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Foreword and Editorial

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 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.

In the paper “Application of Resonance Demodulation in Rolling Bearing Early Fault Feature Extraction Based on Electronic Resonance”, resonance demodulation is a commonly used rolling bearing fault diagnosis method, but resonance frequency of traditional resonance demodulation technology has a certain discreteness due to differences in terms of processing, testing and installation of sensor to collect fault information, so parameter of band-pass filter needs manual pre-determination. At the same time, as information of early bearing minor fault is often submerged in strong background noise, signal to noise ratio is low. Application of traditional resonance demodulation method to improve signal to noise ratio is with limited capability, and diagnosis effect is not obvious. This paper makes use of the equivalence of electrical resonance system and mechanical resonance system and gains resonance of sensor output signal through electrical resonator, which breaks through shortcomings of traditional method, achieve ultra narrow brand high-resolution detection, and improves signal to noise ratio of fault feature signal. Finally, verification is done through simulation fault bearing signal and actually collected fault signal. The results proves validity and effectiveness of the proposed method which has an important guiding significance for engineering.

The aim of the paper entitled “Implementing Constructivist Principles in Early Mathematics Education: Exploring Cognitively Guided Instruction” is to review the literature on cognitively guided instruction (CGI) for early mathematics to determine how a CGI classroom embodies constructivist teaching-learning principles. A key philosophy of CGI is that teaching must be based on an understanding of each learner’s development of mathematical thinking. CGI also emphasizes contextualization in problem solving, promoting learners’ development of mathematical thinking by allowing them to share their thoughts with peers and teachers and solve problems in their own ways. These aspects of CGI correspond to constructivist teaching-learning principles. Therefore, they conclude that CGI may provide appropriate guidelines for developing constructivist teaching and learning practices for mathematics education among young children.

In the paper “Dynamic Hand Gesture Trajectory Recognition Based on Block Feature and Skin-Color Clustering”, in recent years, dynamic hand gesture recognition has been a research hotspot of human-computer interaction. Since most existing algorithms contain problems with high computational complexity, poor real-time performance and low recognition rate, which cannot satisfy the need of many practical applications. Moreover, key frames obtained by inter-frame difference degree algorithm contain less information, which leads to less identified species and lower recognition rate. To solve these problems, they present a dynamic hand gesture trajectory recognition method based on the theory of block feature to extract key frames and the skin-color clustering’s hand gesture
segmentation. Firstly, this method extracts block feature of degree of difference between frames in hand gesture sequence to select key frames accurately. Secondly, the method based on skin-color clustering is applied to obtain the area of hand gesture after segmenting hand gestures from images. Finally, hidden Markov model (HMM), in which the angle data of hand gesture trajectories are input, is used for modeling and identifying dynamic hand gestures. Experimental results show that the method of key-frame extraction is used to obtain information of dynamic hand gestures accurately, which would improve the recognition rate of dynamic hand gesture recognition and, at the same time, can guarantee the real-time of hand gesture recognition system. The average recognition rate is up to 86.67%, and the average time efficiency is 0.39s.

In the research paper “The Research of the Key Technologies in Complex Local Navigation System Based on Binocular Stereovision”, binocular stereo vision platform, visual navigation for complex local range contains a lot of moving targets. The system includes a feature detection, projection reconstruction, motion analysis, clustering target four. Whereby the field of view may be obtained of the target group number, position, relative speed and direction of movement, and a comprehensive analysis of the nature of the target. The system uses real-world scenarios to test the performance of the system in most scenes to achieve the expected goal, improved method of the present system puts forward.

The study “The Influence of Robot-Based Learning on Elementary School Students’ Creativity” examines the influence of robot-based learning on both male and female elementary school students’ creativity. For this purpose, they applied robot-based learning to the official Republic of Korean general education course curriculum, comprised of mathematics, social studies, science and art. A creativity test was conducted twice, both pre and post robot-based learning. The results indicate that robot-based learning increases students’ creativity effectively. Furthermore, the creativity of students in the middle and upper grades showed distinct improvement in comparison with that of students in lower grades, regardless of gender. The results of this research are significant because the study investigates the potential for robots to be used as a source of educational media and possibilities for the examination of robot-based learning on elementary school student creativity in a regular education course.

