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 "A Study on Strategic Modeling to Develop Comics Content with Smart Device Platform" proposed the strategic model for developing and distributing content, and support to progress Korean comics market steadily. This application of modeling can produce diverse content with qualitative improvement. Moreover, it can expand comics market and then complete a virtuous circulation to reproduce comics through profits.

In the paper "CRM Fit and Relationship Quality in Hotel Industry", attempts to examine the effect of the FIT between each stage of CRM process and Internet usage for each stage. CRM Fit and relationship quality variables have been identified from the aspect of customers who have membership of a certain hotel. The results showed that the Fit for the maintenance stage has a positive effect on Commitment, which leads to Loyalty. Customer Orientation was also found significant to influence Satisfaction and Commitment. Interestingly Termination stage has a positive effect on Commitment while it has a negative effect on Satisfaction.

Paper "Activity Recognition In Smart Home Using Weighted Dempster-Shafer Theory" aims to define more precise sensor reliability and decrease uncertainty in sensor data in the activity recognition process within smart home. In the proposed method, in training step some models are built for per activity according extracted features from training samples and then in the prediction step when a new signal sensor is observed, the features extracted from that signal and applied to models and a weight is calculated for that sensor. These weights are considered as sensor reliability and uses in the decision making process.

The paper "Meta-Analysis on Relations between E-Learning Research Trends and Effectiveness of Learning" seeks to investigate research trends on e-learning in Korea for the past 10 years and meta-analyze relations between e-learning and its effectiveness with an eye on confirming the effectiveness of e-learning. The analysis showed that there is a high correlation between changes in the society's overall interest in e-learning and the number of published papers on related subjects(r=.672). Early on, researches focused on applicable areas for e-learning, but the focus gradually shifted towards design. In terms of research method, survey based on paper questionnaires or data analysis on research subjects showed a high percentage (49.3%), and research areas have been found to be meaningfully related to research methods (Fisher's exact test: 42.019, p=.012). Overall effectiveness of learning through e-learning proved positive, but the mean effect size was somehow small (Mean ES=.301).

The Author of "Structural Relationship among Affective Characteristics, Cognitive Characteristics, Students' Participation, and Course-retaking Intention in E-learning Environment" verify the structural relationship among affective characteristics, cognitive characteristics, students' participation, and course-retaking intention in e-learning environment. Web survey was conducted from one university in Korea and 210 students participated in this survey who already took e-learning courses. A hypothetical model was proposed, which was composed of affective characteristics, cognitive characteristics as a extraneous variable, and students' participation, course-retaking intention as endogenous variables. Also, students' participation has been suggested as a intervening endogenous variable. The results of this study through structural equation modeling analysis are as follows: First, affective characteristics affect students' participation, course-retaking intention. Second, cognitive characteristics affect students' participation but doesn't course-retaking intention. Third, students' participation mediated between affective characteristics and course-retaking intention.

Paper "Study on Communication of Characteristics Smart Learning from UX Perspective" is based on the stance that, as smart learning is mainly practiced through smart devices people carry with them every day, its platform evaluation should go beyond just simple evaluation of content effectiveness but to more diversified aspects such as users' feeling, association, and difference. And such smart learning analysis and evaluation should be connected to subsequent emotional UX management and brand asset management that serve as strategic guidelines for mobile telecommunication op erators' platform business and e-learning content production. This study examined more customized functions of mobile telecommunication operators' smart learning platform services currently available in the market by considering the perspective of the emotional UX. By doing so, this thesis sought to make some strategic approaches to create values.

The paper "PC & ARM-based Design of Remote Control System for Intelligent Home" introduces the hardware and structure of the remote control system for intelligent home. The design method of main modules, as well as the structure diagram of the software implementation and the concrete implementation of the control system is also introduced in this article. There are many interfaces in this system. Along with the development of broadband wireless communications technology, network technology and microprocessor technology, the remote control system for intelligent home will be perfected and developed. Intelligent home is a sign of improvement in living standards in recent years.

The Authors of "Smart Learning System using Contents Adaption Method" propose an Intelligent Tutoring System (ITS) for learning English that uses multi-modal technology. By overcoming mobile environment limitations and using appropriate mobile contents and content negotiation; and adaptation strategies, the proposed system provides an effective learning method based on ITS-supported teacher's role.

