

# 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 23 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.

Authors of the paper “Research on the Impact of Tourism E-business on the Theory and Practice Teaching System based on Internet” built the curriculum theory and the practice teaching system of tourism electronic commerce based on internet, and make empirical analysis of teaching evaluation system. The result shows that multimedia teaching and management informatization is the important part of education system innovation. For tourism management, how to make use of multimedia and the practice teaching to improve students' ability is especially important. On this basis, they put forward the construction of tourism electronic commerce course, such as a combination of teaching theory and practice.

In the paper “Development of Smart Phone Applications Linked with Fire Alarm Control Panel in Automatic Fire Detection System”, the notification of a fire situation on smartphones by a simple text message was developed recently. To improve these drawbacks, smart phone applications linked with fire alarm control panel in automatic fire detection system have been developed for monitoring the fire situations in situ including occurrence of fires, fire control related equipment, short circuit of the fire detectors, and status of the control panel. As a result, the fire related information in situ can be monitored by the fire officers anywhere and anytime.

The paper “Building Waste Output Forecasting Model based on Gray Metabolism GM (1,1)” first constructs a set based on the construction area and per unit area of garbage generated quantity of urban building waste estimation method, then using grey system theory prediction and analysis of the next four years of building waste output. By the introduction of metabolic thought, the grey metabolic GM (1,1) forecast model was constructed, overcoming the shortages of conventional GM (1, 1) model. Prediction results show that the model is higher than the conventional GM (1,1) model prediction accuracy, which is suitable for the prediction of the short term of building waste in their country and for the treatment and reuse of building waste to provide certain reference.

In the study “Simulation and Energy Analysis of Thermal Environment of Unassisted Passive Solar House”, the greenhouse effect is the most basic work principle of the passive solar house. The passive solar house provides indoor heating relying on natural circulation, without any other mechanical power, with the excess heat stored in the walls, ceilings and ground hot body to radiate heat into the room at night, to maintain a certain temperature. It takes in, keeps, stores and distributes solar thermal energy by reasonable arrangement of building orientation and surrounding environment, smart manipulation of the inner and outer space and the proper selection of the building materials, structure and construction, so as to solve the problem of building heating. The heat collection and storage of the passive solar house mainly uses the building envelope walls or windows or

the simple tablet device as a heat collector, which can be freely controlled by people, without the complex mechanical equipment and complex pipe ventilation system.

In the paper “Design and Implementation of In-house Mobile Electronic Cash in Universities”, the design and implementation of an in-house mobile payment system of electronic cash is presented. The mobile electronic cash for in-house use is an electronic cash system that is exclusively used within a single organization; the system was implemented by using mobile payment as the payment method.

The paper “Research on Interactive Device Ergonomics Designed for Elderly Users in the Human-Computer Interaction” studied the performance of elderly people using the mouse, stylus and touchscreen to perform two-dimensional pointing tasks, compared with younger people, in the computer user interface by controlled experiments, measured the movement time and hit accuracy, and also investigated the subjective experience when they used the three input devices for completing two-dimensional pointing tasks.

In the study “Improvement of the Crop Growth Rate in Plant Factory by Promoting Air Flow inside the Cultivation”, temperature increases and air flow stagnation caused by the large temperature variation between the cultivation beds and the close irradiation by artificial lightings in a vertical type plant factory serve as chief factors in the deterioration of crop quality and growth. In preceding researches, the methods to resolve these problems and to improve air flow rate were applied by utilizing air flow devices such as air conditioning devices and external fans. However, enhancing the air flow by an external fan reduces the temperature deviation in the entire area of the facility. To maintain a uniform growth environment, there is a limit in improving air flow, which is locally stagnant. Therefore, the factors that hinder the growth of the crops need to be removed by promoting air flow stagnation near the crops with a simultaneous operation of the inner fans at each cultivation bed.

