

NORTH ATLANTIC UNIVERSITY UNION

Editor

Claudia-Georgeta Carstea

Latest Trends in Applied Informatics and Computing

Proceedings of the 3rd International conference on
Applied Informatics and Computing Theory (AICT '12)

Barcelona, Spain, October 17-19, 2012

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LATEST TRENDS in APPLIED INFORMATICS and COMPUTING

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Plenary Lecture 1

Non-Conventional Aggregation Functions



Professor Imre J. Rudas

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Fellow of IEEE

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Abstract: One of the most important and central problems of fuzzy set theory has been the proper definition of set-theoretic (or logical) operations. From the beginning of the theory, the 'min' for intersection and 'max' for union is very common and popular in the literature. This is due to the fact that they have several nice properties and are easy to work with, especially in the applications. It turned out that the justification of a class of operations - instead of any particular one - for extending crisp intersection (union and complementation) is more reasonable.

This recognition has led researchers to the definition of t-norms, t-conorms and strong negations. Generally speaking, these connectives possess reasonable properties. But t-norms, t-conorms and strong negations can also be interpreted as many-valued extensions

of the usual Boolean logical connectives conjunction, disjunction and negation, respectively. Thus it is natural that their properties have to be connected and be in accordance with that of fuzzy implications.

On the other hand, if we work with binary operations and there is no need to extend them for three or more arguments then associativity is a very restrictive and unnecessary condition. In addition, the two variables in the connective may have different semantics, whence the commutativity property may also be questionable. It has also become clear that these operators do not always follow the real phenomena and do not provide optimal performance. These facts are very often left out of consideration. Therefore, there is a natural need for finding new operators to develop more sophisticated intelligent systems.

This paper summarizes the research results of the authors that have been carried out in recent years on generalization of conventional aggregation operators. This includes, but is not limited to, the class of uninorms and nullnorms, absorbing norms, distance- and entropy-based operators-

Brief Biography of the Speaker:

Imre J. Rudas graduated from Banki Donat Polytechnic, Budapest in 1971, received the Master Degree in Mathematics from the Eotvos Lorand University, Budapest, the Ph.D. in Robotics from the Hungarian Academy of Sciences in 1987, while the Doctor of Science degree from the Hungarian Academy of Sciences in 2004. He received his first Doctor Honoris Causa degree from the Technical University of Kosice, Slovakia and the second one from "Polytechnica" University of Timisoara, Romania.

He is active as a full university professor. He served as the Rector of Budapest Tech from August 1, 2003 for a period of four years, and was reelected for three years in 2007. From 2010 Budapest Tech is changed to Obuda University and he was elected as the rector for five years.

He is a Fellow of IEEE, Senior Administrative Committee member of IEEE Industrial Electronics Society, member of Board of Governors of IEEE SMC Society, Chair of IEEE Hungary Section and Vice-President of the Hungarian Academy of Engineering.

He is the treasurer of IFSA (International Fuzzy System Association), he had been the President of Hungarian Fuzzy Association for ten years.

He serves as an associate editor of some scientific journals, including IEEE Transactions on Industrial Electronics, member of editorial board of Journal of Advanced Computational Intelligence, member of various national and international scientific committees. He is the founder of the IEEE International Conference Series on Intelligent Engineering Systems (INES) and IEEE International Conference on Computational Cybernetics (ICCC), and some international symposia. He has served as General Chairman and Program Chairman of numerous scientific international conferences.

His present areas of research activity are Computational Cybernetics, Robotics with special emphasis on Robot Control, Soft Computing, Computed-aided Process Planning, Fuzzy Control and Fuzzy Sets. He has published books, more than 500 papers in books, various scientific journals and international conference proceedings. He received more than 750 citations for his publications.

Plenary Lecture 2

Methodologies and Standards for Information System Security Assurance



Professor Mario Spremic
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Abstract: Over the past decade information system security issues has been treated mainly from technology perspective. This paper goes a step further and considers it from the IT governance view, mainly aligning it with the risk management activities and stressing the necessity for a holistic approach in which the executive management should be involved. The main objective of the paper is to stress the importance of implementing information system security governance mechanisms, procedures and metrics. Metrics for information system security assurance are analysed and the phases and processes of its regular reviews (audits) explained in further details. The standards and legislation activities that help in that sense are evaluated. Implementation of industry best practices standards and processes such as ISO 27000, PCI DSS and CobiT combined with other IT-related solutions can deliver substantial security risk reduction and reduce business risks associated with information system security. The holistic model of treating information system security risks as business risks are explained and tested on multiple case studies.

