

Foreword and Editorial

International Journal of Smart Home

We are very happy to publish this issue of an International Journal of Smart Home 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 “Wireless Communications for SCADA Systems Utilizing Mobile Nodes, the Supervisory Control and Data Acquisition systems are collecting data from various sensors nodes deployed in remote locations and then transmitted to a central controller which then manages and controls this data. Utilization of wired or line communications is becoming impractical as the scope is increasing widening. This paper discusses the role of wireless communications for SCADA systems.

In the paper “A Smartphone Indoor Positioning Method”, propose a method of indoor positioning that determines the user's current position with the smart phone's sensor values. Referring to the accelerometer values, the method counts steps. With the orientation values, the method estimates the direction. With the step count and the direction, the method determines the current location of the user. Referring to the floor map, the method adjusts the user's current location from time to time. It has implemented the proposed method on Android smart phones and the test results are discussed in this paper.

Paper “How to Maximize the Effectiveness of Prompts in Assistive Technologies According to the Particular Cognitive Profile of People with Alzheimer’s Disease?” proposes comprehensive guidelines. First, it identifies the main deficits of AD that influence the effectiveness of prompts. Second, it details which prompting strategy to use accordingly. Third, it proposes an experimental protocol based on a well-known test, and new prompting software, which allows for the validation of the proposed guidelines. Finally, it present the preliminary results of a first experiment conducted in the laboratory with participants ranging from mild to moderate AD. This paper is a revised and expanded version of a paper entitled Smart Homes for People with Alzheimer’s Disease: Adapting Prompting Strategies to the Patient’s Cognitive Profile presented at the 5th International Conference on Pervasive Technologies Related to Assistive Environments (PETRA 2012).

The paper “Design of Distributed Sensor Stream Data Input System” is trying to design a data input system which collect and combine those individuals of sensor data into a big chunk of file and store it in HDFS, while using MapReduce framework to access and process those chunks inside HDFS.

The Authors of “A Proposed Integration of Hierarchical Mobile IP based Network in SCADA Systems” presents a discussion that the Supervisory Control and Data Acquisition systems are collecting data from various sensors nodes deployed in remote locations and then

transmitted to a central controller which then manages and controls this data. Utilization of wired or line communications is becoming impractical as the scope is increasing widening. This paper discusses the role of wireless communications for SCADA systems.

Paper “Development of Service Verification Methodology Based on Cloud Computing Interoperability Standard” focused on four key capabilities in the search for greater interoperability: scalability, universality, continuity, and specialty. Cloud computing can only be considered interoperable to the extent that it incorporates these four issues. Assessing these issues comprises the methodology it proposes to verify the interoperability of cloud computing architecture. Also, in order to effectively assess and implement the methodology described in this paper, there must be a stringent and detailed process of preparation, with regards to full implementation and institutionalization.

The paper “A Study of New Room Equalizer using Non-electronic Matching Method” proposes a room equalizer which uses a movable and variable acoustic board and revises frequency response, and is also applicable to a variety of places. When equalizing frequency response, commonly used electric graphic equalizers or parametric equalizers have the same effect as the sound signals such as audio passing through electrical elements like condenser or coil, and phase shift of audio signal occurs at this time. Accordingly, they secure frequency response by adjusting and equalizing the characteristics of sound-absorbing materials without any distortion of the original sound. Therefore, this study proposes a room equalizer that does not use these electrical characteristics, but uses non-electronic spatial matching with an excellent sound persistency rate to enable its application to various changes in space and time.

The Authors of “Adaptive Power and Rate Transmission in hybrid DS/FH CDMA Communications over Fading Channels” consider a hybrid direct-sequence frequency-hopped (DS/FH) code division multiple access (CDMA) communication system, where the transmission power and data rate are adapted relative to the channel variation. Instead of random frequency hopping, hopping pattern is adaptively adjusted to obtain the maximum channel gain among available frequency slots. Transmission power and/or data rate are also adapted such that a target transmission quality is maintained. It is shown that the proposed scheme provides a higher average data rate than pure DS/CDMA with power and rate adaptations, subject to the identical average transmission power and bandwidth constraints.