In the paper “A Study on Tennis Competition Enhancement Technology on the Basis of Virtual Reality Technology”, with the development of the science and technology, as one of the hot direction of IT, the virtual reality technology has been widely used in more and more fields. Wherein, in sports competition, it is particularly prominent. This paper is based on the related theories of virtual reality, sets up the tennis dynamics model, using ODE technology to operate the simulation system. By simulating the trajectory and collision detection, this paper has drawn a conclusion that virtual reality technology can make accurate and scientific simulation on sports competition both in static and simulation lab environment. Therefore, the computer virtual technology has a catalytic effect on sports competition enhancement technology. Moreover, this paper will open up new ideas for the application of computer virtual technology on sports competition enhancement technology, and also provide the theoretical basis for related researches.

In the paper about “Utilizing Augmented Reality for Creative Writing Educational Contents and Story-retelling”, today, although the importance of creative writing is emphasized in their society as ‘where dreams are sold and commercialized,’ creative writing and oral storytelling are regarded as challenging tasks for children. Therefore, elementary education should be the starting point to help children to have a systematic understanding of literature with a voluntary and independent attitude, to express their
emotions and thoughts creatively, and to systematically produce the story based on the structure and development of the story. In this context, the purpose of this study is to provide precise directions for contents development, which allows children to actively understand the story structure elements and recreate stories. The research questions focus on how they can develop creative writing educational contents using story-retelling and the effectiveness of the contents. The effectiveness of the developed contents was verified through pilot tests among grade 3-4 elementary students. Results show that the contents successfully played a role as an interesting tool for creative writing, and provided a framework for creative writing allowing participants to have a better understanding on story structure and elements, and the experience of creating a story on their own. In conclusion, the effectiveness of the educational contents to learners was verified.

The paper “Social Network Analysis of Public Administration Articles in Korea” aims to examine an overlooked area, the role of public administration and policy as a contributor to Korean national development using a social network analysis of public administration papers published in Korea. In addition, it suggests some future directions as to what Korean public administration system has to do both in the present and in the future. Korea has achieved an unprecedented rapid economic growth since 1948 when the Korean government was established. Nowadays, the developmental process which Korea has experienced has become a model for other developing countries. However, there has been a dark side to this process together with the light side associated with rapid economic development. These dark-side aspects include a gap between haves and have-nots, the gap between rural and urban areas, and social polarization. The analysis results show that to overcome these obstacles, the Korean government should make great efforts by coordinating policy objectives, policy priorities, policy tools, and the role of public administration, as Korea’s governments have done in the past in order to attain the high rate of economic growth that has prevailed up until now.

In the study entitled “Technology-based Educational Portfolio”, Portfolio is a collection of works that focuses on the specific areas of learning. That is an effective way of showing the progress of students’ learning. This study was to find out whether educational portfolios help preservice teachers with their technology skills and teaching practices. To achieve the study goals, the survey instrument was developed by the research and reviewed by three professors in the field of educational technology to confirm the reliability. It consists of three sections with 26 questions with 5 Likert scales. The survey was conducted with the two groups of preservice teachers. One group had experiences with developing portfolios while the other group did not have any experiences with portfolios. The class was designed to achieve the technology skills while developing the multimedia-based portfolio. The technology applications that students had to learn included PowerPoint, Excel, Moviemaker, o’Cam, Compozer and free-mind. According to the study results, the group with portfolio experiences had higher technology skills and more positive perceptions of teaching and learning practices. Based on the study results, the items that should be included in the educational portfolios were suggested and effective ways of using portfolio were discussed.

Paper “A Design of Smart-based Education Gamification Platform Using Mobile Devices for Digital Content” states that it’s been observed that some of the researchers in the game industry and educational fields are developing the teaching materials in the form of games to make classroom learning more interesting, which involves ‘gamification’. A the same time, they are trying to understand what kind of gaming factors are relevant to increase the students’ interest in learning and have an educational effect. A model of the ‘Education-Gamification Platform’ has been designed in this study for the mobile device-based games to assist in such an effort. The platform can be adjustable to the level of the
players and lets them to experience the intended educational effects. A lot of the discussion is focused on the process involving an IT technology but the platform can be applied to non-IT gadgets. Also, this platform will be able to recognize some of the problems which could arise during the gamification process with a simple mechanics.

In the paper about “Research on Intelligent Automatic Translation System in Chinese and English Based on Integration Technology”, with the development and revolution of economic globalization, cross-language communication is becoming more and more important. The traditional artificial Chinese and English intelligent automatic translation system is not able to satisfy the growing need for translation. On this basis, through deeply analyzing the deficiencies of current traditional automatic translation system, this paper proposes the use of integration technology to build Chinese and English intelligent automatic translation system. First they build a confusion network for integration technology, then by using the log linear model for parameter modulation and decoding of confusion network to obtain better accuracy and better performance of the translation results. Based on the algorithm, this paper constructs experiment for the integration technology in Chinese and English intelligent automatic translation system. Experimental results show that the English and Chinese intelligent automatic translation system based on Integration Technology is capable of obtaining higher precision and better robustness of translation results, with great practical significance.

