A Special Session on

Methods and Applications of Fuzzy Cognitive Maps

organized by Engin Yesil, Elpiniki I. Papageorgiou, Jose L. Salmeron

Fuzzy Cognitive Map is an extension of cognitive maps for modeling complex causal relationships easily, both qualitatively and quantitatively. During the past decade, FCMs played a vital role in the applications of diverse scientific areas, such as social and political sciences, engineering, information technology, robotics, expert systems, medicine, education, prediction, environment etc. FCMs combine fuzzy logic and neural networks inheriting their main advantages. From an Artificial Intelligence perspective, FCMs are dynamic networks with learning capabilities, whereas more and more data is available to model the problem, the system becomes better at adapting itself and reaching a solution. They gained momentum due to their dynamic characteristics and learning capabilities. These capabilities make them essential for modeling and decision making tasks as they improve the performance of these tasks.

The proposed special session aims to present highly technical papers describing new FCM models and methodologies addressing any of the following specific topics: theoretical aspects, innovative applications and FCMs extensions. Topics include, but are not limited to:

- Methods on FCM modeling
- FCMs for Approximate Reasoning
- Knowledge Representation
- Learning Algorithms for FCMs
- FCMs in Decision Making & Control Systems
- FCMs in Business Management
- FCMs in Engineering
- FCMs in Agricultural Systems
- FCMs in Data Mining
- FCMs in Computer Vision Tasks
- FCMs for Stakeholders analysis
FCMs in Biomedical Engineering
FCMs in Pattern Recognition
FCMs in Medical Decision Support
FCM extensions
Fuzzy Grey Cognitive Maps
Intuitionistic FCMs
Hybrid FCM-based approaches
Dynamic Cognitive Networks

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Dr. ENGIN YESIL is an Assistant Professor in the Department of Control and Automation at the Istanbul Technical University, Faculty of Electrical and Electronics Engineering. He is the co-director of the ABB Process Control Laboratory at the Istanbul Technical University. He also works as Invited Lecturer at the Dresden Technical University, Germany. Asst. Prof. Dr. Engin Yesil is a member of the Institute of Electrical and Electronics Engineers (IEEE) and he is a member of the Turkish National Committee of Automatic Control (TOK), which is a National Member Organization (NMO) of International Federation of Automatic Control (IFAC). His core research interests are in computational intelligence, notably type-1 and type-2 fuzzy systems, fuzzy logic,
neural networks, and optimization. Moreover, his research concentrates on intelligent control, process control and automation. Asst. Prof. Dr. Engin Yesil has participated in leading positions in many national and international projects as principal investigator, and advisor. He has extensive experience in managing multi-cultural research teams in multi-regional projects, and has a strong relationship with external funding bodies, as well a high knowledge of EU, international and national funding environment. Asst. Prof. Dr. Engin Yesil secured of large funding from commercial and scientific organizations such as The Scientific and Technological Research Council of Turkey (TÜBİTAK), Deutscher Akademischer Austauschdienst (DAAD), Istanbul Technical University Research Council (ITU-BAP), and GETRON Bilişim Hizmetleri. A.Ş. in last 5 years. Asst. Prof. Dr. Engin Yesil has authored more than 100 papers in national and international journals, conferences and books. He is the Associate Editor of the Turkish Journal of Electrical Engineering & Computer Sciences (TJEEC) and the International Journal of System Dynamics Applications (IJSDA). He also works as a peer reviewer for about 25 international journals.

He serves as a member of the IEEE Computational Intelligence Society (CIS) and IEEE Control Systems Society (CSS). Asst. Prof. Dr. Engin Yesil has chaired and been invited to serve in national and international scientific committees of many conferences. He has chaired the Turkish National Committee of Automatic Control Conference in 2012 (TOK2012), and worked as a Local Organiaztion Committee Co-chair in 2011 IEEE International Conference on Mechatronics (ICM 2011); besides he continuously works as a Program Committee Member for various international conferences. He has also served recently as a co-organizer of the special session entitled as “Advances to Type-2 Fuzzy Logic Control” and “Methods and Applications of Fuzzy Cognitive Maps” in WCCI2014 (IEEE International Conference on Fuzzy Systems, FUZZ-IEEE 2014); moreover he served as a PC member for the same conference. He consults for numerous companies on issues including intelligent systems, process modeling, quality improvement, and software reuse. Asst. Prof. Dr. Engin Yesil is also actively involved in undergraduate and graduate teaching, promoting continuing engineering education and professional development in Turkey.