Brief Biography of the Speaker:

Mario Spremic, CGEIT is a Full Professor and a head of the Department of Informatics at the Faculty of Economics & Business, University of Zagreb, Croatia. He received a B.Sc. in Mathematical Sciences, M.Sc. in IT Management and Ph.D. in Economics and Business (IT Governance) from the University of Zagreb. He had published 10 books and more than 150 papers in scientific journals, books and conference proceedings mainly in area of e-business, IT governance, IT risk management, IS strategy, IS security, IS control and audit and IT Value. He is also a visiting professor at various postgraduate studies (University of Zagreb, University of Sarajevo, University of Ljubljana) with courses IT Governance, e-Business, Information Systems Strategy and Information System Control and Audit. He is program director and co-founder of the 'FBA-CIO Academy', a regional executive development program in the field of IT Governance and Business/IT Alignment (www.efzg.hr/cio) and academic director of Bachelor .Degree in Business study, EPAS accredited 4-year study program taught in English (www.efzg.hr/bdib).

Mario is an associate editor and a member of Boards and Committees for a number of international scientific journals and a program committee member and/or reviewer for various international conferences (full list available at www.efzg.hr/mspremic).

Mario is reviewer and a program committee member at wide range of international conferences (WSEAS, etc., full list available at www.efzg.hr/mspremic). He is an ISACA and IIA member and holds ISACA's CGEIT international certificate (Certificate in Governing Enterprise IT).

Mario has also been acting as a consultant for a number of companies preferably in areas of IS strategy, IT governance and risk compliance, business process change and IS control and IS audit with the experience in implementing various IT projects and conducting wide range of information system audit projects. As a qualified information system auditor and consultant he has been participating in a number of regulatory-based IS audits and advisory projects and besides scientific, gain in-depth expert knowledge of commonly used standards such as CobiT, ISO 27001, PCI DSS, Basel II, SoX, ITIL, etc. Previously he had been working as system analyst, project manager and CIO deputy.

Plenary Lecture 3

Text Classification in Deep Web Mining



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Abstract: We Looming the quick growth of the deep web is causing the continuous growth of information, leading to several problems such as increased complexity of extracting potentially useful knowledge. Web content mining challenges this problem by gathering explicit information from different web sites for its access and knowledge discovery. Using data mining algorithms such as classification to extract information using different classification algorithms such as K-Nearest Neighbor (CK-NN) and Classifier Naïve Bayes (CNB).

We will investigate and evaluate these common methods; using web mining systems by using a set of features as a vector of keywords for the learning process to apply text classification for the system. The algorithm usually used to classify a various number of documents written in a Latin text language.

Brief Biography of the Speaker:

He received his Ph.D. in Computer Science in 2002 from Debrecen University in Hungary, he is an Associate Professor since 2010. Dr. Zubi, served his university under various administrative positions including the Head of Computer Science Department 2003-2005. He was also the head of the technical and cultural affairs office at the university and sign out many academic MOU with a number of international university world wide. He was a member of the Libyan Tempus team in Libya. He was the postgraduate study coordinator in Computer Science Department. He was also the postgraduate study coordinator for the Faculty of Science for one academic year 2004-2005. He is also an undergraduate and postgraduate lecturer in the computer science department and supervised several research work and thesis in several Libyan universities. He publishes a great number of papers and researches in many scientific and international proceedings and journals world wide.

He is a reviewer of many scientific journals such as World Scientific and Engineering Academy and Society (WSEAS) , Journal of Software Engineering and Applications (JSEA), Member of the International Association of Engineers (IAENG), Journal of Engineering and Technology Research (JETR) , World Academy of Science Engineering and Technology (WASET) journal, an Associate Editor in the Journal of the WSEAS Transactions on Information Science and Applications and more local journals in Libya. He is a member of the Association for Computing Machinery society (ACM), a member of IEEE society, a member of the World Scientific and Engineering Academy and Society (WSEAS). He published as authors and a co-author in many researches and technical reports in local and international journals and conference proceedings.

