I. Dzitac, F.G. Filip, M.J. Manolescu (eds.),
2016 6th International Conference on Computers Communications and Control (ICCCC)

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Prof. Ioan DZITAC
rector@univagora.ro, professor.ioan.dzitac@ieee.org

Prof. Ioan Dzitac, PhD, Senior Member of IEEE (since 2011), is an information sciences professor at Aurel Vlaicu University of Arad -Romania (since 2009), Adjunct Professor at University of Chinese Academy of Sciences -Beijing, China (2013-2016) and Rector of Agora University of Oradea -Romania (2012-2020). He received B.Sc.(eq.M.Sc.) in Mathematics (1977) and Ph.D. in Information Sciences (2002) from Babes-Bolyai University of Cluj- Napoca, Romania. His current research interests include different aspects of Artificial Intelligence, Applications of Fuzzy Logic, Distributed Systems and Information Systems. He is co-founder and A. Editor-in-Chief of an ISI SCI Expanded quoted journal (2006), International Journal of
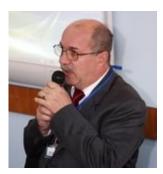
Computers Communications & Control and member in Editorial Board of 7 scientific journals. Also he is co-founder and General Chair International Conference on Computers Communications and Control and he was member of the Program Committee of more than 60 international conferences and gave plenary papers and special sessions in universities and conferences held in China, Russia, Brazil, India and Lithuania.. He has published over 60 scientific papers, 2 books, 14 courses and materials for students, 4 conference proceedings and more than 60 scientific papers in journals and conferences proceedings.

Program Committee Chair
Acad. Florin Gheorghe FILIP
ffilip@acad.ro

Prof. Dr. Eng. Florin Gheorghe Filip is a full member od Romanian Academy, President of "Information Science and Technology" Section of Romanian Academy, and director of Library of Romanian Academy. He was a Vice-President of the Romanian Academy (2000 - 2010), Managing director of National Institute for R&D in Informatics (19911997). He authored/coauthored over 250 papers published in international journals (IFAC J Automatica, IFAC J Control Engineering Practice, Annual Reviews in Control, Computers in Industry, System Analysis Modeling Simulation, Large Scale Systems etc) and contributed volumes printed by

international publishing houses (Pergamon Press, Springer, Kluwer, Chapmann & Hall etc). He is also the author/coauthor of ten monographs. He was an IPC member of more than 50 international conferences held in Europe, USA, South America, Asia and Africa and gave plenary papers at scientific conferences held in Chile, China, France, Poland, Portugal, Rep. of Moldova, Spain, Tunisia, UK. He is co-founder and Editor-in-Chief of International Journal of Computers Communications & Control and co-founder of International Conference Computers Communications & Control. He has received Doctor Honoris Causa title from "Lucian Blaga" Univers ity of Sibiu (November 2000), "Valahia" University, Targoviste (2007), "Ovidius" University, Constanta (2007), Ecolle Centrale de Lille (France) (2007), Technical University "Traian Vuia", Timisoara (2009), Agora University of Oradea (2012) and Academy of Economic Studies, Bucharest (2014).

Organizing Committee Chair
Prof. Misu-Jan MANOLESCU
mmj@univagora.ro

Prof. Dr. Eng. Misu-Jan Manolescu is a Professor of Risk Management and President of Administration Council of Agora University. He is an Engineer, PhD in Energy Engineering, PhD in Management, president of Agora Foundation, Founder of Agora University and co-founder and Managing Editor of International Journal of Computers Communications & Control and co-founder of International Conference Computers Communications & Control.

His publications and research results consist in 10 books, over 60 papers and 2 inventions.

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- Ramona URZICEANU, Agora University of Oradea, Romania.

IEEE – ICCCC2016 Keynote Lectures

1. Intelligent Decision Making and Consesus,
Enrique Herrera–Viedma**,** University of Granada, Spain

Abstract. We analyze the fuzzy decision making models as to develop intelligent decision making processes in the real world. In particular we focus on the soft consensus models by analyzing an overview of consensus models based on soft consensus measures, showing the pioneering and prominent papers, the main existing approaches and the new trends and challenges.

Prof. Dr. Enrique Herrera-Viedma,
DECSAI - University of Granada, Spain,
C/ Periodista Daniel Saucedo Aranda,
18071- Granada, Phone: +34 958 244258,
Fax: +34 958 243317, viedma@decsai.ugr.es

Prof. Dr. Enrique Herrera-Viedma was born in Jódar, Spain, in 1969. He received the M.Sc. and Ph.D. degrees in computer science from the University of Granada, Granada, Spain, in 1993 and 1996, respectively. He is currently a Professor of Computer Science with the Department of Computer Science and Artificial Intelligence, University of Granada, and also the new Vice-President for Research.

Around 27 of his papers are classed as highly cited in the Thomson Reuters database as well as being in the top 1% of the most cited papers in its field (Computer Science and Engineering). His h-index is 52 according to the Web of Science with more than 10.000 citations received and 63 according to Google Scholar with more than 18.000 citations received and he is ranked in the top 1% of the Most Cited Scientists in Engineering according to the Essential Science Indicators of Thomson.

He has recently published in Science [339:6126, p. 1382, 2013] on the new role of the public libraries and he has been identified in the list of Highly Cited Researchers published in 2014 and 2015 by Shangai Center and Thomson Reuters in the categories of Engineering and Computer Science, therefore, being considered one of the world's most influential scientific researchers. His current research interests include group decision making, consensus models, linguistic modeling, aggregation of information, information retrieval, bibliometric, digital libraries, web quality evaluation, recommender systems, and social media.