Authors of the research paper “An Effective Kinetic Art Generation Framework Utilizing Physics Engine Jbullet” propose an effective kinetic art generation framework based on a 3D physics simulation. The framework focuses on the design process time required for an artist to express artistic ideas while reducing the time and cost of producing machine structures of kinetic art. they utilize JBullet, a well-known physics engine, to verify the physical accuracy of the kinetic art by providing rigid body simulation, collision resolution, and constraints. The experimental results show that the proposed animation framework can effectively handle the tedious and repetitive process of previous kinetic artwork.

Paper entitled “A 3D Modeling UI Method focused on Geometry Education Experience for Novices” states that in creative education through spatial ability, incorporating 3D printer to education enabled 3D modeling education approach to beginners such as elementary school students following the advancement of 3D printer industry. However, the existing 3D modeling tools for graphic works of 3D modeling have a disadvantage in that beginners have difficulties in accessing as they target practical workers. Hence, they suggest UI of the 3D modeling tool that differs from the existing modeling UI scheme so that beginners can intuitively access 3D modeling and combine it with 3D printer. The 3D modeling UI scheme that is easily accessible to beginners also has small burden on educators who have to learn it in advance. they analyze the modeling scheme and UI access scheme of the existing 3D modeling tool to find out their problems from an aspect of beginners and suggest direction for solving them. The suggested UI scheme is aimed at improving 3D printing education and spatial ability focusing on users’ educational experience based on geometry. they plan to use 3D modeling writing tool combined with the suggested UI in 3D printing education and expand it.

The paper “Study of the Temporal and Spatial Analysis by using SST Satellite Data” states that it is studied the sea surface temperature(SST) variation around Korean Peninsula by using Group for High Resolution Sea Surface Temperature(GHRSST) images for 22-year data from 1993 January 1 to 2014 December 31. For the accuracy of GHRSST data, near observation station were collected to correlate GHRSST and water temperature data. Mean correlation in Yellow Sea was 0.968, mean correlation in South
Sea was 0.963, and mean correlation in East Sea was 0.962. The result of harmonic analysis showed that the amplitude of SST in Yellow Sea was 10–16°C and the amplitude of SST in East Sea and South Sea was 8–12°C. The phase of SST in Yellow Sea was 230–235°, and the phase of SST in South Sea and East Sea was 240–244. EOF analysis resulted that the first mode of coefficient was 97.59%. When it is used with various climate data, for example, sea level, wind, air temperature, it will be represented the specific variation of SST.

The paper “Performance Comparison of Asynchronous Transfer Configurations for UHD Game Image Compression with GPGPU” states that Ultra high definition (UHD) game scenes have caused the memory bandwidth problem. The lossless DPCM-GR based compression algorithm [12] using NVIDIA CUDA(Compute Unified Device Architecture) like general purpose GPU (GPGPU) computing relieves the bandwidth problem without sacrificing image quality, which supports bit parallel pipelining. This paper increases the memory bandwidth efficiency using the shared memory of CUDA based on the compression algorithm [12]. Also, various asynchronous transfer configurations which can overlap the kernel execution and data transfer between the Host and the CUDA device are implemented with the page-locked host memory. Experimental results show that GPGPU CUDA computing obtains the maximum 87.5 and 30.6 times speedups for GTX650Ti and GT330, respectively, comparing to Host CPU. Also, the maximum reductions of the compression time for GTX650Ti and GT330 are 54.1% and 30.3%, respectively, among various concurrency transfer configurations.

In the paper “A Fast Intra Prediction Algorithm for DMM Mode in Depth Map Coding”, as the extension of High Efficiency Video Coding (HEVC) for 3D video coding, 3D-HEVC achieves high efficiency for the compression of the multi-view videos plus depth (MVD) format. In order to ensure the performance of depth map coding, a new depth intra coding tool called Depth Modeling Mode (DMM) is introduced. However, the process of DMM significantly increases the computational complexity of depth map coding due to the blind traversal of all wedgelet partitions. In this paper, a fast intra prediction algorithm for DMM mode in depth map coding is proposed. In the first step, the unnecessary DMM mode is skipped by judging whether the best prediction mode in Rough Mode Decision (RMD) is DC mode. In the second step, the direction information represented by a permitted angle range is acquired based on the best prediction mode achieved in RMD. In the third step, a searching subset is obtained based on the direction information and the position information represented by the coordinates of the pixel with biggest depth value change in each boundary of PU. Then the patterns within the searching subset are tested by view synthesis optimization (VSO) to find the minimum distortion partition. Compared with the coarse-refinement algorithm, the proposed algorithm shows significant time saving with acceptable performance loss.

