

Foreword and Editorial

International Journal of Multimedia and Ubiquitous Engineering

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

This issue contains 16 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.

Authors of the paper “Modeling Software Platform of Multi-Organization Core Based on Voxels Interpolation Method”, states that the multi-organization modeling technology is widely used in medical field. But there is no application in reservoir cores which correlative study is also rare. In this paper, a new segmentation modeling method of multi-organization core based on labeled voxels interpolation is proposed. Firstly, the surface model of core is constructed by using the image processing technology and surface model reconstructed technology based on the CT images of the core. Then, the tetrahedral model of core is constructed by using constrained Delaunay triangulation algorithm. The information of model elements is obtained through labeling data information and interpolating model information on the tetrahedron model. Finally, the model units of different organization were segmented to organization model with a single attribute of the reservoir core which realized the multi-organization core reconstruction. The visualization and interaction functions of CT images and core models are realized based on the OpenGL technology. The software is good for attempt of multi-organization core modeling which provides data support for the following simulation experiments and finite element analyses.

In the paper “Wireless Sensor Network Based Monitoring Sensory System towards Environmental Pollution”, air pollution is an issue that is being concerned by public – particularly in campus environment. This has led the stakeholders in campus to take apart in monitoring the environment condition by carrying out a number of researches on green campus by monitoring the environment condition around campus. The advance of science and technology and planted system principally can cope with the issue by making an application system equipped with a wireless Sensor to monitor the level of air quality. This system supports a number of environment monitoring Sensors integrated in a wireless Sensor network. This research aims to design a Sensory system that is able to monitor the environment quality in the wireless Sensor network in the area of UNDIP (Diponegoro University). The built system uses a number of environment monitoring Sensors interconnected in a wireless Sensor network. The technology-based environment monitor can assist the environmentalists to monitor the campus area. The tool of environment monitor can be in the form of the detecting Sensor of the concentration of CO, NO₂, and density of dust particles, temperature, air humidity, and light intensity to make the Sensor data identifiable by all environmentalists in everywhere. For this, it requires a media that is able to present the real-time Sensor data. The Sensors used to read the parameters of environment include TGS 2600 Sensor to read the concentration of the carbon monoxide (CO), TGS 2201 Sensor for the nitrogen dioxide (NO₂), GP2Y1010AU0F Sensor for the density of dust particles, BH1750 Sensor for the light intensity, and SHT11 Sensor to read the humidity and temperature of the environment. These Sensor systems use the microcontroller ATmega 2560-based Arduino board as the

central of system controller. This system is also equipped with RTC as the timer and GPS as the coordinate of the location where the Sensor system in the non-cable Sensor network is located as a node.

In the research paper “An Adaptive Compression Strategy Based on A* Algorithm”, a new adaptive compression strategy based on the A* algorithm called SA* algorithm is proposed which combined the data compression with the heuristic method. A new evaluation function construction method is devised for the SA* algorithm, which is suitable for the frequency optimization of data compression. The simulation experiments are carried out to compare the adaptive compression algorithm based on heuristic search with the traditional equal-interval sample method applying Matlab platform, the experimental results show that the adaptive compression strategy based on A* algorithm can reduce the storage space of the data with lower distortion, and reach the balance of the quantity and quality of the data. This algorithm will be used to deal with the problem of large amount of historical load data in SCADA system, and it has the phenomenal ability to capture the tendency of changing load data, reducing the burden of the network and information processing system. The data cleaning and load forecasting time can be reduced as well.

The article “Comprehensive Evaluation of Transformer Condition Based on Fuzzy Grey Clustering and Variable Weight”, aiming at the problem that the transformer condition evaluation factors have fuzzy and gray characteristics and fixed weight (FW) cannot accurately evaluate the condition, they proposed a condition evaluation method for transformer based on fuzzy grey clustering and variable weight. The method is applied to evaluate transformer condition layer by layer. Firstly, the confidence degree of the association rules is introduced to determine the FW of key indicators. According to the classification of transformer state grade, the triangle whiten function is established. The grey clustering coefficient (GCC) matrix and fault layer evaluation results are obtained through grey clustering method. Then the variable weight (VW) is obtained by combining variable weight synthesis mode, and then the transformer condition is evaluated by fuzzy evaluation method. The transformer test report data is carried out as case analysis and the result shows that the method they proposed can assess the transformer condition objectively and accurately.

In the paper “Cognitive Radio Spectrum Sensing Technique Using M-ary QAM for Different Fading Environments”, Cognitive Radio have emerged up as the innovative technology to counter the problem of Spectrum Scarcity and its underutilization. Using Cognitive Radio unused spectrum bands by their licensed users can be utilized by the secondary users and therefore increase the overall spectrum utilization. In this paper energy detection based Spectrum Sensing Technique is proposed based on M-ary QAM. The proposed techniques work under diverse channel conditions and environments. To test and verify the proposed technique, Receiver Operating Characteristics (ROC) curves for analysing Probability of Detection (Pd) and Complimentary ROC curves for Probability of Missed Detection (Pmd) is performed. The proposed technique is tested over different fading channels with varying Signal to Noise Ratio.

