

# Foreword and Editorial

## International Journal of Smart Home

We are very happy to publish this issue of International Journal of Smart Home by Science and Engineering Research Support soCiety.

This issue contains 30 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 “Corrosion Characteristics of 20G in the Environment of Heating Surface in Biomass Boilers” combined the analysis of the corrosion characteristics with the surface morphology. And the surface morphology and chemical composition of the specimen after experiment were analyzed by using the energy dispersive spectrometer (EDS) and scanning electron microscopy (SEM).

Paper “Lightness Pretreatment with Pedestrian Detection Studies Using CH&K Algorithm for a Night Environment” presents a real-time pedestrian detection algorithm for a night environment. By first converting the nighttime image data to the  $L^*a^*b^*$  color space, it can be extracted in the area  $L^*$  with robust noise reduction and contrast adjustment. This data is used to generate pre-data through image subtraction. A background image is generated using the data, and the Cascade Histogram of Oriented Gradient & Kalman filter (CH & K) algorithm is proposed to track the movement of pedestrians.

The paper “Characteristic Analysis of Adjustable Permanent Magnetic Coupler with Slotted Conductor Disk” this article focuses on a permanent magnet governor with slotted conductor disk. The 2D and 3D dynamic simulation model are established and the characteristics of slotted and plain structure are analyzed. The results are shown that the vortex path of the permanent magnet governor with slotted structure is optimized, the magnetic flux leakage is reduced, and the thermal capacity is higher. The transmission torque mathematical model with temperature parameters is established considering the transmission torque. The transmission torque is affected by conductivity changing with the conductor disk heating. The effects of temperature changing and relative speed on torque transmission are analyzed. Finally, the torque characteristics of slotted and plain structure were compared by the experimental test under different conditions. It is proved that the slotted structure can improve the transmission efficiency and reduce the vortex field impact due to the temperature of conductor disk rising. And it is verified that the mathematical model is valid.

The research paper entitled “Research on Combination of Controllable Reactor and Magnetic Saturation Transformer” proposed a novel combination technique of controllable reactor and magnetic saturation transformer. The optimal control target is implemented by combining the advantages of controllable reactor and magnetic saturation type transformer to suppress flicker of voltage effectively. The corresponding mathematical representation and the equivalent circuit are presented. The design and realization approach of this kind of transformer is described. The traditional transformer capacity can be promoted effectively.

The paper “Design and Implementation of Context Aware Sensor Tags for Distribution Measurement of Farm Products” discusses the design and implementation of context-aware sensor tags that can be attached to various containers. The tags are designed to be utilizable in non-standardized fruit boxes, and can identify whether fruit has been loaded in a box because they are attached inside the box. After recognizing normal load status, data are sent only when there is content. The tags were designed and implemented to measure distribution by detecting the movement of the fruit box, and sending data through a context-aware function that determines whether fruit is loaded, and a data-transmission event

Authors of the paper “Review on Operation Fault of High-voltage Power Transmission Lines and Effective Prevention Countermeasures” present study mainly focuses on the fault of transmission line resulted from external uncertainties, such as lightning, wind age yaw, ice coating and bird damage, as well as internal factors of high-voltage transmission line, including the grounding and short circuit. Accordingly, fault diagnosis and protecting measures on the high-voltage transmission line are proposed with advices on the improvement of operation and maintenance management of the line to reduce the fault frequency of the transmission line in the process of operation at a greater extent and to ensure the power supply stability of the whole power grid system to the user.

In the paper “Floor and Motion Classifying Scheme Exploiting Smart-phone for Indoor Movements”, propose a classification scheme that classifies ambulatory movements of the user and the floor where the user exists with a smart-phone. In the proposed scheme, ambulatory movements of the user are classified by exploiting the barometer and the accelerometer, while the GPS data is used to classifies the floor information. With the proposed scheme, various motions, such as walking, stop, up and down motions with elevator or stairs, are distinguished by utilizing the data from the barometer and the accelerometer. When the user enters a building, the building information is confirmed with the GPS information and the smart-phone can classify ambulatory movements and the floor information of the user. An Android application is developed for the performance evaluation of the proposed scheme. The proposed scheme is evaluated with experiments at general building in university and the accuracy of the proposed scheme is more than 94% for floor estimation, although there is still works to improve the estimation of movements.

In the paper “An Adaptive Network Prediction and Judgment Method for Unstable Communication on Moving Medical Vehicles” presented an automatic network judgment method for unstable communication environment based on adaptive network speed analysis and prediction method to evaluate the wireless network condition on moving medial vehicles and make reasonable judgment among multiple network channels. Historical network observation data are collected; time series analysis method and ARMA model are employed to build prediction model using historical data statistics with periodical update mechanism. Predicted network speed value is then compared with real speed value and a criterion to identify the condition of network is summarized from comparison result analysis.