In the paper entitled “A Study on Hybrid Encryption Technique for Digital Contents of Copyrights”, the environment using multimedia information such as image, audio, and video is widely applied through the rapid development of the IT environment. The digital content industry applying this has been developed in a variety of forms. However, copyright is subjected to a serious threat as digital content is distributed in quantity with the spread of the Internet. Also, business model of companies is threatened largely by the variety of attacks such as illegal copy and transformation of digital content. In this paper, they propose a hybrid encryption in order to prevent copyright information damage by malicious attacks. The encryption process in two steps is performed in order to enhance hiding copyright in the proposed technique. The block encryption process is performs to prevent exposure and transformation of encrypted information after encryption performs using ARIA algorithm for copyright information. The encrypted copyright information
like this improved robustness to several of attacks. The performance of the proposed technique is confirmed by experiments.

The paper “Blind Channel Estimation and Equalization” presents the problem of blind channel estimation of a non-minimum phase system using three algorithms. These algorithms play an important role for blindly estimate the parameters of radio mobile channel. Thus studying the problem of blind channel equalization based on, the proposed algorithm, CMA and SKMAA algorithms. The simulation results in noisy environment and for different SNR values demonstrate that the proposed algorithm is more performing than other algorithms. In addition the Sign Kurtosis Maximization Adaptive Algorithm (SKMAA) is more powerful in comparison to constant modulus algorithm (CMA) at the blind channel equalization, that is to say gives the right equalization.

Paper “A Reliability Examination Method for Multi-source and One-Destination Network” states that in the multi-status network, data could be transmitted via different path. The network and its elements such as links and nodes are usually regarded with two statuses. However, in the real-life cases, due to the communication traffic jam and physical errors from network devices, it is a multi-state network. In order to discuss the reliability examination of such cases, this paper introduces an innovative algorithm to evaluate the reliability with continuous time intervals as constraints. Each source transmit a data sequence via a minimal path, where two paths have the same link. The time interval for generating the data and data volume obey random distribution. In this paper, Monte-Carlo simulation is used for getting the distributions. The time for transferring the data should be smaller than the constraints and such time is heavily related to the data volume. From the results, some lessons and insights could be learned. Firstly, under the random variables of data and time interval, their influences on the network reliability is great. Secondly, the end-users like network administrators can configure smaller data volume transfer and bigger time interval to achieve better network reliability.

Paper “Implementation of Smart Cupping Therapy System” states that the use of IoT technology in home automation systems, industrial automation systems and health care is on the rise. In health care, it is included in devices for fitness and wellness; furthermore, devices for diagnosis, treatment and health care are expected to increase owing to increased demand and aging in the future. This paper shows the system design and implementation of a smart cupping therapy system that aims to provide easy, safe therapy. In their system, the pressure of a cupping boil and therapy time are adjusted like a prescription from a doctor. The system consists of a smart sensing unit that detects and controls the degree of pressure, a ZigBee transmitter and receiver unit that can communicate wirelessly between a cupping device and a ZigBee coordinator, and a GUI application.

In the paper entitled “Research of Optimal Path Automatic Navigation in the Prescribed Scope”, identification, liquidity and the direction of the blind and weak-sight patients are more and more hard, and strange scenario especially. Introduces the embedded pedestrian navigation system consists of sensor, they are active radio frequency. Identification (radio frequency identification devices) tags active-system. System navigation formed in the active radio frequency identification is a kind of detecting direction way, determine the any positions and directions of weak-sight through intelligent network labels. The direction of the experimental data proved that for any navigation positioning and distance are effective in the range of intelligent network.

The study “Correlation Analysis: Game Professional Score and User Score on Steam” states that game ratings have been one of the most important factors in the online game
purchase. The game ratings are numerical scores and its two types are professional score and user score. This paper presents the experiments focusing on the relationship between professional score and user score across 2,069 games distributed by the Steam platform. They also investigated a variety of game genres for the analysis of the relationship between two rating scores. A better understanding of the relationships of the two scores would be of great value when game users want to choose their favorite games. Their experiments found that indie game and casual game has no differences between two scores. Notably, most major games which are developed by some big game companies have differences between professional scores and user scores. Another more factors can affect the game ratings for the big major games, such as advertising and promotion.

