration of these multiple networks into a single seamless network. Achieving the quality demanded by the users of wireless communications networks requires the devices to be able to learn and adapt to new situations in order to mitigate the detrimental effects of the wireless channel. We propose a three-layers elf-awareness mechanism, which consists of Monitoring, Situational-awareness and Adaptation functions that reside in the Forwarding, Management and Control planes. This research introduces adaptive capabilities to the network device in the context of cross - layer design. By using an adaptive genetic algorithm (GA) as the underlying technology, the device is able to learn and apply the acquired knowledge to adapt its operational parameters when facing unknown situations. The genetic algorithm can be tested in a multi-objective scenario that aims to find the weight distribution of a linear antenna array. Research contributions made by this work also will include proposal and development of the architectural framework, procedural algorithmic and experimental application simulator, which will serve as the baseline to our comparative experiments between the designed engine and traditional approaches.

Keywords: Genetic Algorithm, Wireless Devices, Antenna Array, Selection, Crossover, Mutation, Migration.

Performance evaluation of DSR protocol

for rescue mission scenario

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Abstract

Mobile Ad-Hoc networks (MANETs) are a new model of wireless networks that do not rely on any fixed infrastructure. Hosts rely on each other to make networking possible. The main problem of MANET networks which conditions their operation is routing of packets. Communication between the hosts can easily be lost as they are in a dynamic network environment where nodes can enter and exit frequently from the network. In our article we will be discussing the performance of the DSR protocol, which is a reactive routing protocol, designed specifically for use in ad hoc multi-hop networks. This protocol preserves and refreshes the routes discovered for each nodes as well as offers different routes for achieving a particular destination. Simulations are performed with the NS-2 simulation program for realistic scenarios in civil emergencies missions.

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Real-life Performance Examination of Ad-hoc Wireless Networks

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Abstract

Ad-hoc wireless networks nowadays are being utilized by the users as a possible way to communicate indoors within a specific range. Basically, wireless networks use specific 802.11x protocols found in a variety of devices, with new devices having newer protocols. Those newer protocols have a better data rate transfer but they are not usable if all the communication devices do not have them adopted. Some users might think upgrading their devices in order to benefit from the higher transfer rate. However, when it comes to real-life performance examination, the data transfer rates are not much different. The main goal of this paper is to set up a practical home network and examine the data transfer rate improvement. By using different wireless protocols, the data transfer rate will be measured and compared to the theoretical one. Also the difference will be evaluated from the distance point of view of the device location to see if there is a threshold distance where the improvement decreases. At the end, the conclusion will be drawn to whether the upgrade of the devices is justifiable or not.

Keywords: *ad-hoc wireless network*, 802.11*x protocols*, *data transfer-rate*, *performance testing*, *mobile devices*.

Recurrent Neural Networks in Time Series Forecasting

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Abstract

Time series forecasting is the use of a model to predict future values based on previously observed values. Time series forecasting has some important applications in real life, and also these kind of problems are a difficult type of predictive modeling problem.

This paper studies the ability of recurrent neural networks (RNN) to perform time-series forecasting. In RNNs, signals passing through recurrent connections constitute an effective memory for the network, which can then use information in memory to better predict future time series values.

In this paper we use a recurrent dynamic network, the Non-linear Auto-Regressive with eXogeneous inputs (NARX) model, to forecast time series like EURO/ALL exchange rate, USD/ALL exchange rate, Consumer Price Index (CPI) and Interest Rate for credits in Euro. The conclusion is that the RNN model achieves high accuracy on time series forecasting.

Keywords: Recurrent Neural Networks, time series, forecasting, NARX, RNN

RISK CULTURE ASSESSMENT OF SMES THROUGH CAUSAL RELATIONSHIPS Case Study: SMEs in Southern Region

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Abstract

Constant identification and assessment of the risk culture of SMEs is one of the most important challenges for the management staff of these organizations. The factors that enable the identification of risk culture are generally not numerically measurable in most usual cases, and this leads in complications of its immediate and direct identification. In the vast majority of cases these factors are measured through perceived sensitivity of the organization members. As a result, the process of decision making, and generally of the organization of the main activities becomes possible through cause and effect analyses. The main purpose of this research is to study the causal relationships through statistical methods of the most important influent factors in the risk culture identification and assessment, and their representation by means of graphs and diagrams. This paper represents the study of causal relationships of some of the most important factors considered in the Albanian reality, in order to identify the risk culture of SMEs in the Southern Region.

