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 35 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 New Similarity Measure with Deformation Detection of Visual Salient Regions for Image Retargeting” proposes a new similarity measure with deformation detection of visual salient regions for image retargeting. According to the fact that the human visual system is sensitive to content changes as well as visual effect variations, the proposed approach combines content similarity and visual effect similarity. Firstly, a content correspondence between original and retargeted images is established, which aims to assess their content similarity. Secondly, deformation detection of visual salient regions between two images is conducted to measure their visual effect similarity.

Paper “A Study of Agricultural Meteorological Monitoring System Based on Wireless Sensor Networks” designed a dioxide, and applying the corresponding solution is really necessary. An agriculture meteorological monitoring system with ZigBee wireless sensor networks (WSNs) and wireless communication technology is designed in this paper. Sensor nodes are distributed.

The paper “E-Learning Development for Indonesian Traditional Music” motivated due to low interest of Indonesian people for learning of traditional music. So in this study I tried to design e-learning for learning of traditional music. E-learning is designed to make it easier for members to access learning materials anywhere and anytime. Learning materials are provided concerning theories in music, the history of traditional musical instruments, as well as equipped with a virtual musical instrument as a medium for member practices. The e-learning is one of Indonesia's culture introduction media to the outside world, particularly in the field of traditional music instruments.

In the paper “Optimal Control of Exhaust Recovery Generator System with Scroll Expander”, presents a novel exhaust recovery system with the battery. And then the scroll expander average model and power system dynamic model, the optimization function of exhaust recovery power generation system was constructed to optimize controlling the exhaust system. Combining with constraints acquired by exhaust flow pressure and the limitation of battery charge/discharge current, the scroll expander can be optimized for sake of the improvement of exhaust recovery efficiency. It can be judged the work mode of battery energy system in real time according to the generator output current and load current.

The Authors of “Study on joint speech encoding technology based on compressed sensing” proposed new joint speech encoding scheme based on compressed sensing. In this encoding
algorithms, the compressed sensing reconstruction and PCM (Pulse Coding Modulation) were
used for the speech signal encode. For the speech signal, the high frequency and low
frequency coefficients can be acquired by using the wavelet transform based on the lifting
scheme. For the details coefficients, using a hard threshold to remove the smaller coefficients,
the high frequency coefficients are sparse, so the high frequency can be reconstructed with
the compressed sensing method. Because the length of the low frequency coefficients is half
of the original signal length, the PCM complex of the speech signal can be reduced. Finally,
the speech can be approximately recovered with the low frequency PCM coefficients and the
high frequency compressed sensing reconstructed coefficients.

Paper “Study of HTML5 WebSocket for a Multimedia Communication” deals with the study
of WebSocket that aims to solve the problems of the conventional communication method,
though it has several restrictions. Therefore, in this study, experiments were conducted to
measure the performance analysis of WebSocket.

The paper “Speech Intelligibility Enhancement Using Convolutive Non-negative Matrix
Factorization with Noise Prior” propose a convolutive non-negative matrix factorization
method to improve the intelligibility of speech signal in the context of adverse noise
environment. The noise bases are prior learned with Non-negative Matrix Factorization
(NMF) algorithm. A modified convolutive NMF with sparse constraint is then derived to
extract speech bases from noisy speech. The divergence function is selected as an objective
function to get a multiplicative update of speech base and its corresponding weight. The
weights of prior learned noise bases are also updated in the update rule.

The paper “Implementation of UHD Interactive Media Art Work through Multi-touch
Interface” interface was recognized by receiving 2 touch inputs and as its system processing
result in order to implement 9K (8960*720, 3840*1080) image in real time, image of
7K(8960*720) was displayed and media art work was implemented based on cube type multi
display work of Gwangyang POSCO Technology Institute. UHD interactive media art
through multi touch interface enables user setting based on display bezel and it could be
utilized in a diversified way in the future.

The paper “Investigation of Modified PSO algorithm used in the solution of problems with
constraints and its application” propose a modified PSO. In order to avoid premature
convergence in the local search, trust region algorithm combined with PSO is used in the
calculation to adjust the inertia weight. When the particles began to search, inertia weight
would be adjusted to strengthen the global search capability. When the function is decreasing
at a certain value, the inertia weight should be adjusted to strengthen the local search ability.

