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 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 "Research on Milk Conductivity Real-time Online Monitoring System" developed a design based on single-chip microcomputer processing core control sensor measurement unit, data transmission unit, display and control unit, online monitoring system to achieve real-time data collection, transmission, display and other control functions. For monitoring the conductivity values were piecewise linear model of the relationship between the conductivity and the feedback voltage power function curve model comparison with simulation experiment.

Authors of the paper "An Improved Smart Card based Anonymous Multi-Server Remote User Authentication Scheme" have shown that their scheme is not too much secured as they have claimed and it can suffer from stolen smart card attack, user impersonate attack and lack of some important features of smart card as well. To overcome these security flaws, they have further proposed an improved anonymous authentication scheme.

The study "Design of a Remote Data Monitoring System based on Sensor Network" uses the sensor network to realize automation of remote data monitoring. This monitoring system is developed by Internet of Things technology, software technology, network evaluation technology and so on. The system has the characteristics of data real-time processing, visualization, and alarm on abnormal occasion, and has the ability to monitor data remotely and automatically.

The research paper entitled "Asymmetric Variable Universe Adaptive Landing Fuzzy Controller for Carrier-Based Aircraft" presents an improved asymmetric variable universe adaptive landing fuzzy controller with Safe Flight Area during approach for carrier-based aircraft in order to keep the accuracy of landing. By means of universe-conversion factors and contraction–expansion factors, universe of discourse can be modified online, and fuzzy rules can reproduce automatically to adapt to the modified universe of discourse.

Paper" Applying Demand Response Based on TOU and EDRP to Optimal Microgrid Operation" deals with an optimal operation a microgrid in grid-connected operation mode. DR programs based on time of use (TOU) program and emergency demand response program (EDRP) are applied in this paper. Mixed integer linear programming is used to the end of simulation.

In the paper "Construction and Application of Information Base of Urban Residential Landscape Based on Big Data", the urban residential landscape information database system architecture has been designed, focusing on the data source analysis, conceptual design, logical design and physical design. And further to the database techniques, such as data dictionary, ER model, SQL, and Web publishing platform, network applications

techniques were introduced. Development and application of urban residential landscape database is a significant way to expand urban landscape environment construction.

Paper "User Privacy Framework for Web-of-Objects based Smart Home Services" presents user privacy framework for web-of-objects based smart home services to control the release of personally identifiable information (PII) in smart home environment. The ubiquity of smart home enables smart home users and third parties to access home devices and data from any location at any time. The ubiquitous and pervasiveness improves the user comfort level, but also makes user PIIs highly prone to leakage. It proposes Smart Home Web of Object User Privacy (SWOPR) architecture to protect and control the release of user PIIs according to the user consent. It suggests an architecture that integrates the RESTful framework, ISO/IEC-29101, and XACML/Ontology; the integration is not supported in existing systems. The SWOPR introduces Smart Home Web of Objects Privacy Controller (SWOPC) and Privacy Processor (SWOPP) nodes. SWOPC controls the process of collection of PIIs from users to the release of his PIIs to others. SWOPP provides PIIs processing functions such as anonymization and encryption under the control of SWOPC. The proposed privacy framework architecture is simple, lightweight and has high performance. It also presents service scenarios to acquire the user PIIs, consents and release of PIIs to others.

Authors of the paper "Rotary Shaft Structure Optimization of High-Temperature Motor Based on Ansys" focuses on the problems of high-temperature furnace motor in term of rotary shaft over length as well as deformation tendency under high-temperature condition, and therefore the thesis conducts design optimization upon rotary shaft of a motor that is applied in high-temperature furnace regarding its mechanical property and thermal-stress distribution. First, it establishes a full-scale 3D model of the shaft-fan system, then it analyzes its mechanical properties such as rigidity and stiffness under the high-temperature environment, which bases on reasonable assumed conditions and the boundary conditions, where hence the thesis puts forwards an optimized dimension design solution for the motor rotary shaft. And then the thesis analyzes and calculates the shaft-fan system to improve the motor shaft size from the angle of thermal stress and thermal deformation consideration and the special characteristics of such motor working under high-temperature environment. And the improved motor shaft size is verified as reasonable. The thesis analysis can be the designing references for cooling system applied in the high-temperature furnace motor.