The paper “Defying Gravity: A Novel Method of Converting Screen Orientation” proposed a novel method considering users' hand grip pattern by utilizing sensors on the back of the mobile phone to convert the screen orientation between horizontal and vertical. The proposed method not only reflects both users' hand grip pattern and comfortableness but also has advantages in adaptability for other flat-back mobile devices, faster computational time and lower power load in comparison to conventional methods.

Paper “The Tangibility and Intangibility of e-Service Quality” aims to explore the effect of e-service quality on customer satisfaction and loyalty. Especially, the current paper focuses on customer perceptions and reactions to the tangible factors of e-service quality in the Business-to-Customer (B2C) area. This tangible e-service quality includes web design esthetics, ease of use, virtual tour, and visualization. In addition, intangible e-service quality involves information content, reliability, security, and customization. In order to investigate the interrelations among tangible and intangible e-service quality, customer satisfaction, and customer loyalty, the survey is conducted. Data from 468 tourists, who have purchased hotel

packages during the last three months from hotel Web sites, is used for testing the hypothesized model. The result shows that the significant effect of tangible e- e-service quality on the intangible e-service quality and the significant effectiveness of e-service quality in improving customer satisfaction and loyalty.

In the paper “Design and Implementation of In-House Electronic Money Using Java Cards” focused mostly on the e-money security since e-money is personal asset. In other words, it used by realizing Java Card based technology with superb security and by developing e-money Java applet to ensure safe e-money management. Moreover, algorithm for hash encryption was applied to transmit data safely within the organization when it comes to charging, authorization, adjustment and refund. Algorithm for hash encryption was applied to transmit data safely. E-money will now consolidate its position as a part of everyday life. Furthermore, hopefully, e-money of the in-house method will be utilized to create profit and as a new business culture.

In the paper “Digital Watermarking for Image Tamper Detection using Block-Wise Technique”, propose an efficient image tamper detection method using block-wise technique which is able to detect the tamper locations. In the proposed method, a digital signature is generated from the hash code of the blocks of the final level where the watermark is inserted and the blocks of the upper level where those blocks are included in the image division process and this signature is used as the watermark, which is randomly inserted into selected image blocks. As the result of experiment, the proposed method was confirmed to be able to detect the tampered parts of the image without testing the entire block of the watermarked image.

The Authors of “Effort Reduction of Unit Testing by Supporting CFG Generation and its Test Design” develops a method that fills the gap between the graph generation and the test design step. This paper analyzes the extent to which the method decreases the effort required for unit testing, and show that the method effectively reduces the effort. The effort is measured in ManMonths.

Paper “Design and Analysis of Client Control System Using DNS Control Firewall” the client control system designed for infringement blocking system development. In order words, infected with harmful files on your computer by using a user-centered information systems development and security through the design of a control system using DNS control firewall client access to the site randomly for acts that can block the under solving techniques. Design of the client control system was classified as Dynamic intrusion prevention system module design, Embedded domain name service system module design, Interlocking DNS service module design and Cert & Analysis module design. Finally, through simulation, an average of 14% was measured by abnormal packet ratio.

The paper “A Design of Advanced Authentication Method for Protection of Privacy in M2M Environment” suggests the privacy protection technique planning among Device, Gateway and Network Domain in the M2M environment. The proposal protocol protects a privacy and it also assures a confidentiality and an integrity of the messages when it communicates through Device Domain and Network Domain by using the attribute based cryptography.

In the paper “An Explorative Model for B2B Cloud Service Adoption in Korea - Focusing on IaaS Adoption”, attempts to explore companies’ adoption behaviors toward the B2B cloud services that were recently deployed in the Korean market. Especially, it focuses on IaaS among B2B cloud services provided in Korea. In order to achieve the goal, it identified key influencing factors that affect the companies’ adoption behaviors, based on an extension of the TAM. An explorative model is proposed and a number of hypotheses are tested and analyzed. The study results can not only help company users gain insights into IaaS adoption, but also help IaaS providers improve both new cloud service development and marketing strategy.

