

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 22 articles. Achieving such a high quality of papers would have been impossible without the huge work that was undertaken by the Editorial Board members and External Reviewers. We take this opportunity to thank them for their great support and cooperation.

The paper about “A Study on Appropriate Temperature of Phase Change Material applicable to Double Skin Facade System for Heating Energy Load Reduction”, was conducted to apply a phase change material (PCM) to the inner skin part of a double skin facade to positively utilize natural solar heat so that a double skin facade may not only counteract external environmental changes but also positively introduce external natural solar energy, highlighting the advantages of a double skin facade. However, PCM is currently used by impregnating to a wall or a board of a building. Studies on the determination of an appropriate PCM temperature according to the applications are only conducted with respect to a wall or a board. Applying a PCM to an inner part of a double skin facade system involves variables such as impregnation method and appropriate temperature. These are the properties of a PCM, which are important variables directly affecting the room temperature depending on the mixing ratios and applications targets. This study was conducted with respect to window surfaces having a direct impact on the inside and the outside of a building to select a double skin facade system having excellent energy-saving performance and determine a PCM temperature which is applicable to a double skin facade, verifying the indoor energy-saving effect depending on the application of a PCM to the inner part of a double skin facade.

The Authors of “Adoption and Diffusion Rule of LBS in the View of Social Network Privacy – A Case Study of SinaMicroblog LBS” selects the aggregation form based on Microblog content in the LBS of SinaMicroblog, namely, LBS Microblog, as the object of study, acquires an actual Microblog user data sample of over 30,000 items, with over 8.64 million Microblog postings and 20 million Microblog re-postings of these users, conducts a contrastive research on the adoption behavior in LBS of users at Hub nodes and common nodes in social network through relative analysis, and discusses the diffusion rule of LBS through BASS model. The study finds that the structure attribute of users in social network has strong influence on the adoption rule of LBS ; the adoption of different types of LBS by users is obviously in consistency; LBS is remarkably influenced by emergencies related to privacy.

The paper “Design of Simulator for Cloud Computing Infrastructure and Service” provide SimCloudIS: simulator for cloud computing infrastructure and service. The SimCloudIS provides cloud system components such as the datacenter, host, VM, application, network and scheduling polices that are extendable and managed in independent layers. The network component supports packet based network communication which is based on the real network model, thereby facilitating simulation of internet based services

In the paper “A Novel DC Power Line Carrier Technology for the Technological Process of Water Distributor in Water Injection Well” a novel DC power line carrier technology based on the Orthogonal Frequency Division Multiplexing (OFDM) technology is proposed, aiming to save the difficult communication problem between the underground and the surface. Using the signals on the power line, it includes the modulation and demodulation techniques and filter encoding technology to transmit the data.

The paper “The Service Recommendation Method based on Semantic Technology in Ubiquitous Computing” use SAWSDL (Semantic Annotation WSDL for XML Schema), which is Semantic Web Services technique. SAWSDL provides two construct: modelReference and schemaMapping to enhance WSUN service substitution method. A modelReference specifies the association between a WSDL or XML Schema component and a concept in some semantic data. Semantic annotations using modelReference help to discover substitutable operations. In addition, a schemaMapping solves the heterogeneity of I/O message structures and parameter types of operations. Consequently, even if the operation, which has same functionality of unavailable operation, has different I/O message structures and parameter types of unavailable operation. In order to recommend the operation has good quality, it defines the quality of operation. It is a criteria that user can choose the best operation. In addition, it takes a user weight for accommodation of user’s requirements. The recommendation system prioritizes operation through calculating quality of operation based on user weight value. Therefore, operation by operation’s priority recommends users. The system supports substitutable operation discovery mechanism using Semantic Web Services technique, and substitutable operations list to satisfy user’s requirement recommend in ubiquitous environment. Therefore, user can discover substitutable operation in substitution situation. In addition, substitutable operations to fit user requirement recommend user according to weight value from user.

In the paper “Induction Power Transmission System Parameter Identification and Constant Current Control”, authors proposed DC/DC circuit for dynamic adjustment method Based on the current source power transfer system. The method ensures that the transmission efficiency is the biggest. Because the power system loads the randomness of the nature, power transmission of AC induction system has the low efficiency. In order to improve the transmission efficiency, the transmission efficiency influenced factors of the system is analyzed.

