Guest Editorial Preface

Special Issue on Distributed Computing and Systems (DCS) and Applications

Shamsollah Ghanbari, Institute for Mathematical Research, Universiti Putra Malaysia, Malaysia

Distributed Computing (DC) is a field of computer science that studies Distributed Systems (DS). A distributed system is a system in which components are located on different networked computers. Accordingly, distributed computing systems communicate and coordinate their actions by message passing or publishing/subscribing. The key word is middle-ware. There are a wide range of open problems and challengeable issues in the area of distributed computing and systems. This special Issue focuses on some recent problems concerning to distributed computing and systems. The purpose of this special issue (SI) is to bring together researchers, practitioners, and decision-makers from academia, industry, the non-profit sectors, and the governments, who have expertise in the field of distributed computing and systems in order to share their knowledge. The key objectives include:

- To identify the major challenges in the field of distributed computing and systems;
- To identify who will benefit or negatively will be affected by developing the distributed computing and systems and applications;
- To create a basis for the future collaboration among scholars and practitioners in the field of distributed computing and systems;
- To develop assessment tools and techniques of distributed computing and systems field.

We have planned this special issue with the association of the International Journal of Distributed Systems and Technologies, with the aim of tracking some new updated research on the applications of distributed systems. We have received a good response in terms of quantity of submissions and quality of the content. We have subjected a tight review of all submissions and ended with six papers.

The first paper is A. Asemi and F. Ebrahimi, "A Thematic Analysis of the Articles on the Internet of Things in the Web of Science with HAC Approach". It carries out a biblio-metric method to thematically analyze the articles on IoT in the Web of Science (WoS) with a Hierarchical Agglomerative

Clustering (HAC) approach. The results of that paper indicate that various industries have been a ected in education, health, commerce, transportation, and other industries by this technology.

The next paper is Z. Umarova, S. Botayeva, A. Zhidebayeva, and N. Torebay "Analysis and Calculation of the Probability Selectivity using the Modern Distributed Algorithms." It uses a probabilistic approach for the theoretical evaluation of the selectivity of ultrafiltration membranes. In these membranes, the separation process mechanism is significantly different from the separation mechanism in nanomembranes. The objective of that paper is to provide a theoretical evaluation of the selectivity of ultrafiltration membranes. The results of the paper show that this feature is modeled by the coefficient of anomalous fractal diffusion in time, as well as by the displacement of the effective separation zone in the membrane.

The third paper is A. Wali, K. Tanveer, S. Fatima, A. Tanveer, and S. Ftikhar, "An Efficient Cloud-Based Traffic Signal Manipulation Algorithm for Path Clearance." In this paper an intelligent path clearance system for emergency vehicles is presented. Given the GPS coordinates of an emergency vehicle, a destination, a map, and the traffic light grid system, the system provides a signal free corridor to the priority vehicle by automatically manipulating traffic signals that fall in its path using cloud computing. The objective of this paper is to propose an automated, dynamic and cloud-based traffic manipulation model that provides pre-arrival lane clearance based on the location of the emergency vehicle. This would save time spent on clearing of long queues. The importance of the paper is that the model proposed is centralized, and applicable in real life situation, a small-scale experiment was conducted. In terms of distributed computing, this does give an interesting research direction for future researchers. The results of this work indicate the accuracy of the proposed system is 98%. This was based on the experiments on 103 traffic signals in which 100 responded accordingly when an EV approached them.

The next paper is M.L Abdul-Majid, S. Chuprat, "Adapting Market-Oriented Policies for Scheduling Divisible Loads on Clouds." This paper is concerned with the investigation of adapting users' preference policies for scheduling real-time divisible loads in a cloud computing environment. The Objective of this paper is to develop an optimal scheduling of real-time divisible load on cloud resources. The workload allocation approach that is presented in this paper uses Divisible Load Theory (DLT). The optimal workload allocation strategies development will help cloud users to gain maximum benefit while guaranteeing the QoS. The experimental results suggest that the proposed algorithms can significantly benefit users under different circumstances.

The fifth paper is N. Zhumatayev, Z. Umarova, G. Besbayev, and A. Zholshiyeva, "Development and Calculation of a Computer Model and Modern Distributed Algorithms for Dispersed Systems Aggregation." The paper attempts to eliminate the contradiction of the Smoluchowski equation, using modern distributed algorithms for creating calculation algorithm and implementation a program for building a more perfect model by changing the type of the kinetic equation of aggregation; taking into account the relaxation times. The objective of the paper is to develop a computer model for calculating the aggregation of the dispersed systems. The obtained system of differential equations of the second order is solved by the Runge-Kutt method.

The last paper is K. K. Ezchiel, S. K. Ojha, R. Agarwal, "A New Eager Replication Approach using a Non-blocking Protocol over a Decentralized P2P Architecture." Eager replication of distributed databases over a decentralized Peer-to-Peer (P2P) network often generates replicas unreliability because participants can be or cannot be available. Moreover, the conflict between transactions initiated by different peers to modify the same data is probable. These problems are responsible for perpetual transactions abortion. This paper proposes a new Four-Phase-Commit (4PC) protocol that allows transactions commitment with available peers and recovering unavailable peers when they become available again. After implementing the new algorithm with C#, a collection of experiments makes it possible to analyse the performance which reveals that the new algorithm is efficient because in one

second it can replicate a considerable number of records. Moreover, an important volume of data can be queued for subsequent recovery of the concerned slave peers when they become available again.

I am confident that the papers and studies that are presented in this issue mark technical elegance and merit and also show directions for high quality research. Lastly, I would like to express my sincere appreciation to Mrs. Maryam Khosrokhani for her kind collaboration for editing of the papers

Shamsollah Ghanbari, PhD
Guest Editor
IJDST