Dr. Herrera-Viedma is an Associate Editor of seven core ISI journals such as the IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS: SYSTEMS, Knowledge Based Systems, Soft Computing, Fuzzy Optimization and Decision Making, Applied Soft Computing, Journal of Intelligent and Fuzzy Systems, Information Fusion and Information Sciences; and a member of the editorial boards of three core ISI journals Fuzzy Sets and Systems, International Journal of Information Technology and Decision Making, and International Journal of Computational Intelligence. From 2014 he is member of the government of the IEEE SMC Society.

2. The wonderful adventures of the mathematician in Logic-land: from Łukasiewicz-Moisil Logic to Computers,

Ioana Moisil, University Lucian Blaga of Sibiu, Romania

Abstract. In 1996 Grigore C. Moisil received posthumously the IEEE Computer Pioneer Award for *"the develop*men*t of polyvalent logic switching circuits, the Romanian School of Computing, and support of the first Romanian computers."* Moisil, one of the greatest Romanian intellectuals, was first of all a gifted mathematician. His mentors were Bertrand Russell, Stefan Banach and Kazimierz Kuratowski, and the Romanian mathematicians Dimitrie Pompeiu, Gheorghe Ţiţeica, Traian Lalescu and Anton Davidoglu. He graduated mathematics at the University of Bucharest in 1926 and obtained the Ph.D. in 1929 with a thesis of applied mathematics "Analytical Mechanics of Continuous Systems". His first works were devoted to functional analysis applied in the mechanics of deformable media and also to abstract algebra. He had a special sense for new directions in mathematics and the encounter, at the University of Iassy, with the Polish school of logic, marked the beginning of the wonderful adventures in the field of multi-valued logic. In my contribution I will try to point out the milestones of the journey of the mathematician towards the magic world of computer science.

Prof. Dr. Ioana Moisil,
University "Lucian Blaga" of Sibiu, Romania
Faculty of Sciences,
Research Center for Informatics and Information Technology
No. 5-7, Dr. Ion Ratiu st., 550012 Sibiu, Romania,
Phone:+40-(0)-269 21.66.42, Fax:+40-(0)-269 21.66.17, im25sibiu@gmail.com

Prof. Ioana I. Moisil was born in 1948, in Bucharest, Romania. She obtained the M.Sc . in mathematics-mechanics at the University of Bucharest in 1971, and later the Ph.D. in mathematics – statistics and probabilities at the Romanian Academy. She has, as a second specialisation, informatics, and she obtained the scientific degree from the School of Public Health-Universite Libre de Bruxelles, Belgium. She started her career at the Institute for Research in Informatics – ICI Bucuresti, then moved on to the „Carol Davila" University of Medicine, the Ministry of Health and since 1999 at the „Lucian Blaga" University of Sibiu. She was a full professor at the "Lucian Blaga" University of Sibiu (ULBS).

She is currently retired, but continues the collaboration with the university in the frame of the Research Center for Informatics and Information Technology –Faculty of Sciences –ULBS.

She became seriously interested in medical informatics in 1985 through a project regarding an electronic directory for homeopathy, developed at the Institute for Research in Informatics – ICI Bucuresti. Since then she promoted medical informatics through lectures, presentations, publications, organizing conferences and workshops. After 1990 she was actively involved in several research projects, at national and European level. Her academic interests cover fields as: applied informatics in bio-medicine, nursing informatics, education and economics, statistical modelling, artificial intelligence, decision making.

She has more than 180 papers published in international journals. She promoted nursing informatics in Romania with the support of prof. Marianne Tallberg, IMIA SIG-NI and the Telenurse (coordinated by Randi A. Mortensen) projects team. As a member of the Romanian Medical Informatics Society she coordinated until 2011 the Nursing Informatics Working Group. Among others , she contributed to the *Telemedicine Glossary* 3rd, 4th , 5th edition, Working document of EC, DG Information Society Technologies, Bruxelles, Belgium, 2001, 2002, 2003 and to the *Nursing and Informatics for the 21st Century*, by Charlotte A. Weaver RN, PhD, Editor, Connie W. Delaney PhD, RN, FAAN, Editor, Mr. Patrick Weber RN, MA, Editor, Ms. Robyn Carr, RGON, Editor, ISBN: 0-97161277-5-X, HIMSS, SUA, 2006 (HIMSS –Book of the Year Award 2006).

Ioana Moisil is a member of the RMIS (Romanian Medical Informatics Society), EFMI, IMIA, ISCB, of the HIT Foundation –Health Informatics & Telematics, honorary member of the Medical Association *J.E.Purkyne* of Boemia – Boemia Society for Biomedical Engineering and Medical Informatics – Czech Republic and of the cultural association ASTRA –Sibiu (Romania).In 2010 she launched as editor the *International Journal of Advanced Statistics and IT&C for Economics and Life Sciences (now edited by prof. Daniel Volovici)*. She is also one of the editors of the cultural publication "*Lumina slovei scri*se"("*The Light of the Written Word*").

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3. *The theorem and methodologies of the data analysis in the decision making*,
Gang Kou, Southwestern University of Finance and Economics, Chengdu, China

Abstract: In the multi-criteria decision making, decision matrices are used extensively to gather the related decision information and/or quantify experts' judgments so as to compute the priority vectors of alternatives. Therefore, the theorem and methodologies of the data analysis in the decision matrices have been widely studied from different perspectives, and various approaches and models have been proposed over the past few decades. The pairwise comparison matrix , one of the most popular decision matrices in the decision making, usually involves the following issues in practice: uncertain or missing data estimation, cardinal/ordinal inconsistency identification, consistency index, priority derivation and sensitivity analysis due to unavailable or asymmetric information, prejudice, limited expertise and the complicated decision problems in nature etc, which could result in invalid even wrong decision making. In this study, some theorems and methodologies of the data analysis are proposed to tackle the above issues in the decision matrices.