The paper entitled “A Method of Reference Point Range for Field Navigation of Agricultural Robot”, proposed a new method for solving agricultural robot navigation reference point distance measurement. First, conduct calibration for the binocular system with the improved BP neural network, and secondly, obtain the left and right image coordinates of the navigation reference point (U1,V1) (U2,V2) with the improved SIFT features and input the BP neural networks trained in the calibration, and finally, output the coordinates of the navigation reference point in the world coordinate system (X, Y), and then the horizontal distance between the navigation reference point and the robot body can be expressed as  $s = \sqrt{X^2 + Y^2}$ .

In the study “A Distributed Infrared Temperature Monitoring System Based on Embedded Technology and Visualization Technology”, for the contradictory issues of the transmission rate and flexibility in the current temperature system, this paper puts forward a novel fast rate, high flexibility, and visualization monitor system, and presents its architecture principle design and software-hardware of the whole system. Controller area network (CAN) bus acting as multi-host and high-speed field bus is selected to design the distributed communication system, ZigBee technology based on CC2530 and embedded system centered with ARM Cortex-M3 microprocessor STM32F103VET6 are selected to design the flexible data acquisition network, and embedded Ethernet is selected to design remote and distributed monitoring. Based on the distributed system, visual monitoring software is developed; it can achieve data display, data query, and real-time monitoring and give an early alarming of accidents caused by temperature. After a number of experiments show that the system is stable, temperature flexible, highly real-time, and the temperature measurement accuracy can be up to 99.37%.

The main aim of the paper “A Prediction Approach for Demand Analysis of Energy Consumption Using K-Nearest Neighbor in Residential Buildings” is the assurance of energy production according to the consumer demands in an efficient manner. The energy market is an important tool for setting prices between the energy producers, suppliers and the consumers. An excellent precision in the prediction of next day consumption is required for the suppliers to get good prices in the energy traded. The main aim of this paper is to facilitate the energy suppliers to make decisions for the provision of energy to different apartments according to their demand. In this paper, they have utilized K-Nearest Neighbors classifier for daily energy consumption prediction based on classification. The process consists of five stages namely data collection, data processing, prediction, and validation and performance evaluation. The historical data containing hourly consumption of 520 apartments of Seoul, Republic of Korea has been used in the experimentation. The data has been divided into different training and testing ratios and different qualitative and quantitative measures have been applied to find the performance and efficiency of the predictor. The highest accuracy has been observed for 60-40% training and testing ratio giving 95.9615% accurate results. The effectiveness of the model has been validated using 10-Fold and 5-Fold cross validation.

In the paper “The Research on the Coordinated Development Evolution of Technology Innovation in New Energy High-tech Industry”, based on improving the Entropy Evaluation Method and Er’xiang Dual Theory, this paper firstly divides new energy high-tech industry system into two subsystems: one is status subsystem, based on the representation of innovation ability and another is process subsystem, based on the measurement of innovation efficiency, than makes a further statement on Er’xiang characteristics of new energy high-tech industry according to the subsystems. Finally, this paper carries out a demonstration measurement through the development level of Er’xiang subsystem, the comprehensive development level of whole system, and the coordinated development level of these two subsystems, of the new energy resources systems in Heilongjiang Province of China from 2005 to 2012.

The paper “The Development Analysis of Leisure Agriculture in Xinxiang City, Henan Province Based on GAHP-SWOT” states that leisure agriculture is an industry which combines the agricultural production and leisure recreation. In order to promote the development of leisure agriculture, it is particularly important to conduct an analysis of its development from the overall perspective of the city. This paper takes Xinxiang City of Henan Province in China as an example and adopts GAHP-SWOT as the analysis method. Based on affirming the influencing factors of advantages, disadvantages, opportunities and threats, the AHP method is adopted to calculate the weights of different factors and sort them so as to realize the organic combination of the qualitative and quantitative analysis. Group Decision is used in computation to exert the collective intelligence.