The Application of Artificial Intelligence Techniques in Optimized Resources Scheduling

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Abstract

Scheduling problems are complex and difficult to solve. They are likely to be unmanageable because of a competition for limited resources and many constraints that have to be maintained. Using only combinatorial search techniques, cannot guarantee the success. The techniques used in scheduling are a combination of search techniques and heuristics. In this paper we present an overview of existing production scheduling systems and the tools used in decision-making supporting in real-world production scheduling. In finding ways to improve scheduling decisions process, helping production schedulers and engineers in dynamic manufacturing systems with sophisticated algorithms, we concentrate on artificial intelligence techniques such as genetic algorithms. By a study case we present how to use a genetic algorithm in maintenance scheduling in a modern power system. The scheduling realized using genetic algorithms concerned the constraints and is an optimum or near-optimum schedule.

Keywords: genetic algorithm, scheduling, optimization, power system, production scheduling.

The Digital Signature and the X.509/OpenPGP Authentication Models

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Abstract

This article explains what a Digital Signature is, why it is an important part of the DigitalIdentity, and how it works. Then it describes the authenticity and social problems related to the usage of the Digital Signature. It explains as well the two authentication models, X.509 and OpenPGP that can be used to solve these authenticity problems. Finally it makes acomparison between these two authenticationmodels and their features and tries to explain why the OpenPGP model is better.

The Use of software in visualization and measurement of 3-D objects Application on the morphometry of the coral, Lophelia pertusa

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Abstract

A basic way to learn about geometric objects is to measure them. Casual investigation of geometric objects will yield only qualitative information about the object. To truly gain understanding it is necessary to obtain quantitative measurement data that can easily be analyzed and compared. Computers help researchers in analyzing a large amount of data. A much-used method for measuring objects is to acquire a digital version of the object and perform the measurements on the digitalized version of the object. The scope of this paper is to create an interactive measurement environment for measuring corals, found on the Adriatic coast of Alania. The data obtained in this paper were obtained through a CT scanner, and used for statistical analysis of the corals.

The RSA Signature Scheme

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Abstract

In this paper we present the RSA signature scheme is based on RSA encryption introduced Fast Encryption with Short Public Exponents. A surprisingly simple and very powerful trick can be used when RSA operations with the public key *e* are concerned. This is in practice encryption and, verification of an RSA digital signature. In this situation, the public key e can be chosen to be a very small value. In practice, the three values e = 3, e = 17 and $e = 2^{16}+1$ are of particular importance.

Using computational methods to analyze and evaluate statistically the manuscripts of writer Petro Marko

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Abstract

Computational Linguistic is still in the first steps in terms of research in Albanian language and literature. In our previous study, regarding the statistical evaluation of the Albanian language, where as a corpus is considered the Albanian language dictionary with 48000 words, digitalized in order to be easily treatable by the computational algorithms. In this way, the first bases were laid, creating a statistical evaluation standard for the Albanian language as it was previously done in other languages. In this study, a statistical analyzes and evaluation for manuscripts of Petro Marko's will be carried out by trying to create a statistical profile of the language he uses. In this manner, we open the way to researches about authorship studies for other authors as well. To carry out the study we have developed a program that takes into consideration the particularities of the Albanian language: the diacritic letters "dh, ll, th, rr, sh, xh, zh" as well as the special words "ë, ç". The AntConc program, which deals with concordances and n-grams, has also been used. We will analyze the language and style of the writer, in order to enhance the current analysis of the Albanian literature.

Using Docker to Run Everything From a Single Server

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Abstract

Often it is desirable to install several web pages or web applications in the same server, in order to minimize costs. However this is not so easy and presents some challenges. We will discuss several ways of trying to accomplish it, and argue that using Docker is the most e_cient and the most easy one. We will also see some use cases of applications that can be installed with Docker, which actually make use of some custom shell scripts that I have developed.

