Guest Editorial Preface

Big Data, the Cloud, and Network Optimization:

Special Issue from the 2nd International Conference of Computing for Engineering and Sciences

Sean Eom, Southeast Missouri State University, Management Information Systems, Cape Girardeau, MO, USA
Mohamed Ridda Laouar, University of Tebessa, Department of Mathematics and Computer Science, Tebessa, Algeria

ICCES (International Conference of Computing for Engineering and Sciences) 2016 was composed of research presentations, keynote lectures, invited presentations, tutorials, panel discussions, and poster presentations. An important mission of ICCES is "Providing a unique platform for a diverse community". One main goal of the ICCES is to assemble a spectrum of affiliated research conferences into a coordinated research meeting held in a common place at a common time. This model facilitates communication among researchers in different fields of computer science and information systems.

ICCES'2016 was held in Barcelona, Spain, on 23-27 July 2016. The Conference continues to be the premier meeting on Computing for Engineering and Sciences issues attracting international participants around the world.

The special issue brings together a few selected papers from the proceedings of the 2nd International Conference of Computing for Engineering and Sciences (ICCES'2016). We would like to express our appreciation to all of those who have contributed to this special issue as authors and reviewers. The comprehensive evaluation process began with the initial selection of 70 papers, which were carefully screened—including a close check to ensure originality. Guest Editors Sean Eom and M. Laouar ultimately chose 5 papers to be carefully examined and put through the peer-review and revision process.

Henceforth, the following five articles address a wide range of issues related to the frontiers of computing for engineering and science including Big Data, the Cloud, and network optimization.

The first paper, "Big Data in Healthcare and Social Sciences: Bip4Cast as a CAD system," (Valverde, et. al.) introduces an innovative approach to improving patient access using lean methods and big data predictive analytics. Healthcare providers and payers are increasingly turning to big data and analytics, to help them understand their patients and the context of their illnesses in more detail. Industry leaders are exploring/using big data to reduce costs, increase efficiency and improve patient care. The next future is an innovative approach to improving patient access using lean methods and predictive analytics. Social sciences are very much related to healthcare and both areas develop in a parallel way. In this article, we introduce one example of application: Bip4cast (a bipolar disorder CAD system). This paper shows how Bip4cast deals with different data sources to enrich the knowledge and improve predictive analysis.

The second paper, "Data Replication in Cloud Systems: A Survey," (Tabet, et al.) presents a survey of data replication strategies in cloud systems. Based on the survey and reviews of existing classifications, the paper proposes another classification of replication strategies based on the following five dimensions: (i) static vs. dynamic, (ii) reactive vs. proactive workload balancing, (iii) provider vs. customer centric, (iv) optimal number vs. dynamic adjustment of the replica factor and (v) objective function. Ideally, a good replication strategy must simultaneously consider multiple criteria: (i) the reduction of access time, (ii) the reduction of the bandwidth consumption, (iii) the storage resource availability, (iv) a balanced workload between replicas and (v) a strategic placement algorithm including an adjusted number of replicas. Therefore, selecting a data replication strategy is a classic example of multiple criteria decision making problems. The taxonomy we present can be a useful guideline for IT managers to select the data replication strategy for their organization.

The third paper, 'Two Rounds Based LEACH: A Variant of Low Energy Adaptive Clustering Hierarchy for Wireless Sensor Networks," (Boumassata and Benmohammed) presents a hierarchical cluster based routing protocol that was proposed as a solution for low power consumption in Wireless sensor networks (WSNs). WSNs are networks formed by a large number of electronic devices called sensor nodes, where each node is capable of measuring environmental or physical values and communicating data, through wireless links, to a base station. The main problem that WSNs routing protocols face, is that sensors are powered with low power batteries, which plays an important role in network lifetime. Low Energy Adaptive Clustering Hierarchy (LEACH) is a hierarchical cluster based routing protocol that was proposed as a solution for low power consumption in WSNs. One of LEACH protocol limitations is "Extra Transmissions". This paper examines LEACH protocol and some of its various enhancements. The paper proposes a new clustering and selecting cluster head scheme with the goal of optimizing the energy consumption in WSNs.

The fourth paper, "A New Unicast Routing Algorithm for Hyper Hexa-Cell Interconnection Networks," (Al-Sadi) introduces the first unicast routing algorithm for Hyper Hexa-Cell Interconnection Networks. The Hyper Hexa-Cell topology; HHC for short; is a new interconnection network topology that has many attractive topological properties compared to other traditional topologies. There have been a number of studies in the literature on the HHC to explore the promising topological properties of this topology. Furthermore, other studies extend this topology by combining it with OTIS technology to produce a new version called OHHC. We have found that there is a lake of presenting any point to point routing algorithm for the HHC, although there were some efforts on building routing algorithms for the OHHC. To cover this shortage, this paper introduces the first unicast routing algorithm for the HHC. The new routing algorithm for the HHC uses store-and-forward techniques which allow a message to be transmitted through a path from the source node to the destination node. In addition to presenting the routing algorithm, we provide an example to explore the algorithm steps and also, we present a theoretical theorem to prove that the algorithm routes any message from any source to any destination via an optimal path.

The Fifth Paper, "Effects of Interaction on E-Learning Satisfaction and Outcomes: A Review of Empirical Research and Future Research Direction" (Eom and Ridda) reviews several e-learning empirical studies that investigated the effects of interaction on satisfaction and outcomes of e-learning, published between 2001 and 2010. Their conclusions seemed inconclusive, ranging from no relationships between interactions and two dependent variables (satisfaction and learning outcomes) to positive relationships. In-depth analyses of these empirical studies were conducted by examining dependent and independent constructs and their indicators, research methods, and participants' characteristics. The paper concludes that the conflicting results are due to primarily

different definitions of the dependent and independent constructs and their indicator variables, different research methods employed, and participant's demographic characteristics. In order to build e-learning theories and a cumulative research tradition, it is necessary to (1) define the dependent/ independent constructs and their indicators, (2) employ common research methodology, and (3) test commonly accepted research models.

ACKNOWLEDGMENT

The guest editors acknowledge the Editor-in-Chief of the Journal, Professor John Wang, for the indispensable input provided during the various reviewing stages.

Sean Eom
Ridda Laour
Guest Editors
IJISSC

Sean B. Eom is a Professor of Management Information Systems (MIS) at the Harrison College of Business of Southeast Missouri State University. He received his Ph.D. in Management Science from the University of Nebraska - Lincoln. His research areas include Decision Support Systems, Business Intelligence Systems and E-learning Systems. He is the author/editor of twelve books and has published more than 70 refereed journal articles and more than 130 articles in encyclopedias, book chapters, and conference proceedings.

Mohamed Ridda Laouar is a Professor in Computer Science at the University of Tebessa, Algeria. He received his Ph.D. in Industrial and Human Computer Science from the University of Valenciennes, France in 2005. His research areas include Information Systems, Decision Support Systems, E-Library Systems, Cloud Computing, and other related topics. He has contributed to journals such as Hi Tech Library and Human Systems Management. He is the editor of IJIST Journal and different proceedings of conferences such as of ICIST and ICSENT.