

Guest Editorial Preface

Special Issue on Greener Data Management for Ultra Large Scale Systems

Zhigao Zheng, Central China Normal University, Wuhan, China

Jinming Wen, Centre national de la recherche scientifique, Paris, France

Shuai Liu, Inner Mongolia University, Hohhot, China

The convergence of HPC and Big Data systems offer a great opportunity to improve the energy efficiency when processing massive amount of data. For the past years, HPC systems have considerably improved their energy efficiency, so opportunities exist to apply HPC solutions and technologies to Big Data systems. For instance, GPU have considerably improved the FLOPS/Watt ratio of HPC systems, and we could follow the same path for data analytics software. Such convergence is already happening. For instance, Big data systems, MapReduce, which have first addressed the issue of extreme scalability, are now considerably concerned about the responsiveness of the computation. As a result, we see more and more in-memory processing, which by alleviating access storage both improve the computation time and decreases the energy usage. For such kind of computation, a foreseeable trend would be to support high speed network commonly found in HPC platform.

There are 8 papers have published in this issue, which focused on greener data management for ultra large scale system. Recently, many issues are still waiting for solution in this area. In particular, the research of data management and resource utilization are important.

This special issue aims on all kinds of research in greener data management for ultra large scale systems. In this issue, there are 8 research papers, which focus on data management technology, data scheduling, and greener big data processing system. The list of papers is as follows.

1. “Image Recognition of Rapeseed pests based on Random Forest Classifier” by L. Zhu, M.H. Wu, et al. proposed an image recognition method of rapeseed pests based on the color characteristics. In the proposed method a multi-dimensional vector, which extracted from the color feature of the benchmark image, is used to train the random forest classifier. By using this method, we can get the recognition results through inputting the detected color features of the image to the random forest classifier. This paper presented a serial of experiment to showed the effectiveness of the mentioned method.
2. “Personalized recommendation mechanism based on collaborative filtering in cloud computing environment” by Y.H. Tan, H.Y. Xu, and Y.J. Gong proposed a personalized recommendation collaborative filtering mechanism RAC in the cloud computing environment. By using the mentioned mechanism, the author developed a distributed score management strategy and two stage index score, to locate the candidate neighbor. The author designed a serial of experiments to show that the proposed method is very useful to improve the recommendation accuracy and efficiency in large scale and distributed processing architecture.

3. "Navigation Path Detection for Cotton Field Operator Robot Based on Horizontal Spline Segmentation" by D.C. Li, S.Y. Xu, Y.Z. Zheng and et, al. proposed a new field navigation path extraction method based on horizontal spline segmentation. The author first uses a two stage OTSU threshold algorithm to segment the binary image of the furrow. And then use the horizontal spline method to segment the binary image. Finally, the author calculates the change of parameters of boundary line of the connected domain to make sure whether the robot reaches the outside of the field or encounters obstacles.
4. "Design of Vision Measurement Device for Seeding Robot based on Ant Colony Algorithm and Nonlinear Circuit System" by X.J. Liu, H.J. Zhu, H.H. Fan, et al. implemented an ant colony algorithm based nonlinear circuit system, which solved low efficiency and accuracy problem of the control process for seeding robot.
5. "PID control algorithm based on genetic algorithm and its application in electric cylinder control" by G. Zhang, X.S. Gong and X.R. Chen use the global optimization of genetic algorithm to optimize the parameters of PID and improve the performance and adaptive capability of PID controller.
6. "An Efficient Spatiotemporal Approach for Moving Object Detection in Dynamic Scenes" by M. Liu, Y. Liu, C. Liu, et al. proposed an efficient framework of moving object detection in dynamic scenes based on DT and observability of the LTI system. The proposed method represents the video clip of τ frames with DT in a holistic manner and estimates efficiently DT parameters by combing the batch PCA and CCIPCA in a MVE group. A deduced formulation of measuring observability, which does not need eigenvalues decomposition operation of the state transition matrix, is simple and efficient.
7. "Research on the information construction of accounting audit based on the big data of computer" by D.M Lin proposed a large data transmission algorithm, which combined the grid computing task assignment and scheduling algorithm. A serials experiments show the efficiency of the proposed algorithm is quite well.
8. "Design and Implementation of Wireless Voltage Monitoring System Based on Zigbee" by X.H. Luo proposed a low cost wireless monitoring system based on ZigBee wireless transmission, and designed a new floating voltage sensor which is suitable for the monitoring of medium voltage and high voltage(MV/HV) public equipment. A serial of experiment is presented to showed the effectiveness of the mentioned method.

We hope that new researches and applications in this exciting field are interesting and helpful. The authors listed are all experienced researchers of the field, have already published high-level papers in this area.

Zhigao Zheng
Jinming Wen
Shuai Liu
Guest Editors
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