Using GIS and revealing client side patterns

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Abstract

GIS concepts and workflows are going to be presented and explained by using GIS API-s. some topics that are going to be covered are: Creating GIS data and finding data others have shared, pattern visualization by displaying GIS data on a map, GIS data analisys in revealing new insights and correlations and in the end sharing of GIS solutions with others in growing their acess and impact. By the end, we shall know how to find different GIS APIs of different programming languages, connect with other developers for support and incorporating GIS workflows in our coding projects. Preliminary requirements is being familiar with at least one programming language. Demonstrations included are all based on JavaScript whereas GIS knowledge we'll try to find out are sort that can be translated well among different kinds of programming languages. All this work with accent on an effort to reveal the next coming work an aim for a deepened 3-year study over GIS technologies and JavaScript-based APIs and work with graphical and conceptual design of client applications.

Keywords: GIS, pattern, visualization, JavaScript.

Web as a multi-agent platform

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Abstract

Nowadays one of the biggest problems of implementing multi-agent systems based on the web is the infrastructure that fails on addressing the challenges of the current web technology. There is an approach to developing these systems capable of recognizing and to adapt the changes within the environment. Implementing multi-agent systems need close collaboration between a number of facilities such as platform, architecture, autonomous capabilities, etc. In this paper, we will present a web-based agent platform that allows creating web agents, communicate and collaborate with each other in a distributed environment.

Keywords: Web, multi-agent, multi-agent systems, distributed systems, environment.

WiFi-RFID Based Smart University

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Abstract

Radio frequency identification (RFID) is getting popularity among identification technologies owing to its low cost, light weight, reduced size and inexpensive maintenance. Attendance is one of the important factors that determine the students rendering. There is a necessity to build a smart system that decrease load in managing the attendance and improves the performance of colleges, universities and any educational institute. The most common actions in educational organizations involve identification of student, maintenance of student attendance, security of attendance and electrical power conservation at the place where the attendance is taken.

The Multifunctional Plant Efficiency Analyser M-PEA – an unique instrument for experimental approaches to studying the state of the photosynthetic apparatus

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Abstract

Chlorophyll (Chl) a fluorescence measurements have been used for more than 80 years to study photosynthesis, particularly photosystem II (PSII). The technique has become a trusted probe in biological research. Many measured and calculated parameters are good biomarkers or indicators of plant tolerance to different abiotic and biotic stressors. This was made possible by the rapid development of the fluorometers. Currently, most of these instruments are based mainly on two different operational principles for measuring variable chlorophyll a fluorescence: (1) a PF signal produced following a pulseamplitude-modulated excitation and (2) a PF signal emitted during a strong continuous actinic excitation. In addition to fluorometers, other instruments have been developed to measure additional signals, such as DF, originating from PSII, and light-induced absorbance changes due to the photooxidation of P700, from PSI, measured as the absorption decrease (photobleaching) at about 705 nm, or increase at 820 nm. M-PEA (multifunctional Plant Efficiency Analyzer, Hansatech Instruments), allow for fast and very informative sub-millisecond time resolution analysis (in vivo and in situ) of the functional status of the photosynthetic apparatus in plants. It is based on a simultaneous signal 16-bit resolution registration of the kinetic characteristics of prompt chlorophyll fluorescence emission, delayed chlorophyll fluorescence and modulated light scattering and reflection of the actinic incident light at 820 nm. Olive leaves were analyzed in different physiological states, using physical stressors, light intensity and temperature. In this review, the technical and theoretical basis of newly developed instrument, allowing for simultaneous measurement of the PF and the DF as well as other parameters is discussed.

Table of Contents

Preface
International Program
Committee4
Organizing
Committee5
A comparative study on sensitivity to outliers of some fuzzy clustering algorithms
Enea Mançellari, Luan Sinanaj, Erind Bedalli6
A hybrid clustering model combining K-means and agglomerative hierarchical clustering
algorithms
Erind Bedalli, Evald Serreqi, Sokol Shurdhi7
A survey of size optimization algorithms applied in the structural engineering design
Ersilio Tushaj
An Integrated Web-GIS Visualizing System
Ana Dhembi, Endri Xhina9
An iterative presentation of the Geometric Algebra with the CLUCalc software
Elda Lamçe, Morena Breshanaj, Llambrini Sota10
Analysis of Telecommunication Services in Albania
Fjoralba Janku, Oltiana Toshkollari, Eljona Zanaj11
Application on NoSql database: Classification, Characteristics and Comparison
Silvana Greca, Anxhela Kosta, Suela Maxhelaku12
Augmented Reality in Education
Romina Agaçi13
Barriers to ICT Adoption by Small and Medium Enterprises: Case of Vlora, Albania
Alma Sheko14