In the paper “The O2O Marketing System Using Augmented Reality and Beacon”, recently, the supply of the smartphone serving as the main personal communications terminal and the development of the Bluetooth-based beacon technology have induced the appearance of a new shopping method known as the O2O marketing. However, the problem is that the current O2O marketing using beacon has been sending unbridled push signals to the users, and, thereby induced the users to think of the O2O marketing information as the spam information. In addition, since the beacon only provides the simple push-based product information, there are limits in providing accurate and diverse information to the users. In this thesis, the beacon signals preferred by the users are selectively received so that the information definitely required by the users are provided to the users instead of the spam information. In addition, the augmented reality is applied to the O2O marketing, and, therefore, the system providing a wide range of diverse information to the users is proposed.

The paper “Pedestrian Detection System Using CENTRIST Algorithm on SIMT Based Image Signal Processor” proposed a pedestrian recognition using CENTRIST algorithm on the basis of SIMT based Image signal processor. The conventional pedestrian recognition used algorithms such as Haar-like feature and HOG, but the huge amount of calculation makes it difficult to operate in real time in a restricted environment such as an embedded environment. This paper sought to improve the operation speed by processing the pedestrian recognition in parallel with the use of SIMT based Image signal processor and CENTRIST algorithm with less amount of calculation compared to other algorithms. The pedestrian recognition implemented in ISP exhibited the improved performance, which is about 2.7 times higher than that of the pedestrian recognition executed by Cortex-A9.

In the paper “Matching Points Filtering Applied Panorama Image Processing Using the SURF and RANSAC Algorithm”, techniques of generating a single panoramic image by using multiple images are being widely studied in a number of areas, such as computer vision and computer graphics. Generating a panoramic image is a good way of overcoming the limitations of the images obtained from one single camera (e.g., those of picture angles, resolutions, information amounts, etc.) and may be applied in a variety of fields such as virtual reality and robot vision that require wide-angle images. A panoramic image has a great significance in that it can provide a greater sensation of immersion compared to a single image. Currently, there are a variety of techniques of producing panoramic images, but most of them commonly use a method of detecting feature points and matching points in each of the panoramic images they generate. In addition, they use the method of converting images after obtaining homography matrix using the RANSAC (Random Sample Consensus) algorithm that uses matching points. The SURF (Speeded Up Robust Features) algorithm used in this study utilizes the black-and-white and local space information of images when detecting their feature points and is widely used because it provides an outstanding performance in detecting the viewpoints and the
changes of the image sizes and is faster than SIFT (Scale Invariant Features Transform) algorithm. However, the SURF algorithm also has its weak point of detecting wrong matching points, which may slow down the performance speed of the RANSAC algorithm and thus increases CPU usage occupation rates. The errors in detecting matching points serve as essential elements of lowering the accuracy and resolutions of panoramic images. In order to minimize these errors, this paper went through an intermediate filtering process of removing wrong matching points using the RGB values of 3x3 region around their coordinates and then presented analysis and evaluation results related to improvements in panoramic image construction & processing and CPU usage occupation rates and the decreasing rates and accuracy of the extracted matching points.

In the paper “Design and Application of Teaching Model of Flipped Classroom on Information Technology Course”, with the rapid development of information technology, modern information technology is gradually changing people's life, study and work. People have clearly recognized that information collection, transmission, processing and application ability has become a most basic ability and the marker of the cultural level. Information technology, as a modern new discipline, compared with other subjects, it has its remarkable characteristics that in the process of learning it pays more attention to cultivate the students' ability of hands, brains and initiative exploration. As educators work in the line of the disciplines of information technology, seriously exploring the subject of teaching mode so as to do well the teaching of information technology course and improve the teaching effect is their responsibility. Nowadays, many students lack learning interest in information technology course. Investigating its causes, they find problems occur in the teachers' teaching methods. Most domestic schools generally use cramming teaching methods, blindly instill the knowledge in students no matter they have digested or attracted. For the knowledge teachers taught, they just heard and they just have the impression on the knowledge learned, ignoring the students' creative, hands-on, and thinking ability. This kind of traditional information technology course cannot well mobilize students' interest in learning information technology course. In contrast with the cramming method of teaching is the heuristic teaching method, whose important feature is considering the importance of the application of knowledge. Under the guidance of the teaching mode, flipped classroom concept in the heuristic teaching mode enters into people's vision. The flipped classroom refers to change the traditional teaching mode of teachers explaining the new knowledge for students in the classroom, and students consolidate new knowledge through their own independent homework to the teaching mode of students learning new knowledge independently after class and doing exercises to consolidate the digest new knowledge in the classroom with teachers. The author, after reading the flipped classroom theories and teaching research, combined with the characteristics of information technology disciplines, constructs information technology teaching model based on flipped classroom concept. In the practice process, test the effects of applying flipped classroom in information technology teaching, and gradually modifies and perfects it. Under the background of information culture in their country, explore the information technology teaching model based on flipped classroom concept characterized by the local culture.

