

GUEST EDITORIAL PREFACE

Special Issue on Advanced Tools and Techniques for Complexity Sciences (Part 2)

Mohamed Nemiche, Ibn Zohr University, Agadir, Morocco

*Abdelouahed Tajer, National School of Applied Science, Cadi Ayyad University of Marrakech,
Marrakech, Morocco*

The recent technological progress leads to an increased complexity in many natural and artificial systems. This increase in complexity is a result of the emergence of new properties and spatio temporal interactions among a large number of system elements and between the system and its environment. In the last years, rapid advances in high performance computing have created a revolution in the scientific understanding of complex systems. Data-mining, modeling and computational intelligence are tools and techniques most used in complexity sciences.

The articles for this special issue were selected from the papers presented at to the Second World Conference on Complex Systems (WCCS), which took place on November 10-12, 2014 in Agadir-Morocco. WCCS technically sponsored by IEEE and “International Academy for Systems and Cybernetic Science” attracted over 163 researchers from 20 countries around the world. From 351 submissions 130 were selected as full papers and 33 as posters. We have invited eight authors to submit extended versions of their papers to this two-part special issue. Each of these was reviewed and assessed on the overall quality of the submitted work compared to the original WCCS paper. The main objective of this special issue is to provide researchers with tools and techniques for handling many features of the complexity from several viewpoints and different tools and techniques.

Raya et. al. in the first article “Tracing Structures in Networks to Capture its Organization” analyze how the changes in the topology of the network could develop new relations between the nodes composing it. The work was motivated by how a computer network can be analyzed as a complex system. This paper is a proposal that explains a method to identify the hierarchy of a node in a network and its neighborhood by creating a dendrogram, make an analogy to how computer and neuron networks create pathways. The results demonstrated that when a network

collapsed, the clustering degree changes, so there are fewer node communities. The proposed ideas and methods will be used in a multi-agent architecture to manage a network when a congestion situation arises.

Alvarez-Molina et al. in the article, “Emergent behavior in complex Organizations, teamwork on software development process” addresses organizations as a complex system focusing on the analysis in software development teams. In this research, a team is described as a socio-technical subsystem where behaviors emerge such as companionship, segregation, conflict, culture. The position in this paper is that these behaviors are caused by the interaction between the elements that make up a team and the influence of their environment. The article is a discussion of how to model this phenomenon, proposing a computational model which is composed of qualitative and quantitative assessments. Agent-based modeling and simulation is proposed as a way of describing the phenomenon, using fuzzy logic techniques as a component of the agent’s architecture, considering aspects of decision making and personality factors. The motivation of this study was small and medium-sized Mexican companies dedicated to software development, particularly in the integration process of software development teams. The ultimate goal is to propose a computational model to describe a team’s complex behavior and support an organization to integrate effective teams.

The last special article “An Overview on Access Control Models” by Mammass Mouad and Fattehallah Ghadi give a survey on the current security models with a specific classification in term of their use. This work was motivated by the fast technological progress and the modern social contexts that have evolved during those past years. Due to that, various security models have been successfully developed and implemented within companies or computer system. This paper include an evaluation of the advantages and drawbacks of access control models cited in literature and also the efficiency of their security policies, keeping in mind that the choice of the model depends on the user needs.

The fourth article in this issue, titled “The Application of Meta-Heuristic Optimization Algorithms for Software Development Effort Estimation: Optimization algorithms for Software Development Effort Estimation”, is not part of the special issue on Advanced Tools and Techniques for Complexity Sciences.

In this two-part special issue, the articles presented provide interesting viewpoints and perspectives regarding current advanced tools and techniques in complexity sciences. As guest editors, we would like to thank all the authors who submitted their papers to this special issue. We really appreciate the efforts of the contributors and reviewers. We are also very grateful to the WCCS keynote speakers, Matjaz Mulej, Pierre Bricage, Nigel Gilbert, Hans Van Vliet, and Alain Abran. Finally I would like to express my gratitude to the Professor Wei-Chiang Samuelson editor-in-chief Thanks of International Journal of Applied Evolutionary Computation (IJAEC) for accepting our invitation to publish the best papers of WCCS and for giving the authors the opportunity to present their work in IJAEC.

We hope that readers can benefit from the work presented in this special issue and will contribute to this growing research area.

Mohamed Nemiche
Abdelouahed Tajer
Guest Editors
IJAEC

Mohamed Nemiche is an Assistant Professor at Ibn Zohr University, Morocco. He received his PhD from the University of Valencia-Spain in 2002 and his Habilitation in Computer Science from Ibn Zohr University, Morocco in 2012. His research interests are related to Complex Systems, Agent-based social simulation and Mathematical modeling. Dr. Nemiche is the founder and the current president of the "Moroccan Society of Complex Systems" and the founder and co-chair of the "World Conference on Complex Systems". He is a winner of the "Kybernetes Research Award" (Pittsburg, USA) in 2002. Dr. Nemiche is co-editor of the ICCS12 and WCCS14 IEEE Proceedings and co-guest Editor of many special issue journals.

Abdelouahed Tajer was born in Morocco in 1977. After a Master degree in Systems Optimization and Safety at the University of Reims Champagne-Ardenne / University of technology of Troyes in France, he achieved a PhD in Control of Discrete-events Systems at the University of Reims Champagne-Ardenne in France in 2005. Research interests: Discrete Event Systems, Fault diagnosis, Modeling, Supervisory Control Theory, Optimal Control, Complexes systems and Embedded Systems Currently, he is HDR professor at the High School of Applied Sciences in Cadi Ayyad University of Marrakech in Morocco and realizes its research at LGECOS Laboratory.