Prof. Dr. Gang Kou,
Executive Dean of School of Business Administration,
Southwestern University of Finance and Economics,
Chengdu, 611130, China, E-mail: kougang@yahoo.com

Dr. Gang Kou (b. December 12, 1975) is a Professor and Executive Dean of School of Business Administration, Southwestern University of Finance and Economics. He is managing editor of International Journal of Information Technology & Decision Making and series editor of Quantitative Management (Springer). Previously, he was a research scientist in Thomson Co., R&D. He received his Ph.D. in Information Technology from the College of Information Science & Technology, University of Nebraska at Omaha; got his Master degree in Department of Computer Science, University of Nebraska at Omaha; and B.S. degree in Department of Physics, Tsinghua University, Beijing, China.

He has participated in various data mining projects, including data mining for software engineering, network intrusion detection, health insurance fraud detection and credit card portfolio analysis. His research interests are in Data mining, Multiple Criteria Decision Making and Information management.

He has published more than eighty papers in various peer-reviewed journals and conferences. He has over 2,000 citations in Google Scholar.

4. *Methods and Applications of the Multidimensional Data Visualization*
Gintautas Dzemyda, University of Vilnius, Lithuania

Abstract: Human participation plays an essential role in most decisions when analyzing data. The huge storage capacity and computational power of computers cannot replace the human flexibility, perceptual abilities, creativity, and general knowledge. A proper interaction between human and computer is essential. Moreover, such an interaction is one of the areas in computer science that has evolved a lot in recent years. Real data in technologies and sciences are often high-dimensional. So it is very difficult to understand these data and extract patterns. One way of such an understanding is to make a visual insight into the data set. Here a hopeful view may be put on the visualization of multidimensional data.

It is often desirable to visualize a data set the items of which are described by more than three features. Therefore, we have multidimensional data and our goal is to make some visual insight into the data set analyzed. For human perception, the data must be represented in a low-dimensional space, usually of two or three dimensions. The goal of visualization methods is to represent the multidimensional data in a low-dimensional space so that certain properties (e.g. clusters, outliers) of the structure of the data set were preserved as faithfully as possible. The dimensionality reduction or visualization methods are recent techniques to discover knowledge hidden in multidimensional data sets.

The main items that are covered by the presentation: Multidimensional data visualization: idea and advantages; Traditional methods: Multidimensional scaling (MDS), Sammon's mapping; Visualization of multidimensional data by using neural networks (SOM, SAMANN); Combinations of traditional methods and neural networks; Nonlinear

manifold learning methods; Software for visualization of multidimensional data; Application of multidimensional data visualization in medicine.

Prof. Dr. Habil. Gintautas Dzemyda
Full member of the Lithuanian Academy of Sciences
Director of the Institute of Mathematics and Informatics
Head of the Systems Analysis Department
Institute of Mathematics and Informatics
Vilnius University
Akademijos St. 4
Vilnius, LT-08663, Lithuania
e-mail: gintautas.dzemyda@mii.vu.lt

Prof. Dr. Habil. Gintautas Dzemyda was born in Vilnius, Lithuania, on July 24, 1957. In 1984 he received the doctoral degree in technical sciences (Ph.D.), and in 1997 he received the degree of Doctor Habilius from the Kaunas University of Technology. He was conferred the title of Professor (1998) at the Kaunas University of Technology. Full member of the Lithuanian Academy of Sciences (2011).

Recent employment is at the System Analysis Department of the Vilnius University Institute of Mathematics and Informatics as a Head of System Analysis Department and Principal Researcher. Since 2005, he is a Director of the Vilnius University Institute of Mathematics and Informatics.

The research interests include visualization of multidimensional data, optimization theory and applications, data mining, multiple criteria decision support, neural networks, parallel computing, internet data mining, recommender systems, image analysis. Applied problems have been solved in various areas including medicine and technologies. A software is designed both for general purposes and for applications. International and national RTD projects are managed. The author of 220 research papers, one monograph, five textbooks and two electronic courses for students.

Editor in Chief of the international journals *Informatica* (http://www.mii.lt/informatica) and the *Baltic Journal of Modern Computing* (http://www.lu.lv/baltic-journal-of-modern-computing/), Executive Editor a member of Editorial Board of the international journals: - *Nonlinear Analysis: Modelling and Control (Associate Editor)*, - *Informatics in Education*, - *Journal of Civil Engineering and Management, - Vestnik BSU. Series 1. Physics. Mathematics. Informatics*, - *Information Technology and Management Science. The Journal of Riga Technical University*. Member of Lithuanian Computer Society, Lithuanian Mathematical Society, Lithuanian Operational Research Society, IFIP Technical Committee 12 Artificial Intelligence.

5. From Fitt's list to modern incremental platforms: the impact of modern I&CT technologies
Florin Gheorghe Filip, Romanian Academy, Romania

Abstract. In 1951, Paul Fitt proposed the well known *MABA-MABA* ("man is better at-machine is better at") *list* in his paper entitled "Some basic questions in designing an air navigation and traffic control system". The list contained 11 statements meant to recommend proper function allocation to man and automation artifacts in designing control schemes. Since then dramatic evolutions have been noticed in business models, information and communication technologies (ICT), and human's skills and knowledge. The paper aims at reviewing such changes with a particular emphasis on the multi-participant decision-making activities in management and control setting. It first describes the attributes of the modern organization characterized by an ever increased degree of intra- and inter-enterprise collaboration. The transition of the management and control schemes from pure hierarchical structures to more cooperative ones is addressed next. The corresponding evolving role of the man "in the loop" is described next and the allocation of functions on level of automation of the current context is discussed. Several key technologies such as business intelligence and analytics, web technology and social networks, mobile and cloud computing that enable e-collaboration are reviewed. The talk concludes by presenting a practical incremental ICT platform meant to support multi-participant decision-making.

