Foreword and Editorial

International Journal of Multimedia and Ubiquitous Engineering

We are very happy to publish this issue of International Journal of Future Generation Communication and Networking by Science and Engineering Research Support soCiety.

This issue contains 28 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 “A Single Chord Localization Algorithm for Wireless Sensor Networks” presents a novel range-free single chord localization algorithm with low energy consumption and high accuracy for wireless sensor networks. A mobile anchor node and a mobile reference node are employed to periodically broadcast beacon messages and reference messages, respectively. Each sensor node is equipped with a received signal strength indicator for comparing the signal strength. By using the edge function and the result of comparing signal strength, each sensor node only needs one chord on the communication circle for localization.

Paper “A Fuzzy based Routing Protocol for Delay Tolerant Network” proposes a new routing technique based on fuzzy logic for intermittently connected network. Also an effort has been made to evaluate the performance of the proposed routing strategy in realistic environment (having obstacles) in MATLAB.

In the paper “A Novel Architecture Design of Large-Scale Distributed Object Storage System”, a novel architecture design of large-scale distributed object storage system (called DOSS) is proposed. The design takes several aspects effecting on the overall performance of DOSS into consideration, including an improved model of interaction based on the traditional interactive mode of object-based storage systems, MDS (Metadata Server) management scheme and a load balancing scheme combines the definition of the maximum load for OSD(Object Storage Device), hierarchical model and re-polling in order to solve access of heat objects issues.

The research paper entitled “An Improved SVM in Cloud Computing Information Mining” introduces support vector machine (SVM) concept in the cloud computing data mining, introduces a penalty factor in the SVM, and improves SVM data mining algorithms. The constructed Map / Reduce model by the concept of featured multi-tree conducted the validation of the model.

In the paper “Multiprocessor Task Graph Scheduling Using a Novel Graph-Like Learning Automata”, an ingenious graph-like learning automata in which each task in the task graph is represented by a learning automaton tries to solve the multiprocessor task-scheduling problem in a collective manner. Set of different experiments on various real-world task-graphs has been done and archived results are so promising compared to the traditional methods and genetic algorithm.

Authors of the paper “A Cloud Manufacturing Resource Allocation Model Based on Ant Colony Optimization Algorithm” adapt the Ant Colony Optimization (ACO) algorithm to find the optimal solution based on a four-dimensional objective function, that is, time,
cost, quality of services and the load balance. They also present a case study to evaluate the model.

The paper “Multi-hop Range-Free Localization Algorithm for Wireless Sensor Network Using Principal Component Regression” proposed a novel approach to multi-hop range-free localization algorithm in wireless sensor network using principal component regression. The localization problem in the wireless sensor network is formulated as a multiple regression problem, which is resolved by principal component regression. The proposed methods are simple and efficient that no additional hardware is required for the measurements, and only hop-counts information and location information of the beacons are used for the localization. The proposed method consists of two phases: the offline training phase and the online localization phase. In offline training phase, the real distances and the hop-counts among sensor nodes are collected to build localization model. In online localization phase, each unknown sensor node finds its own location using the localization model.

The paper “Simulation Analysis of Tree and Mesh Topologies in Zigbee Network” investigates the performance of Zigbee for tree and mesh topologies. In doing so parameters like MAC throughput, MAC load, MAC delay, end to end delay have been evaluated through extensive simulations using OPNET. The intricate behavior of these topologies in Zigbee shows optimum bounds of performance for these topologies have been computed in this work.

In the paper “Research of Job Scheduling With Cloud Based On Trust Mechanism And SFLA” this article introduced the term of trust mechanism and apply it to cloud calculation and job scheduling in order to satisfy the requirement of quality of cloud calculation service for job scheduling. It uses altered SFLA as scheduling strategy, and brings forward a model of job scheduling with cloud circumstance which is based on trust mechanism and SFLA.

In the paper “Research on the Resource Scheduling of the Improved SFLA in Cloud Computing” the status of cloud computing resources is first analyzed, to point out the existing problems, and then combined with the characteristics of resource scheduling in cloud computing, the Shuffled Frog Leaping Algorithm is introduced. First, in its stage of subgroups classification, the chaos strategy is introduced and in the internal search the positive learning strategy is introduced, which makes the improved frog leaping algorithm gain good convergence, reduces the time of global search and optimization. Through the CloudSim platform, it shows that this algorithm can improve the efficiency of task processing and make the resource scheduling in cloud computing rational and effective.