Paper “Design and Implementation of Heating Saving Energy System based on CANBus” energy-saving heating system was designed using CAN technology, and different users’ requirement was thought, and room control was achieved with a relatively low cost. CANbus is a modern system in reliability improvement design concept which shows the transmission distance is longer than ordinary methods, and it can hang node on the optional position in availability distance. The nodes are linked in parallel, and not interfere with each other. By using the CANbus technology, the relay output module with a radiator, thermocouple acquisition module is linked to the temperature sensor. The temperature sensor collects information from the outside system. Relay output module controls heating valve based on the temperature information, and make temperature of the room controlled automatically. Four energy-saving modes are developed in this project.

The paper “IP Based Network Public Address for Intelligent Building Environment” shown experimentally the mechanism of IP based public address based on the audio streaming implementation over network. Hence, the adoption of broadcast mechanism in three-step completion process is reasonable in order to deliver high performance managed audio distribution over the LAN infrastructure. This is suitable to be applied in IP based network public address system, which reflects critical concern on the capacity of simultaneous audio channels within the network.

In the paper “Detection of Building in Natural Images with one New Discriminative Random Fields” authors presents a new Discriminative Random Fields (DRFs) framework. Based on the DRFs framework proposed by Kumar and Hebert, the following improvements have been conducted. Firstly, the interaction potential and the associated potential model are simplified. Secondly, it reduces the dimension of the multi-scale features, re-define dimension of the single-scale feature, and increase the color feature of Building. Thirdly, the quasi-Newton method with linear search and gradient descent method are adopted to solve parameters, which get a simple model and achieve good performance.

The paper “Application of Rank Sequence Localization Algorithm based on Voronoi and Spearman in WSN” proposes a rank sequence localization algorithm based on Voronoi and Spearman. First of all, the paper divides the localization space of WSN according to the Voronoi diagram, takes the polygon’s points, center of gravity and the boundary intersection as virtual anchor nodes, and builds the rank sequence list for virtual anchor nodes and anchor nodes. Afterwards, the paper calculates the Spearman's rank correlation coefficient of unknown nodes sequence and optimal sequence, and realizes the weighted estimate of unknown node location through coefficient normalization.

Paper “Proposal of the Promotional Video Design Model of Culture Contents, using 3D Image Moving Technique: Applying the Augmented Reality and E-museum Concepts” is about the new expressive techniques for promotional videos for culture contents and aims to propose a new design model for making effective promotional videos using augmented reality technology and E-museum concepts. Augmented reality is one of the up-rising intelligent information technology, but has been barely used for promotional videos. However the technology enables the interaction between physical objects in the real world and virtual image through digital devices. Augmented reality opens the door for connecting real and virtual world, and invites humans to the virtual environment. There are growing numbers attempt to move off-line culture contents into on-line space. Considering the connection between culture contents and digital environment, more studies about the convergence is necessary in the cultural-art industry, especially for marketing business. Therefore, this study aims to take a brief look at augmented reality technology, and proposes the new experimental model and expressive techniques for cultural-art organizations’ promotional video, which set the experiential learning environment, and enables consumers to take contents actively.

Authors of Paper “Outer P-sets and Disguise of Warning Information- Application” presented concepts including - warning information image, -disguise particle size, information circle, and pure dependence on information image, etc., and theorems including the theorem of generation about - warning information image, embedded circle of -warning information image, the theorem of embedded disguise about information image, the first recovery theorem of information image on the basis of P-sets theory in order to solve the security problems in transmission of sea typhoon early warning information image. Disguise algorithm which is

original and applicable to network information is built with these theories as the guiding principle.

Authors of Paper “Analysis of RFID Application for U-healthcare System in Internet of Things” surveyed and analyzed the technologies and characteristics of RFID and its application based on IoT. In the past years, Internet of Things (IoT) has been focused and fused with wireless sensor node such as RFID, NFC tag and small sensor nodes, especially for hospital environment with mobile device. Due to the weakness characteristics of wireless signals, unauthorized person can access easier to hospital networks in wireless part than wired network systems. This may induced in several security problems.