Prof. Dr. Florin Gheorghe Filip,
Full member of Romanian Academy
Calea Victoriei 125, Sector 1, Bucureşti,
tel 021.212.82.84, 021.212.82.85, fax 021.212.58.56
ffilip@acad.ro

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Acad. Florin Gheorghe Filip was born on 25 of July 1947. Still very young he became corresponding member of the Romanian Academy (in 1991, when he was only 44 years old), and at 52 years old (1999) become full member in the highest cultural and scientifical forum of Romania, something that is extremely rare in the "world of immortals". For 10 years, during 2000-2010, he was Vice-President of the Romanian Academy and since 2010 was elected President of the XIV Section "Information Science and Technology". Presently he is also the director of the Romanian Academy Library. He was managing director of National Institute for R&D in Informatics (1991-1997). He authored/coauthored over 250 papers published in international journals (IFAC J Automatica, IFAC J Control Engineering Practice, Annual Reviews in Control, Computers in Industry, System Analysis Modeling Simulation, Large Scale Systems etc) and contributed volumes printed by international publishing houses (Pergamon Press, Springer, Kluwer, Chapmann & Hall etc). He is also the author/coauthor of ten monographs. He was an IPC member of more than 50 international conferences held in Europe, USA, South America, Asia and Africa and gave plenary papers at scientific conferences held in Chile, China, France, Poland, Portugal, Rep. of Moldova, Spain, Tunisia, UK. He is co-founder and Editor-in-Chief of International Journal of Computers Communications & Control and co-founder of International Conference Computers Communications & Control. He has received Doctor Honoris Causa title from "Lucian Blaga" Univers ity of Sibiu (November 2000), "Valahia" University, Targoviste (2007), "Ovidius" University, Constanta (2007), Ecolle Centrale de Lille (France) (2007), Technical University "Traian Vuia", Timisoara (2009), Agora University of Oradea (2012) and Academy of Economic Studies, Bucharest (2014).

6. Lithuanian School on Multiple Criteria Decision Making,
Zenonas Turskis, Vilnius Gediminas Technical University, Lithuania

Abstract: Ralph Keeney and Howard Raiffa (1976) published book that was instrumental in establishing the theory of multi-attribute value theory (including utility theory) as a discipline. It became a standard reference and text for many generations of study of decision analysis and MCDM. The history of multi-criteria decision-making in Lithuania related with the works of professor E.K. Zavadskas. He presented his PhD in 1973 – he researched the applications of polymer resins in reinforced concrete. A selection of decision-making solutions dominated his research. This is how he significantly developed some elements of rational decisions theory (1982). As a synthesis of research results, in 1987 E. K. Zavadskas defended his Post-Doctoral (Habilitation) Thesis where Judgement Methods applied for construction tasks solutions, and presented the first monograph summarising his achievements. Numerous researchers stimulated by Zavadskas work. There could to be found that among 25 authors that are most cited in the field of MCDM 6 are form Lithuanian MCDM school (based on schoolar.google.com search): the third is E.K. Zavadskas, 7th Z. Turskis, 8th A. Kaklauskas, 16th J. Tamosaitiene, 17th L. Ustinovicius, 24th J. Antucheviciene.

Multi criteria decision making since has become a mainstay of civil engineering, construction technology and management. Furthermore, these methods used for development of decision support systems. Zavadskas and his colleagues (1994) introduced the COPRAS method – the first original Lithuanian MCDM method. Later, new methods of performing multiple criteria analysis in projects developed. Professor's E. K. Zavadskas team continuously develops new and researches existing MCDM methods for further improvements. Furthermore, variety of the new MCDM methods and software developed in collaboration with academic colleagues from abroad. The Professor and members of his team are members of editorial boards of more than 20 international journals referred in Thomson Reuters Web of Science database and more than 20 other journals. Lithuania was one of the main initiators of international German – Lithuanian – Polish colloquium dedicated to Operational Research (OR) in Civil Engineering (1986). Based on collaboration the idea of setting up of a new EURO working group ´OR in Sustainable Development and Civil Engineering (EWGORSDCE) aroused and it was established. Under E. K. Zavadskas supervision, 33 PhD dissertations were presented (four of his former students were awarded the title of Full Professor).

Prof. dr. Zenonas Turskis,
Full member of the Lithuanian Academy of Sciences
Vilnius Gediminas Technical University
Sauletekio al. 11, LT-2040 Vilnius, Lithuania
E-mail: zenonas.turskis@vgtu.lt

Scientific interests: Civil Engineering, Construction Management, Decision Aiding, Technology, Multiple Criteria Decision Making.

WORK EXPERIENCE: Chief Researcher at Vilnius Gediminas Technical University, Faculty of Civil Engineering, Smart Building Technologies Research Institute of Smart Building Technologies, Research Laboratory of Construction Technology and Management, Vilnius (Lithuania); Professor at Faculty of Civil Engineering, Department of Construction Technology and Management, Vilnius (Lithuania); Manager at different Joint Stock Companies (more

than 15 years); Computer programmer - Manager at different companies (more than 5 years); Senior engineer, master, chief dispatcher at construction copmpanies (more than 5 years)

EDUCATION AND TRAINING: 1979 Civil engineer at Vilniaus CIVIL Engineering Institute (now Vilnius Gediminas Technical University), Vilnius (Lithuania); 1990 Applied mathematics at Kaunas Polytechnic institute (now Kaunas Technological University), Kaunas (Lithuania); 1993 PhD degree, Technical sciences at Vilniaus Technical University (now Vilnius Gediminas Technical University), Vilnius (Lithuania); 2009 Habilitation procedure, Technological Sciences, Civil Engineering (02T) at Vilnius Gediminas Technical University.