Authors of paper about “A SVM Active Learning Algorithm Based on Class Boundary Characteristics, and Its Application in Audio Classification”, states that audio classification means recognizing different types of audio events in the audio documents. One difficulty of audio classification is the sample labeling problem, because manual labeling is very time-consuming, and then it is usually difficult to get enough labeled samples for training. To reduce the manual labeling workload, one effective way is to use the SVM (Support Vector Machines) active learning technology. SVM is a discriminant

classifier which is only interested in class boundary samples, and then samples on class boundary are more informative to SVM. To this end, in this work they propose to select unlabeled samples based on class boundary characteristics, and propose a new SVM active learning algorithm. they summarize 3 characteristics of class boundary, i.e. 1) the class boundary lies in a low-density region; 2) the class boundary region is confusing; 3) there exists redundancy in the class boundary region. They use the proposed active learning algorithm to resolve the sample labeling problem of audio classification.

In the research paper “Development of AHTS-vessel Marine Engine Room Virtual Training Platform and Research on Key Technology”, “HYSY681” is selected as the parent ship to develop the AHTS (Anchor Handling Tug Supply) vessel MERVTP (Marine Engine Room Virtual Training Platform). Hybrid simulation design mode is applied to the training platform and the advantage of each applied simulation method is fully made. In order to give consideration to both the instantaneity and accuracy required by 2D-MERSS (2D Marine Engine Room Simulation Software), simulation algorithm and strategy are analyzed and chosen reasonably. To improve the efficiency of development and expansibility, the simulation data is planed from the whole prospect, WPF (Windows Presentation Foundation) technique is applied to the development of 2D-HMI (2D Human-machine Interface) and the refresh mechanism of 2D-HMI is optimized to improve the simulation efficiency. In order to promote the overall training effect, visual simulation technique is applied to this training platform and 3D-MERSS (3D Marine Engine Room Simulation Software) is developed. Optimization techniques including LOD (Level of Detail), structural nodes optimization, Prefab and rendering method based on Shader are adopted to promote the user experience. To further enhance the immersion, 3D-MERSS is also applied to the 3-channel stereo projection environment, meanwhile, the relevant techniques including scene segmentation, edge blending and geometric correction are analyzed and researched.

In the study entitled “Designing Wearable Electronic Spectacle for Enhancing Social Impressions Emitting Sound and Smell”, states that sound and smells aid in the impression of one another. These two senses can generate stronger emotional feelings more than words. The author built a wearable electronic system that allows users to emit preset sounds and fragrances during a face-to-face encounter. The system is designed as a spectacle form factor allows a user to select her own characteristic sounds and smell identifications (IDs). The IDs are then transferred to another system when two people meet and indirectly stimulate each person with their partners sound and smell preference. The paper presents the design of the system and experimental results with human subjects examining how the system augments in building a positive impression using subtle sound and smell stimulations.

In the paper about “Research on Power Quality Evaluation of Wind Farm Based on Fuzzy Neural Network”, power quality is the key factor that influences the stability and security of grid system with the wind power integration. Strengthening the evaluation research of power quality of wind farm has significant influence. This paper constructs the fuzzy neural network model to evaluate the power qualities of different observation points of wind farm, and uses certain power quality classifications to verify the security and stability of wind power in grid-connection. Numerical example analysis will verify that the model in this paper is reasonable and subjective in power quality classification determination, and corresponding power evaluation result in the same classification is characterized by high identification degree and high resolution, which has advisory value for decision making.

Authors of research paper “Hybrid Approach Using Sensors, GPS and Vision Based Tracking to Improve the Registration in Mobile Augmented Reality Applications” states that one of the main challenges to creating rich, seamless, and adaptive Augmented Reality (AR) browsers is the accurate registration of the virtual contents in the real world. Usually, the AR browsers offer augmented navigation functionality by GPS and sensors, such as magnetometer and accelerometer. However, the position of virtual markers suffers some errors when the user is near to the desired location, due to many factors such as sensors failures and bad internet connections, among others. Additionally, to identify the correct marker, when there are many, is a challenging task to users. Therefore, to mitigate these problems, this paper proposes a hybrid approach of location and vision based tracking for AR applications, since the image recognition can be very helpful to identify near locations, avoiding misplaced markers and at the same time giving emphasis to that marker. Furthermore, to avoid bottlenecks in the AR browser applications the combination of the quality of vision-based tracking and the speed of the sensors is proposed. The designed system gets the information about the Points Of Interests (POIs), recommend places to explore around the user via GPS and sensors (as already done by current AR browsers) and run the recognition process only for the nearest POI to improve its registration. Aiming to choose the best recognition algorithm for this scenario, precision and time tests are performed using three algorithms (ORB, BRISK, and AKAZE) to detect keypoints and compute their features, and two algorithms (RANSAC and LMEDS) to estimate camera pose. The test pointed that the combination of AKAZE and RANSAC has the best accuracy, but an impractical time to use in real time application. Hence, the usage of vision techniques in an interval of time (skipping some frames) and the usage of inertial sensors movements to update the skipped frames are proposed, in order to use this solution on a mobile platform. Finally, the system solution was implemented in a tourism mobile AR application and some results are presented.