The research paper “A High Availability Clusters Model Combined with Load Balancing and Shared Storage Technologies for Web Servers” designs and implements a high availability clusters and incorporated with load balance infrastructure of web servers. The paper described system can provide full facilities to the website hosting provider and large business organizations. This system can provide continuous service though any system components fail uncertainly with the help of Linux Virtual Server (LVS) load-balancing cluster technology and combined with virtualization as well as shared storage technology to achieve the three-tier architecture of Web server clusters. This technology not only improves availability, but also affects the security and performance of the application services being requested. Benefits of the system include node failover overcome; network failover overcome; storage limitation overcome and load distribution.
Paper “Socially Aware Discovery Approach Supporting Service Composition” states that service composition provides a promising solution to integrate service components and business process, enabling cooperation with new partners. It increasingly relies on multiple service providers to fulfill a given complex business goal. Despite significant progress, most approaches of service composition are still impractical and almost unusable, because the current methods of service composition lack consideration of interaction among service providers. With the increasement of providers and services, it becomes difficult to find the required services in the distributed computing environment. This work addresses such issue and suggests metrics to discover the relationships of service providers by accounting of recent service interactions.

The paper “A Formal Method of CPU Resources Scheduling in the Cloud Computing Environment” presents a formal method of CPU resources scheduling (FRS). VMs are divided into three resources statuses according to resources requirements and their run information. FRS scheduling is formally scheduling CPU resources according to the resources statuses.

In the paper “Virtual Machine Allocation Policy in Cloud Computing Using CloudSim in Java”, proposed a model for dynamic load balance policy with considering different attributes and different service level agreements in cloud computing environment helps this environment to utilize their resources and improves performance. The proposed model uses Hungarian algorithm and the result is verified by simulating this model using CloudSim.

Paper “Simulation Study on Parameters of SLF Chaotic Neural Network Model” presented a novel chaotic-neuron model by introducing the non-monorotonous activation function which is composed of the Legendre function and the Sigmoid function. The reversed bifurcation of the chaotic neuron model is given and analyzed, meanwhile, how do parameters influence the network convergence speed is discussed. Based on the neuron model, the piecewise simulated annealing SLF chaotic neural network was made by introducing the simulated annealing idea, the model improve the convergence speed, at the same time, the precision of this network have not being influenced.

Authors of the paper “Performance Evaluation of Efficient Routing Protocols in Delay Tolerant Network under Different Human Mobility Models” study and analyze performance of well-known PROPHET and Spray and Wait routing protocol, under different human mobility models such as Truncated Levy Walk mobility model (TLW), Self-similar Least Action Walk (SLAW) and Random way point (RWP) model. The MATLAB simulator is used in order to analyze the performance of these routing protocols.

In the paper “Verification Method of Real-time System Based on Refinement Relation” presents a new real-time system verification method, it takes the deadlock timed Büchi automata as the medium, and translates the timed temporal logic into timed communicating sequential process language. The tock event is also joined, which can be directly used for the detection of refinement tool FDR. The method verifies the situation of deadlock. To establish the link between the conventional model checking and refinement model checking can well combine the advantages of both and improves system security and reliability.

In the the paper “An Improved K-means Algorithm based on Mapreduce and Grid” the traditional K-means algorithm is improved to solve the problems. The improved method is divided into the same grid in space, according to the size of the data point property
value and assigns it to the corresponding grid. And count the number of data points in each grid. Selecting M(M>K) grids, comprising the maximum number of data points, and calculate the central point. These M central points as input data, and then to determine the k value based on the clustering results. In the M points, find K points farthest from each other and those K center points as the initial cluster center of K-means clustering algorithm. At the same time, the maximum value in M must be included in K. If the number of data in the grid less than the threshold, then these points will be considered as noise points and be removed. In order to make the improved algorithm can adapt to handle large data. They will parallel the improved k-mean algorithm and combined with the MapReduce framework.