The paper “Voltage Based Energy Efficient Mobile Charge Sensor Design Using LVCMOS” made an approach to design the voltage based energy efficient mobile charge sensor design and for that reason they have used LVCMOS IO standards. Power dissipation is the major factor that has been analyzed and focused. Voltage sensor is operating at different frequencies and at fix temperature that is 25 degree Celsius. Frequencies of different mobile phones have been evaluated. Frequencies taken in consideration are 1400MHz for Nokia Lumia710, 1.2 GHz for Samsung Galaxy core, 2100 MHz for iphone6, 1700 MHz for HTC/T, 1800 MHz for micromax X091 and 2.2GHz for Song Xperia Z1. This research work, is basically done to check the charging status of a mobile phone. The coding is done in Verilog on 28nm FPGA that is Kintex-7. Kintex7 is 28-nm FPGA on which they implement their circuit to re-assure power

reduction and reduction in junction temperature in sequential circuit. There is 4-19% reduction in power dissipation with LVC MOS33, 3-15% reduction in power dissipation with LVC MOS25, 2-13% reduction in power dissipation with LVC MOS18, 2-12% reduction in power dissipation with LVC MOS15, 1-5% reduction in power dissipation with BLVDS25 at 25 degree Celsius when they use 28nm FPGA. The performance of their sensor is evaluated and tested through simulations on Xilinx software development kit. . The quality of their sensor can be improved by changing IO standards.

The study “A Data-Mining Approach for Wind Turbine Power Generation Performance Monitoring Based on Power Curve” put forward a new data-mining approach based on power curve profiles to monitor the power generation performance of wind turbines in this paper. Through assessing the wind-speed power datasets, the weakened power generation performance of turbines could be identified effectively by this approach. Shapes of power curve profiles over consecutive time intervals are constructed by fitting power curve models into wind-speed power datasets. In this research, they designed the Auto-adapt Optimal Interclass Variance algorithm, optimal constraint in each wind-speed power sub-dataset is explored for governing the data-driven method based on distance-based outlier detection and variance analysis model. The AOIV algorithm achieves the self-optimization of the threshold parameter and reaches a high degree of robustness to variations in wind-power generation performance monitoring. The blind industrial researches are conducted to validate the effectiveness of this approach, also indicates the decrease of error rates while detecting weakened power generation performance and the improvement of turbines’ power output.

Authors of the paper “Research on the Management Innovation in Green Supply Chain: an Empirical Analysis based on Probit Model” test the management innovation diffusion in green supply chain by using Bass model, the result shows that green procurement and ecological design has always been the important factors, which influence enterprises whether to adopt green supply chain management or not. Other factors in turn are the enterprise internal environment management, investment recovery and customer cooperation. Study shows that the implementation of green supply chain management will not only improve the environmental performance of enterprises, but also enhance the economic performance of enterprises, so as to achieve the win-win effect.

In the paper “Study on the Autonomous Learning of College English Based on Online Learning Platform”, the Internet provides learners with unprecedented opportunities; student can not only share the learning resources, but also overcome the obstacles of time and space. The new teaching model make full use of the advantages of modern information technology, especially the network multimedia technology, so that English teaching has been developed toward the direction as autonomous learning and collaborative learning. In this paper, they make empirical analysis of how online learning platform influence college English teaching, the result shows that more than 90% students agree that online learning plays a positive role in College English teaching, however, external monitoring of autonomous learning is an important factor to guarantee the quality of online teaching. Overall speaking, network teaching is helpful to arouse the enthusiasm of teachers and students, and it is helpful to establish the central position of students in the teaching process.

In the study “Research on the Discrimination of Hatching Eggs Activity Based on Thermal Imaging: A Food Nondestructive Testing Practice”, The hatching eggs in 4-16 days incubation were from incubator of 38.5°C to 22°C for natural cooling and the time series images were acquired by thermal imaging technology. Analyzing the cooling curve and the cooling area and region growing, ellipse fitting, morphological processing and

other methods were used to extract eggs region of interest; time series images superposition and contrast enhancement were used to raise the temperature close to the different categories of eggs gray differences; the ratio of gray value  $\leq 150$  and entire ROI area was seen as characteristic parameters and the decision threshold was set according to minimum error rate Bayes rule. The non-fertilized eggs in incubating 4 days was 89.6% overall recognition and the dead embryo eggs in incubating 16 days was 96.3% overall recognition. Research showed that thermal imaging technology combined image processing technology can achieve non-destructive testing of hatching eggs activity.