In the article “Estimation of the Steering Angle Based on Extended Kalman-Filter”, many vehicle state parameters such as the sideslip angle, yaw rate, and steering angle are important for the Advanced Driver Assist System and vehicle safety system. In the past, most methods used to estimate the vehicle state parameters were based on models with directly measured parameters (steering angle, yaw rate, etc.). In this paper, they propose a method to estimate the vehicle state parameters (sideslip angle, yaw rate, and steering angle) based on the Extended Kalman Filter (EKF). The EKF is designed to deal with the bicycle model, linear tire model, and steering wheel model with measurements from in-
vehicle sensors such as the electronic stability control system. Therefore, the results show that the proposed algorithm for estimating the vehicle state parameters, sideslip angle, yaw rate, and steering angle can effectively estimate the vehicle state parameters when the speed of the vehicle varies. The results from this study can be evaluated and analyzed by evaluating the root mean square error. In future, the proposed algorithm can be used not only for the design of an automatic control system for the tracking vehicle but also for steering system fault diagnosis.

The paper “Design of Low Hardware Complexity Multiplexer Using NAND Gates on Quantum-Dot Cellular Automata” presents a 2-to-1 multiplexer based on quantum-dot cellular automata (QCA) with low hardware complexity. A QCA is the computing with cellular automata composed of arrays of quantum-dot devices. They propose a novel 2-to-1 multiplexer using three NAND gates in QCA. They focus on reducing a hardware complexity and minimizing a wasted cell. In order to the implementation of the 2-to-1 multiplexer, they use a new equation using De Morgan’s law. Their new architecture also can increase the speed with clock phase.

The study entitled “Simulation of Water Conservancy Scheduling System Based on an Optimized Dijkstra - Genetic Algorithm” states that dynamic optimization scheduling strategy is carried out based on a comprehensive objective function which is constructed for reservoirs. Corresponding constraints and conditions are generally designed, and then the solution of the objective function is worked out based on those constraints and finally an optimal scheduling scheme suitable for reservoirs is acquired in combination with actual conditions. Focusing on the problems above, this study combines Dijkstra algorithm with genetic algorithm (GA) effectively and makes full use of their advantages. Consequently, an optimized Dijkstra - genetic algorithm (D – GA) is obtained and applied in the scheduling scheme. First of all, the thesis preliminarily introduces relevant algorithms on water conservancy project and sets up a data model consistent with the actual situation. Secondly, this work analyzes the two algorithms, improves the Dijkstra algorithm and applies D – GA to solution optimization. Thirdly, this study compares the results obtained by using D – GA and GA respectively and finally completes the simulation of water conservancy scheduling system.

The study “Factors Influencing Primary and Secondary School Students’ Media Literacy and those Factors’ Degree of Influences: with a Main Focus on the Variables of Students’ Background, Personally Owned Kinds of Media, and Media Utilization Behaviors” employed the 2015 Korea Media Panel Survey conducted nationwide in order to examine primary and secondary school students’ media literacy, the variables of students’ background and the kinds of media devices that they own, utilization behaviors affecting their media literacy, and such variables’ degree of influence. To this end, data on 1,253 primary and secondary school students (884 households) were used. In order to analyze the data, SPSS 22.0 was used. Validity, reliability, and hierarchical regression analysis were also conducted. The analysis results showed that media literacy of primary and secondary school students was mostly high and the variables of students’ background and kinds of media devices and utilization explained 61.1% of media literacy variate. In particular, as the school level became higher, the place of residence changed from the county, small- and medium-sized cities to large cities, the kinds of Internet services utilized increased, and the more kinds of media devices that the students owned, their media literacy became higher. On the other hand, the greater the frequency of participation in Internet utilization was, the lower media literacy was. Meanwhile, the factor that most affected students’ media literacy was the level of school, followed by Internet service utilization kinds and resident districts. Based on such study results, this
study presented specific measures aimed at increasing primary and secondary school students’ media literacy.

