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 & Engineering Research Support soCiety.

This issue contains 24 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 "Research and Design of Coal PLC Control System in Coal-fired Power Plants", Coal handling system in thermal power plant is the important component of the auxiliary system of power plant, it takes on the power plant's power to produce fuel supply missions with other corresponding mechanical and electrical equipment. During the operation of thermal power plants, the improvement of working efficiency of coal handling system is the key factor to improve the work efficiency of the whole power plant, the whole process of remote monitoring of coal is also put forward higher requirements on the design of automatic control system, so they choose the most widely used PLC control system in coal handling system, it makes the dream a reality.

The paper "A Pervasive Interconnection Technique for Efficient Information Sharing in Social IoT Environment" presents a method and algorithm which is based on not only the analysis of the human's social network but also the consideration of the device's sociality. Then they describe some scenarios and implement prototype system using the scenarios. Some experiments are conducted. From the experimental evaluation, they verified that their proposed technique is helpful in the efficient interaction between devices without any intervention of humans.

The paper "The Storage Grain and Environment Modeling Based on TS-PLS" proposed a modeling method of dynamic nonlinear multi-input multi-output (MIMO) system based on this, combining PLS and TS fuzzy model, which effectively solves the problem of strong nonlinear and correlation, at the same time reduces the computational complexity of data modeling methods.

Paper "Design for Indoor Environment Monitoring System based on Embedded System and Multi-sensor Data Fusion Algorithm" aim to construct an environmental monitoring system for newly decorated room. Digital temperature-humidity sensors, formaldehyde sensors, benzene sensors, ARM11 and Linux embedded system were selected. According to the application characteristics of the sensors, hardware device drivers were designed, generated kernel module files were loaded into the Linux kernel, and the user application programs operating the sensors' devices were written. To get accurate measurement and reliable evaluation for environmental condition, a two-level fusion algorithm was designed, which was composed of data-level fusion based on adaptive weighted fusion algorithm and decision-level fusion based on fuzzy set theory and judging principle of composite index. The system was capable of realizing the real-time acquisition and transmission for environmental data. Thus, the indoor environment quality could be accessed conveniently by users via PC terminal on the Internet.

Authors of the paper "Design and Implementation of Middleware Based on ID and IP Address for Actuator Networks" design and implement the actuator network middleware based on ID (IDentification) and IP(Internet Protocol) address for control the environment using multiple actuator devices. Also, this middleware assigns ID for identifying each actuator nodes, and uses an IP address for transferring control messages between application and actuator networks. And, the presented middleware provides to connect between actuator ID and IP address using the mapping table. They design the middleware using sequence diagram and state diagram, and implement it based on .Net framework. The middleware supports to transfer command messages between application and actuator networks.

In the paper "The Effect of Emulsifying Capacity of ASP Flooding on Oil Displacement Efficiency for Jing-11 Fault Block Reservoir in Huabei Oil Field", taking Jing-11 fault block reservoir in Huabei Oil Field as the research object, the influence rule of alkali, surfactant and polymer on the stability of the crude oil emulsion was inspected through indoor experiment. Besides, on the basis of the controlling variables method and under the circumstance of other conditions remains unchanged, the simulated displacement experiment was conducted using the physical model for ASP system of emulsion type and non-emulsion type surfactant respectively. It is proved that the emulsifying capacity of ASP flooding has significant effect on improving the oil displacement efficiency.

Paper "Implementation of CIE General Sky Model Approach in Ukraine and Effects on Room Illuminance Mode" states that New standard CIE S 011/E:2003 "CIE standard general sky" was accepted in Ukraine in 2010. With its adoption the question of its appropriate usage with national documents became an important event. Feasible way of standard's utilization with Ukrainian daylighting standards and effects of its implementation are given in the paper.

The paper "An Empirical Study of China's Financial Risk Early Warning Based on PSO-AHP Method" proposed a financial risk early warning method based on PSO-AHP. First, they select early warning indicators of financial risk in their country, and build a hierarchy model which is composed by target layer, criterion layer and sub-criteria layer, then they use the financial risk early warning method based on PSO-AHP to calculate the weight of each criterion and sub-criterion layer, by using the financial data from 2006 to 2013 in China .The result shows that the overall financial risk in China has been in a very stable state, but external shock risk is still in high levels.

The paper "Study on the Measurement Technique of the Alignment Variation of Medical Infrared Thermal Imaging System" analyzed the change cause of the thermal imager alignment and its detection principle. On this basis, an infrared thermal imaging is designed for the shortcomings of the traditional detection method, that alignment change detection system is based on CCD imaging technology. The cross pinhole target is used to establish the measurement space coordinate system for the digital image interpretation program in this system. The interpretation software is called about aiming at the baseline variation in the data processing system. According to the position relationship of the 5 pin hole in the field of the infrared thermal imager, the alignment change can be measured.

