Foreword and Editorial

International Journal of Multimedia and Ubiquitous Engineering

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

This issue contains 39 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 “Analysis on Fairy Tales in Terms of Exhibition Material for Exhibitions at Literature Museums” studied fairy tales which have the strongest attraction motivation were selected among the literature genre in consideration of future viewers of literature museums, and their storytelling characteristics and then how to apply them into exhibition planning was contemplated.

Paper “The Design and Implementation of Real Time Encoder System” designed and implemented a next-generation solution for the Internet Broadcasting system applying FlashVideo. Compressing HD Class images in real time currently being broadcast in the field, this is a system that can service VOD as well as Internet live broadcasting, which is a solution that supports the operation of Internet Live broadcasting, VOD service and UCC service easily online. It is a system that supports real time streaming of MPEC4 and WMV images on the Internet or Smartphone by compressing camera and VOD images using H264 Codec in real time, which is first, the first real time encoder system in Korea with the real time recording feature of camera images and a software product that supports the up-to-date Codec technology suitable for the Web and Smartphone environments. Second, it is a two-way Internet broadcasting system that can play videos with an MP4 player and support user chatting and customizing. Third, the Contents Management System (CMS) feature can service streaming of video contents and lecture management contents in real time through Android phone or iPhone.

The paper “Proficient Energy Consumption Aware Model in Wireless Sensor Network” focuses is on energy aware model of wireless sensor networks in which each sensor node randomly and alternatively stays in an active or sleep mode. The active mode consists of two phases, the full-active phase and the semi-active phase. When a particular sensor node is in the full-active phase of the active mode, it may sense data packets, transmit the sensed packets, receive packets, and relay the received packets. However, when the phase of the sensor node switches from the full active phase to the semi-active phase, it is only able to transmit/relay data.

In the paper “Virtual Sender-based Message Logging for Large-scale Ubiquitous Sensor Network Systems”, presents a scalable virtual sender-based message logging algorithm to solve this problem by enabling the broker elected in a group of nodes as virtual sender to localize both of the logging and recovery procedures to a maximum. It shows how this
algorithm can guarantee the system consistency in case of sequential failures and perform better than the conventional one in terms of message overhead.

The Authors of “Broadcast Protocol Guaranteeing Causal Delivery Order Consistency Condition for Social Networks” present deadline-constraints causal order protocol respecting \( \Delta \) (lifetime) based on P/S architecture for broadcasting in real-time collaborative applications in social networks to guarantee causally ordered messages delivery from brokers to subscribers. In the proposed protocol, every broker manages a 2-dimensional vector, representing its knowledge of the last message sent by each broker at time \( t \). But, every broker disseminates a broadcast message only with one scalar variable, the time-stamped information that represents the maximum gossip round and is the deadline (lifetime) of the immediate message of it, to subscribers because all messages disseminated by brokers have the same lifetime as the maximum number of gossip rounds.

Paper “Research on Model of Distance Education System Based on SIP Protocol” proposed the model SIP-based distance education system with three centralized servers are constructed and the corresponding topology structure. The mechanism and education function of the model are embodied and realized through several aspects, such as distance class creation, participation and termination, state information notification and education resource control.

The paper “Provisioning of Context-Aware Augmented Reality Services Using MPEG-4 BIFS” present methods for supporting such functionalities using the Binary Format for Scenes (BIFS) technology standardized by the Moving Picture Experts Group (MPEG).

The paper “Reducing the Student's Stress from Studying by Personalized Brain Music Training” implement an EEG based music therapy. Music therapy can help the student deal with the stress, anxiety and depression problems. To do so it will develop EEG-based human emotion recognition algorithm. Proposed training program works as a therapist. The music choice and duration of the music is adjusted based on the student’s current emotion recognized automatically from EEG. If the happy emotion is not induced by the current music, the system would automatically switch to another one until he or she feel happy. Proposed system is personalized brain music treatment that is making a brain training application running on smart phone or pad. That overcomes the critical problems of time and space constraints of existing brain training program. By using this brain training program, student can manage the stress easily without the help of expert.