The Authors of “Adapting a Novel Dual Authentication Method based on Smart Cards” proposed adapting a novel dual authentication method based on smart cards in public networks. This method uses the ElGamal public key cryptosystem and extend Chaum–van Antwerpen’s scheme to authenticate a signature between the signer and verifier using a dual protocol with a smart card that has tamper-resistant features. It proposes the method to change the verification and disavowal protocol in Chaum–van Antwerpen’s scheme to authenticate both the signer and verifier. With these modifications, attempts to reject or deny a valid signature between the signer and verifier can be prevented or detected with high efficiency

Paper “An Offline Current-Mode PFM Controller for Low Power Residential LED Lighting with Primary-Side Constant Current Regulation Techniques” presents an offline current-mode pulse frequency modulation (PFM) controller for low power residential LED lighting, which has a better performance and a simplified structure. A novel controller which contains Constant Current (CC) regulation technique based on auxiliary winding feedback and pulse frequency modulation (PFM) mode basing on the flyback structure is presented, which simplifies the application environment. Also, an input power adjusting technique is introduced which improves the working stability. These techniques are validated by using an integrated circuit designed in 0.5- μm 700V BCD process. In the constant area, when the input AC voltage is from 85V-220V and the load resistance is from 3Ω to 4.7Ω , the test results of actual application circuit show the constant current point is about 1A and the current ripple is about $\pm 4\%$.

In the Paper “Inverter Power Monitoring System Based on VRMLVirtual Reality Technology”, introduced a Inverter power monitoring system based on virtual reality. A good interactive 3D virtual scenes Based on the communication of VRML and java, can get real-time power state parameter of inverter from database. Based on the virtual scenes, a variety of monitoring functions is achieved.

The Authors of “Identification of Permanent Faults for Three-phase Autoreclosing Using Inductance Parameter on Transmission Lines with Shunt Reactors” proposed a novel permanent fault identification method suitable for three-phase adaptive reclosure. The method uses π -type equivalent model as the prototype to build parameter identification formula. When some single phase-to-ground fault occurs, the parameter identification formula of zero-mode component is built; when some phase-to-phase fault occurs, the parameter identification formula of line-mode component is built. The current of the shunt reactor is given and the inductance of the shunt reactor is taken as the unknown parameter to evaluate the difference between the calculated inductance and the actual one so as to distinguish permanent fault from transient fault. The inductance difference of the temporary fault is minute because the actual fault model is consistent with the prototype. But the inductance difference of the

permanent fault is distinct because the actual fault model is inconsistent with the prototype. Results of EMTP simulation show that the proposed method is reliable and effective, and can be applied to the three-phase adaptive reclosure on transmission lines with shunt reactors..

Paper “Research on the Corresponding Relationship between Tool Wear Position and Chip Type in Cutting Process” as workpiece ICr18Ni9Ti for researching foundation, under turning experiments, with the high speed camera, piezoelectric dynamometer and FEM thermal imager, get relevant data from the cutting process, analyze the effect law of geometry shape and chip type from the cutting force, cutting heat, tool wear and breakage as well, in the removal process. By analyzing and summarizing the tool wear position, study the formation, curl, liquidity of chip and their influencing factors.

The paper “Using Stochastic Petri Nets for Reliability Evaluation of Subsea Annular BOP” performs reliability evaluation of the subsea annular blowout preventer (BOP) based on stochastic Petri nets. The presented model has been analyzed based on its isomorphic continuous time Markov chain. According to the derived equations, transient availability, reliability and MTTF of the annular BOP are obtained. Availability will reach a stable value very quickly while reliability decreases slowly over time. The effects of failure rates on MTTF are researched. The results demonstrate that in order to effectively improve MTTF, great efforts should be made to reduce the failure rates of blue pod or yellow pod.