The paper “Design of Open Language Laboratory Information System in Network Environment” analyzes the significance and role of the language laboratory for cultivating students' self-learning and innovation ability, designs out the model of function structure for the opening of the language laboratory, proposes the form of database design, and discusses the system architecture.

The research paper “Development of a New Experimental Model to Improve Daily Living Performance Ability in TB Patients” estimates the effects of a new experimental model to improve daily life performance ability in tuberculosis patients. The subjects of this paper were 126 patients who had visited a hospital which located in Metropolitan area. The pair wise t-test was done to compare the before and after intervention by a new experimental model for measurement of health promoting practice in tuberculosis patients.

In the paper “The Application of Building Energy Consumption Index in Campus Energy Efficiency Management Platform”, established categorized, itemized energy consumption model of buildings using energy consumption data of campus energy efficiency management platform; existing categorized, itemized energy consumption evaluation indices of buildings are summarized; and a mathematical model of building energy consumption indices is established, providing the basis for the quantitative evaluation of building energy consumption. The scope of application of each index is summed up; and the methods and steps for evaluation of building energy consumption using categorized, itemized energy consumption indices of buildings are elaborated through case study.

The paper “Comprehensive Evaluation of Forestry Desertification Based on Grey Relational Analysis” aims to get a comprehensive evaluation using the grey relational analysis method. Unlike the mathematical-statistics method, the grey relational analysis also is suitable for irregular data. On the basis of the proposed evaluation method, ten samples of Dumeng County were carried out to determine and evaluate the status quo by grey desertification system included fifteen indicators. This research offered new ideas for the desertification comprehensive evaluation and protection.

Authors of the paper “Study on Selective Leakage Protection System of Mine Low-voltage Grid Based on Internet of Things” proposed the design of leakage protection system of mine low-voltage grid based on the combination of ZigBee protocol the framework of Internet of Things, and the perception layer of Internet of Things is constructed by ZigBee technology to collect and transmit the related data. Meanwhile, the low-voltage leakage fault principle of the mine and the variation law of zero-sequence current and zero-sequence voltage mine are analyzed in this paper; on this basis, a selective leakage protection scheme based on the additional DC power detection and zero-sequence power direction is proposed, in which additional DC power principle is applied to the main feeder switch, the protection principle of zero-sequence power direction is applied to the branch feeder switch, and the branch leakage is interpreted by Fourier algorithm.

The paper “Applying the SPLE to Develop Smart Home Resource Management Systems” described the experience of applying SPLE for designing a family of home resource management systems for integrated home resource management. The PLA for the family of home resource management systems was designed based on the planned resource management systems. In the home resource management system PL, there was lots of variability related to data due to the differences of resource types other than functional variability. Three types of resource relevant data variability were managed with hierarchical configuration. In the case of services, one of those resource types was divided into two types: single and composite. Services can be served only when the specific devices exist, so service variability depends on devices. For this reason, it dealt with variability in resources, except for service variability.

In the paper “Electricity Demand Forecasting for High Energy-Intensive Industries of Inner Mongolia in China”, since the development of high energy-consuming industries has an important impact on the total electricity consumption, it is essential to predict the

electricity demand of these industries. A procedure based on LS-SVM algorithm and scenario analysis is proposed to forecast the electricity consumption of high energy-intensive industries in Inner Mongolia, which takes three affecting factors into consideration, including the output value, the proportion of output accounting for GDP, and electricity consumption intensity.

The paper “An iBeacon-based Indoor Positioning Systems for Hospitals” presents an iBeacon-based indoor positioning system for hospitals. It firstly analyzes the advantages of iBeacon compared with the common indoor positioning technologies; then designs the indoor positioning system for hospitals based on the three-layer architecture of Internet of things to have message-push-service through clients.

In the paper “Cross Layer Optimization Routing Algorithm for Wireless AD HOC”, through local control actions, MCPEF aims to maximize the network throughput by performing joint routing, scheduling, and transmit power control. Specifically, the algorithm dynamically allocates spectrum resources to maximize the capacity of links without generating harmful interference to other users, while guaranteeing bounds bit error rate (BER) for the receiver. In addition, the algorithm aims to maximize the weighted sum of differential backlogs, and which can stabilize the system by giving priority to higher capacity links with a high differential backlog.

The paper “A Study on Analysis & Outlook of Smart City based on Actual Cases” described a smart city which was leading case in digital convergence and related with the life. During the last decades, cities have become increasingly central in the economic, social, and development-related processes. Since 1990 the term Smart City has been spreading in conjunction with the liberalization of telecommunications and the development of services provided through the internet.

