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 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 “Motion Recognition based on Sparse Representation and 3D Spatial–Temporal Feature” studies the emergence of a large number of databases for capturing 3D human motions which has made the efficient analysis and processing of human motion data to effectively use these databases a new challenge. To reduce high-dimension complexity, a dimensional feature based on the 3D spatial–temporal characteristic should be extracted from human motions. Moreover, the motion data should be re-expressed by sparse representation to realize the projection from high dimensional data to a low-dimensional subspace. The different motions should then be recognized and classified to obtain the automatic recognition and automatic retrieval of 3D human motions.

Paper “Brightness Compensation Investigation for Power-Efficient System” presents brightness compensation and enhancement method for power-constrained condition. The proposed method is useful for low-power device. It assumed two conditions: half and quarter power-consumption. It compares two brightness enhancement methods in scenarios, histogram equalization and contextual and variational contrast enhancement methods. Both methods are contrast adjustment approaches using the given images histogram. Simulation results thoroughly report objective and subjective performance.

The Authors of “Investigation of an Analytical Model Based on Resource Factor for Vertical Handoffs” proposes an analytical model for evaluating the VHO performance. In the model, resources are proportionally assigned to real-time services (RS) and to non-real-time services (NRS) by a resource factor m, which can be defined as any value. The performances on blocking probability and on throughput are derived and evaluated with different values of m under the restriction of resources. For enhancing the effect of VHO, the Random Waypoint Model on the border (RWPB) is implemented in the simulation, which enforces the mobile users residing near the border of networks. Simulation results demonstrate that with a greater value of m, the blocking probability slightly increases while the total throughput is significantly improved.

Paper “Nonlinear Diffusion Filtering Method based on Wavelet Image” gives emphatic analysis represented by P - M model of diffusion filter principle of several kinds of nonlinear diffusion model, and their respective characteristics and problems on the basis of the anisotropic diffusion mechanism. In-depth analysis of the nonlinear diffusion model, the threshold and termination mechanism of combining image geometric structure feature and visual information (gradient, brightness, contrast, structural information), in view of the
existing nonlinear diffusion filtering model, the diffusion coefficient depends on the gradient and the problem that the susceptible to noise interference, presents a fidelity term used in image denoising and restoration contain nonlinear wavelet diffusion model, the theoretical analysis and experimental results show that this method is compared with other diffusion model while denoising can keep image edges and details characteristics, image visual effect is better.

The paper “MP3 File Identification Based on Concurrence Order of Metadata” investigates applicability of metadata to identify music contents in MP3 file. Metadata in MP3 include information associated with music contents such as a table of Hoffman code, scale factors, stereo types. It considers music contents in MP3 file as a function of metadata. In order to identifying a MP3 file, it used a concurrence order of metadata. It assumed that MP3 files with other music contents have other concurrence orders in their metadata. In experiments, we extracted metadata from MP3 files and rearranged metadata as column vector of matrix. The rearranged metadata were analyzed various numerical analyses such as singular value decomposition.

The paper “Analysis of Forest Fire Spread Trend Surrounding Transmission Line Based on Rothermel Model and Huygens Principle” presents a method based on Rothermel model and Huygens principle to analyze forest fire spread trend surrounding transmission line. Firstly, the principle of forest fire spread and the influence factors of the forest fire spread around transmission lines are analyzed. Then, based on Rothermel model and Huygens principle, the forest fires spread trends under three different conditions are simulated. By taking a transmission line of power grid in Shanxi Province as an example, the simulation is implemented and works out the average velocity and the consumed time during the forest fire spread from fire point to the transmission line under three different conditions. The result shows that the method is reasonable and valid.

The paper “Robust Speech Detection using SEM and SFN” proposed a robust speech detection method in noisy environments using a SFN (silence feature normalization) and SEM (speech energy maximize). In the high signal-to-noise ratio for the proposed method was used to maximize the characteristics receive less characterized the effects of noise by the speech energy. Cepstral feature distribution of speech and non-speech characteristics in the low signal-to-noise ratio and improves the recognition performance. Result of the recognition experiment, recognition performance improved compared to the conventional method.

The paper “A Traffic Aware Routing Protocol for Congestion Avoidance in Content-Centric Network” proposes a traffic aware routing protocol for congestion avoidance in Content-Centric Network (CCN). The proposed routing protocol considers rapidly increasing traffic in the situation and establishes another routing path to avoid increasing traffic problem in CCN.

Paper “Cloud Security Mechanisms for Data Protection: A Survey” focuses on various security concerns and mechanisms of cloud computing that are provided in the enterprises and also discusses few of the common security mechanisms like authentication, authorization, encryption and access control.