The paper “Multi hop mechanism used in energy saving for multimedia file transfer in school education system” proposes a new method to improve the data transfer speed in education network system. The method is based on multi hop mechanism, but it is different from multi hop mechanism in WSN. The method firstly uses PSO to divide the whole education system into more than one subsystems, and then ACO is used to find the fastest path to transfer the data package. In the path searching period, the ant would go to center computer and vice computers along paths with the fastest speed and the path would be more than one to improve the data transfer speed.

The paper “HMM-Based Distributed Text-to-Speech Synthesis Incorporating Speaker-Adaptive Training” proposed a hidden Markov model (HMM) based distributed text-to-speech (TTS) system to synthesize the voices of various speakers in a client-server framework. The proposed system is based on speaker-adaptive training for constructing
HMMs corresponding to a target speaker, and its computational complexity is balanced by distributing the processing modules of the TTS system at both the client and server to achieve a real-time operation. In other words, fewer complex operations, such as text inputs and HMM-based speech synthesis, are conducted by the client, while speaker-adaptive training, which is a very complex operation, is assigned to the server.

Paper “Virtual Farmers Training: Realistic Simulation with Amusements using Historic Simulation and Game Storyline” present realistic farming trainer for experiencing crop cultivation and livestock breeding simulation. Farming simulation utilizing game experience has been presented by various formats but current researches have not presented balanced farming experience and amusement to users. It achieved both education purpose and entertainment feature by realistic farming trainer using historic simulation and gaming elements. To achieve realistic educational purpose, it implemented realistic farming simulation using historic simulation, which covers last ten years of weather, disease, and other factors.

The paper “An Improved Random Walk Based Community Detection Algorithm” presents an improved community detection algorithm based on random walk. Based on the basic understanding that people getting together often relies on their common interests, node similarities are initially calculated with node attributes and iteratively updated based on the random walk model. Meanwhile, node importance is computed to represent how much it can influence other nodes, based on which some important nodes are selected as seeds for community clustering. As for overlapping community detection, some construction is made on a given social network.

Paper “The Enhancement of Presence with Respect to Moving Images” measured individual emotions and sense of presence. This is measured by two methods, a questionnaire survey and electroencephalography (EEG), in order to obtain objective data. EEG brain signals were measured when participants looked at the moving images. The psychophiology test results of questionnaire survey and EEG for the figurative images were good. In this paper it revealed that the concept of presence is a psychological and physiological reaction related with the individual emotions to the images and that EEG signals can be used as one of the important tool for the visual arts.

Paper “A Design of BCI based Environment System for Immersion of FPS Game” present a methodology about BCI (brain computer interface) based environment system for immersion of FPS game play. FPS (First-person shooter) game is a video game genre centered on gun and projectile weapon-based combat through a first-person perspective, immersion is important factor in this game. FPS game designer effort to raise players immersion when make game using interface, graphic effect, sound etc. It implemented real-time game environment changing system using the BCI to raise the degree of immersion in FPS game. EEG is the recording of electrical activity along the scalp. It measure user’s EEG using MindSet for implemented game playing time to get user’s concentration rate. This value operates the environment system in virtual space. In virtual space, each player experience different environment situation because each player has various concentration rate. Implemented environment system is formed with alternation of day with night and weather. Human body condition is changed depending on day and night. Player can feel change of character’s condition via player’s condition by the system.
Paper “Surface Reconstruction from Gradient Fields Using Box-Spline Kernel” proposes a novel method, i.e. kernel gradient regression, to reliably reconstruct surfaces. The box-spline kernel, instead of the common Gaussian kernel, is deployed in surface reconstruction due to its compact support and parameter robustness. To the knowledge, this is the first time to prove the special box-spline function as a new kind of positive definite spline kernel. The target surface is recovered under least-squares sense from the gradient fields, by converting the reconstruction problem to its kernel representation.