ADDITIONAL INFORMATION: Member and co-founder of „International Academy of Information Technology and Quantitative Management" (IAITQM); Member of FuturICT FET FLAGSHIP; member of EURO working group „OR in Sustainable Development and Civil Engineering, EWG-ORSDCE".

Member of editorial boards: „Journal of Civil Engineering and Management"(Thomson Reuters Web of Science), „Technological and Economic Development of Economy"; "International Journal of Information Technology & Decision Making"; "Journal of Construction Engineering"; "Engineering Structures and Technologies"; "Actual Problems of Economics".

IEEE-ICCCC 2016 Special Sessions

Special Session 1: Network Optimization and Security
Organizer and Chair: Yezid DONOSO, University de los Andes, Colombia

Prof. dr. Yezid DONOSO,

Head of the Information Security Postgraduate and Master Program, Systems and Computing Engineering Department, Universidad de los Andes, Cra. 1 Este No. 19A-40, Phone 57-1-3394949 Ext 1723, Bogotá, Colombia, South America, ydonoso@ uniandes.edu.co

Dr. Eng. Yezid DONOSO is an Associate Professor at the Universidad de los Andes in the Computing and System Engineering Department in Bogota, Colombia, South America. He is a consultant in computer network and optimization. He holds a degree in System and Computer Engineering, a M.Sc. degree in System and Computer Engineering, a D.E.A. in Information Technology and a Ph.D. (Cum Laude) in Information Technology from Girona University, Girona, Spain. IEEE Senior Member. Distinguished Professor, given by Universidad del Norte, Colombia, October 2004. National Award of Operations research given by the Colombian Society of Operations Research, 2004. He is co-author of the book Multi-Objective Optimization in Computer Networks Using Metaheuristics (2007) and Network Design for IP Convergence.

Session Scope: The convergence in communication networks and computing has led the exponential growth of new applications and information systems. Nowadays, users and applications generate and request more data demanding efficient and secure management. New algorithms are needed to manage the network resource allocation improving the network performance, response against failures, congestion and attacks; and to avoid loss of confidentiality, integrity or availability in the network.

Session Topics

T.2.1. Network Optimization: *Advanced Network Architecture; Computational complexity and data structures; Distributed Algorithms for control and management in Communication Systems; Energy Efficiency in Wireless Networks; Mobility, Handoff, and Location Management; Network Algorithm analysis; Network Structure, Routing and Resource Management; Networks Survivability against Failures, Congestion and Attacks; Network Planning; Quality of Service / Quality of Experience Optimization; Software Define Network; Scheduling and Network Optimization; Self-Organizing Networks; Reliable Networks; Special Topics in Network Optimization.*

T.2.2. Security: *Intrusion; Detection and Prevention Systems; Network Authentication and Key Management; Network Reliability; Privacy and Anonymity; Secure Networking; Secure Network Protocols; Security for Cloud Networking; Security for Internet Applications; Security for Wireless Sensor networks; Security for Smart Grids; Security for Vehicular Networks; Security for Critical Infrastructures; Special Topics in Security.*

Special Session 2: Data Mining and Intelligent Knowledge Management

Organizers and Chair: Yi PENG, University of Electronic Science and Technology of China

Prof. Dr. Yi PENG,
School of Management and Economics,
 University of Electronic Science and Technology of China
Chengdu 610054, China, pengyi@ uestc.edu.cn

Dr. Yi PENG (b. March 21, 1975) is a professor of School of Management and Economics, University of Electronic Science and Technology of China. Previously, she worked as Senior Analyst for West Co., USA. Dr. Peng received her Ph.D. in Information Technology from the College of Information Science & Technology, Univ. of Nebraska at Omaha and got her Master degree in Dept of Info. Science & Quality Assurance, Univ. of Nebraska at Omaha and B.S. degree in Department of Management Information Systems, Sichuan University, China. Her research interests cover Knowledge Discover in Database and data mining, multi-criteria decision making, data mining methods and modeling, knowledge discovery in real-life applications. She published more than forty papers in various peer-reviewed journals and conferences. She is the Workshop Chair of the 20th International Conference on Multiple Criteria Decision Making (2009), guest editor of Annals of Operations Research special issue on Multiple Criteria Decision Making on Operations Research.

Session Scope : Data mining (DM) and knowledge management (KM) are two important research areas, but with different emphasis. Research and practice in these two areas have been largely conducted in parallel. Although both data mining and knowledge management have been active areas in research and practice, there is still a lack of idea exchange between these two camps. The first goal of this workshop is to bridge this gap. It has been well-known that data mining algorithms can discover hidden patterns from large-scale databases. However, the results of data mining may not be regarded as "knowledge". To elicit explicit knowledge from the hidden patterns of data mining, which is useful to the end-users, the theory of human knowledge management should be adopted. Such a "special" knowledge, different from traditional knowledge since it can be stored, transformed, disseminated and expanded, is called intelligent knowledge. The second goal of this workshop is to discuss the research issues beyond data mining, foundation of intelligent knowledge management, and the process of identifying intelligent knowledge.