The paper “A Study on the Properties of the Relation between Digital Computer Games and
Media Performance with a Focus on the Kinect Device” aims to examine the possibility of a
connection between the two fields and to explore the possibility of development through a
mutual interchange. In this sense, these two fields have common properties, and they interact
and allow the story to unfold within the frame of the virtual environment through the
independent actions of the actors. Therefore, it can be said that actors’ gestures and media
interactivity are the most important properties of digital media, and these play the important
role of connecting the notions of digital games and the performing arts. Moreover, as the
body of the player or performer works as an interface and manifests the most basic
interactivity, this becomes an important notion in understanding the similarities of the two fields.

Paper “Multi-sensuous Mediator: Evolutionary Interactive Art through Network” created randomly connected structural environment of network by manufacturing multi-sensuous mediator that gives emotional immersiveness (flow) to the audiences. And audiences are making an advanced network by a process of generation, extinction and consolidation of community through a system. By storing multi-sensuous mediator in information of random majority, created customer information sometimes becomes extinct by other customers and it passes through a consolidation process in a process of a sharing activity.

The paper “Research on Multi-Core PC Parallel Computation Based on OpenMP” explored technique of parallel programming on multi-core computers. First, the OpenMP standard which is an application programming interface (API) on parallel programming model of shared-memory is introduced and an overview of a set of compiler directives and a library of support functions are given. The OpenMP programs requires an OpenMP-compatible compiler and thread-safe libraries, therefore, both Intel C++ compiler 9.1 and Microsoft Visual Studio 2005 are perfect choices. Then, two-dimensional discrete fast Fourier transform (FFT) is studied by focusing on parallel program design, realization and optimization technology.

Paper “The Introduction of building a Cylindrical Multi Display System by Game Engine” conducted on the cylindrical multi display system which can maximize the experience of viewers in theme parks and experience theaters by extending the environment in which a viewer can concentrate his or her visual experience. For this purpose, this study has offered efficient results in terms of time and cost both by enabling the re-use of CG resources, easy updating and real-time image processing by the hardware rendering method that utilizes a game engine.

Paper “Research on User Customized Social Mobile Platform base on Personalized TV through IP Networks” provides to users who are using the SNS and IPTV platform a customized Social TV. The existing simple feature of security and Social TV, the user's preference by offering a decent TV channels, users would like to help to use the TV. In order to provide a suitable platform for customized Social TV, it use Hadoop MapReduce and by analyzing the words which users were looking for and recommended through the SNS, TV channel to give similar extent, television channels. Compare the information in descending order of priority of the 5 different TV programs. In addition, analyzing of the data is based on users and providing customized TV Schedule. Using smartphone, users can watch TV with the application of information in real time and users might change the order of the TV program channels.

Paper “A Parallelization Design of JavaScript Execution Engine” proposes a mathematical model to detect the dependency of serial JavaScript tasks and a parallelism execution algorithm for serial JavaScript execution engines. Moreover, the parallel JavaScript execution engine with thread-level speculation technology is implemented based on the SquirrelFish Extreme engine of WebKit. As the experiment were conducted respectively on the general test platform platform Sunspider in the industry and world top 15 websites at traffic volume, the results indicate that both in the real Web application and Sunspider platform, the parallel
JavaScript execution engines with 2 to 16 threads can raise the performance dramatically compared with a SquirrelFish execution engine with or without JIT acceleration, respectively.

The paper “Power Efficient Dynamic Source Routing Protocol” contributes Power Efficient Dynamic Source Routing (PEDSR) protocol, satisfying less power consumption from the viewpoints of nodes and network. To achieve the goal, first, it studied DSR protocol using performance and power aware metrics. Modifications are done on the Dynamic Source Routing (DSR) protocol by taking into consideration the outcomes of the pre-simulation, the existing feature of DSR for implementation of the design, and the previous research works done on DSR routing protocol by many researchers.

The paper “A study on Analysis of Key Success Factors of a Serious Game: In Case of “Anti-Aging Village” help for serious game design and could be the guideline for the development of serious game for elderly. This research method is so subjective and qualitative, so I complemented by using clinical trials and play test results and by interviewing twice a director of this game. After analyzing a serious game I found some key success factors as follows; first, they had understood enough the state of growing elderly population in South Korea and designed gameplay well for improving cognitive function for the elderly. Second, they organized a development team including some experts and made use of the feature as a RF (Radio Frequency) card. Third, they validated the effectiveness of a serious game through clinical trials and play test.