In the paper “Design and Implementation of a Context Aware Contents Service Model in Mobile LMS” aims to design and implement a context aware service model that can collect and process learners’ learning context in real time on mobile LMS. And provides elaborative
knowledge organized by teachers based on the learners’ context recognized using various types of context aware information collected from the learners’ mobile device. With the outcome of this study, it expect to enhance the timeliness of learning by providing contents of education organized in advance by teachers at any time and in any place, even without the learner’s request.

Paper “Denoising Algorithm in Fresnel Transform Domain for Electronic Holographic Video System” proposes a new denoising algorithm for digital hologram using Fresnel transform (FT). The proposed algorithm initially transforms a digital hologram into frequency-domain data through a FT, and separates the object from the background in the transformed image. Experimental results show that the technique to reduce noise in a natural 2D image such as a smoothing filter can reduce the noise to improve the image quality for a digital hologram. It expects that the conclusions of this paper will be a very useful technique for further work in the area of signal processing scheme for electronic holographic video service.

Paper “A Novel Multi-view Three-dimensional Visual Measurement Method Based on Hexahedron Targets” proposes a highly efficient and accurate technique for point cloud registration, which can acquire the whole surface information of the measured piece without the help of other locating equipment. The new technique solves the problem that the measured surface cannot be placed with index points. Furthermore, this technique ensures the registration accuracy without any other apparatus.

Paper “One Color Extraction Method in Representation Techniques of Video Production” aims to get an effective marketing strategy in terms of business by introducing combined social video marketing and color marketing techniques. The method for research is in the range of research that implements highlighting techniques by extracting the core color and brand monochrome image, to analyze the specific process. The expected result is that the effects can contribute to the development and the activation of company or social video marketing of brand by using the new video production technique. Also, this paper expects this new way of expression and editing technique cause furthermore attempts on black and white in video making technique.

The paper “SPTF: Smart Photo-Tagging Framework on Smart Phones” proposes a new architecture in terms of Smart Photo-Tagging Framework (SPTF) to manage the substantial number of photos taken by smart phones. In particular, SPTF collects the ambient data obtained from various embedded sensors on a smart phone when a photo is taken. After processing and analyzing the ambient data, SPTF can accurately record both the ambient tags and the face tags of the photo, which will be used for auto-tagging photos and searching photos. It also implements SPTF and verifies its effectiveness by conducting a number of realistic experiments.

The paper “Three Dimensional Analysis of Carving Front Turn of Alpine and Boarder-cross Snowboarder” deals with the three dimensional comparative analyses of the carving front turn of alpine and boarder-cross snowboarders. The research aims to provide winter sports instructors and snowboarders with scientific and quantitative data for evaluation of carving front turn. To achieve the purpose, Alpine and Boarder-cross athlete from Korean National Team for 2018 Pyeongchang Winter Olympics were chosen as subjects. The proposed method and the results can be used as a reference for improvement of the training method and skills in snowboarding.
In the paper “Finding and Typing New Named Entities in Tibetan from Chinese-Tibetan Parallel Corpora”, the author describes a method for Chinese-Tibetan bilingual named entity recognition using easily obtainable bilingual dictionary and parallel political corpora. It presents two distinct steps for NER, one step identifying entity candidates in Tibetan, and the second step typing the entity into the semantic class. Then, it tests the approach on the dataset and gives the analysis of NE type errors.

The paper “Convergence of Gradient Descent Algorithm with Penalty Term for Recurrent Neural Networks” investigates a gradient descent algorithm with penalty for a recurrent neural network. The penalty considered here is a term proportional to the norm of the weights. Its primary roles in the methods are to control the magnitude of the weights. After proving that all of the weights are automatically bounded during the iteration process, it also present some deterministic convergence results for this learning methods, indicating that the gradient of the error function goes to zero(weak convergence) and the weight sequence goes to a fixed point(strong convergence), respectively.

Paper “A Model of Media Information Management for Content Retrieval” proposes a content-based multimedia retrieval data model and combined with the different modal data abstraction and decomposition classification thought, discusses the significance of this data model, also briefly introduces the building method of this model. And by combining this design, it implements a multimedia digital books data retrieval system.

The paper “Fast and Secure Session Mobility in IMS-based Vertical Handover Scenario” enhances SIP header in order to solve IP address-mismatch problem. That is, a SA setup scheme is proposed for pre-authenticated registration in WiFi-to-3G handover scenario. Also, it defines IMS handover delay as the sum of authenticated registration delay and session re-setup delay occurring under IMS-based vertical handover. It finally shows that this delay reduced by the proposed scheme is acceptable enough to provide delay-sensitive real-time services. Moreover, the modification is deployed only at MH and P-CSCF, which is independent of other party’s network as well as the CSCFs in MH’s HN (home network).

