Foreword and Editorial

International Journal of Grid and Distributed Computing

We are very happy to publish this issue of an International Journal of Grid and Distributed Computing by Science and Engineering Research Support Society.

This issue contains 17 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper “Multidimensional Aggregation Process in Cloud Computing System” presents multidimensional aggregation query processing algorithm in cloud computing system. The existing cloud computing research work in the MapReduce calculation framework lacks effective support to the aggregation of multi-dimensional data. On the other hand, the use of MapReduce computing framework needs to start large computing nodes, and costs huge amounts of energy. For the above problems, this paper presents multidimensional aggregation operation scheme in the cloud computing system, through two layers of index structure to reduce the query computing nodes and Calculation of aggregation operation in single computing nodes. This paper gives an algorithm framework using two layers of index structure to process multidimensional aggregation query, and proposed priority mode of performance and multi-dimensional aggregation algorithms under low-power mode in this framework. In two modes of multidimensional aggregation algorithm proposed query allocation problem, and proves that the two modes query allocation problems are NP-completing problem. This paper presents approximation algorithm of two NP-completing problem and proves the approximate ratio of two approximation algorithms.

Paper “Sybil Attack Detection and Analysis of Energy Consumption in Cluster Based Sensor Networks” emphasize on Sybil attack, which is a harmful threat to sensor networks and proposed an algorithm for Sybil attack detection based on Time difference of Arrival (TDOA) localization method, which detects the malicious behavior of the head node and member nodes in a cluster based network.

The paper “An Intelligent Agent based Grid Scheduler with Enhanced Fault Tolerance” present an intelligent agent based meta-scheduler, which is aiming at improving the fault-tolerance of grid systems when running user’s application. The proposed meta-scheduler is designed as an extendable framework, which allows plugging in multiple scheduling policies for deal with different scenarios. The agent-based scheduling framework enables grid systems to deploy their local schedulers in a flexible manner.

The paper “Evaluation of Encryption Method of SNEP for Implementing Security in Wireless Sensor Network using SPINS Framework” analyzed the XTEA and RC5 encryption algorithms in WSN environment with the help of many parameters. MATLAB simulated WSN environment shows the results are more efficient in terms of storage, energy and speed. Consequently, XTEA consume less energy & time as compare to RC5 encryption algorithm for implementing security in SNEP Method of SPINS framework for WSN.
The Authors of “Financial Time Series Forecasting with Grouped Predictors using Hierarchical Clustering and Support Vector Regression” paper proposed a two-stage financial time series prediction approach hybridizing support vector regression (SVR) with hierarchical clustering (HC). By averaging the variables within the clusters obtained from hierarchical clustering, it defines super predictors and use them as the input variables of the SVR forecasting model. Although averaging is a simple technique, it plays an important role in reducing variance. To evaluate the performance of the proposed approach, the Shanghai-Shenzhen 300 index is used as illustrative example.

In “Efficient Keyword Search Scheme in Encrypted Cloud Computing Environment”, discusses and addresses the problem of querying different variants of a keyword. Combining with the stemming algorithm, it proposes a semantic keyword-based search scheme over encrypted cloud data. Given a query word, data users can find all the documents containing the semantically close keywords or different variants through the scheme, which tackles the limitation of exact keyword search. Through rigorous privacy analysis and experimental study on real dataset, the scheme is quite secure and practical.

In the paper “Hybrid Algorithm to Control Congestion in Wireless Sensor Networks”, the author deals with the study Congestion in wireless sensor networks occurs when packets arrive at a fully loaded buffer of a sensor node. Due to lack of space in the buffer, packets are dropped. It also leads to packet delay, retransmission of packets, reduced QoS and throughput. A hybrid of rate control and resource control algorithms can be used to control congestion considering the priority of the packets. Congestion is detected when the service time is greater than the inter-arrival time of packets. The inter-arrival time can be increased by a certain factor computed as congestion degree, thus reducing the rate of sending packets. The congestion degree which is the ratio of service time to inter-arrival time can be sent to the sources. The sources can then adjust the rate of sending packets accordingly to control congestion in the upstream nodes. At the time of congestion, high priority packets are sent using multiple paths after increasing the time between generations of packets thus decreasing the rate of sending packets. Low priority packets are sent using a single path after decreasing the packet sending rate thus increasing the time between sending consecutive packets. The method also serves as a hybrid of congestion control and congestion avoidance.