In the paper “Design and Implementation of Smart Home System Based on ZigBee Technology” authors proposed smart home system solution. Firstly, this paper analyzes the characteristics of ZigBee technology, device types, network topologies and ZigBee protocol specification. Secondly, a design scheme of smart home system based on ZigBee technology is put forward and discussed. Then, the hardware design of ZigBee nodes based on CC2530 chip is given in detail. And, embedded programming software in each ZigBee node and user management platform software are implemented respectively using IAR and Microsoft Visual C++ 6.0.

The Authors of “A Hybrid Simulation System for Juicing and Filling Production Line” propose a new design method by introducing virtual design technologies to develop a hybrid simulation system for juicing and filling production line, based on modeling software SolidWorks, virtual reality software EON Studio and application development software C++ Builder. It also describes our design method from aspects of process design and layout design, scene modeling, model import and route configuration, and interactive simulation control. Besides, it compares our design method with one traditional design method.

This paper “A Study on the Collection Site Profiling and Issue-detection Methodology for Analysis of Customer Feedback on Social Big Data” proposes a methodology which detects issues by analyzing diverse data patterns as a method for analyzing the Big Data of social media. The Issue-detected Methodology defines the independent variables as contents and writers which affect the spread of negative public opinions, and the dependent variables as average reaching time and speed of the issues. The influence of the negative public opinions is detected concerning issues based on the numbers of tweets and re-tweets. The service providing corporations may prepare appropriate measures by the issue detection prior to the spread of the negative public opinions.

Authors of paper “A Novel Integration Model for the Simulation of Kiln Landscape in Ancient Fu Liang Area” create virtual maps of ancient Fu Liang area and propose such constructs to unambiguously denote a novel integration model. In this model, ancient virtual maps are created by ARCGIS10.0 software and PCI9.0 software, land use changes are performed through cellular automata, decision processes are controlled beyond the multi-agent, spatial optimization is represented by particle swarm optimization. It uses the simulation approach to recreate the kiln transformation of Fu Liang, Jiang Xi, annually from 1271 to 1554.

The paper “Novel Microstrip Antenna Design” presented novel, compact and low cost suspended plate antenna miniaturization design for 2.4GHz application. It is observed that

significant size reduction from a conventional rectangular patch antenna can be achieved by implementing these proposed techniques. For this, the radiation properties such as impedance band width, return loss, gain, directivity, efficiency, radiation pattern and surface current was discussed and analyzed. Improvements were also made based on best efforts to minimize the degradation.

In the paper “Microcontroller Implementation of Rule-based Inference System for Smart Home” the limited role of the sensor node in traditional M2M communication is improved in order for the sensor node to make inference based on the sensor data. If the sensor node can make inference, it is possible to provide basic context-aware services within sensor node level. Therefore, in this paper, implementation of rule-based inference system on microcontroller for smart home is proposed. Recently, the development of Machine to Machine (M2M) communication has been largely accomplished in a variety of fields including smart home. In M2M communication, the role of sensor node is only limited to gather data and send them to upper application layers.

In the paper “RFID Indoor Localization Algorithm Based on Adaptive Self-correction” some traditional RFID indoor localization systems were studied, such as LANDMARC to improve the accuracy of active RFID indoor location system. On this basis, an adaptive self-correction location algorithm was presented, which uses a positioning correction value to correct the positioning result. N minimum errors and position results are obtained by using adaptive K-nearest neighbor algorithm N times. The positioning correction value calculated with N minimum errors in weighted way. The sum of the positioning average value and the positioning correction value would be the final positioning results.

Paper “E-Learning Platform Development using A Model Driven Methodology Approach” introduce LMSGGENERATOR, a multi-target Learning administration framework generator with a model-driven procedure focused around MDA methodology coupled with part approach. Taking into account generative programming, from client determinations (abstract models) and the fancied advances, programming blocks will be created and amassed to deliver a complete arrangement adjusted to zone and clients' necessities. This paper concentrates on the change guidelines actualized in the LMSGGENERATOR centers .Also; it introduces a careful investigation to delineate this proposal.

The paper “Network based Mobility Management for Smart Homes through Proxy Mobile IP” presents a discussion of the concepts of proxy mobile IPv6 applied to smart home networks in order to spontaneously control the home devices and equipment while the home owner is mobile. An overview of the concepts of smart homes and proxy mobile IPv6 are also presented.

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**Editors of the November Issue on
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