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 31 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 "A Rabbit Farm Environmental Monitoring System based on Internet of Things" design a rabbit farm environmental monitoring system according to the three-tier architecture of the internet of things. Then it chooses a wireless transmission module as required by the system in addition to the proposal of a new gateway initialization flow for the internet of things. After that, it analyzes the flow to query the farm monitoring data and the flow of reverse control on the environmental parameters to verify finally the feasibility of the system through the experiment.

In the paper "Levelized Recommendation Method in Internet of Things Environment", presents a levelized recommendation method in IoT environment. The method integrates the traditional recommendation method with the social relationships between objects in IoT environment. The recommendation method is proposed, a scenario is described, and then several experiments are performed.

The paper "The Forecasting of Weekly Tourists Visiting a Scenic Area in Off-Season by Using Goodness of Fit Weight" aiming at this problem, this paper built two different forecasting models by SVR and BP neural network in order to guess about the weekly tourist numbers and then, put forward the Goodness of Fit Weight(GFW) and used it to make three SVR-BP combination models(LCM, GEOM-WTD, and HARM).In order to support the results empirically, Data of the Huangshan Scenic Area has been used and the dynamic virtual variable was adopted to deal with the objective factors that influence the weekly visitor numbers.

In the study "Based on Digital Elevation Model (DEM) for Farmland Landscape Pattern", analyzed the characteristics of farmland landscape patterns at the five slope gradients by Digital Elevation Model (DEM), and explored the human disturbance on farmlands. The results indicated that the distribution of farmland landscape elements differed obviously with slope gradients, the main farmland landscape elements was dryland and the irrigable land, and dryland inter-planted with fruit trees distributed in.

In the paper "Noise Elimination Method in Automatic Fire Detection Equipment in Accordance with the Communication Distance", focused on the communication noise level depending on the distance for conventional fire detection systems (RS-485 code-transmitter) in comparison to the newly developed optical cable automatic fire detection system (optical communication code-transmitter. The noise levels of the RS-485 code-transmitter were respectively 10, 200, 1200, and 2400 mV for the communication distances of 0, 1, 40, and 80 m and showed a correlation between the increase of the communication noise with the increase of the communication distance.

The paper "Study on an Improved PSO Algorithm and its Application for Solving Function Problem" proposed WLFCPSO algorithm in which chaotic optimization strategy is used to initialize the parameters of PSO algorithm in order to obtain the more reasonable initialization parameters. The adaptive inertia weight adjustment strategy is used to control the adjustment ability of inertia weight in order to keep the diversity of the inertia weight. The dynamic linear adjustment strategy for learning factors is used to gradually reduce the cognitive ability of the individual and improve the global search ability of particles. In order to prove the effectiveness of the proposed WLFCPSO algorithm, several benchmark functions are selected.

In the study "Plant Production System Based on Heliostats and LEDs Using Automatic Sliding Cultivation Shelves", discussed a plant production system based on heliostats and LEDs using automatic sliding cultivation shelves. In the production system, a hybrid lighting system of sunlight and LEDs is adopted to promote plant growth. Sunlight is thus provided to plants by using a solar tracking system during the day. LED lights are then used for illumination during the nighttime or on cloudy or rainy days. It also study reduction ratios of sunlight reflected into the plant production system and uniform irradiation capability of LED light. Safety of proposed sliding cultivation shelves is further investigated through structural analysis. An actual case study is demonstrated by growing ginseng seedlings in the plant production system and their cultivation results are analyzed.

The paper entitled "Application on Planning and Operation of Spatial Information Technology in Industrial Technology Innovation Strategic Alliance", builds a database by integrating multi-source data like RS, spatial survey, economic statistics, etc., accomplishes the planning of ecological pattern of industrial technology innovation strategic alliance in gulf of Hangzhou area, and presents the strategies of constructing the operation mechanism of the industrial technology innovation strategic alliance in a bid to provide basis for the decision making of enhancing the innovation abilities of Chinese enterprises in this area.

In the study "Optimization Research of Effective Stimulation for Carbonate Reservoir and its Application", adopted staged-fracturing technology for horizontal wells based on the characteristics of carbonate reservoirs to effectively drain the reservior. Fracture parameters including orientation, number, length, fracture conductivity and distribution were optimized, and accordingly a hydraulic fracturing design was developed. Applied in oilfield, this method was proved to be effective in oil production.

The main aim of the paper "System Modelling Approach Based on Data Acquisition and Analysis for Underground Facility Surveillance" presents system architecture for monitoring underground facilities and provides a model for data acquisition from heterogeneous sensing sources and the analysis of such data. The system architecture for monitoring underground has an efficient data acquisition and processing procedure.

In the paper "A Comprehensive Theory of Multi-Aspect Interaction with Cyber Physical Systems", tries to make the first steps in this direction and to provide insights for a necessary new theory. Four kinds of interaction which play a crucial role in the operation of CPSs and four fundamental aspects of interaction (i.e. levels, domains, contexts and modalities) are introduced. The theory explains both the aspects and the various constituents that should be considered. The novelty of the theory is in that it establishes relationships between the four aspects and supports the specification of wishful interaction profiles.

