

Guest Editorial Preface

Special Issue on High Performance Computing and its Applications

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High Performance Computing (HPC) is the use of supercomputers, large clusters and parallel processing for solving complex scientific and engineering problems. It has grown exponentially in the business and research community over the last few years. As the number of customers and their requirements are increasing, HPC solutions are essential for the significant growth of the business processes. As a result, it is referred as the backbone of the current product developments. The HPC system is used by researchers, scientists and practitioners to execute their applications. Many complex applications such as modeling of workflows for product designs, financial analysis, predictive analysis, molecular modeling, weather forecasting, development of large datasets, mathematical calculations, development of software and health and biosciences are relying on the HPC. HPC is more attractive for its cost-cutting solutions, efficiency, productivity and agility.

An Efficient HPC requires high-bandwidth and low-latency between its components such as processors and storage systems. However, the performance of the HPC depends on the number of CPU/GPU cores, interconnection networks, utilization factors, protocols, flexibility and scalability. High speed interconnects are essential for the message communication between the HPC components. For instance, InfiniBand is used for the HPC applications because of its price, performance and reliability in comparison to Gigabit Ethernet. Similarly, the protocol for HPC plays a major role as the traditional TCP/IP protocol may not perform well in HPC systems. The traditional protocols may suffer from high latency and CPU overhead.

HPC has found applications in the current emerging fields, including cloud computing, big data analytics, Internet distributed systems, vedic mathematics, machine learning, deep learning, neural network, recommendation system and high performance wireless sensor network to name a few. The main objective of this special issue to provide the recent developments in the field of HPC and its applications which are contributed by various researchers by developing algorithms, simulations, theories and improved techniques.

Das, Dutta, Sharma and Godbole presented a comparative study of an anomaly detection algorithm using neural networks. They have viewed the problem of anomaly detection as a special type of supervised classification problem and modeled the datasets using different estimation techniques.

Mishra and Panda presented a server minimization algorithm for Internet distributed system. Their proposed algorithm can be used to minimize the number of servers and load balancing. Sapkal and Shrawankar have focused on the parallel implementation of the Paravartya Yojayet and compared

with existing LU decomposition. They have analyzed the implementation of the Paravartya Yojayet in two different ways, namely “for loop” parallelization and direct parallelization.

Gopalachari and Sammulal have presented a hybrid recommender framework by mixing content-based and collaborative filtering techniques using conceptualization. They have also incorporated the temporal semantics for achieving better recommendation process. Chawla, Mishra, Singh and Kumar discussed a comparative analysis of various data exchange mechanisms with respect to factors that are affecting the real-time web application. Moreover, their proposed approach can be used to select appropriate data exchange mechanism for the recent emerging web application.

Kamila and Dhal have proposed an approach which is based on LEA2C and energy based clustering self-organizing map model. They have also introduced a self-silence model which compares the residual energy with a self-silence threshold energy in each transmission process. Yaseen and Das presented a clustering algorithm to eliminate the frozen period and minimize the re-clustering overheads. They have reduced the number of messages exchanged in their work by forming stable non-overlapping clusters.

As guest editors of HPC and its applications, we hope that variety of research work covered under this special issue. It has tremendous value for researchers, scientists and practitioners. At the same time, we are also grateful to the authors for making their scholarly contributions to this issue and their patience during crucial revision stages. The technical standard and quality of the published content is based on the strength and expertise of the submitted papers. In response to the call for submissions, HPC and its applications received 18 submissions. Each submission was peer reviewed by up to three international review committee members (from University of California, CSIRO, IITs, NITs, VSSUT, CVRCE to name a few). After receiving the reviews of the papers, the committee was selected a total of 7 papers for publication in this special issue of IJRSDA. We wish to thank all the committee members for their hard work, dedication and timely submission of the reviews without which it would have been difficult to maintain the publication schedule. We sincerely thank Sean Eckman, Development Editor from IGI Global for their cooperation and constant support throughout the publication process.

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