The paper “From Cloud to Fog and IoT-Based Real-Time U-Healthcare Monitoring for Smart Homes and Hospitals” proposed architecture for IoT based u-healthcare monitoring with the motivation and advantages of Cloud to Fog(C2F) computing which interacts more by serving closer to the edge (end points) at smart Homes and Hospitals.

In the paper “Experimental Study on Synchronous Shifting for AMT without Synchronizer Based on Three-phase Induction Motor”, the experimental study on synchronous up-shifting and down-shifting is given by test-bed which consisted of three-phase induction motor and heavy-duty AMT without synchronizer. Based on shift model, the synchronous speed difference is put forward for the synchronous shift strategy. The synchronizing control strategy of up-shifting is proposed on the basis of the braking characteristics of TB (transmission brake). The synchronizing control strategy of down-shifting is given according to the characteristics of the three-phase induction motor. Under the conditions of various synchronous speed differences, the up-shifting experiments and down-shifting experiments are achieved. By comparisons, the best value of synchronous speed difference is discussed in terms of gear-position and working conditions.

Paper “Study & Analysis of Role of Li-fi in Future” stated that in this hi-tech world, privacy is most important issue. Has anyone ever imagined why this problem arises? In the field of correspondence media or portable correspondence, web association is a spine of data and correspondence innovation which gives numerous administrations to client to these applications they need quick and headway of Internet integration innovation and vast range of channels[1]. Internet access speed or whether it is about downloading files, internet speed is big issue. Why not take a step further to resolve this problem? The answer to their problems is 'li-fi'. Have you ever wondered a city where internet access is wireless and without any interruption? Like other queries science has an answer to these questions also which is LIFI. LIFI is the new future. From sharing data to accessing it, can be done for laptops, smart phones, and tablets through transmitting light from LED bulb installed within the room. And for the security, if you can't see the light, you can't access the data[2].

The paper entitled “Smart Parking by Mobile Crowdsensing” considers the design of a crowdsensing-based smart parking system as a specific case study in an attempt to explore the basic design principles applicable to an array of similar applications. Through simulations, they show that the strategies behind crowdsensing activities can influence the utility of such applications significantly. Equally important, they show that a certain level of freeriding could be allowed to increase social benefits as long as a reasonable service differentiation mechanism exists. Their findings provide designers with a better understanding of mobile crowdsensing features and help guide successful designs.

The paper “Design of Smart Home System based on ARM and ZigBee Technology” designs a portable smart home system which based on ARM embedded gateway and Zigbee wireless sensor network. With the low power consumption, ad-hoc network, scalability and high practicability of ZigBee technology, wireless sensor network is built

in the home. The smart home system use S5PV210 processor as the core of Hardware platform and use embedded Linux operating system as real-time operating system, porting Web server for embedded gateway and develop a human-computer interaction interface with Qt, both local and remote can monitor and control the home appliance equipment. The feasibility of the design is verified by experiments. At the same time, the system is extensible and portable, so it will have a good reference value for the similar system.

Paper “Threshold Selection Algorithm Based on Skewness and Standard Deviation Using Back Propagation Artificial Neural Networks in the 60GHz Wireless Communication Systems” stated that accurate localization has gained significant interest in the field of sensor networks, impulse radio 60GHz 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 threshold selection algorithm using Back Propagation Artificial Neural Networks (BP-ANN) is proposed which is based on a joint metric of Skewness 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. Simulation results are presented which show that for the IEEE802.15.3c channel models CM1.1 and CM2.1, the proposed BP-ANN algorithm provides better precision and robustness in both high and low SNR environments than other ED-based algorithms.

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**Editor of the February Issue on  
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