Plenary Lecture 4

Benefits and Challenges of Using Data Mining Techniques



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Abstract: For long time companies have recognized the need for multidimensional analysis, decision support systems for data mining and knowledge discovery from large data sets. Companies use their multiyear historical data for various analysis and data from a variety of other heterogeneous sources available on the Internet. Different profiles of users explore the data for analysis in order to make decision before the others. In current environments systems support for managerial decision-making requires accuracy and clarity in the problem presentation and intelligence in the right selection of data relevant to the specific problem. The positive aspects of decision support systems, techniques that can improve operations and problems that may arise related to the security of data and information in such environment will be presented. Several different case studies will be discuss in order to explore and present all benefits for decision support using different techniques such as collaborative filtering and trust based clustering. Beside benefits, data mining and application of different tools and techniques bring many challenges. Through presentation some of these issues will be discussed, and possible ways to mitigate them without undermining expected results will be proposed.

Brief Biography of the Speaker:

Dzenana Donko received M.Sc. degree in Computer Science from the University of Sarajevo, BiH at the Faculty of Electrical Engineering in 1994 and Ph.D. degree in Computer Science at the same University in 2004. She is currently an associated professor at the University of Sarajevo where she teaches various subjects on computer science. Besides being an author and co-author of numerous papers with special aspect of business intelligence and published book "Object Oriented Analysis and Design", she is also member of the organizing committee and review of several international conferences. She was consultant on several projects for United Nations Development Project for digital government processes. Her research interest includes object oriented analysis and design, programming languages, web architectures and web programming, workflow management, system analysis and design, and service management.

Plenary Lecture 5

WiFi Channel Attack Detection and Avoidance; A Markov Chain Approach



Professor Tarek Saadawi

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Abstract: Wireless Fidelity (WiFi) employing IEEE 802.11 DCF protocols is the most widely used wireless local access technique. The goal of this presentation is to introduce the problem of channel capturing by a hacker, a detection technique, and an avoidance strategy to reduce the impact of the hacker on the network. IEEE 802.11 DCF employs CSMA/CA mechanism to reduce the probability of collisions inside the network.

The proposed solution is to mathematically calculate the maximum achievable throughput using Markov Chain modeling and monitor each node to detect if any node is capturing the channel and utilizing all the bandwidth between that node and the AP (access point) with the presence of other innocent nodes. The theoretical network throughput will be derived using two dimensional Markov Chain to determine the network capacity. Results obtained by the theoretical computations will be validated by network simulation to determine the baseline for the maximum achievable throughput in the network under fair conditions where all nodes follow the standards. An approach is proposed to enable all the nodes in IEEE 802.11 network with a mechanism to detect and identify the malicious nodes in a distributed environment. Results are presented to prove the effectiveness and feasibility of the proposed algorithm.

Brief Biography of the Speaker:

Dr Saadawi has been with the Electrical Engineering Department, The City University of New York, City College, since 1980, where he currently directs the Center of Information Networking and Telecommunications (CINT) at CCNY. His current research interests are wireless networks, multimedia networks, AD-HOC networks and network security. He has published extensively in the area of telecommunications networks. He is a co-Editor of Cyber Infrastructure Protection, published by Strategic Studies Institute, 2010, lead-author of a text book on telecommunications, and the lead author of Egypt Telecommunications Infrastructure Master Plan, funded by USAID. Dr Saadawi a former Chairman of IEEE Computer Society of New York City He has received IEEE Region 1 Award. Dr Saadawi has been a member of the Consortium Management Committee of ARL Consortium on Telecommunication (2001- 2011), and has been on US Dept of Commerce delegation to the Algerian Government addressing Rural Communications, April 2007.

Plenary Lecture 6

Theory to Practice in Business Intelligence



Professor Mihaela I. Muntean

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Abstract: The debate is developed based on the following considerations: 1 - Business Intelligence (BI) is unanimously considered the art of gaining business advantage from data; therefore BI systems and infrastructures must integrate disparate data sources into a single coherent framework for real-time reporting and detailed analysis within the extended enterprise; 2 - Business Intelligence can be described as a value proposition that helps organizations in their decision-making processes; 3 – the Business Intelligence Value Chain represents a „From DATA To PROFIT“ approach and is recommended to ground any performance management program. Different aspects, including theoretical considerations and practice examples, regarding location intelligence, mobile BI, cloud-based BI, social BI and collaborative Business Intelligence will be treated, pointing out some of the author’s contributions.