The paper "Implementation of Privacy Policy-based Protection System in BEMS based Smart Grid Service" examined this issue by focusing on the load management system based on BEMS that uses the privacy policy-based protection system in the smart grid environment. The structure of the privacy policy-based protection system using load management system in the smart grid environment is the structure that serves data in the load management system to the web through the application service network. For this, the privacy policy-based protection system suggested and developed the smart grid privacy policy-based protection system which

controls service access by protecting items related to the personal information of the user and setting the privacy protection level for each item.

Paper "Kindergarten Teachers' Understanding on Multimedia Application" conducted a survey targeting a total of 161 currently in-service teachers in early childhood education institutes in Daejeon and Chungnam area in order to understand the teachers' recognition and present status on multimedia activity that would be frequently performed in the early childhood education institutes. For the data analysis, frequency analysis was carried out with SPSS 17.0.

In the paper "Research on Regression Testing Methods for Industry Applications" discusses the problems about scope accuracy and quality control in application of regression testing in the engineering practice, and proposes a practical regression method, combing with change-impact-analysis, business rules model, cost risk assessment and test case management.

In the paper "A Study on Smart Phone Use Condition of Infants and Toddlers", investigated the smart phone use condition of infants and toddlers, and mothers' perception of their children's smart phone use, including the role of a mother's parental efficacy in making difference in the smart phone use condition of infants and toddlers. Parents whose children go to childhood education institutes in D and I cities were selected as research subjects. The total number of the children was 500, and with collected data, frequency analysis and difference verification were carried out by using SPSS program. The results of study showed that infants and toddlers most frequently used smart phones at home with their mothers, and toddlers used smart phones more than infants did, and infants and toddlers used smart phones 'less than 5 times a week', with average 1hours a day. Secondly, analysis of mothers' perception of infants and toddlers' smart phone use indicated that the need of their children was the most influential factor. And mothers who said their kids needed a smart phone considered it a useful learning tool, but others opposed smart phone use because of its negative effects on children's physical and cognitive development. Among many programs, cartoon animation was most frequently used with smart phones, contrary to the infrequent use of educational contents. Thirdly, the difference in smart phone use condition according to parental efficacy of mother showed that there was a significant difference between the number of use and average use hours.

The Authors of "Incremental Weighted Mining based on RFM Analysis for Recommending Prediction in u-Commerce" proposes a new incremental weighted mining based on RFM((Recency, Frequency, Monetary) analysis for recommending prediction in u-commerce. Association rules search for the associated item set on large database. Association rules are frequently used by the marketing pattern analysis in e-commerce, recommendation to promote for selling a product in marketing. The proposing method can extract frequent items and create weighted association rules using incremental weighted mining based on RFM analysis rapidly when new data are added persistently in order to predict frequently changing trends by emphasizing the important items with high purchasability according to the threshold for creative weighted association rules in u-commerce.

Paper "Design Study of the U-city Home Network Architecture of Cloud Computing" defines a new paradigm as Electronic as a Service using cloud computing for next-generation ubiquitous network environments and propose new U-City home network architecture. The system shows that ubiquitous services can be provided to users effectively in a Home network

environment. The performance of the developed proposed system is observed by measuring the data processing time. The system shows that ubiquitous services can be provided to users effectively in a Home network environment..

The paper "An Indoor Hybrid Localization Approach Based on Signal Propagation Model and Fingerprinting" propose a new hybrid localization method for tracking moving object using the two typical methods which are signal propagation model and fingerprinting. According to a threshold which is defined as an effective working distance of signal propagation model between target tag and RFID reader, it chooses the different localization algorithm to estimate the location of moving object. The threshold is obtained by calculating the slop of signal attenuation curve. If the distance is within the effective reading range of RFID reader, it revise signal propagation model by maximum likelihood estimation and use it to calculate the object position by minimum cumulative error. Otherwise, the fingerprinting location method is used in the external area, and the particle filter is also used as the core algorithm.