The paper “Research for the Task Scheduling Algorithm Optimization based on Hybrid PSO and ACO for Cloud Computing” puts forward a cloud computing optimization algorithm based on particle swarm optimization and ant colony optimization algorithm. Through many simulation experiments, it is proved that the algorithm has a good real-time performance and optimization ability and is an effective scheduling algorithm.

The Authors of “A New Fuzzy Logic and GSO based Load balancing Mechanism for Public Cloud” presented an effective load balance model for public cloud in which cloud is partitioned with a switch mechanism to choose different load balancing strategy for different load. Fuzzy Logic have been extensively used in various applications such as image processing, data mining, networking, etc. due to its efficient internal architecture and its compatibility to solve various optimization problems. Fuzzy base networks have been observed to produce optimal results in various combinatorial optimization problems. Another important area which provides significant results in solving optimization is the swarm intelligence approach. GSO is observed to have provided significant optimal solution in lesser iterations. In this paper The Fuzzy logic and GSO based load balancing algorithm applied to
the load balancing strategy to enhance the utilization and efficiency in the public cloud environment.

In “Position-based Data Dissemination to Interested Region in VANETs”, presented a data dissemination protocol, which uses geocast routing method to deliver message to all vehicles in a certain region. To adapt characteristics of geocast and improve delivery ratio of message, it modified the scheme of GPSR. Simulation results showed it was able to reach close to 100 percent delivery ratio when there exist enough vehicles.

The paper “A Survey on Virtual Sensor Networks Framework” surveyed on virtualization on wireless sensor network to provide a platform to serve the different applications in a single framework of sensor infrastructure to reduce the different parameters such as deployment cost, number of sensors etc of sensor infrastructure. In this work, it is trying to provide a model which will solve the problem of sensor network and provide the multiple services in deployed sensor infrastructure.

Paper “Normal Estimation for Mass Point Clouds of Irregular Model in the 3D Reconstruction based on Fuzzy Inference” presents a fuzzy normal estimate for mass point clouds of irregular models in reconstruction. The irregular model is complex object that some part is smooth and some parts are irregular including sharp features. Therefore, it put kNN and curvature of mass point clouds to fuzzy inference system to divide the kind of point clouds and the output of FIS can determine which part of tooth point clouds belong to. For different kinds point clouds, corresponding algorithm is given. Point clouds in the smooth area are estimated normal by PCA directly and ones in other regions of thin or sharp area are estimated by checker and attach points. This method is simpler than those complex methods used on the whole point clouds directly.

The paper “BCC-DPSO Algorithm for Task Scheduling on NOC” proposed a BCC-DPSO scheduling algorithm to solve multi-objective optimization problem for task scheduling on Network-on-Chip (NoC). In the proposal, the relative advantage of the solution is evaluated by calculating its efficiency using BCC model in Data Envelopment Analysis (DEA), and the referred-time method is introduced to rank the BCC-efficient solution. Moreover, a sub-swarm strategy is adopted to reduce the high computational requirement introduced by the DEA. There are four sub-swarms, each of which optimizes one of four observed metrics, namely makespan, energy, link load and workload balance.

The paper “On the Locality Modeling of Web Access Stream” proposed new metrics to capture the two causes of reference locality: popularity and correlation. Entropy is defined as a natural metric for measuring the skew in the relative popularity of different objects in a request stream, and the Coefficient of Variation of the IAT distribution was used as a metric for spatial locality between the same files, motivated by the fact that the presence of such a correlation between accesses to the same object. It is validated of these metrics using wide logs from different area and these metrics are intuitive and effective.

The Authors of “Second Order Duality in Multiobjective Programming with Generalized Convexity” concerned with a class of multi objective programming problems in which the objective functions and constrained functions are twice differentiable and containing the support functions of a compact convex set. Further, the Mangasarian type second order dual model associated with the multi objective problem are formulated. Several weak, strong and
strict converse dual theorems are established and proved by utilizing the new generalized convexity.

In “Research of Enterprise Private Cloud Computing Platform Based on OpenStack”, designs the enterprise private cloud platform architecture. According to the characteristics of more than class of enterprise personnel, this paper expounds the enterprise resource virtualization mode and the distribution and use of the virtual machine. At last, the user interface system design scheme is given. Hope to be able to reach the elasticity computing and on-demand distributing cloud resources.

The Paper “An Architecture for Human Resource Information Management Using Cloud Computing” puts forward a kind of application in the cloud computing environment of human resource management architecture which provide cloud computing environment of vast human resources information organization. By employing advanced learn of middle attribute to get instantly mapping of top concept and use the center data to preforms rapid adaptation complex time-varying demand, the network environment, and terminal equipment.

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