Nowadays, organizations have adopted more prudent policies requiring a financial justification for nearly every IT initiative, including Business Intelligence system implementations. A business-driven methodology is recommended in any BI project management approach, project scoping and planning being vital for the project success. A business-driven approach of a BI project implementation starts with a feasibility study. The decision-making process for large projects is very complicated, and will not be subject of this paper. Having in mind a middle-sized BI project, a feasibility study based on the Monte Carlo simulation method will be conducted.

Brief Biography of the Speaker:

Currently, professor Mihaela I. Muntean is the chair of the Business Information Systems Department at the West University of Timisoara and an IT independent consultant. With a background in Computer Science and a Ph.D. obtained both in Technical Science and in Economic Science (Economic Informatics), professor Mihaela I. Muntean focused her research activity on topics like information technology, knowledge management, business intelligence, business information system. Over 70 papers in indexed reviews and conference proceedings and the involvement with success in 8 multi-annual national research grants/projects are sustaining her contributions in the research fields mentioned above.

Plenary Lecture 7

Multimedia Applications for Educational Purposes



Professor Eva Milková
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Abstract: Multimedia applications have substantially influenced education. They give teachers an excellent chance to demonstrate and visualize the subject matter more clearly and comprehensibly, as well as also enabling them to prepare study material for students which optimizes their study habits. The top applications of multimedia are represented by virtual reality.

There are large software products dealing with wide spectrum of objects developed by a team of professionals. However there are also various smaller programs dealing with objects appropriate to a subject created on a script given by the teacher with regard to students needs. We have prepared with our students such multimedia applications dealing with objects appropriate to subject matter for many years.

We will introduce the two most important applications used not only as a complement of our lectures for demonstration and visualization the explained matter to be much clearer and comprehensible, but also for creation an interesting study material located within the virtual study environment for self-preparation of students.

Brief Biography of the Speaker:

Professor Eva Milková graduated from the Charles University in Prague, Faculty of Mathematics and Physics, Czech Republic in 1978. Gradually received the following titles - master degree RNDr., doctoral degree Ph.D., associate professorship (docent) and professor.

She is a full professor at the University of Hradec Králové, Faculty of Science, and Department of Informatics. Her scientific interests include Graph Theory, Combinatorial Optimization and ICT in Education. She is a member of scientific counsels for doctoral studies and a supervisor of considerable number of doctoral students.

Her publication activity includes more than hundred contributions at international conferences and journals. She is a member of scientific program committees of prestigious international conferences and she is a member of editorial board of several international journals.

Details can be found on <http://lide.uhk.cz/prf/ucitel/milkoev1/>.

Plenary Lecture 8

Ontological Engineering for Medical Knowledge Management



Professor Abdel-Badeeh M. Salem

Head of BioMedical Informatics and Knowledge Engineering Research Lab
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Abstract: Ontological engineering have become an efficient methodology for knowledge representation and management in many domains and tasks. Ontologies have a range of potential benefits and applications in medical domain including the sharing of medical information across medical systems, enabling reuse of medical knowledge and providing intelligent and personalized researcher support. This paper presents the research results of the author and his colleagues that have been carried out in recent years at the BioMedical Informatics and Knowledge Engineering Research Lab in Ain Shams University, Cairo, Egypt, on using ontological engineering in medical informatics. Examples of the research performed for developing web-based ontologies for breast, lung, and liver cancers, and viral hepatitis are discussed. The developed ontologies were encoded in OWL-DL format using the Protégé-OWL editing environment. In addition the talk discusses several directions for future research.

Brief Biography of the Speaker:

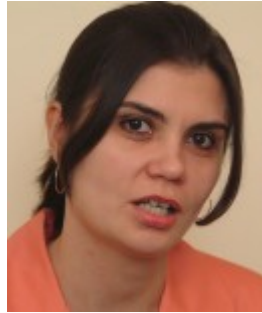
Prof. Dr. Abdel-Badeeh M Salem He is a Professor of Computer Science since 1989 at Faculty of Computer and Information Sciences, Ain Shams University, Cairo-Egypt. He is a professor emeritus since October 2007. He was a Director of Scientific Computing Center at Ain Shams University (1984-1990). His research includes intelligent computing, expert systems, biomedical informatics, and intelligent e-learning technologies. He has published around 250 papers in refereed journals and conference proceedings in these areas. He has been involved in more than 300 conferences and workshops as an Int. Program Committee, organizer and Session Chair. He is author and co-author of 15 Books in English and Arabic Languages.