Paper “A Study on the Realization of Mobile Homecare Nursing Service Based on Effective Security” developed an application for inquiring about the information of patients and homecare nursing patient clients in the middle of medical services thanks to the recent development of mobile service, and improved the safety of service by applying an effective security method suitable for mobile platform. As homecare nurses can confirm the details of homecare nursing requests, inquiries by reserved patients, progress records, etc. at home in real time, it is likely possible that a good quality of homecare nursing service that provides tailored information according to the patients’ status is realized.

In the paper “Ontology Model-based Situation and Socially-Aware Health Care Service in a Smart Home Environment”, try to model contexts which are generally distributed in smart home environment using the ontology technology. The set of modeled contexts includes home domain-based contexts and social relationship-based contexts. Based on these context models, it can provide fully personalized healthcare service to a specific user in a smart home environment. For verifying the usefulness of the proposed smart home service, it implemented a prototype of healthcare services. Through the demonstration of the developed prototype, it knows that using ontology-based context awareness model can provide situation and social-aware health care services in much pervasive way.

In the paper “Hybrid Contents Recommendation Service Using LBS and NFC Tagging”, propose a hybrid contents recommendation service using LBS and NFC technology. The proposed service divides an exhibition into the areas through analyzing the Wi-Fi signal strength and collects information that user tagged NFC tag. It recommends contents using viewing path information through LBS and viewing exhibits information through NFC. It might recommend the contents which user likes among the tagged information. Furthermore, it can recommend contents related with exhibits which are the user’s favorite, but not tagged by the user. So, it recommends appropriately the contents which is right for the user’s taste.

Through experiments, it shows that the proposed service recommends appropriately more than tagging pattern based methods.

The Authors of “FDS Simulation High Rise Building Model for Unity 3D Game Engine” proposed Smoke simulation rendering is based on game engine of particle system. But common game engine don't have stack effect model and compute coordinate position algorithm. Recently proposed method based on FDS's (Fire Dynamic Simulation) result Excel file which improves Unity 3D game engine for stake effective fire model and smoke boundaries. Using Excel file coordinates to improve Unity 3D game engine particle system, and changes the original game engine particle system, over the coordinates of particles moving location, boundary and fire model stake effect look like real world fire model. Recently game engine computer graphic researcher usually control computing resources focused on smoke visualization skip fire effect and physically problem. In this paper, need focused on smoke location boundary and fire model stake effect. The proposed method can change smoke and fire model of stack effect and particles more accurately and efficiently than other, rendering is implemented by making smoke particles and physically effect. After putting the coordinate form FDS into Unity3D game engine Experiment performance result shows particles more look like reality, and gives neutrality and reality to user's view. This algorithm problem is from simulation high rise building mesh with loading time need more computer resource, and need to change some effect in Unity 3D game asset.

The paper “Precise Attitude Control System Design for the Tracking of Parabolic Satellite Antenna” aims to track the precise location of Parabolic satellite antenna using the BLDC motor, two-axis (elevation, azimuth), encoders, gyro sensor, digital tuner AGC signal and implements precise position control in the six degrees of freedom motion system. In order to overcome various disturbances gyro sensor Yaw, Pitch, Roll 3 axes were used. To respond immediately to the disturbance at the same time, two-axis motor by controlling the precise location of the system was designed to compensate instantaneously. Conventional stepping motor that was used for position control to the correct response, but not fast, but also a lot of noise caused by the shortcomings BLDC motor noise suppression, and also increase the reaction rate, the exact position encoder coupled high system was implemented to control the completeness. Digital tuner AGC signal between the antenna and the satellite can maintain high delivery ratio and orientation angle of the antenna to the desired angle by experiment that Step input to the desired angle within 0.6 seconds were able to confirm that.