Session Topics: The workshop welcomes both high-quality academic (theoretical or empirical) and practical papers in the broad ranges of data mining and intelligent knowledge management related topics including, but not limited to the following: *Data mining interpretation; Data mining and knowledge transfer; Data analysis and knowledge management; Data mining and risk management; Data warehousing in knowledge management; Evaluations of hidden patterns; Optimization based data mining for knowledge management; Practical issues of data mining; Integration of data mining and knowledge management; Intelligent knowledge algorithms; Man-machine interaction in data mining; Intelligent knowledge management.*

Special Session 3: Computational Intelligence Methods

Organizers and Chairs: Răzvan ANDONIE & Donald DAVENDRA, Central Washington University, USA & Valeriu BEIU, Aurel Vlaicu University of Arad, Romania

Prof. Dr. Răzvan ANDONIE,
Central Washington University, 400 East University Way,
Ellensburg, WA 98926, USA, Phone: (509) 963-1430,
FAX: (509) 963-1449, andonie@ cwu.edu

Prof. Razvan ANDONIE received the M.S. degree in mathematics and computer science from University of Cluj-Napoca, Romania, and the Ph.D. degree from University of Bucharest, Romania. His Ph.D. advisor was Solomon

Marcus, Fellow of the Romanian Academy. He is currently a Professor of Computer Science at both Central Washington University and Transilvania University of Brasov, Romania. He has published more than 130 research papers and was an invited professor at many universities. His actual research interests are computational intelligence techniques and applications, parallel/distributed computing, machine learning, and big data analytics.

Dr. Donald DAVENDRA,
Central Washington University,
400 East University Way, Ellensburg, WA 98926, USA,
Phone: (509) 963-1430, FAX: (509) 963-1449,
donald.davendra@ vsb.cz

Dr. Donald DAVENDRA is an Associate Professor of Computing Science at Central Washington University, USA. His education background includes a Bachelor of Science, Postgraduate Diploma and Master of Science in Computing Science and Engineering from the University of the South Pacific, Fiji Islands and a Doctor of Philosophy in Technical Cybernetics from Tomas Bata University in Zlin, Czech Republic. His research areas are in evolutionary systems, chaotic systems, complex networks and its application to combinatorial optimisation problems. His publication list includes two edited monographs and around 100 papers in various peer-reviewed journals and conferences.

Prof. Dr. Valeriu BEIU,
Aurel Vlaicu University of Arad,
str. Elena Drăgoi, nr. 2, 310330, Ara,
valeriu.beiu@uav.ro

Prof. Valeriu Beiu received the MSc in CE from the University "Politehnica" Bucharest (UPB) in 1980, and the PhD summa cum laude in EE from the Katholieke Universiteit Leuven (KUL) in 1994.

His affiliations include the Research Institute for Computer Techniques, UPB, KUL, King's College London, Los Alamos National Laboratory, Rose Research, Washington State University, United Arab Emirates University, and "Aurel Vlaicu" University of Arad, while his research interests have constantly been on biological-inspired nano-circuits and brain-inspired nano-architectures (low-power, highly reliable, massively parallel), being funded at over US$ 41M, and publishing over 250 papers (42 invited and 11 patents) as well as giving over 190 invited talks and organizing over 100 conferences.

Dr. Beiu received 5 fellowships and 7 best paper awards, and is a member of ACM, INNS, ENNS, and MCFA. He was a member of the SRC-NNI Working Group on Novel Nano-architectures, the IEEE CS Task Force on Nano-architectures, and the IEEE Emerging Technologies Group on Nanoscale Communications, and has been an Associate Editor of the *IEEE Transactions on Neural Networks*, *Nano Communication Networks*, and *IEEE Transactions for Very Large Scale Integration Systems*.

Section Scope

Computational intelligence is relatively new to industry. It On top of that, computational intelligence is based on a smorgasbord of approaches with very different theoretical bases, such as fuzzy logic, neural networks, evolutionary computation, statistical learning theory, swarm intelligence, and intelligent agents.

There is little consensus as to a precise definition of Computational Intelligence (CI). Nevertheless, most practitioners would include neural networks, fuzzy and evolutionary techniques, swarm intelligence (and perhaps others), and more especially *hybrids* of these. Essentially, CI comprises concepts, paradigms, algorithms and implementations of systems that are supposed to exhibit intelligent behavior in complex environments. It relies heavily on numerical, predominantly nature-inspired methods. These methods have the advantage that they tolerate incomplete, imprecise and uncertain knowledge.

CI is still a fast- growing research area in the category of emerging technologies, with thousands of applications. For most of the scientists introducing computational intelligence technologies into practice, looking at the growing number of new approaches, and understanding their theoretical principles and potential for value creation becomes a more and more difficult task. One of the reasons is that it is hard to choose from this huge variety of techniques the most appropriate one for a given real-world problem. Moreover, we sometimes do not even know if a CI technique is the appropriate approach.

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Therefore, this section will adopt a very different definition of CI. We focus on problems instead of tools, looking at methods for problems not at problems for methods. This will enable us to compete with other methods for various applications, facilitating real progress towards more difficult problems.

This approach inspired by Włodzisław Duch's definition, *"CI is a branch of computer science studying problems for which there are no effective computational algorithms"*. If we define CI by the problems that the field studies, then we do not have to restrict the types of methods used for solutions.