He was one of the founders of the following events, First Egyptian Workshop on Expert Systems 1987, Int. Cairo Conference on Artificial Intelligence Applications in 1992 and Int. Conf. on Intelligent Computing and Information Systems 2002, and one of the main sustainers of annual Int. Romanian Internet Learning Workshop Project (RILW), 1997.

In addition he was Secretary of Egyptian Computer Society (1984-1990), Member of National Committee in Informatics – Academy of Scientific Research and Technology (1992-200), Member of Egyptian Committee in the Inter-Governmental Informatics Program, IIP-UNESCO, Paris (1988-1990) and Coordinator of the Annual International Conference for Statistics, Scientific Computing, and Social and Demographic Research (1983-1990). In addition he was a partner of a MEDCAMPUS Projects on Methodologies and Technologies for Distance Education in Mediterranean (1993-1995). In addition He is a Member of the Editorial Board of 15 international and national Journals in the following countries: Canada; Italy, Romania, Japan, Turkey, UK and Egypt. Also, He is member of many Int. Scientific Societies and associations in USA, UK, Switzerland, Austria, Canada and Egypt.

Plenary Lecture 9

Use of Functional Analysis for Increasing the Efficiency of the Information Systems in the Romanian South East Region Farms



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&

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Abstract: Agriculture is one of the economic activities which benefits in Romania by natural resources which can turn it into a driver of the national economy. An information system, designed to support the farmers' informational needs may lead to the improvement of agricultural farms management and may contribute to transforming agriculture from subsistence agriculture in an efficient economic activity. Therefore, the research proposes the development of management information systems accessible to small and medium farms, to respond their informational needs. For their development is introduced the use of a design method focused on the needs and requirements of end users. By using the Function Analysis as the working tool of the Value Analysis are written the specifications for a computer system for small and medium farms. The requirements are acquired through interviewing the farms managers located in the Romanian South Eastern Region and collaboration with professionals in the information technology sector.

Brief Biography of the Speaker:

Liliana Moga graduated from Dunarea de Jos University of Galati in 1997 with a degree in Food Economics and in 2001 with a degree in Informatics for Business. In 2004, she obtained a Master's degree in Management of European Programmes and Politics and in 2010 in Financial and Banks Management. As a fellow of DiploFoundation, in 2006 she completed her studies in Internet Governance and Policy. She has defended her PhD thesis on Value Based Software Engineering at The Bucharest Academy of Economic Studies and she is a postdoctoral researcher in the same university with a project focused on information technologies role in regional development. She has professional experience as an academic and a researcher. Her interests are related of the use of information technologies in business, as a reflection of her work experience with Software Company and as an Associate Professor for Dunarea de Jos University of Galati in Financial Information Systems and Software. Her research activity is focused on Knowledge Management, Management Information Systems, Information Technologies for Quality Safety Traceability, and on ICT adoption in banks, enterprises and farms with application in Regional development. She is author or co-author of more than 80 papers published in international journals or presented at international conferences. Also, she is a member of Association for Technology and Internet, Alumni DiploFoundation, Giganet, and Romanian Regional Science Association.

Plenary Lecture 10

Design and Implementation of a Tool for Flexible Shape Bézier Interpolation



Professor Dana Simian
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Abstract: The aim of this presentation is to introduce many families of Bezier interpolation curves depending of many parameters influencing the shape of the curves. These families of curves are important in Computer Aided Geometric Design, in design of cars body when only the interpolation points are known and the possible shapes are investigated, or when we want to avoid any particular cases (curve with cusps or loops). We present many original interpolation schemes and their integration in one MATLAB tool with a friendly user interface. In order to make a proper choice of the parameters we provide a characterization diagram for any scheme.

Brief Biography of the Speaker:

Dana Simian received the diploma in engineering from the University of Sibiu, Romania, the diploma. in Mathematics from the University Babes-Bolyai of Cluj-Napoca, Romania and the Ph.D. from Babes-Bolyai University of Cluj-Napoca, Romania. She graduated many courses in Computer Science. She has a great experience in algorithms and numerical methods for modelling and optimization, and in machine learning. She published 16 books, more than 60 articles and participated in the editorial board of more than 22 scientific publications (proceedings of international conferences).

She organized 8 special sessions within international conferences, 2 international workshops and an international conference on topics related to algorithms and computational techniques in modeling, approximation and optimization. She is member of many international scientific committees. She is reviewer of many scientific publications.