The paper “Query Processing on OLAP System with Cloud Computing Environment” proposed Cloud P2P OLAP, which dynamically adds/removes instances to maximize expandability and usability. To make use of ROLAP’s flexibility and MOLAP’s expandability, lots of user-clients are used as distributed nodes, and cube caches are shared through P2P. The architecture including cloud systems and P2P together are newly proposed and proved to have better performance than general OLAP systems by experiments.

The paper “Information Entropy for Color Image Format Conversion” proposes a method which implements Shannon’s information theory on entropy evaluation and uses the results for weight decision. It assumes that there are two conventional methods, LA and ELA. Using Shannon’s information theory it obtained entropy values which are used as weights for choosing interpolation method. The original image is downsampled to be low resolution image, where it applies Shannon’s entropy evaluation equation.

In the paper “A Simplification Method of Terrain Modeling Based on Spatial-autocorrelation”, proposed a terrain simplified method based on the theory of spatial autocorrelation to solve the problem of three-dimensional terrain simplification in large-scale which was based on digital elevation model (DEM) data. The slope, a key factor for expressing the terrain features, has been taken into account in this method. According to principle of regional similarities in geomorphology is related to DEM data correlation, a cluster analysis was performed on the terrain data to get the thresholds distinguish terrain features. On the basis, the gradient-based distance-weighted method was adopted to fit elevation values of the center point and generated a new terrain mesh.

The paper “A Study of Nail Contents Design based on the Women’s Psychology and Emotion” aims to design a mobile app that can provide the most suited nail design for women’s condition based on the relational analysis of psychology and color choice. A designed app offers recommendations in comprehensive consideration of factors such as weather, season, women's psychology and preference toward color and texture and is customizable according to the matching analysis between expert's recommendation and customer's choice.

The Authors of “Finger Actions Sensing-Based Robot Motion Authoring System” proposes a finger actions sensing-based robot motion authoring system. Based on finger actions sensing and their recognition, the proposed robot motion authoring system allows users easily to create and control robot motion according to the number and events of fingers. Furthermore, the system can be used to simulate user-created robot contents in the 3D virtual environment. This allows the users to not only view the authoring process in real time but also transmit the final authored contents.
The paper “Estimation of Walking Direction Estimation using a Shoe-mounted Acceleration Sensor” proposes a method for estimating walking direction using a shoe-mounted acceleration sensor. Heel contact is determined from the negative peak of the acceleration magnitude, and foot inclination is calculated for estimating the horizontal acceleration. The stepping direction of each foot is calculated through principle component analysis along the horizontal acceleration. The walking direction is estimated by averaging consecutive left- and right-step directions. The proposed method was applied to out-door straight ground walking for 658 steps, and yielded a mean difference of 0.48° with a standard deviation of 1.98°.

The paper “Analysis and Countermeasure Research on Electronic Resources Utilization in Vocational College” puts forward the corresponding countermeasure on how to improve the utilization of electronic resources in vocational colleges in an attempt to push on the promotion and utilization of electronic resources.

The paper “Personalized TV Contents Recommender System Using Collaborative Context tagging-based User’s Preference Prediction Technique” propose the context tagging-based user’s preference prediction mechanism by extending the widely known recommender algorithm, collaborative filtering (CF) in order to increase the user’s satisfaction about the recommender service. The development of the prototype system shows the usefulness of proposed mechanism. And the experiment confirms that the proposed mechanisms improve the recommender system.

Paper “Raw Data Recovery from Pulse Code Modulation Pieces in the BitTorrent Environment” propose an original content recovery technology based on Pulse Code Modulation pieces obtained from the CD ripping of music held by leechers. The proposed technique uses a correlation-based method that exploits the similarity of music. It verified that the proposed algorithm could recover pieces of files by comparing the output value of a correlator with that of the input piece, using a number of wave file channels and 8/16 bits.

