Editorial

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Biographical notes: Pardeep Kumar is currently working as an Associate Professor in the Department of Computer Science & Engineering at Jaypee University of Information Technology (JUIT), Wakanaghat, and he has 10 plus years of extensive experience in academic roles. Prior to joining Jaypee Group, he was associated with Mody University of Technology & Science (formerly known as Mody Institute of Technology & Science) Rajasthan, India. He completed his PhD from Uttarakhand Technical University, Dehradun, MTech from Guru Jambheshwar University of Science & Technology, Hisaar, and his BTech from Kurukshetra University, Kurukshetra. He has presented and published over 40 research papers in reputable journals and various national and international conferences. His research interests include big data, distributed databases, data warehousing, data mining, social media data analysis and parallel computing.

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Recent advances in digital sensors, communications, computation, and storage, have produced huge collections of data, capturing information that is of value to business, science, government, and society, hence the coining of the term 'big data'. In addition, big data is applied to large volumes of data whose size is beyond the ability of commonly used software tools, to capture/manage/process the data within a reasonable time for the application, from medical, banking, e-commerce, social networking sites, e-voting, education, astronomy, intelligent computer networks, handling of income tax documents etc., to smart cities approaches such as urban planning, intelligent

transportation, water supply networks etc. The large volume of data makes computing difficult when using a single processor and storage, and parallel, distributed and grid processing with parallelised multi-processors is preferred, while the data themselves are stored in the distributed environment.

As the size of data grows exponentially, current algorithms are not efficient or scalable enough to handle such large volumes of data. Designing more accurate intelligent models and framework so as to satisfy the processing needs will bring a large number of opportunities as well as challenges to the researchers for big data computing. As such, there is a strong demand to investigate parallel, distributed and grid computing solutions to process large-scale data sets. The objective of this special issue is to concentrate on all aspects, state of the art, recent developments/methods and future research directions related to big data processing.

This special issue has attracted 27 manuscripts and the submissions have been rigorously reviewed by reviewers consisting of guest editors and external reviewers, with two high-quality articles accepted in the end. Below, we briefly summarise the highlights of each paper.

The first paper, entitled 'GPU accelerated video super-resolution using transformed spatio-temporal exemplars', by Chaitanya Pavan Tanay Kondapalli, Srikanth Khanna, Venkatachalam Chandrasekaran, Pallav Kumar Baruah, Diwakar Kartheek Pingali and Sai Hareesh Anamandra, proposes a novel framework of expanding the patch search space by using affine variations in five neighbouring subsampled low resolution frames of a scene. They used vanishing points (VP) detection for estimating the planar perspective transformation parameters between the low-resolution (LR) and corresponding sub-sampled image frames. This method works well even if there is no patch redundancy within and across image scales and also if there is a failure in detecting VP, which are used to determine perspective transformation between LR image and its sub-sampled form. They also focused on reducing the computation time by exploiting the embarrassingly parallel nature of the algorithm. They achieved a speedup of 6 on multi-core, up to 11 on GPU, and around 16 on hybrid platform of multi-core and GPU by parallelising the proposed algorithm. Using their hybrid implementation, they achieved 32x super-resolution factor in limited time. They also demonstrate superior results for the proposed method compared to current state-of-the-art super resolution methods.

The second and last paper, entitled 'Energy-efficient fuzzy-based approach for dynamic virtual machine consolidation', by Anita Choudhary, Mahesh Chandra Govil, Girdhari Singh, Lalit K. Awasthi and Emmanuel S. Pilli, proposes future forecasting methods for host overload detection; a fuzzy logic-based virtual machine (VM) selection approach that enhances the performance of VM selection strategy; and a VM placement algorithm based on destination CPU utilisation. They incorporate forecasting techniques to predict the future load of the server and take a decision on the requirement of VM migration. Single exponential and double exponential smoothing techniques were used to achieve the same. The upper threshold was calculated using median absolute deviation technique which automatically adjusts the threshold based on the pattern of workload resource utilisation. Fuzzy VM selection is used for selecting the VMs to be migrated from the overloaded server. The performance evaluation of the proposed approaches is carried out with the CloudSim toolkit using the PlanetLab dataset. The simulation results exhibited significant improvement in the number of VM migrations, energy consumption, and service level agreement violations.

These two selected contributions reflect the new achievements in parallel, distributed and grid computing and we hope they can provide a solid foundation for future new approaches and applications. Finally, we would like to thank all authors for their contributions, reviewers for reviewing these high quality papers, and Editor-in-Chief of *IJGUC*, Prof. Fatos Xhafa, for his support and guidance throughout the process.