The paper "Bridge Surface Crack Detection Method under Multi-Scale and Multi-Perspective" starts from the fracture of grey value relevance, establish crack gray feature similarity function, and use gray correlation to convert image into binary figure with crack information. This method is very successful in the organization structure, texture and edge feature points of different multimodal sensor images. In addition, the proposed algorithm can produce high quality fusion image in a less computation time. Unlike the existing image fusion method, this algorithm can even keep unchanged complexity of image when fuse images with larger dimensions.

The paper "Voltage Scaling Based Wireless LAN Specific UART Design Based on 90nm FPGA" emphasizes on the design of the wireless LAN specific UART. The frequencies that are standardized for the wireless LANs have been analyzed by scaling the voltage. The aim is to find out the most energy efficient specifications for the UART. After all the calculations, deduction comes over to a point that increasing the voltages increases the power consumption and therefore, the wastage gets elevated too.

The study "A Method for Missing Data Recovery of Air Pollutants Monitoring in Henhouse Based on QGSA-SVM" proposed a method for missing data recovery to solve the data missing problem caused by sensor faults during the air pollutants monitoring in henhouse based on support vector machine (SVM). Multiple factors that influence monitoring values of the air pollutants in henhouse, such as temporal, spatial and environmental, were considered to established a SVM regression model to estimate the missing data of the air pollutants monitoring. Meanwhile, to obtain better prediction accuracy, regression model parameters were optimized by a novel hybrid optimization algorithm which was combined standard genetic algorithm with quantum genetic strategy and simulated annealing tactics. Taking the data processing of the ammonia (NH3) concentration as an example, the proposed method was tested with the monitoring data of 3 days in a farm.

Authors of the paper "Evacuation Safety Evaluation of Inundated Stairs Using 3D Numerical Simulation" inundated flow condition of stairs are simulated numerically using commecial 3 D CDF model (FLOW 3D). From the results, critical evacuation conditions are evaluated according to flow depth and slopes of stairs. It is found that flow depth only over the 20cm could cause the danger in the evacuation along stairs. In the flow depth over 0.36cm, every people including young male, could not escape alone without any help. Inlet flow depth is more important factor than stair slopes.

In the paper "FPGA Implementation of Image Acquisition for Quadruped Search Robot Monitor", aiming at the problems of stability and real-time for home vision monitor of the quadruped search robot, it put forward a new image acquisition system of FPGA in this paper. The development of FPGA technology, especially image acquisition module, makes this a competitive FPGA hardware architecture, and it is very suitable for image acquisition of quadruped search robot. Ping-pong operation design method is used to improve the acquisition speed based on FPGA. The host configures the slave machine through I2C bus to achieving data transmission. Co-ordination mechanisms of image acquisition, image storage and image processing is designed to meet with buffer device.

In the study "Optimization Study on Bias Angle of a Swirl Burner with Tangential Inlet Air", numerical simulation and experimental study was carried out for a tangential inlet air swirl burner which is used for high heat value biomass gas. Study on the different inlet angle effects on Combustion by numerical method.

The paper "Design Goal Based Implementation of Energy Efficient Greek Unicode Reader for Natural Language Processing" designed a device to convert Greek language into different languages that the people could understand. This Unicode reader code has been implemented on 28nm FPGA platform called Kintex-7 FPGA. In this paper it uses frequency scaling technique and Design goal. In this paper power analysis is the main concern and it have studied about the power analysis at different frequencies keeping the temperature constant at 25 degree Celsius and maintaining the constant air flow.

In the paper "An Embedded Software Power Consumption Model based on Software Architecture and Support Vector Machine Regression", proposes a model about energy consumption of embedded device based on analysis of embedded software structure and support vector machine regression. The nonlinear relationship between energy consumption and software structure is revealed. The research finds software structure is determined by features like number of components, complexity of component interface, component coupling, and path length. These features are qualified and modeled by using support vector machine regression and energy consumption is predicted based on this model.

The Paper "Extension Neural Network Learning Algorithms and Models and their Applications in Fault Diagnosis of Rolling Bearing" describes the structure, algorithm and simulation with the new extension neural network. Experiment shows that the method is reliable and superior compared with conventional neural networks. When applied to fault diagnosis of rolling bearing, the algorithm exhibits the advantages of simple design, faster convergence and smaller error. It is suitable to be used as a new fault diagnostic method for rolling bearing.

Paper "Smart Pet Care System using Internet of Things" developed various smart services using IoT. This paper introduces a smart pet care system that is working in an environment of Internet of Things (IoT). Basic services of the proposed smart pet care system are: Remote feeding, remote controlled automatic defecation, CCTV service and Smart phone APP that can provide the control information of the above services. Basic architecture and system implementations are introduced with the details of services.