The paper “An Analysis Method about Change Region of Business Process Model Based On Action Pattern” construct object sub-model of business process model with labels based on the analysis of behavioral profile of Petri net. A method is proposed to determine change region and the smallest change region based on the concept of action pattern.

The paper “Enhancing User-friendliness of the User Taste Prediction Service Using MapReduce Framework” introduces a user taste prediction service using big data for improving user-friendliness to a maximum. The proposed service predicts the user's taste using big data such as Twitter and blogs. It is possible to predict the exact user's preference and might recommend more suitable contents to the user's taste because it predicts the user’s taste using big data with a variety of user's social network information. So, it can recommend contents that match the user's taste.

Paper “A Temporal Reasoning based Social Calendar Framework” describes a framework to answer those requirements. Using the standard interoperable calendar data format - iCalendar as calendar representation, the framework compiles the event information into an internal network structure, and incorporates a MapReduce consistency algorithm - that makes the framework suitable for large scale data processing in social network context.
Paper “Characterizing Interference Model for Wireless Mesh Networks” studies the extent problem of interference, which spreads the trials of channel re-assignment toward neighbor mesh routers. In particular, the extent of interference causes additional throughput degradation when compared to a pair-wise interference to a small fraction of the links. This implies that the pair-wise interference measurements may be optimistic when used to drive protocols in wireless mesh networks. It newly defines an analytical model, which is referred to as a ripple effect problem. The defined model is a formal model of interference to estimate the maximum rate at which flows can safely send traffic without overloading network. The proposed model can exemplify how protocols should take the extent of interference into account.

In the paper “A Intelligent English Situated Learning System based on Signboard Information”, proposes an intelligent English situated learning system that can practice situation context learning more reasonably using a location-based service and a recognition technology that automatically recognizes text information on street signboards that are easily accessible in everyday life, yet provide learners with a lot of information. The proposed system provides learners with English conversation learning contents that can be used in the business sector related to trade name recognized through text information on street signboards from images captured by cameras.

The paper “A Study on Efficiency of ISMS for ICS with Compliance” deals in finding out subsidiary security index that can help enhancing the efficiency of existing ISMS, especially for ICS-ISMS. All data and assumptions were rest on questionnaire collected from national infrastructure. Specifically, this paper focuses on 8 operational centers of thermal power generation. Through the analysis, the effectiveness of PDS index was proved successfully. Nevertheless, there are hidden variables the author could not catch, and it restricts only on thermal system. With efforts on eliminating errors and exceptions, PDS index can be applied to any field that has unique characteristic (organizational and technical) such as ICS.

The paper “Emotion, Discretionary Behavior, and IT Effectiveness” propose a conceptual process model which not only provides an explanation of how emotion affects IT effectiveness and why simply IT use may not always lead to IT effectiveness, but also reveals the areas for further research to better understand IT effectiveness and IT use such as developing the measurement items for discretionary cooperation behavior and discretionary resistance behavior, analyzing the emotion antecedents of such discretionary IT usage behaviors and the moderators between emotions and discretionary IT usage behaviors.

The Authors of “Location Recommendation System Using Big Data” design and implement test with data which is Big Data of writing of SNS user to make it useful information. The result of this test performed 10 times showed a probability of 61.9% success rate.