In the paper “Voice of Customer Analysis for Internet Shopping Malls”, proposed a sentiment analysis system for review sites in Internet shopping malls. Customized web crawler, filtering and natural language processing tools, sentiment analysis and visualization tools have been implemented in the system. Users can see the positive and negative opinions and their causes for various kinds of electronics products such as TVs, washers, PC, and smartphones, etc.

The Author of “The Development of Mobile Movie Tracking System and App in China” introduced a Mobile Movie Tracking System (MMTS) and its internal system developed by a theater company which operates 17 theaters in China. Through this case study, from a business perspective, components within the MMTS can be identified. Further, reservation information by individual and segment level can be collected through the MMTS and put into a database. Then, through mixture modeling, a list, time, and theater of recommended film contents that a mobile phone user would most likely to reserve is shown on the application

screen. From an academic point of view, post-hoc segmentation such as mixture modeling has been reported frequently, but in the film industry, mixture modeling is rarely used in practice. Especially, the output example in fuzzy clustering algorithm by mixture modeling in MMTS shows the probability of when, where, and which movie a potential moviegoer choosing movies.

Paper “The Development of Location Decision Making Support System for Chinese Shopping Malls from the Developers’ Perspective” aims to explore the factors that determine the attractiveness of shopping mall locations for developers, from the perspective of those who want to select site to open shopping malls in China, and to evaluate the relative importance of these factors. Through a literature review, shopping mall location, store attractiveness in the shopping mall, fit between target market customers and prices, and shopping mall image were identified as the four components in shopping mall attractiveness. The measurement variables under these constructs were also identified: size of the population within the catchment area, proximity, anchor store, tenant mix, number of stores, the shopping mall size, products, properties, and visual presentation. The preference among the four competing shopping malls in Beijing was measured after identifying the relative importance between the criteria for the four constructs and nine measurement variables through pairwise comparison using the AHP of the five experts. The researchers applied this model to four shopping malls in Beijing. Through the AHP analysis, the researchers found that the relative importance of the variables was in the following descending order: store attractiveness > fit between target market customers and prices > shopping mall image > location. Using the results, the researchers can establish a Location Decision Making Support System for shopping mall in China.

In the Paper “A Density Control Scheme Based on Disjoint Wakeup Scheduling in Wireless Sensor Networks” propose a disjoint scheduling for density control in wireless sensor network to achieve the desired robust coverage as well as satisfactory connectivity to the sink with a small set of working nodes. Simulations showed that the scheme works well in an energy efficient fashion by turning off too many redundant nodes.

Paper “Miniaturized Dual-band RFID Antenna Applied for Smart Home” proposed two kinds of novel Radio Frequency Identification (RFID) antenna, which is based on conventional dipole antenna. Through arms carried by bending or simply fractal, its size and electrical length can be decreased compared with the same frequency of the antenna. These two kinds of symmetric antennas can realize miniaturization and dual band. Because of its small size, it could be employed by smart home. And it makes change and optimization to symmetric model of the existing antennas through a large number of simulation analyses. The experiment on the processing objects shows the antennas have a good performance.

In the Paper “Bending Process Analysis and Structure Design of Orthodontic Archwire Bending Robot”, Authors proposes to use robots to replace dentists for completing orthodontic wires bending. Quantitative model of orthodontic wires with canine eminace is established based on Power function model. On the basis of bending process analysis of orthodontic wires, the overall structure, bend die and archwire supporting part of archwire bending robot for orthodontic treatment is designed.

The Author of “Energy Efficiency and Fuel Economy Analysis of a Series Hybrid Electric Bus in Different Chinese City Driving Cycles” establishes simulation model of the series

hybrid powertrain. The energy efficiency and fuel economy of the series hybrid electric bus are analyzed by energy flow method in the driving cycles of Chinese typical city, Zhuzhou city in Hunan province of China, and Hefei city in Anhui province of China. Simulation results show that, APU parts selection, braking system configuration and control of the series hybrid electric bus can be optimized. The fuel-saving ratios reach nearly 20% in all driving cycles.