In the paper “Nonlinear diffusion filtering method based on wavelet image”, analyzes emphatically represented by P - M model of diffusion filter principle of several kinds of nonlinear diffusion model on the basis of the anisotropic diffusion mechanism and their respective characteristics and problems.

The paper “Sparse matrix of image denoising method based on SVD” expounds on the build process and mechanism analysis of the algorithm, the paper on the basis of the subjective evaluation reference peak signal-to-noise ratio (PSNR) as the objective evaluation standard. Can be seen from the results of simulation experiments for different kinds of image denoising, image sparse decomposition based on a complete atom library has a better effect of denoising algorithm often, this is because after complete the atoms in the dictionary has redundancy, to show more abundant characteristic information, can more effectively extract the image features. In the proposed algorithm, the K - SVD algorithm for image sparse decomposition to optimize dictionary and residual error than the threshold for accurate division of image information and provide evidence for image noise effectively, a combination of both in image denoising, especially in low SNR image denoising experiment obtained good effect.

The Authors of “A study on Light Embodiment Method through Technology Analysis of Light Art” studied researched works by artists who physically controlled light to create new visual forms and analyzed them. Also, this study analyzed and compared the AT Field_Paralyzed Sense I made with art forms of the same kind. AT Field_Paralyzed Sense is applied of technique which can visualize and shape the light into the plane. Also, through the plane of light embodiment, it visualized a three dimensional light structure.

The paper “Two kinds of digital video watermarking algorithm implement and compare” mentioned three-dimensional discrete wavelet transform and three-dimensional discrete cosine transform based on mean quantization algorithm of two kinds of robust digital video
watermarking algorithm, for the original video proceed three dimensional transformation and embedded watermark information into the approximation part of the important coefficient that by corresponding transform to original video so that the generated watermark has good robustness and invisibility.

The paper “Development of Smart Multiplatform Game App using UNITY3D Engine for CPR Education” spread CPR education to the public and to promote the effects of training using an app design that applied the gamification theory based on UNITY3D engine. The results of this study are expected to contribute to the advancement of the online smart SNG market through the promotion of the net functional effects of games by applying the gamification theory on various functional games, and by using UNITY3D to convert web-based games and contents into ‘IOS’ or ‘ANDROID’ and widely developing them into smartphone-use services.

The paper “A Network Coding-Based Reliable Multicast Routing Protocol for Efficient Data Delivery in Mobile Ad-hoc Wireless Networks” proposes a Network Coding based Reliable Multicast Routing Protocol, called CRMP, in mobile ad-hoc wireless networks. The proposed CRMP has the following novel features: i) it builds a stable mesh structure to improve coding and decoding opportunities, ii) it uses random linear network coding to simplify coding algorithm, iii) it has a local route repairing mechanism to prevent decoding failures caused by local route breaks. CRMP is especially well-suited for reliable, high speed multimedia applications.

Paper “A Novel Retrieval Method for Multimodal Point of Interest Data” a novel retrieval method for MPOI which includes offline and online phases is proposed. In the offline phase, a two-step POI fusion algorithm and a Geo-ontology model were adopted to preprocess the MPOI data. In the online phase, a retrieval process is presented to do the practical retrieval. This method not only satisfies the requirement of multimodal fusion and semantic sharing in the mobile Internet, but also supports cross-modality multimedia retrieval.

The paper “The Research on Demands and Development Strategy of Mobile Travel Service--an empirical study based on Chinese Scenic spot” concluded that demands of mobile travel service can be divided into five categories with demand degree from high to low: mobile information services, mobile marketing services, mobile payment services, mobile location-based services and mobile social contact services. Then, it used one-way ANOVA to explore the disparate impacts of s’ attributes on the demands of the above services.