The paper “The Openness to Cultural Understanding by Using Western Films: Development of English Language Learning” determined students' interests on: 1) film selections, 2) group discussion and exams, and 3) continuous learning using western films. The results indicate that 1) they were likely to be more confident and expressive when stories have easy sequence of events that may help them organize opinions well for effective communication; 2) characterization spoke about their present situation, and that gave them enough knowledge about future's life; 3) they were likely to be more interested to join discussions and other types of classroom activities because film selections or topics have abundant cultural inputs to
make them more logical in reasoning and decision-making; 4) they were likely to be more active due to the native or foreign speaker’s teaching techniques, accent, and diction that can better their learning and performance skills; 5) “thinking like a native speaker” technique could help them express their thoughts and feelings spontaneously and freely without cultural boundaries; 6) they were more motivated to learn English because grouping or pairing helped them compare and contrast the amount of their learning with other students’ as basis for improvement; 7) when a teacher seemed not strict, but rather helpful, they were likely to be more focused on completing any classroom activities; 8) they were assertive to participate in discussion and activity because theme, plot, characterization, and conflict involved in the analysis attracts them to better understand other cultures and their own culture; and 9) they were more attentive when a teacher gave challenging questions. Oxford (2012) believes that "when allowed to learn in their favorite way, unpressed by learning environment or other factors, students often use strategies that directly reflect their preferred learning." Consequently, this paper will serve as basis for needs or situational analysis for establishing language teaching inputs to develop students’ amount of language learning by considering their attitude of openness to cultural understanding between them and their teachers by using western films in a big class size.

Paper “Interactive Fractal Tree Generation Method having Multiple Clipping Volumes” proposes the extended environmentally sensitive L-system, which represents tree branches with multilevel and multimodal clipping volume. In order to model the garden tree structures, it proposed the rule of main-branch and growth-area-variable in the L-system. If the main-branch moves one clipping volume into another in the growing process, branching in both volumes take place simultaneously. Growth-area-variable is used to control the volume checking. It also designed new parametric L-system for leaves. This designed L-system generated various shaped leaves from same rule by changing parameter value. The modeling system provides the UI to organize the clipping volumes interactively. The proposed tree modeling technique makes it is possible to model multilevel and multimodal topiary.

The paper “Application of Reverse Engineering based on Computer in Product Design” described the application of reverse engineering in product design and development; effectively solved the design and subsequent engineering design, manufacturing link disjoint problems; put forward a kind of using computer software Pro/Designer, Pro/ Engineer and SolidWorks seamless connection method in the process of product design; industrial product modeling design and the engineering and manufacturing of coherence have opened up a new way; the design process will provide effective measures for the product design system, so as to shorten the product design and development cycle and realize the product design system.

The paper “An Adaptive Fault Tolerance Running on a Cloud Computing Environment” explains the design of the AFT_CCE (an Adaptive Fault Tolerance running on a Cloud Computing Environment). The cloud computing environment distributes IT (Information Technology) resources and allocates according to user’s request, so there should be a study on technology that manages these resources effectively. An example of ubiquitous applications based on a cloud computing environment is a multimedia education system. Since ubiquitous applications based on a cloud computing environment need situation-aware middleware services and computing environment (e.g., resources) keeps changing as the applications change, it is challenging to detect errors and recover them in order to provide seamless services and avoid a single point of failure for a cloud computing environment.
The paper “Study on a Classification Model of Data Stream based on Concept Drift” proposes a new classification method for data stream based on the combined use of concept drift detection and classification model. The data stream classification model can’t adapt to concept drift problem to solve. Before the model classification, the use of information entropy to judge the data block concept drift, the concept of history to have appeared, the use of a classifier pool mechanism to save it, to makes the classification model has stronger resistance to concept drift.

The paper “A Model of Ecological Monitoring and Response System for Internet Public Opinion” built up an internet ecological monitoring and response system model, including public opinion monitoring information collection, analysis, and response modules, and discussed how to monitor and respond to internet public opinion, how to transform passive response to active research management, and make rational decisions, not emotional decisions based on the theory of internet public opinion ecology system’s constitutes.

In the paper “Maximizing Throughput of Cluster-Based WBAN with IEEE 802.15.6CSMA/CA”, considered a cluster-based meaning two hops technic based on network topology of WBAN. In cluster-based WBAN, a cluster header (CH) forward the received data packet from a sensor to the coordinator, therefore, an over concentration that is a reason of deterioration of performance, can be avoided and then the performance of system is improved. However, the optimal access probability that can achieve the highest throughput is changed depending on a number of clusters.

May 2014

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Editors of the May Issue on
International Journal of Multimedia and Ubiquitous Engineering