Paper “Smart Nursery Construction Based on the Idea of Cost Performance” establishes the basic framework of smart nursery by the application of smart technology. The smart nursery is divided into five layers and five modules. The five layers are composed of access layer, supporting layer, network communication layer, exhibiting layer and application layer, creating a complete technical supporting system. Five modules respectively are smart production module, smart sales module, smart logistics module, industrial information module and financial guarantee module, forming a complete industrial chain. The application of smart technology to nursery stock industry can provide services for pre-production, production and after production of nursery stock, promotes industrial overall efficiency and effectively reduces consumption of resources and energy.

In the paper “An Enhanced Method of Face Recognition for Cloud Robot” describes a cloud-based robot system which connects cloud computing infrastructure for accessing distributed computing resources and big data and executing multitask like face detection, face recognition and etc. The ROS (Robot Operating system) has been employed as the operating system of the RC-Cloud server. It has deployed one application, “real-time face recognition application” in the RC-Cloud robot system.

The paper “Control and Research on Blade Vibration of Wind Turbine” takes control of fan blade vibration as the main body, introduces a new type of intelligent materials -- Electro rheological fluids, focusing on explain the smechnical and electrical properties of electro rheological fluid explain. The application of electro rheological technology to practical use in the performance of electro rheological fluids, control the occurrence of electro rheological effect, so as to achieve active vibration control effect on leaf and model simulation and eventually realize the effect of blade vibration weakened.

Paper “Research on the Development Strategies of New Energy Automotive Industry Based on Car Charging Stations and Battery Management” analyzed definition and classification of new energy vehicles, the development of automobile industry and its impact on the environment, analysis of vehicle charging station, to maintain stable economic growth and improve people's living standards have an important strategic meaningful conclusions.

Paper “A Study on Intelligent Traffic System related with Smart City” described intelligent traffic system which was leading case in digital convergence and related with the life. Intelligent Traffic System (ITS) integrates cutting-edge technology into existing traffic system elements. It described actual cases, analysis and applicability of current ITS.

In the paper “Wind Power Short Term Forecasting based on Back Propagation Neural Network” analyze and summarize the current situation as well as methods of forecasting wind power from home and aboard based on wind power development of China. Due to the BP neural network can approximate any nonlinear mapping with any arbitrary precision and its generalization ability is strong.

Paper “Temperature Change Analysis of Internal Channel and Outside Sensor for PCR Chips” presents the analysis of the steady state error and the time delay of the temperature of the chip sensor in a micro PCR chip and that of the reagent. The chambers with the various heights and sizes are compared in order to examine the differences in temperature and speed.

The Paper “Sensor Node Localization Based on Improved Genetic Algorithm” put forward the sensor node localization based on improved genetic algorithm, through multiple sensors of simple structure, low cost, integration of communication interface network group, via the network group environment to establish a sensor node sampling module node localization analysis, to pinpoint genetic algorithm search process.

This Paper “The Research on Ad Hoc Network Routing Based on Residual Energy” proposed a new routing protocol based on residual energy, through the study of the energy characteristics of the model, based on AODV routing protocol, through improved routing.

In the paper “Mathematical Modeling of Real-Time Scheduling for Microgrid Considering Uncertainties of Renewable Energy Sources” deals with the real-time scheduling of a microgrid considering uncertainties of renewable energy sources (RESs). A two-step mathematical model based on real-time scheduling and demand responses (DRs) is proposed. DR programs, time of use (TOU) and emergency demand response programs (EDRP), are used to minimize the operation cost of microgrid. The proposed real-time scheduling is based on spinning and load reserves to deal with uncertainties of RESs. In the first step, the day-ahead scheduling is run for 24 hours with forecasted RESs. The second step deals with the actual RESs and the microgrid operation is rescheduled in the real time. The effectiveness of DR programs on the electrical demand for each interval is also shown in this study. The mixed-integer linear programming (MILP) method using CPLEX optimization program is used to solve the proposed two-step mathematical model.

The paper “Examination of Thai Construction Safety Factors using the Analytic Hierarchy Process” examined the key construction safety factors to improve safety standard to compete internationally utilizing the analytic hierarchy process. The results reveal the Policy factor as the most important factor to improve safety standard. The

implementation plan must be practical and include regulations stated in the international safety standards.

Paper “A VLSI Implementation of High Sensitive Fingerprint Sensor using Parasitic Insensitive Charge Transfer Circuit” implements 80x64 array high sensitive fingerprint sensor with the parasitic insensitive charge transfer circuit. The fingerprint sensor cell uses an active output voltage feedback integrator. The parasitic insensitive charge transfer circuit includes a differential amplifier and two switches to remove parasitic capacitance and transfer charge.

July2015

**Editors of the July Issue on  
International Journal of Smart Home**