The paper entitled "An Improved Evaluation of College Students' Decision-making Behavior Based on Online Survey: Improving Management Performance through Network" make an empirical analysis to test the college students' decision-making behavior by using online survey, the result shows that decision making style will indirectly affect the career decision-making through the self management strategy (self adjustment dimension) and job definition (cognitive dimension).

The paper "Optimization Layout of Anhui Provincial Construction Engineering Quality Inspection Institutions" analyzed the status and present problems of Anhui provincial construction engineering quality inspection to identify significant research associated with advanced construction test technology. With the overall progress of the construction industry, there appear some problems of construction engineering quality inspection institutions such as management norms, uneven regional development, market environment influence, and supervision difficult.

Paper "An Optimal Energy Management Strategy for Thermally Networked Microgrids in Grid-Connected Mode" proposed a mixed integer linear programming (MILP)-based model for optimal energy management in thermally NMGs with piecewise linearized model for combined heat and power (CHP) generators. In order to fulfill the electric load demand, each MG is considered as a distinct entity with the objective to minimize the

operation cost. Being in grid-connected mode, this objective can be achieved either by operating the local generations or through trading with the main grid. The thermal load demand can be satisfied by either using the local resources or through trading with other MGs of the NMG with specified lines capacities. The objective is to maximize the usage of more economical units of individual MGs while minimizing the thermal energy waste of the entire network.

Authors of the paper "Second-Order Power Analysis Attacks against Precomputation based Masking Countermeasure" investigate the resistance of this masking countermeasure against second-order power analysis attack under the attack context of the Hamming weight leakage and the precomputation masked S-box. It improves the Adapted CPA technique [1] to make a better use of this attack context. The attack successfully reveals the secret key with and without electronic noise and algorithmic noise. The number of power traces required to reveal the secret key rises from 600(unprotected implementation) to 16,000.

In the paper "NLOS Channel Identification Based on Energy Detector for60GHz Wireless Communication Systems", propose a novel NLOS identification technique based on threshold selection using the ratio of kurtosis and maximum slope of energy block of the received signal using energy detector. In particular, IEEE 802.15.3c 60GHz channel models are used as examples and above statistics is found to be explained in detail. The simplicity of the proposed approach lies in use of parameters of energy-based time of arrival (TOA) estimation algorithm. The CM1 (LOS) and CM2(NLOS) of IEEE 802.15.3 cchannel models are used.

The paper "Implementation of Boolean Control Network Based Intelligent System in Smart Home" represented an intelligent system for smart home by using Boolean Control Network. For easy control, it has used matrix expression of logic. The system is controlled in several states and in each state different device is operated through actuator network. Matlab based simulation work is done to show the state changes of the system.

In the study "Development of a Smart Home Control System Based on Mobile Internet Technology", designed the topological structure through the analysis of the requirement of smart home control system in order to design a smart home control system. Then it selects hardware devices; build IP network and communication network to achieve the system function. At last it develops Pad and smart phone software. The system has multiple functions like monitor house, open and close curtains automatically, give an alarm, etc. The smart phone, PC and other devices link the residents and community service center to the houses.

In the paper "Performance Analysis of Roof-Integrated Water-Type PVT Heating System", aims to analyze the performance of heating system combined with PVT collectors that are integrated on a building roof. For this study, a 1.5kWp roof-integrated water-type PVT system was installed onto an experimental house and was incorporated into its heating system.

The paper "Research on the Impact of B2C E-commerce and Third Party Platform: An Empirical Analysis based on Factor Analysis" is in the context of e-commerce is being more and more companies accept and adopt, select the most representative, the most popular e-commerce mode - third party e-commerce platform model. Through theoretical analysis and empirical analysis, it find out the influencing factors of the third party e-commerce platform, and verify the importance of these factors by empirical analysis, and provide suggestions for enterprises in the choice of third party e-commerce platform. This

paper analyzes the problems in the use of small and medium enterprises in the third platform and the external environment, and puts forward the countermeasures and suggestions for the government level, enterprise level and platform technology. Platform technology level of countermeasures and suggestions are proposed for small and medium enterprises in the choice of third party e-commerce platform should focus on information quality, service level, diversification needs, transaction security and other factors.

In the study “Research on Industry Competition, Ownership Structure and Earnings Management: Empirical Analysis based on Listed Bank”, selects the data of listed banking industry in China from 2004 as the sample, and tries to find out the factors that affect the earnings management, especially the influence of the ownership structure and the competition on earnings management. Through the empirical analysis, it found that the proportion of the first largest shareholder and the degree of earnings management of the bank presents the "U" type nonlinear relationship; the proportion of the senior executives has negative impact on the earnings management. There is a positive correlation between the market share competition and earnings management in the banking industry. Overall, the rise in the absolute amount or relative amount of bank loans will increase the level of earnings management of banks. The degree of competition of state-owned banks is negatively related to earnings management, but non state-owned banks were positively correlated to earnings management.

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