The paper “Color Image Enhancement by Histogram Equalization in Heterogeneous Color Space” presents a luminosity conserving and contrast enhancing histogram equalization method for color images. The histogram equalization is one of the ordinary methods employed for enhancing contrast in TV and images for consumer electronics where unwanted subjective deterioration are frequently occur. Although there have been many solutions to overcome the drawback of histogram equalization, however the method is for RGB color space, which is not well suited for different color spaces. To do this, it uses fuzzy set to improve histogram equalization. All RGB images are firstly transformed into different color spaces, and particular channels are applied histogram equalization process.

Paper “Research on the Measurement of Enterprise Technological Innovation Capability Model based on Information Axiom” studies the measurement of enterprise technological
innovation capability based on measurement index system that can reflect the innovation ability in an objective and systematic way. This index system is constructed according to certain rules and standards and sheds light on the measurement index model based on Euclidean distance and Information axiom. In this model, measurement indicators of different types are standardized and Euclidean distance is established. Then the weight of information content produced by Euclidean distance is calculated to get the comprehensive information content so as to measure the enterprise technological innovation capability.

Paper “Sentiment Analysis on News Comments Based on Supervised Learning Method” presents a research of sentiment analysis on news comments. In this paper, it adopt four feature selection methods (DF, IG, CHI, MI), three feature representations (Presence, TF, TF-IDF) and five learning methods (NB, ME, Winnow, C4.5, SVM) for the sentiment analysis of Chinese news comments. The experimental results indicate that, except MI, other three feature selection methods are all suitable for selecting features for news comments, and through comprehensive assessment of feature selection method, CHI is better; TF performs the best calculation of feature weighting; ME outperforms other classifiers for the sentiment classification.

In the paper “A Natural User Interface for E-learning Learners: Focused on the Automatic Speed Control of Multimedia Materials” conducted two experiments and an interview. First, in experiment 1, it found that there is significant relevancy between the participants’ action of lowering their head and note taking. Second, it determined that nodding that lasts less than two seconds has no relationship to note taking. In experiment 2, it determined that the e-learning system with the automatic speed control of multimedia materials reported less learner manual control, clicking pause and rewind buttons, than the regular e-learning system.

The paper “An Integration and Optimizing Allocation Platform of High Quality Teaching Resources for University-led Collaborative Innovation” build an integration and optimizing allocation platform of high quality teaching resources for universities-led collaborative innovation based on the analysis of basic content and process of university-led collaborative innovation, and study the structure and functions of the platform in detail using the theory and method of collaborative innovation.

The paper “A Simplified Forest Fire Detection System and Improved Area Detection Method for Handling Exception” resolved real time forest fire detection system on changing of the background and the foreground. This study is focused on easy case between Hardware and software, and made up widely used methods as a basis for each step. First step is a process for detecting targeted forest fire by using HSV color space. On second step, adaptive threshold used for more accurate and intuitive representation on forest fire area. And third step labeling used for distinguishing the target area. Final step, histogram back-projection used for processing exception situation.

The Authors of “The Performance of Knowledge Collaboration in Virtual Teams: An Empirical Study” proposed a principle of best engine valve timing based on the requirements of best engine valve timing. A novel variable valve timing system is designed according to the principle. The construction of the mathematical model of the system and its dynamic simulation are also presented. The adjust performance of system and the oil pressure are studied in the paper.
The paper “Application of Improved Ant Colony Algorithm in Solving TSP” proposed an improved ant colony algorithm in order to find the optimal path accurately and rapidly. Using ant colony algorithm to solve TSP (traveling salesman problem) has some disadvantages as easily plunging into local minimum, slow convergence speed and so on.

Paper “A New Measure of Code Complexity during Software Evolution: ‘A Case Study’” first computes the Complexity increment by taking four complexity metrics WMC (CK), CMC (Li), CC (BS) and CCC (S&B). The maintainability index of the successive version has been computed at the system level. The tracking of the number of classes added and deleted has also been obtained for the archaeology of successive versions. The understandability and the maintainability of software are then mapped with the trends of complexity increment, change in number of classes added and deleted and the Maintainability index.

The paper “A Composite Index-Based Approach for Hierarchical Assessment of Forest Ecosystem Health: An Example of Pinus tabulaeformis” establishes a forest health assessment model and a three-level indicator system using the analytic hierarchy process, assessing forest ecosystem health is an effective way for forest resource management. Taking as an example Pinus tabulaeformis Carr., a superior afforestation species in northern China.

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