Topics and Keywords

We seek original and high-quality contributions on the general theme of Computational Intelligence Methods. The session is focused on both CI algorithmic developments and applications. The following is a non-exhaustive list of problem environments for which we look for CI solutions: *incomplete and imprecise data; big data; data streams; real-time processing; hybrid data; parallel/distributed processing; scheduling, logistic and assignment problems optimization; complex network analysis; social network analysis; bioinformatics.*

Special Session 4: Advanced Decision Support Systems with particular emphasis on sustainable energy
Organizers and Chairs: Marius CIOCA, Lucian Blaga University of Sibiu, Romania
Felisa CORDOVA, University of Santiago de Chile, Chile

Prof. Dr. Marius Cioca,
Faculty of Engineering,
"Lucian Blaga" University of Sibiu,
Emil Cioran Street, 4, 550025 - Sibiu, ROMANIA,
Phone (office): +40 - 0269 - 217928, int. 1438,
Fax (office): +40 - 0269 - 212245,
 marius.cioca@ ulbsibiu.ro

Prof. Marius CIOCA received his M.Sc. in Computer Science (1995) and PhD in Automatic Control (2004) from Politehnica University of Bucharest. Now he is full Professor of Computer Science at Department of Industrial Engineering and Management, "Lucian Blaga" University of Sibiu, Romania. His current research interests include different aspects of Web engineering, References Arhitectures, Informatic Systems, Decision Support Systems and Data mining. He has (co-)authored more than 9 books, 70 papers, has received 7 grants and was member of 20 research projects.

Prof. Dr. Felisa Cordova,
Department of Industrial Engineering,
University of Santiago of Chile, Santiago, Chile,
felisa.cordova@usach.cl

Prof. Felisa CORDOVA is graduated in Electrical Engineering at the University of Santiago of Chile (1974). She obtained the D.E.A. in Electronics and the *Docteur Ingenieur* degree at the University of Paris XI, France (1981). Now she is professor and Director of the Department of Industrial Engineering, she was also Academic Vice Rector at USACH. Her main research interests include Strategic and Operations Management and Knowledge Management of the Supply Chain. She has participated in several national and international research projects in the fields of Robotics, AGV and Virtual Operation Systems in underground mining. She has published more than 70 papers in conference proceedings and international journals in areas of Robotics and Production Re-search, Knowledge and Strategic Management. She is past-president of the Chilean Association of Automatic Control ACCA (member of IFAC). She has participated in the organization of national and international Conferences (ACCA, LCA, LCR, SEPROSUL, ICCC, ICPR). She is national councilor and past Vice President of the Engineers College of Chile. Actually she is member of the engineer accreditation board at Acredita CI.

Session Scope: The concept of DSS is extremely large and there are multiple definitions depending on the viewpoint of researchers. Passing over definition and concept, this session aims types of users, ways of use and implications of using DSS. Thus the components of DSS must be highlighted, and, considering the new paradigm in field, ways of tehnological integration and emphasis (news) technologies used to build them, especially, focused on communications as well an approach of DSS based on web. Sure, beside concepts, ways and principles are welcome also exemplification

of DSS already used/tested both in industry but also in other fields (ex. e-Health, e-Governance, e-Business, DSS Group etc.)

Session Topics: Challenges of complex decision making in an organization; An overview of the decision making methods of a human; The relation of knowledge and data from different perspectives; DSS Architecture and types; Requirements of decision makers in an organization; Data warehousing and DSS; Data mining and Web mining in DSS; Multi-criteria decision making; Group decision making; Organizational decision making; DSS using Knowledge management.

Special Session 5: Fuzzy Control, Modeling and Optimization
Organizer and Chair: Radu-Emil PRECUP, Politehnica University of Timisoara, Romania

Prof. Dr. Radu-Emil PRECUP,
Department of Automation and Applied Informatics,
Politehnica University of Timisoara,
Bd. V. Parvan 2, 300223 Timisoara, Romania,
radu.precup@upt.ro

Prof. Radu-Emil PRECUP is currently with the Politehnica University of Timisoara, Romania, where he became a Professor in the Department of Automation and Applied Informatics, in 2000, and he is currently a Doctoral Supervisor of automation and systems engineering. He is also an Honorary Professor and a Member of the Doctoral School of Applied Informatics with the Óbuda University, Budapest, Hungary. He has been an Editor-in-Chief of the International Journal of Artificial Intelligence since 2008 and he is also on the editorial board of several other prestigious journals including Applied Soft Computing (Elsevier) and Evolving Systems (Springer). He is the author or coauthor of more than 300 papers published in various scientific journals, refereed conference proceedings, and contributions to books. His current research interests include intelligent control systems, data-driven control, and nature-inspired algorithms for optimization. He is a senior member of IEEE, the vice-chair of the Virtual Reality Task Force of the Intelligent Systems Applications Technical Committee (TC) of the IEEE Computational Intelligence Society, a member of the International Federation of Automatic Control (IFAC) TC on Computational Intelligence in Control, and the Romanian Society of Control Engineering and Technical Informatics. He was the recipient of the "Grigore Moisil" Prize from the Romanian Academy in 2005 for his contribution on fuzzy control.

Session Scope: Fuzzy control has long been applied to very large areas that exhibit important results. Originally introduced as model-free control approach, model-based fuzzy control has gained widespread significance recently. A systematic way to meet the performance specifications of control systems in complex applications is solving optimization problems with variables represented by the tuning parameters of the controllers. The very good quality of fuzzy models is necessary for the description of nonlinear dynamic processes and for getting simple models that are useful in the model-based design of fuzzy controllers. Once the fuzzy models are obtained, their parameters can be tuned on the basis of adequate optimization problems that target the minimization of objective functions in order to reduce as much as possible the modeling errors. The objective of this session is to provide papers about the recent advances of fuzzy control, modeling and optimization in various industrial and non-industrial applications. The combination of two of these three approaches is encouraged.