In the paper "Product Line Pricing Effect Modeling for Shipment Timing Support System for Stored Apple", aims to develop comprehensive modeling alternatives for intra-product line pricing effect and compare the explanation power among them. The researchers want to include the highest explanation power model for Shipment Timing Support System for stored apple. Five intra-apple pricing models were developed and applied to the wholesale price data with four graded Fuji apple announced by SAMPC in Korea. Five intra-apple pricing model divided into three dichotomies: the first model for price level effect with proportional response, the second and third models for price gap effect with proportional response, and the fourth and fifth models for price gap effect with non-proportional response.

The Authors of "Programmable RF Built-In Self-Test Circuit for 5GHz Wireless LAN" proposes a new programmable RF Built-In Self-Test (BIST) circuit for 5GHz Wireless LAN. It is fabricated using 0.18-μm SiGe technology. This circuit is useful for testability of GHz-band RF IC devices in a complete RF transceiver environment. The proposed circuit helps it to provide DC output voltages and accurate phase difference. It contains two peak detectors and a phase detector.

Paper "Average Error Rate Expressions for DF relay Networks with CE Error for PSA-CE schemes Over Rayleigh Fading Channels" provides a framework for evaluating the error rate performance of decode and forward (DF) relay cooperative transmission in the presence of channel estimation (CE) error caused by pilot symbol assisted-channel estimation (PSA-CE) schemes over Rayleigh fading channels. Average bit error rate (BER) and average symbol error rate (SER) are expressed as the well-known closed-forms by using error-events at relay nodes and moment generating function (MGF) of the received signal-to-noise ratio (SNR), which quantifies the SNR penalty arising from CE errors. Moreover, the effects of erroneous detection and transmission at relay nodes are verified in terms of both the combined SNR and the average error rate, and cooperative diversity is observed from closed-form error rate expressions.

In the Paper "Design and Implementation of Security Systems for Smart Home based on GSM technology", suggests two methods for home security system. The first system uses web camera. Whenever there is a motion in front of the camera, it gives security alert in terms

of sound and a mail is delivered to the owner. The second method sends SMS which uses GSM-GPS Module (sim548c) and Atmega644p microcontroller, sensors, relays and buzzers.

The Authors of "Location Control Techniques of Object via Mapping Gesture on Touch Screen to 3-Dimensional Coordinates" propose new input techniques to control the location of object in 3-dimensional space. The method traces user's touch and move action on touch screen, decodes actions, and translates into 3-dimensional coordinates. To trace user's touch and move action, it use one or two fingers gestures. It implements sample Android application adopting the techniques.

Paper "Synchronizing Adaptive LPI Control Mechanism for Improving Energy Efficiency in Ethernet Switch" suggests Synchronizing Adaptive LPI Control Mechanism in a bid to improve the energy efficiency between interfacing terminals on Ethernet network and the Ethernet switches. This mechanism determines ON and OFF durations of consecutive cycles based on the measured incoming traffic quantities from the terminals. It keeps transferring cycle information which is the most proximate to the traffic bursting cycles while resting in idle is left to LPI mode by conveying the corresponding information to the switch. This paper conducts the performance evaluations with simulations on Poisson distribution traffic and burst traffic.

The paper "Security Measures of Personal Information of Smart Home PC" aims to search and encrypt information related to protecting personal information in a smart home PC to enhance security and to delete files so that they cannot be recovered. The analysis of vulnerabilities detected in a smart home PC aims to check user account, shared folders, service firewall, screen savers, and automatic patch updates. A quantitative analysis and expression about vulnerabilities after checking them is carried out to make and show a check list for enhancing security. Smart home PC security management is then managed and operated by a server semi-automatically.

Paper "Activity Recognition in Smart Homes Based on Second-Order Hidden Markov Model" applied second-order Hidden Markov Model to activity recognition. The relationship between the probability and the model's historical states is considered reasonably. The approach shows higher precision than previous approaches by experiments.

In the paper "Quality Measurement for Mobile M-ERP Applications", investigate the relationship among M-ERP system internal control, quality and performance in Korean firms. To investigate the relationship, the questionnaires were collected from 131 M-ERP – adopting Korean manufacturing companies. The following results were determined by verifying six hypotheses using LISREL. Internal control support perceived quality and quality support perceived performance. It expects that the results of the research can be used as the guidance of the implementation strategy of M-ERP systems.