In the Paper “Design and Implementation of a Miniature Intelligent Vehicle Test Platform”, Authors propose to design and build a miniature test model before building a real scene. The whole test system consists of the simulated traffic environment, the micro-intelligent vehicle and the visual information processing. Firstly, a micro-intelligent vehicle test platform applied to visual information perception is proposed. Secondly, some algorithms about traffic environmental element detection such as lane detection, traffic light and traffic signal recognition and obstacle detection are presented. The experiment validated the proposed approach. On the one hand, the main visual technologies of intelligent vehicles such as line detection, obstacle detection, and traffic signal recognition can be tested in this system; on the other hand, the test result can be used to evaluate and improve the design of the real test platform.

In the Paper “The Design of CMOS Integrated Acceleration Detection Circuit System”, Authors designed a kind of CMOS integrated precision acceleration detection system which is use high performance operation amplifier as the core. It was analysis directly as a low noise accelerometer and the principle of charge amplification. Detection circuit is based on the principle of time detection, which can be detected variation of the acceleration continuously in a successive time, and improving the detection accuracy. The input terminal of the circuit using sensitive charge amplifier to realize C-V conversion, which is effectively avoid the switch noise of detection principle. The whole circuit is designed and simulated based on 0.5 μ m CMOS process. The research result of Operational Amplifier module has shown that, the circuit's the DC open-loop gain is 85.96dB, and its phase margin is 62.8°, and the effect input noise is 3.632. The research result of overall current has shown that, full scale range of the closed-loop system between ± 2.5 V the voltage is ± 30 V. The detection sensitivity is 16.2mV/g, which is enough to conform the requirements of the low noise accelerometer. HznV/

Paper “A Novel Way of Storage and Recycling of the Context Information Data”, proposed temporary storage and utilization for the sensing data in other to enhance the performance of the context awareness. The criteria to judge whether to use or not the sensing data reported from the sensor in the next time zones was presented by saving it temporarily, the data proved to be used in the next time zones should be recycled. On using by calling the Basic Probability Assignment saved, weights corresponding to the increment of the previous and present time zones should be added. Since then, the belief and uncertainty were calculated by using each focal element's BPA and through this, advanced information can be deduced rather than obtaining context information.

The Author of “Intelligent Shoulder Joint Home-Based Self-Rehabilitation Monitoring System”, proposes an intelligent monitoring system for home-based self-rehabilitation. In this system, smart phones serve as the platform for integrating an accelerometer-based sensor network for monitoring the performance of rehabilitation exercises by patients with shoulder injuries. The developed sensor network comprises 2 accelerometer sensors and the built-in

smart phone accelerometer that communicate using Bluetooth protocols. The following 5 monitoring exercises were included in this study: touch ear, use fingers to climb wall both facing and sideways to the wall, clockwise and counterclockwise pendulum circles, active-assisted front and side stretches, and raises hand from back. Shoulder rehabilitation activities are recognized by the Support Vector Machine algorithms and recorded on the smart phone. These records can be used by patients as a reference of their activity. The records can also be uploaded to the hospital server to assist physicians in monitoring the effectiveness of exercises. The proposed approach is low cost and can be extended to various monitoring targets by simply installing a new Android app.

In the Paper “Effects of CEE on ASER performance for Cooperative AF Relay Systems with PSA-CE Schemes”, Authors propose the analytical approach for amplify-and-forward (AF) relay cooperative transmission in the presence of channel estimation error (CEE) generated by pilot symbol assisted-channel estimation (PSA-CE) schemes over quasi-static Rayleigh fading channels. Average symbol error rate (SER) is expressed as the well-known closed-form by using moment generating function (MGF) of the received signal-to-noise ratio (SNR), which quantifies the SNR penalty arising from CEE. Moreover, the effect of CEE on SER performance is verified based on the number of pilot symbols and the accuracy of the derived average SER expression of M-ary phase shift keying (MPSK) is confirmed by comparison with simulation results.

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**Editors of the September Issue on
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