The purpose of the paper "A Novel Measurement of Events for the Awareness of Danger in the Residential Condition" is to prepare measures for quick recognition and the avoidance of risk factors in residential environments. To intellectually recognize living spaces, measures to recognize various risks quickly are necessary. In the present study, factor extraction and situation detection measures necessary for space intellectualization for recognizing unusual situations in advance in urban spaces are proposed. Unusual

situation occurrence factors in living environments were classified, and risk elements by factor were derived. The risks were calculated utilizing the extracted unusual situation elements to show the actual utilization.

Authors of the paper "A Smart Home Context-aware Model Based On UML and Colored Petri Net" propose a hybrid Context-aware Modeling approach based on UML and Colored Petri Net in this paper. They also model leave home scenario using this approach, and use Coverability Graph to verify the leave home scenario model.

The study "Construction and Empirical Study of Trend Surface for Willingness to Pay Based on Improved Voronoi Method" is meaningful for cost sharing of environmental goods recovery. This paper forces on the rules of spatial variation of willingness to pay in different areas, by division of sub-area and construction of trend surface. It is divided 71 sub-areas by Voronoi Polygon and constructed trend surface of willingness to pay for each sub-area for the non-use value of Songhua River as a study case. The result shows that high WTP areas spatially aggregated around the environmental goods, as low WTP areas dispersed on both sides of the environment goods uniformly. Which influenced the WTP is not only the distance, but the degree of understanding and the use of environment goods, interpretated by Probit models. It's an easier and faster method for the trend surface construction, which has a significant value for the study of spatial attributes of willingness to pay.

Authors of the paper "A Study on Greenhouse Management Framework for Intelligent Control Service of Greenhouse" designed an intelligent control of the greenhouse in the Greenhouse Management Framework (GMF) for the purpose of increasing the farmer's profit and promoting the ease of agricultural production. The GMF is divided into Greenhouse Control Engine and Crop Growth Engine. The Greenhouse Control Engine consists of Data Aggregator, Greenhouse Information Storage, and Greenhouse Control Agent. The Greenhouse Control Agent includes Information Analyzer, Control Device Selector, and Greenhouse Control Model. The Crop Growth Engine consists of Crop Status Information Storage and Crop Growth Agent. The Crop Growth Agent includes Crop Status Predictor, Environment Set-points Decisioner, and Crop Growth Model. In this paper, the aim to reduce the consumption cost of the control device driven for the optimal greenhouse growth environment is one of the major features of the framework that is being proposed. In order to reduce heating cost, which consists of a major part in the cost of cultivation, they have tested the performance of their proposal for the GMF through the simulation. The simulated results confirm the decrease of heating costs from the present GMF.

In the paper "Circuit Module Design of High-Voltage Side for Optical Current Transformer", the Field Programmable Gate Array (FPGA) technology has been used for designing the signal processing circuit of A/D device, CRE code and Manchester module of high-voltage side for optical current transformer. The A/D controlling module, CRC code module, Manchester encoding module and the storage in FPGA has been designed and simulated. The signal processing circuit design program of high-voltage side for optical current transformer in this paper has been proved from the simulating results and can meet the requirements of optical current transformer on communication of data, which is rapid and reliability.

The study "A Improved Statistical Model Analysis the Mental Health of Rural-to-Urban Migrants in China" aims to test the migrants' mental health. The findings drawn from this qualitative study of 769 migrants in Wuhan in 2012 based on the Bayesian structural equation model. Overall, the survey found that leisure plays the greatest positive role in

migrants' mental health, as well as work, interpersonal relationships, and health status have a negative role in migrants' mental health. Thus, the government must set relevant regulations to help migrants establish a better life and work values to work energetically.

The paper "Wireless Sensor Network-Based 3D Home Control System for Smart Home Environment" introduces a proposed 3d home control system that provides realistic home control service for users. They implemented the 3d home control system between user-centered virtual reality and the real world based on wireless sensor networks. This implemented system consists of smart devices that are equipped with virtual reality, the hardware for a real-world representation, and the synchronization software. The main point of virtual reality is that users are able to control home appliances similar to embellishing their home structure. Communication between the components, they designed the own communication protocol and used the wireless personal area network-based Zigbee module. Some experiments were conducted using the proposed model. As a result of the experiment, the proposed home control system performed well as it was designed.

