

## Guest Editorial Preface

# Special Issue on Convergence of Information Systems with Cloud Computing, Big Data, and IoT

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Recent developments in technologies such as Cloud Computing, Big Data and Internet of Things bring a revolution and acts as a catalyst in social change. These advanced technologies are expected to be the hottest topic in the next few years. There have been research demonstrating architectures, applications, services, experiments and simulations in these areas to support the cases for Social change. Specifically, Big Data and Cloud Computing are two emerging paradigms in the recent developments of information technology. Cloud Computing enables computing resources to be provided as IT services in a pay-as-you-go fashion with high efficiency and effectiveness. Big data is an emerging paradigm applied to datasets whose size is beyond the ability of commonly used software tools to capture, manage, and process the data within a tolerable elapsed time.

This special issue aims to present cutting-edge research addressing recent developments in information technology for social benefits. It contains six previously unpublished papers selected out of more than 15 papers submitted to this special issue after a rigorous double-blind peer review process.

In this issue, the first contribution is by Mahalik and Mohapatra proposes a successful implementation of IT in e-PDS process. They have developed a relationship between the factors and identified the factors that needs in order of priorities to implement the IT effectively. In addition, they have observed that the factor “Government Cooperation” is very much important due to its higher driving power and low dependence and also impact the other factor’s efficiency. The next factors which are important is the Cost of project, Trained manpower and Effective vigilance team depend totally on Government cooperation and without the support from the Government, these factors are not fruitful and also these factors will facilitate other factors like Genuineness of technology, power and internet connectivity, effective working environment and public awareness.

The second paper is by Majhi and Dhal in which they have systematically investigated VM migration process and potential faults in migration. Moreover, the various state transition of the VMs involved in migration are analyzed and subsequently different faults have been presented. They have devised a method to identify some of the faults. This work can be used to proactively identify different functional and security problems in live migration and to devise necessary corrective measures apriori. The work will be helpful to the cloud system developers to design a secured and fault free migration system for the migration module of the cloud operating system. In future, we will address functional and security problems with verified solutions for system services in cloud computing platform.

Mohanty et.al., in the third paper, propose various models and algorithms basically which are evolutionary approaches for balancing the load in cloud computing environment. Each approach has certain merits and demerits and is suitable for a particular design and topology. It is not necessary that an algorithm will always be better than the other heuristic approach in all cases. After doing a

complete study they propose a model for efficiently balancing load in cloud computing environment keeping the goal was to develop a dynamic approach which suitably takes into account all the parameters of virtual machines.

In the fourth paper, Majhi et al., present a model of cloud load balancing using queuing and probability theory. A queuing cloud model is discussed with load balancing perspective. They present analysis for two servers and then extended it to n server. In addition, an optimal strategy is modelled for cloud load balancing. The analytical results are depicted and verified based on the proposed lemma. This optimal strategy can be used to compare the efficiency of load balancing algorithms. A comparison has been presented amongst concurrence ratio, number of servers, and the load.

The fifth paper, authored by Das et al. presents the design of a parallel lexical analyzer for C language. It is simple and splitting the C source code into segments equal to the number of cores. It fairly demonstrates the advantage of multi-core systems in parallelizing the lexical analysis process. In the algorithm, there is a Partitioning overhead consists of the extra work needed to be done. This consists of several components at least including: the actual partitioning code executed; the code executed to merge the outputs. They have adopted parallelism in the lexical analysis process to achieve high performance.

Lastly, in the sixth paper, Bhattacharjee and Dash have analyzed an activity diagram, consisting of concurrent activities, for generating test paths. The obtained test paths are therefore required to be ranked. They have demonstrated that it is conceivable to apply Genetic Algorithm procedures alongside Ant Colony Optimization technique for not only finding the most critical path but also prioritizing the other paths too for enhancing the effectiveness of software testing.

Finally, we would like to express our sincere appreciation to the authors for submitting their original papers, and to the reviewers who carefully spent time reviewing the papers on a double-blind basis and provided valuable comments to help the review process for this special issue. At last but not the least, we convey our heartfelt thanks to Editor in Chief, Prof. John Wang for his valuable and continuous guidance to make this special issue successful.

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