The paper “A Novel Algorithm for Image Copy-move Forgery Detection and Localization based on SVD and Projection Data” presented a Novel approach for image copy-move forgery detection and localization based on SVD and Projection Data. Experiment results demonstrate that the proposed algorithm can effectively detect multiple copy-move forgery and precisely locate the duplicated regions, even when an image was distorted by Gaussian blurring, JPEG compression and their mixed operations.

The paper “Development and Application of Blended Teaching and Learning Model Using American Television Programs”, attempts to overcome problems of students’ negativity and indifference with General English education by developing a conceptual blended learning model which derives a procedural model applying audio-visual materials to foreign language learning. This paper confirmed its effectiveness on students’ affective attitudes to the level of statistical significance between the experimental and the compared group. The result shows that the model indeed contributed to the positive changes in the affective attitude of the experimental group to an intermediate and high level of positive running 3.5 and beyond. Finally, the procedural model that underwent modification of the items scored relatively low and a final procedural model was proposed.
The Author of “LED Bio-friendly Development of Fungal Skin Treatment Device” establishes a work to examine which LED fungal treatment device can be applied to the face. Several methods were used for that purpose. More specifically, 240 50mA low-power LED chips were selected. As a result, a light distribution angle of 150 degrees was possible, and the temperature could be adjusted in the range of 27-32 degrees for fungal treatment (acne), making the device suitable for use. The results show that face use possible factor is more common than initially expected. Moreover, further investigation of the decreases in the angle for standardization of the temperature is required.

The paper “Research on Competitive Swimming Sports based on Optimal Control Theory” build the model of both kinetics and energy transformation through the analysis of features of short-distance competitive swimming sports. On the prerequisite of a series of rational hypotheses and restrictions, the optimal analysis is performed about the distance in a given time frame with the application of the theory of optimal control. The optimal solution to propulsive force is deduced with reference to Olympic champion and experimental results by former researchers. The three-phase optimum speed distribution strategy is proposed, in good agreement with actual situations.

The paper “Security Data Auditing based on Multifunction Digital Watermark for Multimedia File in Cloud Storage” define specially a provable data possession model for multimedia file, and present a framework based on digital watermarking for multimedia data storages audit service, in which it analyze the security features of audit service for multimedia data outsourcing and the corresponding properties of digital watermarking. Moreover as an example, it present a provable data possession scheme based on double function self-embedded digital watermark, which integrate image content audit service and copyright protection.

Paper “Readability Visualization for Massive Text Data” verifies effectiveness of visualization through the test of the case studies. The paper also includes case study findings that readers can have readability information not from independent texts, but from the comparison of previous texts, and therefore it becomes easier to accommodate difficult level of new books.

Paper “Implementation of both Spatial Diversity and Spatial Multiplexing Technique in MIMO-OFDMA Communication System” introduces MIMO combined with OFDM with prior importance in future wireless communication system. In this paper, a MIMO-OFDMA system with both the advantages of Spatial Diversity and Spatial Multiplexing is suggested.

In the paper “A Study of Savings of Power Consumption and Server Space through Integrated Virtualization of UNIX Servers”, introduces server integration & virtualization technology which is used to save power consumption and space and reduce maintenance cost. In this paper, old six UNIX servers were integrated into two in the virtualization process of UNIX servers, in which one partition (DLPAR) per server was created, and more than three DB instances were generated in the created partition for DBMS. As a result, multiple physical servers were made as integrated virtualization servers which ended up solving the space problem in a computer room, securing a rack space and increasing the efficiency of a thermo-hygrostat. More specifically, the server integration & virtualization process brought about the following saving rates: 72% of rack space (U) in a computer room, 90% of power (W), and 59% of cooling (BTU).
The paper “Design of UPS Battery Remote Monitoring System” introduces UPS battery remote monitoring system based on MSP430 single chip microcomputer design, using modular thinking as the core to build the overall structure, to realize the battery voltage, current and temperature of the online real-time monitoring through the acquisition module in the aspect of hardware, and puts forward resistance measurement method that based on ac injection method and phase lock amplifying method.

The author of “Feature Points Extraction for Camera Tracking in Augmented Reality System” studies the natural features from images do not use the specific markers or reference points proposed augmented reality system. This process is generated through the corresponding points for two-dimensional plane to obtain the homograph information to get the camera matrix is a 3-D object matching. The proposed system to put the game on algorithm-based augmented reality, natural feature points of the game will be implemented.