Better decision making for animal shelters with help of Machine Learning Algorithms
Enida Kurti, Prof.Asoc.Dr.Ana Ktona15
Big Data Challenges
Brisilda Munguli , Lidia Dishnica16
Building a Database Application for Maintenance of the Basic Unit Curricula at the University
Jurgen Muho, Elina Jaupllari, Eni Nasi, Denis Saatçiu17
Cloud computing
Nirida Pashaj18
Detection of cycles in Data Warehouse schemas and converting schemas to snowflake shape Olti Qirici
<i>Development of a proactive monitoring platform for ISP-s and on-cloud deployment</i> Ditmir Kukaj, Ines Muka
Development of Android applications based on open source tools
Rinaldo Malko
Emotion Recognition using Image Processing and Machine Learning
Kristiana Çaçi, Olti Qirici
<i>Evaluation of interference effect at the radio performance of LTE eNode-B</i> Arjeta Xhomara, Qani Muka
Fuzyy Logic Control for Washing Machine
Irena Mehmetaj, Rudina Greca24
<i>GPGPU (General-purpose computing on graphics processing units) In CUDA</i> Denis Sinanai, Bruna Shaqirai,

Helping kids manage diabetes with mobile games

Rezarta Kapaj , Fationa Myftari	26
How Software Engineering Methods Support Successfully ICT Projects Development	
Eva Cipi, Jozef Bushati	27
ICT Inclusion in the Division of Knowledge in Teaching and Learning	
Julinda Dukagjini	28
Increase timing performance of a Java application using multithreaded programming	
Elior Vila, Igli Tafa, Kliv Shapllo	29
Integration of Different Information Systems in Local Government	
Elina Jaupllari, Endri Xhina	30
Issues and Challenges for Big Data in Cloud Computing	
Eljona Proko, Dezdemona Gjylapi	31
Local Tax Administration focusing on citizen	
Sidorela Lazi, Acad. Asoc. Prof. Dr Endri Xhina	32
Model an Intelligent System to support a Tourist Agency	
Sona Haxhiu, Ana Ktona	33
Model and implement a recommendation system for farmers	
Ermal Troci, Ana Ktona	34
Modeling and Forecasting Exchange Rate	
Roneda Mucaj, Valentina Sinaj	35
<i>Optimized Dual-Band Low Power and Noise Low CMOS Amplifier For Biomedical Applications</i>	
Medrit Mustafaraj	36
Optimizing Wireless Devices Using Genetic Algorithms	
Elda Xhumari, Suada Koci	37
Performance evaluation of DSR protocol for rescue mission scenario	
Anteo Memetaj	38
Real-life Performance Examination of Ad-hoc Wireless Networks	
Elior Vila, Silvester Hasani	39

Recurrent Neural Networks in Time Series Forecasting
Dezdemona Gjylapi, Eljona Proko, Alketa Hyso40
Risk culture assessment of SMEs through causal relationships
Case Study: SMEs in Southern Region
Miranda Pajo, Elmira Kushta, Miftar Ramosaçaj41
The Application of Artificial Intelligence Techniques in Optimized Resources Scheduling
Alketa Hyso, Alketa Hasanaj42
The Digital Signature and the X.509/OpenPGP Authentication Models
Dashamir Hoxha43
The Use of software in visualization and measurement of 3-D objects
Application on the morphometry of the coral, Lophelia pertusa
Eljona Zanaj, Ina Nasto44
The RSA Signature Scheme
Besnik Memetaj45
Using computational methods to analyze and evaluate statistically the manuscripts of writer Petro Marko
Qani Muka, Roland Zisi, Bardhosh Gaçe, Edlira Çerkezi46
Using Docker to Run Everything From a Single Server
Dashamir Hoxha
Using GIS and revealing client side patterns
Anisa Vurmo
Web as a multi-agent platform
Areti Bojaxhiu, Endri Xhina
WiFi-RFID Based Smart University
Fiodor Ziu
<i>The Multifunctional Plant Efficiency Analyser M-PEA – an unique instrument for experimental approaches to studying the state of the photosynthetic apparatus</i>
Emilia Çaçi52
Table of contents