Dr. ELPINKI I. PAPAGEORGIU is an Assistant Professor in the Department of Computer Engineering at Technical Educational Institute of Central Greece, Lamia, Hellas. She has been working for over thirteen years as researcher in several research projects related with the development of novel computational intelligence methodologies for decision support systems, intelligent algorithms for decision making, data analysis and mining, knowledge-based systems and expert systems. She has been actively involved in several research projects, European and National R&D, related with the development of new methodologies and learning algorithms based on fuzzy and artificial intelligent techniques for decision support systems in engineering, medicine, agriculture and environment. Recently she has worked in four European Research Programs FP6 and FP7, which are: FP7-ICT-2013-11 ISS-EWATUS, FP7-ICT-2011 USEFIL, FP7-ICT-2007-1 DEBUGIT, FP6-SESAME, focused on the development of decision support systems using intelligent/cognitive methodologies, fuzzy cognitive maps and data mining algorithms. Also, her strong relationship with
external funding bodies and especially EU and national funding environments, gave her an experience in managing research teams in different application domain projects. Asst. Prof. Dr. Elpiniki Papageorgiou was the main organizer of the previously accomplished Special Sessions on Fuzzy Cognitive maps during the FUZZ-IEEE conferences at 2011, 2012, 2013 and 2014 and has chaired three of them; moreover she served as a PC member for the same conferences. She was also Chair and main organizer of the 1st Workshop on FCMs held at Paphos, Cyprus in AIAI 2013. She is also a reviewer in many international journals, mainly IEEE and Elsevier. She is author and co-author of more than 124 publications in journals, conference papers and book chapters. 42 of them are in journals with high Impact factors, such as IEEE Transactions, Expert Systems with Applications, and has more than 1172 citations from independent researchers (h-index=15 in scopus). Dr. Elpiniki Papageorgiou is the Editor of the Springer book “Fuzzy Cognitive Maps for Applied Sciences and Engineering - from fundamentals to extensions and learning algorithms”, Intelligent Systems Reference Library 54, Springer 2014. Her research interests include expert systems, fuzzy cognitive maps, soft computing methods, decision support systems, artificial intelligent algorithms, data mining and machine learning.

Prof. Dr. JOSE L. SALMERON, Eng. is a Professor of Information Systems at the University Pablo de Olavide at Seville (Spain) where is the Director of the Computational Intelligence Lab and Research Associate at the University Autonoma of Chile (Chile). He has almost twenty years experience in research and teaching. Experience includes academic positions at several universities, consulting in ICT industry and a broad spectrum of collaborations with private and public organizations. Prof. Dr. Jose L. Salmeron, Eng. is an enthusiastic scholar and he is so interested in inter-disciplinary, intercultural and international team-building and sustained projects collaboration. Moreover, he has been actively involved (as leader and team member) in several research projects, funded from national and international organizations, including the European Union framework and national science programs. He participates in EU and professional projects (as FP7-ICT-2013-11), working with the development of intelligent algorithms for decision support, Fuzzy Cognitive Maps and new methodologies based on soft computing, artificial intelligence techniques for complex diagnostic, decision support, and quantitative methods (including multicriteria and computational ones). He belongs to the editorial board of Applied Soft Computing journal and is reviewer in IEEE journals and others journals and conferences related to Intelligent Systems and Expert Systems. His papers have been published in IEEE Transactions of Fuzzy Systems, IEEE Transactions on Software Engineering, Expert Systems with Applications, Applied Intelligence, Communications of the ACM, Journal of Systems and Software, Computer Standards & Interfaces, Interacting with Computers, Industrial Management & Data Systems, European Journal of Operational Research, Futures, Scienometrics, International Journal of Applied Mathematics and Statistics, and so on. Prof. Dr. Jose L. Salmeron, Eng. is Co-Chair of the 2015 IEEE International Conference on Grey Systems and Intelligent Services (GSIS), where he will be a plenary speaker, and he has recently organized FCM special sessions at FUZZ-IEEE 2011, 2012, 2013 and 2014 conferences. He has served on organizing and program committees of a
number of conferences and workshops. He is an ACM lifetime member and he is doing research in Fuzzy Cognitive Maps, Reasoning in Autonomous Systems, Knowledge-Based Systems, Computational Intelligence, and Decision Support Systems.

**Important Dates**

- Paper submission **February 8, 2015**
- Notification of acceptance for papers **March 23, 2015**
- Camera-ready paper submission **April 21, 2015**
- Early registration deadline **April 23, 2015**
- Conference **August 2-5, 2015**

**Submission of the papers**

Please submit your papers for this special session to both the organizers and conference online submission system (http://fuzzieee2015.org/) by indicating the title of the special session.