The paper “Zero-watermarking Algorithm for Medical Volume Data Based on Legendre Chaotic Neural Network and Perceptual Hashing” proposes a robust zero-watermarking algorithm for medical volume data based on legendre chaotic neural network and perceptual hashing. The algorithm is based on three-dimensional discrete wavelet transform frequency analysis features, which uses perceptual hashing technique to extract medical volume data itself feature vector in order to structure robust zero watermarking. And using legendre chaotic neural network to generate chaotic sequence to enhance the security of the watermarking. The algorithm achieves a combination of legendre chaotic neural network encryption and zero-watermarking technology, which can improve the medical volume data watermarking algorithm security and robustness.

The paper “A Cloud Platform for the Integration and Optimizing Allocation of High Quality Teaching Resources based on the University-led Collaborative Innovation” build an integration and optimizing allocation cloud platform of high quality teaching resources for universities-led collaborative innovation using SOA architecture and cloud computing, to meet the resource requirements of universities based on the analysis of basic concept, types, core process, and evolution characteristics of university-led collaborative innovation following the inherent laws of university-led collaborative innovation, and then analyze the construction concept, logical architecture and main functions of the platform. Finally, they provide a series of suggestions to the relevant universities and government departments to effectively promote the smooth implementation of the university-led collaborative innovation activities and the integration and optimizing allocation cloud platform of high quality teaching resources for university-led collaborative innovation.

The Authors of “Research on Logistic Scheduling Problem with Fuzzy Time Window” study the problem of logistic scheduling problem with fuzzy time window, construct mathematical model, and propose double objective function method. In the solution process, for the feature of the double objective functions, use the phased. In the first phase, use the chaos PSO to get the optimal solution. In the second phase, use simulated annealing algorithm and the preliminary solutions got from the first phase to solute the objective function.

The paper “Research on Task Scheduling Convergence Non-Dominated Sorting Method in Cloud Computing” constructs a population of convergence non-dominated sorting method. This method is based on non-dominated sorting method; the use of distributed estimation method is improved by four steps to complete the task order scheduling.

The paper “A Workload-aware Resources Scheduling Method for Virtual Machine” presents a workload-aware CPU resources scheduling method (WARS). WARS uses the allocated credits and consumed credits to diagnose the CPU resources requirements of
VMs and dynamically adjusts CPU resources according to the requirements of VMs. The adjustment of CPU resources is converted into increased or decreased weights of VMs.

Paper “Study on Different Representation Methods for Subspace Segmentation” focuses on the performance comparison of different subspace segmentation algorithms currently used in handling subspace segmentation problems and views other conventional methods that can be applied in this field.

“THEMIS: A Mutually Verifiable Billing System for the Usage of Cloud Resources in Cloud Computing Environment” Proposes a secure and non-obstructive billing system called THEMIS as a remedy for these limitations. The system uses a novel concept of a cloud notary authority for the supervision of billing. The cloud notary authority generates mutually verifiable binding information that can be used to resolve future disputes between a user and a cloud service provider in a computationally efficient way. Even administrator of a cloud system cannot modify or falsify the data.

In the Paper “Cloud Computing and its Environmental Effects” different strategies have been adopted to control this problem. Virtualization technique is being utilized to control the problem of energy consumption and emission of carbon dioxide gas. So many techniques regarding to virtualization like live migration of VM, Dynamic Resource Allocation of different resources, virtualization of network resources like routers, routing protocols, virtualization of hardware resources like server, storage, memory and other devices. An effort is being exercised to reduce the problem of carbon emission and energy consumption of cloud computing to large extent.

Paper, “Survey Paper: Location Management in CDMA Network” tried to highlight the different location management techniques and paging schemes that are used in CDMA network. This paper also compares their features, merits and demerits. Finally the paper discusses various techniques that are used in order to optimize the location update schemes by categorizing them into two broad groups’ i.e. static location update and dynamic location update. Each group enlists different techniques that are used to decide the update frequency of MS (Mobile System).

The paper “Power Saving Strategies in Green Cloud Computing Systems” analyzed various energy saving strategies in data centers and cloud computing environment. Various energy effective strategies should be implemented in data centers to make an eco-friendly data centers. Cloud computing is effective only if energy consumed in servers are saved. Task consolidation especially in cloud computing has become an important approaches to streamline resource use and improve energy efficiency. Energy saving strategies saves a sufficient amount of power and of course cut down the cloud footprint.

February 2015

Editors of the February Issue on
International Journal of Grid Distribution Computing