The paper "Research on the Capital Structure Decisions of China Logistics Industry: Using the Unbalanced Panel Data Analysis" bases on Listed Chinese logistics enterprises samples, from two aspects of static and dynamic to empirically investigate main effect factors of the capital structure, then studies to compare related research results with traditional Chinese manufacturing listed companies, in order to reveal the characteristics of Chinese listed logistics enterprises financing decision and dynamic adjustment, and summarize the corresponding theory through that. The results suggest that financing decisions of Chinese logistics enterprises have a certain difference from the traditional manufacturing enterprises, not only in financing structure establishment, but also in the dynamic adjustment of capital structure, having more mortgage-backed asset, larger size and better profitability are the powerful conditions of rapid financing adjustment for logistics enterprises.

In the study "Non-parameter Estimation of Failures Intensity of Tractor Based on Bootstrap", the failures data of tractors operating in field conditions were collected by failure tracking tests. A mathematical model is established with non-homogenous Poisson process to get the tractor failure intensity function. Bootstrap method is presented for constructing confidence regions for the failure intensity of a repairable system. Combined with fault data in tracking experiment, the early period failure intensity curves are drawn, revealing the failure regular in the initial stages of tractors. A confidence interval can be estimated by standard likelihood asymptotic theory in the parametric estimation, however in the non-parametric case it can be obtained by using the bootstrap. Comprising the MSE of cumulative intensity and cumulative number of failures between the two estimations, it is seen that the curve which was estimated by non-parameter estimation method is more realistic to the actual experiment process.

Paper "Estimating the Effect of Electric Universal Service in Rural Areas of Southwest China: From the Perspective of Equalization" proposed an electric equalization evaluation model, which contains of electric supply equalization and electric benefit equalization evaluation models. The electric supply equalization evaluation model was established based on variation coefficient method. Meanwhile, the electric benefit equalization evaluation model was conducted based on prospect theory. At last, the electric equalization degree of the rural areas in Southwest China was evaluated, which shows that the electric equalization degrees have increased from 2006 to 2013, but still are low. What's more, some suggestions are put forward to improve the implementation of electric universal service.

In the paper “A Case Study of Site Conditions and Ground Stability of Town Homes”, many houses in Villa Milagrosa Town Homes in San Pedro, Laguna are in substandard condition. This means that families often suffer from unsafe and uncomfortable indoor condition. Holes in roofs or gaps in doorways allow hot air to get inside in the summer and to flow out in the rainy season. Sustainable technologies must be applied to structurally sound homes to make them more resource efficient, improve their quality of life and benefit the environment.

In the study “A Novel Time of Arrival Estimation Algorithm based on Energy Detector”, accurate localization has gained significant interest in the field of sensor networks, impulse radio60GHz signals which is low cost, low complexity are even much more practical for ranging, localization and tracking systems because of the high time and multipath resolution and so on. Typically, accurate Time of Arrival (TOA) estimation of the 60GHz signals is very important. In order to improve the precision of the TOA estimation, a new TOA estimation algorithm based on Energy Detector is proposed which is based on a joint metric of the Skewness, Kurtosis, Maximum Slope and Standard Deviation after Energy Detection. The best threshold based on the signal-to-noise ratio (SNR) is investigated and the effects of the integration period and channel model are examined.

The paper “Evaluation on City's Construction of Ecological Civilization of Mining and Metallurgy based on Gray Correlation Theory” takes the culture of mining and metallurgy as the breakthrough point, based on analyzing the value of the culture of mining and metallurgy on the modernization of the city, discussing how to construct the evaluation index system of ecological civilization city, method, as well as the evaluation system.

In the paper “Application of Improved Decision Tree Method based on Rough Set in Building Smart Medical Analysis CRM System”, a decision tree algorithm based on rough set is proposed, and the improved decision tree algorithm based on rough classification is better than the standard C4.5 algorithm in classification accuracy and regression rate by experiment. Finally, the improved decision tree method is applied to the smart medical analysis CRM system.

The paper “A Study on the iOS-to-Tizen Smart Game Converter using Resource Converter and Platform Mapping Engine” offers a means to solve the problems of different smart platforms. It can ensure quick and automatic conversion of existing iOS game content into game content for the Tizen platform, thus increasing the reusability of existing content and providing smart phone users with more diverse content. In addition, the time and expense required throughout the development and conversion processes in order to provide game content designed for the iOS platform on the Tizen platform can be significantly reduced. Consequently, productivity can be enhanced, and the time and expense thus saved can be invested in developing new game content is expected to accelerate the development of high-quality mobile games and create a basis for increasing the productivity of the mobile industry.

January, 2016

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Editor of the January Issue on
International Journal of Smart Home