The Authors of “Modeling and Application Research on Customer Churn Warning System Based in Big Data Era” attempts to explore for mass security customer data and to focus on analysis and design on customer churn warning model based on data mining technologies and the theory of customer churn management process.

The paper “Virtually Separable Block Management in Flash Storage System” proposes virtually separable Block management scheme for Flash storage system by introducing new common command interface and separable Block management in FTL. The experimental results show that the proposed scheme increases IO performance, as well as reduces flash-internal overhead.

Paper “Gamma Calibration and Phase Error Compensation for Phase Shifting Profilometry” studies the Gamma calibration method expressed as Fourier series and binomial series theorem is proposed to reduce the measurement error caused by the Gamma distortion. In the experiment, results shows that Gamma calibration reduce the maximum phase error of absolute phase by 75.0%. After the linear least square compensation, the maximum phase error is only 5.9% of without any Gamma calibration or phase compensation. The reconstruction surface of a complex curve surface is hardly any waviness, which is clearly noted in the reconstruction of the same tested object without any correction or compensation.

The Authors of “A Haptic Gaming System for Tactile Textures and 3D Shapes Discrimination” proposes a haptic gaming system which can contribute to improve the ability for discerning tactile textures and 3D shapes by using force and tactile feedbacks of the users’ fingers. The haptic gaming system consists of three games: “Haptic Puzzle” for tactile texture cognition, “Shape Puzzle” for 3D geometric object cognition, and “Position Puzzle” for 3D space cognition. Through a number of experiments, it confirmed the effectiveness of the system on enhancing the tactile textures and 3D shapes recognition. The final experiment demonstrated that the visuo-haptic integrated recognition was more advantageous than single haptic recognition.

The authors of “New Causally Ordered Delivery Protocol Using Information of Immediate Predecessor Messages between Brokers and Subscribers” present two versions of causally ordered delivery protocols based on P/S systems using gossip protocols. The one is that only the predecessors immediately before the multicast message are disseminated from brokers to subscribers. And the other, specifically for P/S systems of WSNs, is that the timestamps that
represent the gossip round in which the immediate predecessors are generated are disseminated from brokers to subscribers. The features of these two versions might be highly scalable and suitable for the area of the applications requiring only the minimum causal information with flexible consistency.

Paper “Forecasting Mobile Internet Diffusion Trend Based on Optimized Bass Model” proposes a method which is based on Bass innovation diffusion model. To solve the problem that the parameters of the model are difficult to estimate, a modified particle swarm optimization algorithm (PSO) whose inertia weight changes dynamically is introduced to search the most precise parameters. The application of the index of population density helps determine the convergence status of population. When the algorithm is trapped into local optimum, the combination of Cauchy mutation and Gaussian mutation is applied on the global best particle. The results of the experiment show that optimized Bass model is suitable for predicting mobile Internet diffusion trend and the proposed algorithm can effectively improve the precision of the optimal solution as compared to existed estimation methods.

The Paper “Social Clustering-based Similar User Indexing for Large Recommender System” proposes social clustering-based similar user index to not only improve the prediction of recommendations, but also compose personalized recommendations in fast. Through the experimental result, it shows that proposed clustering method is more accurate than k-means which is prevalent clustering techniques and reduces computation time needed for composing recommendation. That is, proposed clustering-based indexing method improves the performance of recommender systems which deals with a very large data.

The authors on “A Decision Support System for Joint Emission Reduction Investment and Pricing Decisions with Carbon Emission Trade” propose a decision support system (DSS) integrating the proposed model and the analysis which is developed as an efficient decision tool to help manufacturers and retailers to optimize their decision. The visualized outputs of DSS allow the decision makers to gain better understanding the impact of carbon emission trade on decisions, facilitating their decision making process in carbon economics era.

The paper “The K-Partition Flash Code with BIFC-based Sharing and some variants” introduces the K-Partition Flash Code (KPFC) with BIFC-based sharing and explores some of its variants. KPFC is a coding scheme that involves a sharing mechanism within partitions of a flash memory block. The technique was designed to allow more cell writes to flash devices in order to improve its performance by lowering its write deficiency. Computer simulations were conducted to estimate the average case performances of the flash codes.

Paper “Design of a Distribution Management System for IPTV Systems” introduces the design of a distribution management system for IPTV systems. In this study, the IPTV system should be open in that any authorized content providers are allowed to upload their content for circulation and any authorized distributors are allowed to circulate content. The distribution management subsystem of an IPTV system allows distributors to request for content circulation and system managers to process distributors’ requests and therefore makes the distribution management system is one of the most important subsystems of an IPTV system.
September 2014

Seoksoo Kim, Hannam University, Korea
Sabah Mohammed, Lakehead University, Canada

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