In the study “New Useful Heat Flow Equation in Solar Absolute Radiometer and Its Applications”, in order to accommodate with the high accuracy requirement of solar irradiance measurement, a new kind of heat flow equation in solar absolute radiometer is developed in this paper. The detailed solution procedure is present by using the method of separation of variables and principle of superposition. The applications of new equation are also investigated, too. The application in SIAR (Solar Irradiance Absolute Radiometer) shows that the ultimate theoretical value of time constant of SIAR is 18s which apparently smaller than the experimental result of 30s.

In the paper “The Importance of Early Childhood Education and Development in Indonesia”, many experts refer to the period in the development of childhood as a golden period only lasting once and cannot be delayed. An early age is an age that is crucial in shaping the character and personality of the child, because the environment is indispensable stimulation of children in developing intelligence potential. Early education efforts form of psychosocial stimulation as early and as much as possible into a very important thing. This paper presents the importance of early childhood education and development in Indonesia. It is expected to contribute significantly to the development and improving the quality of human resources, in turn, our nation will become a nation full of high quality and competitiveness.

Authors of research paper “The Influence of Computer-Mediated Communication on Students’ Writing Ability” state that there are many ways of teaching writing that can be applied by lecturers to improve the students writing’ ability. Some of them try to improve the students’ writing ability by improving sub-skills of writing: sentence building, developing ideas, organizing ideas, and etc., while others try to use various kinds of learning tools during their teaching and learning process. However, the use of computer

and internet cannot be ignored in this modern era. This study aimed to show whether there is a significant influence of Computer-Mediated Communication (CMC) application on students' writing ability and to know about the students' perceptions on CMC application in Writing classes. One group pretest-posttest experimental design was conducted at English Study Program, Faculty of Teachers Training and Education– Riau University on odd semester of academic year 2015-2016. Cluster random sampling technique was used to select one class of students to become the sample. These students, then, was given treatment by applying CMC in teaching Writing. The instrument used were a writing test and a questionnaire. The obtained data analyzed by using SPSS version 21 for Windows.

In the study entitled “The Organizational Commitment Analysis of Academic Staffs: A Case Study at the Faculty of Economics, Universitas Prof Dr Moestopo (Beragama), Indonesia”, Global competition moves more quickly and requires fitting strategies along with the presence of increasingly sophisticated technological developments. Primarily, the problem is how to turn human resources into assets with excellent competitiveness. This study is oriented on the development of human resource management. In this regards, a university becomes a springhead in the management of human resources. Represented by the Faculty of Economics, Universitas Prof Dr Moestopo (Beragama), Indonesia is selected as the subject of the study, to improve the competitiveness through increased performance. There are many factors adopted by some experts associated with the improved organizational performance; yet in this case, various limitations are observed as well. The organizational commitment is selected as the object of the study. Several literatures support the topic of organizational commitment. Some of the factors influencing lecturers' organizational commitment are the transformational leadership style, interpersonal communication, and job satisfaction. The method of the study uses the application of “TEV” quantitative analysis model based on a decision tree analysis (weighting) using the expected-value formula. The results of the study have an impact on the policy that is based on the transformational leadership style; interpersonal communication, and job satisfaction.

In the article about “The Efficacy of Self-Regulated Learning and Social Media in Higher Education”, self-regulated learning is a never-ending process in the life of a learner. This leads to areas such as learning analytics that concentrate on the learning trajectories of students while they interact with the learning environment. This research work highlights this intersection of self-regulated learning, social media in higher education to identify the ongoing themes and challenges in comprehending its efficacy in learning environments.

The quasi-experimental research entitled “The Effectiveness of Web-Based Instruction on Writing Skill of English Department Students of FKIP Riau University, Indonesia” aims to test the effectiveness of teaching writing by using web-based instruction on writing skills of English Department students of Teacher Training and Education Faculty (FKIP) Riau University. The formulation of the problem to be addressed is: Is there any effectiveness of web-based instruction on writing skills of English Department students of FKIP Riau University? The research was conducted at English Department of FKIP Riau University during odd semester 2014-2015. Cluster sampling technique was used to select two classes of students to become the sample of this research. One class of students was used for experimental class and another one was used as a control class. Students in the experimental class were taught by using web-based instruction method and students in the control class were taught by using conventional method. Instrument used in this research was a writing test and the data were analyzed by using SPSS version 19.0. The finding showed that web-based instruction was effectively improved the students' writing ability.

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