Session Topics: The papers submitted to this session will include the following topics: *Stable and model-based design of fuzzy control systems; Fuzzy modeling and simulation; Nature-inspired optimization in fuzzy modeling and control; Data-driven fuzzy control; Adaptive, predictive and robust fuzzy control; Type-2 fuzzy control and modeling; Evolving soft computing techniques for modeling, fault detection and isolation; Hybrid intelligent control including fuzzy control, neural networks, evolutionary-based optimization.*

Special Session 6: Membrane Computing - Theory and Applications
Organizers and Chairs: Marian GHEORGHE & Florentin IPATE

Prof. Dr. Marian Gheorghe –
The University of Bradford,
Bradford BD7 1DP, United Kingdom,
m.gheorghe@bradford.ac.uk

Prof. Marian Gheorghe received the bachelor degree in mathematics and computer science and the PhD degree from the University of Bucharest. He moved to academia in 1991 as lecturer with the University of Bucharest and after a short spell with the University of Pitesti he took up a lectureship position with the University of Sheffield. Since 2015 he is a professor of computational models and software engineering with the University of Bradford, UK. His main research interests are in computational models, like automata, rewriting mechanisms, membrane systems and their applications in modelling complex systems, especially in biology. He is also interested in formal verification and model based testing. He was for five consecutive years the chair of the steering committee of the membrane computing conference, the main research forum of the membrane computing community. He edited special issues of prestigious journals and volumes of various conference proceedings.

Prof. Dr. Florentin Ipate
The University of Bucharest,
Str Academiei 14, 010014, Bucharest, Romania,
florentin.ipate@ifsoft.ro

Prof. Florentin IPATE received his bachelor degree in computer science from the "Politehnica" university of Bucharest. He received his MSc (in Software Systems Technology, with distinction) and his PhD (with a thesis nominated for the Distinguished Disertation Award in UK) from the University of Sheffield. Since 2002 he is Professor of Computer Science (at Pitesti University 2002-2012) and since 2012 at the University of Bucharest. His main research interests are in model based testing, agent based modelling, verification and testing, membrane computing. He published over 100 papers in prestigious journals and conferences and a research monograph with Springer.

Session Scope: Membrane computing is a new nature inspired computational paradigm abstracting from the structure and functionality of the living cell. It has a well-established corpus of research topics covering computational power, complexity and efficiency aspects, relationships with other classes of computational models, formal semantics and verification. Applications in systems and synthetic biology, cryptography, graphics, natural language processing and parallel and distributed computing have been investigated. A handbook presenting the key research topics has been published with Oxford University Press and two monographs on applications have appeared with Springer.

Session Topics: New computational models in membrane computing; Complexity aspects; Formal verification; Membrane algorithms; Fuzzy membrane systems; Applications.

Special Session 7: Stereovision Based Perception for Autonomous Mobile Systems and Advanced Driving Assistance
Organizer and Chair: Sergiu Nedevschi, Technical University of Cluj-Napoca, Romania

Prof. Dr. Sergiu NEDEVSCHI ,
Computer Science Department,
Technical University of Cluj-Napoca,
28 Memorandumului st., 400114, Cluj-Napoca, Romania
Sergiu.Nedevschi@cs.utcluj.ro

Prof. Sergiu NEDEVSCHI received the M.S. degree in E.E. from Technical University Cluj-Napoca, Romania, in 1975, and the Ph.D. degree in E.E. from the same university in 1993. From 1976 to 1983 he worked as researcher at the Research Institute for Computer Technologies from Cluj-Napoca. In 1998 he was appointed Professor in Computer Science and he founded the Image Processing and Pattern Recognition Research Center at Technical University of Cluj-Napoca (TUCN). From 2000 to 2004 he was the Head of Computer Science Department, from 2004 to 2012 the Dean of Faculty of Automation and Computer Science, and now is Vice–President for Scientific Research and ICT of the Technical University of Cluj-Napoca. His research interests include image processing, pattern recognition, computer vision, stereovision based perception, intelligent vehicles and driving assistance systems. He leaded more than 75 research projects and published more than 300 papers (80+ journal papers). Since 2001 he has coordinated a series of research contracts funded by Volkswagen AG in the field of "Stereovision for Driving Assistance and Autonomous Driving". From 2013 he is continuing the research activity in Stereovision for Driving Assistance in cooperation with Bosch. He has been involved in EU projects like as INTERSAFE 2, INSEMTIVES, LARKC, DRIVE C2X, PAN-Robots. He is associate editor of IEEE Transactions on Intelligent Transportation Systems, the organizer of the IEEE Intelligent Computer Communication and Processing Conference (ICCP). He has been PC member, member in the local organizing committee, session chair of more than 50 international conferences and workshops including IEEE IV Symposium and IEEE ITSC.

Session Scope: The autonomous mobile systems and the advanced driving assistance systems sense their surrounding with devices such as radar, lidar, video camera. The sensory information is captured, perceived and represented in a convenient way for navigation path identification, and collision avoidance. The main perception functions are: environment geometry detection; painted objects detection, localization and classification; traffic signs and lights detection and classification; landmarks detection, localization and classification; detection, tracking, relative localization, relative speed estimation, and classification of the objects from traffic environment; objects behavior understanding; scene understanding; risk assessment.
The stereo sensor is the most powerful and reach in information sensor providing at least 3 different modalities: depth image, optical flow image, intensity or color image. The current research is focused firstly on improving dense stereo reconstruction, dense optical flow estimation, stereovision based visual odometry, and secondly on developing more robust and effective perception functions.
The current trend is to use probabilistic approaches to solve problems as estimation, recursive state estimation, parameters learning, classifiers learning, temporal and multi-sensor fusion, object behavior and scene understanding.
The objective of this session is to provide papers about the recent advances in stereovision based perception with applications in autonomous navigation and advanced driving assistance.

Session Topics: The papers submitted to this session will include the following topics: dense stereo reconstruction; dense optical flow estimation; visual odometry; error models; scene parsing; environment geometry detection; obstacle detection, tracking, classification; pedestrian detection, tracking and classification, behavior understanding, scene understanding, environment representation, risk assessment.