The study entitled “Development of a Smartphone Application for Self-Care Performance of Patients with Chronic Hepatitis B” developed a smartphone application (app), based on user demand, for the self-care performance of patients with chronic Hepatitis B. The smartphone app was developed in five stages. In the analysis stage, they surveyed the demand for the app among 187 patients with chronic Hepatitis B, analyzed several other apps, and conducted a literature review. In the design stage, the app’s purpose was established, and the necessary functions, system interface, database, and screens were designed. In the development stage, the app was developed. In the implementation stage, the master version of the app was used by four specialists and five participants with chronic Hepatitis B. In the evaluation stage, they conducted a heuristic evaluation and a mobile app rating scale evaluation, with these nine subjects. As a result of the evaluations, 19 aspects of the system were modified to further improve the app. This smartphone app is expected to be helpful in performing self-care, serve as a disease-related knowledge source, and promote self-efficacy in chronic Hepatitis B patients.

In the study about “A Study of Leisure Sports Majors’ Innovation Ability Evaluation on the Basis of Computer Use”, at present, artificial intelligence has become an important part of people’s life. Meanwhile, people’s health consciousness and demands for modern leisure sports have improved. Based on the technology of artificial intelligence, this paper is to study the evaluation of leisure sports majors’ innovation ability which stays in relatively low level but with great potential. After researching and analyzing the status of leisure sports majors’ innovation ability at home and abroad, the author defined the standard of gray rates, set gray evaluation index, analyzed the gray evaluation model and concluded that students in HeBei Institute of Physical Education have good innovation abilities. This paper which laid a foundation for studies of relevant theories and practices is a pioneering work for innovation ability evaluation.

The research entitled “Creativity-Character Element Analysis by Organic Fusion of Creativity and Character” aims to extract Creativity-Character Elements by organic fusions of Creativity and Character by examining previous researches on the relationships between creativity and character. Based on previously related researches on the relationship between creativity and character, there are slight differences in opinions, but it appears that they are influencing mutually. Hence, the coherence of elements of creativity and those of characters was endeavored. There were totals of 36 Creativity-Character Elements extracted through this research results. This study attempted organic fusions of Creativity Elements with Character Elements based on the correlation between Creativity and Character. The results of this research would be crucial and fundamental resources for Creativity-Character Education in the educational fields.

In the paper “Effort Monitoring and Tracking System”, Prime Leading organizations will use the web portal for effort monitoring and tracking. This portal is used to store and analyze the employee effort from various R&D departments. This portal provides a front end environment for employees/management of an organization to keep a track of his/her effort. It is also expected to use SharePoint advanced features such as content management, alerts, information management policies, collaboration features, reporting, and analytics services.

In the study about “Vehicle License Plate Image Segmentation System Using Cellular Neural Network Optimized by Adaptive Fuzzy and Neuro-Fuzzy Algorithms”, vehicle License Plate Images Segmentation is a substantial stage for developing an Automatic
License Plate Recognition (ALPR) system. In this paper, it is considered an efficient segmentation algorithm for extracting vehicle license plate images using Cellular Neural Networks (CNN). The learning CNN templates values are formulated as an optimization problem to achieve the desired performances which can be found by means of Adaptive Fuzzy (AF) algorithm and Neuro-Fuzzy (NF) algorithm techniques. The main objective of the paper is to compare the performances of standard CNN, Adaptive Fuzzy (AF), and Neuro-Fuzzy (NF) on real data of several vehicle license plate images of standard Indonesia License Plates. The results are then compared with ideal vehicle license plate images. Quantitative analysis between ideal vehicle license plate images and segmented vehicle license plate images is presented in terms of Peak signal-to-noise ratio (PSNR), Mean Squared Error (MSE) and Root Mean Squared Error (RMSE). From the performance analysis, the CNN template optimized by ANFIS algorithm is more recommended than the standard CNN edge detector or the CNN template optimized by Adaptive Fuzzy algorithm in vehicle license plate image segmentation. It is shown from the calculation that PSNR is 80% better than the standard CNN, and the resulted MSE and RMSE are 70% better than the standard CNN. Whereas the CNN template optimized by Adaptive Fuzzy algorithm achieves the PSNR 90% better than the standard CNN, but it yields the MSE and RMSE 40% worse than the standard CNN.