In the paper "The Design of an Automatically Generated System for Cross Sections of Underground Utilities using Augmented Reality", build a database of underground utilities in order to produce accurate locations and information about underground utilities in a visualized form, and by analyzing the data, build a system which automatically generates cross section of the underground utility at the location where the user requires. Also, it provide the user with efficiency in identifying accurate locations of the underground utility

and in information management by producing the exact location of the underground utility as data on the basis of augmented reality and by visualizing it in realistic data.

The Authors of "A Novel Model for Home Media Streaming Service in Cloud Computing Environment" proposed model that provides remote access functions for receiving multimedia services in home networks and in wireless local area networks (WLANs). The model has four components, i.e., the Assistant Gateway, cloud server, remote controller, and media device renderer. The Assistant Gateway is an important component in the proposed model. It can access a cloud server to obtain multimedia content information before sending it to users in a home network. Thus, users can receive home media streaming services via the Assistant Gateway using a media device renderer. Based on this model, it implemented each component to support streaming service for users in remote areas.

The paper "State of the Art: Embedded Middleware Platform for A Smart Home" presents a review of the state of the art of pervasive middleware platforms for enabling a smart home. There are numerous projects carried out by industry and academic research groups to examine embedded middleware platforms for smart homes. There are projects that consider problems ranging from software to hardware issues of smart home technology and associated issues of privacy, security, and social concerns. These projects emphasize numerous functional and non-functional requirements of a smart house. It discusses stimulating and valuable projects in the literature that addressed some of the concerns that are at the basis of the middleware platform proposal. It considers two aspects during the overview of the state of the art. First, it review a number of existing and recently funded research projects that focus on pervasive embedded middleware platforms. Second, it looks at pervasive methodologies and technologies that are relevant to the middleware platform.

In the paper "Implementation of a Smart VOD System Prototype", deals with the study of Video on Demand (VOD) service that allows users to select and watch video content which is the most popular IPTV service and it is known that most of Internet traffic is for VOD service. It would be very attractive if a VOD service correctly recognizes the situation where the user wants to watch a video, finds out what video the user wants to watch, and actively plays the video for the user. The VOD system does those things and is called Smart VOD. Smart VOD is a client-server system. The client is an Android app that collects sensor values, displays a floor map, and plays a video. The main components of the server are the floor maps repository system and the VOD server. The repository system allows users to upload electronic floor maps, draws maps, retrieves the requested floor map, downloads a graphical floor map, and manages information of points of interest. The VOD manages information of users, determines user's current location, and recognizes the object that the user is watching.

The Author of "Design and Implementation of Android-based Livestock Disease Forecasting System using Thermal Image" propose a livestock disease forecasting system for diagnosing in advance livestock disease status in real-time through image information of livestock by using thermal image camera. The proposed system can extract livestock temperature information through images collected from thermal image camera to diagnose in advance livestock disease status through Android-based smart phone.

Paper "Cloud Computing based Livestock Monitoring and Disease Forecasting System" proposed various services using the environment data that is generated at livestock, as well as facilities data and livestock activity amount data. To collect these data, sensor network is

mainly utilized. Since data is continuously generated in system using sensor network, it is necessary to establish server that is ease to expand and that can efficiently manage the data. Accordingly, HBase was used for the cloud computing system proposed in this thesis for optimum performance under such condition, and MapReduce parallel processing model was used for effective search and management.

In the Paper "The Design and Solution of Students' Entrepreneurial Practice Ability Training Cloud platform" goals to solve the problems of training the students' practice abilities in colleges' entrepreneurship practical teaching, to develop students entrepreneurial practice ability training cloud platform with the use of kinds technology means such as cloud computing, internet technology, embedded technology and network communication, considering the features of school entrepreneurial practical teaching in school. The platform is constituted by many modules such as entrepreneurial assessment, business school, business hall, entrepreneurial capability evaluation, career plan, career decision analysis, business simulation management, etc. Adopting practical training in human-computer interaction model, the platform simulates kinds of problems during their starting business. Platform includes various modules such as disciplines different training system, evaluation system, certificates, cooperating between colleges, employment tracking and business guidance. It effectively strengths the management flexibility of students practical business ability training cloud platform, carry forward the practical teaching of starting business and co-building the lessons of starting business.

Paper "Design and Implementation of Reliable Content Transaction System in Smartphone Environment" propose a transparent and reliable online distribution infrastructure system equipped with improved protection of consumer rights, supplier revenue, and enhanced prevention of copyright infringement. To be precise, this secure digital content transaction system enables N-screen based consolidated authentication model from various smart devices to process transaction confirmation anonymously so that consumer's personal information can be protected. In addition, this anonymous authentication technology between user and service provider also allows possible security threats to be traceable by using traceable anonymous technology.

In the Paper "Study on Motion Recognition Scheme Using Acceleration Sensor in Mobile Devices", proposed a motion recognition scheme using acceleration sensor of smart devices and is experimentally analyzed with a server. Sensor data of 3-axis acceleration of a smart device is collected and 2nd order Butterworth low pass filter (LPF) is applied to reduce noise. With the collected sensor data, the various motions such as falling, sitting, lying and walking are distinguished one another. Based on the fixed threshold by the probability approach, falling motion is especially distinguished from other motions as an indication of emergency situation. A server displays current states and alarm states. The proposed scheme is evaluated through experiments.

The Author of "Discriminating Event Information for Calculation of Basic Probability Assignment" proposed a novel way to calculate Basic Probability Assignment (BPA), which is crucial in the data fusion. The study mapped sensing signal with a linear discriminant function analysis and assessed the sizes with time. This was beneficial to get a clue for context inference with using the Dempster-Shafer Theory and to determine BPA based on the size changing of mapping data in time intervals. The study provides with the way of context inference for fast detecting a local event that affects the whole area.

In the Paper “Research on No-Contact Hydraulic Dynamic Seal Characteristic based on CFD” deals with the sturdy Non-contact hydraulic seal (clearance seal) decrease the leakage by the small clearance between the seal. Non-contact seal is the seal form is very simple. The sealing effect depends on the size of the clearance and pressure difference, the length and parts of the sealing surface quality. Among them, the clearance size of the greatest impact on the sealing performance. The hydraulic systems sealing mathematical and computational fluid dynamics(CFD) model are presented to estimate the impact of eccentricity ratio, seal clearance and pressure are has to hydraulic force and leakage.

In the Paper “An XML Based Communication System for a Ubiquitous Game Simulator”, proposed communication system to support a ubiquitous game. For ubiquitous games, players do not need to get together to use the same game console. Instead, they can enjoy the game together while being in different places so long as they are playing at the same time. Because players might use different kinds of game consoles in different places, there needs to be an interoperable communication system for the games. In this paper, therefore, an XML based communication scheme is proposed and XML documents are defined to represent all the information generated by the game simulator and to process the game progress.

Paper “A Framework and its Associated Process-Oriented Domain Specific Language for Managing Smart Residential Environments”, aims to explore the previous challenges in the context of controlling Smart Residential Environments (SRE). The proposed solution consists first in defining a generic ontology of such environments and then in using it within a Domain Specific Language (DSL) for designing and controlling different environment processes.

The Author of “A Prototype Home-Based Environmental Monitoring System”, describes the development and performance of a low-cost, easy-to-use and easy-to-maintain wireless sensor network suited for home environmental monitoring. Low-cost and ease-of-use are achieved through a single open-source software element developed for use on a home computer and a low-cost sensor node element that can be simply placed and turned on. Ease-of-maintenance is achieved by prolonging the sensor's battery life and minimising user interaction. Data is retrieved from the sensor and aggregated to central location automatically when the home PC/sink node is turned on.

In the Paper “Service-Oriented Layered Architecture for Smart Home”, Authors proposed a three-layered service-oriented architecture for smart home. On the one hand, the proposed architecture provides the facility to model the smart home in terms of devices and the services they provide, while on the other it provides the mean of communication to heterogeneous devices present in a smart home. To show the effectiveness of the proposed architecture, it was applied on “Food cooking and ordering” scenario in a smart home.

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