In the study “Research on the Expert System of Mathematics Application Question Teaching”, in view of the automatic solution process of the elementary school mathematics application question, this article has carried on the research to the mathematics application question teaching expert system. Firstly, this paper introduces the definition and structure of the expert system. Then the system structure and function module of the mathematics application question teaching expert system design, gives a detailed description and design of information extraction module, application of rule base, application type library and application question solving process. In this paper, the application of the problem is divided into an integer one step calculation problem, the integer two steps to calculate the application and fractional scores of three parts of the application. At the same time, according to different types of applications, the structural characteristics of the analysis. According to the information extraction model and mathematical operation rules, the overall framework and function modules of the design mathematics teaching expert system are designed. And the realization process is studied. The research results show that the system can be used to demonstrate the solution of mathematical problems in detail. Help students to understand the application of the problem solving process. Make it better learn to know how to solve the problem. And it is helpful for teachers to easily understand method and carry on the teaching process. This also means that the system has practical application value. As a bridge between mathematical theory and practice, mathematical application problems have become more and more important in the implementation of mathematical quality education. It is necessary to cultivate students' mathematics application consciousness and optimize the students’ thinking quality. After leaving school, every student can still think about problems and solve the problem mathematically. In consequence, pay more attention to the teaching of application problems, make the cultivation of the consciousness of "use" of mathematics throughout the whole high school stage, and integrate training students' ability of solving mathematics application question into daily teaching, which is conducive to promote the development of students' mathematical innovation, stimulate mathematics learning interest, and improve internal drive of mathematics learning. In their country, many middle school mathematics teachers have carried on the thorough research on the mathematics application problems teaching, which also has made some progress. However, there are still a lot of mistakes in the application teaching in the daily used system. In particular, the college entrance examination still has its influences,
teaching material adjustment is not in place, how to teach the application problems plays a crucial role in the overall implementation of the quality education reform.

The paper entitled “Selection Factors of Mobile Social Network Games: Focusing on the Playing Types” states that with the exponential spread of Mobile phones, the Mobile social network game (hereafter ”MSNG”) market is rapidly growing. MSNG Service provider can enjoy an enormous success of fast spreading market growth of MSNG, while they have to endure the short product life of its service. Recently, the average usage length is less than three months, and it is getting shortened. Managers have to harvest the profit while investing on the marketing to fuel the market penetration. This study tries to find the attributes to continue the MSNGs considering the different forms of game opponents (i.e., machine, individual player, and group players). Results based on the 678 respondents present the efficacy of different attributes for the different game opponent settings. Managerial implication and the future research direct have been discussed.

In the study about “Design and Development of Customer Satisfaction Course for Improving Creativity based on CPS Model”, the talented human resource demanded by companies in the knowledge-based society is the person who has creativity and upright character. Currently, there are 10 basic vocational skills commonly sought in all workers nationwide, and one of them is the problem-solving skills. One of sub-factors of problem-solving skills is creative thinking. Under these circumstances, various teaching and learning models have been developed to develop students’ creativity and upright character. However, there are not enough discussions on the optimized education programs. Customer satisfaction (CS) is defined as a condition where customers’ needs, desires, and expectations are met or exceeded to result in the repurchase of products and/or services and repeat this to continue customer loyalty. CS skills include the competencies that promptly adjust to the fast-paced environments and resolve problems creatively. However, the existing CS training is mainly focused on the attitudes or functions of services, and there is limited effort on developing the abilities to flexibly respond to various real-life issues. Therefore, CS training should be developed in order to improve students’ problem-solving skills. Additionally, the scope of CS training is expanding to the broad meaning as training for nurturing the upright character. With social demands for creativity and upright character, the purpose of this study is to develop a CS course that is based on the CPS model to develop college students’ creativity and upright character. In this study, researchers developed Creative Problem Solving (CPS) model by adapting and modifying existing CPS model, and developed CS course based on developed CPS model. The significances of developed CS course are as follow: first, it will improve the creativity and upright character of college students who have participated in a CS course that applies the CPS model. Second, it can help professors teaching CS course in colleges teach image-making course based on the CPS model in schools. Third, it is expected to suggest study directions for the development of other CS courses in addition to image-making.

The paper entitled “Service Clustering by Leveraging a Context-Sensitive Approach” states that service technology has gained increasing popularity in recent communication software applied in many domains. With a growing number of services that share same or similar functionalities, clustering services help improve both service composition and mashup creation. To achieve service clustering, utilizing probabilistic topic model to extract and characterize the service description documents as corresponding topics is an available scheme. However, unlike short text in social networks, the descriptions of published services possess higher dimensionality and sparse functional information. With traditional LDA (Latent Dirichlet Allocation) model to implement topic extraction makes topics unclear. To address that challenge, they conduct a context sensitive approach to
generate context sensitive vector for merging the words with similar context before loading to LDA model, referred to as CV-LDA (Context Vector LDA). Through F1-Measure of clustering and topic perplexity analysis in the real-world dataset, it is shown that the proposed approach outperforms traditional LDA model in service clustering.
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