In the paper "The Study of Services Management Based on the Network Environment", a service management framework is designed. A mechanism and method based on strategy and dynamic network environment service management are proposed. The method can effectively solve the problem of dynamic service management in network environment, and is widely used in dynamic service management based on Web services.

In the paper "Wireless Sensor Network 3-Dimensional Positioning Method", in wireless sensor network, determine the position of the node position or events is very important to its surveillance activities, however, in the traditional wireless sensor network, are using two-dimensional spatial positioning technology, aiming at this problem, this article will wireless sensor network (WSN) 2 d algorithm is extended to 3 d space, analyzes the main factors affecting the positioning accuracy of wireless sensor network. In order to further improve the stability and precision of the algorithm, by introducing the Newton's method, gives the quasi-newton three-dimensional node localization hybrid localization algorithm.

Authors of the paper "Multi-Objective Optimal Allocation for Regional Water Resources Based On Ant Colony Optimization Algorithm" study on the problem of water resources

allocation, with the objective to produce more benefits in economic, ecological and social aspects. Specifically, they formulate the water resources allocation as a multi-objective optimization problem, and propose to employ Ant Colony Optimization (ACO) based algorithm as a solution. They also use the water resources dataset of Beijing city to evaluate the effectivity of the method.

The thesis "Research on College Students' Application Behavior Based on Blackboard System - A Case Study on Business College of Beijing Union University" presents a generalization and analysis the characteristic of students' e-learning behavior by addressing their three behaviors: Information retrieval and processing behavior, social interaction behavior, and problems solving behavior. The behavioral characteristics of students' application of Blackboard were analyzed in detail. The results showed that: overall, there is no great gender difference in the three aspects, but there are significant differences in different grades. Finally, according to the results of the questionnaire and statistical analysis, several suggestions and advices of curriculum construction based on Blackboard were put forward.

Paper "Challenging Issues in Stochastic Calibration based on Bayesian paradigm for Building Energy Model" aims to inform the risks of Bayesian calibration associated with the aforementioned issues through a reference case study. For this study, the Gaussian Process (GP) emulator, which can be regarded as a meta-model of Building Performance Simulation (BPS) tools, was used to reduce the simulation run-time. Bayesian calibration using the GP emulator was implemented with what-if scenarios considering the aforementioned issues. And then the validated models were used for a stochastic retrofit analysis of glazing systems.

In the paper "Wood Defects Recognition Based on Fuzzy BP Neural Network", firstly, they applied the X-ray non-destructive testing technology to detect wood defects for getting the images. After graying the images, they calculated their GLCMS(Gray Level Co-occurrence Matrixes), then they normalized GLCMS to obtain the joint probabilities of GLCMS. The feature vectors of images, which included 13 eigenvalues of images were calculated and extracted by the joint probability of GLCMS. The fuzzy BP neural network(abbreviated as FBP) was designed by combining fuzzy mathematics and BP neural network . And the FBP neural network was regarded as the membership function of feature vectors, the outputs of the network was regarded as the degree of membership to the feature vectors in each category. They use the maximum degree of membership method for the pattern recognition of feature vectors, so the automatic identification and classification for feature vectors were achieved, and then the automatic identification of wood defects was realized.

In the paper "Design and Implementation of Soil Nutrient Monitoring System Based on "3S" Technology", soil nutrient monitoring system is to master the nutrient status of the bare ground, and quickly extract the information of farmland nutrient. Because of having a significant impact on the crop, the soil nutrient monitoring is important. For the lack of monitoring soil nutrient monitoring currently, combined with "3S" technology, spatial database technology, computer network technology and modern agricultural information technology as the basis, using WebGIS Service standard spatial database engine, the soil nutrient monitoring system based on soil nutrient information of Yangling was scientifically constructed. It achieved soil nutrient management from the large-scale, made the monitoring process towards standardization, improved management efficiency and scientific level, and provided technical support for farmland quality decisions.

In the paper "Accuracy Analysis of Structure Modeling using Continuous", a 3D model was constructed using Continuous Panoramic Image and accuracy analysis of 3D modeling data was performed. The way for 3D modeling using images and SketchUp greatly reduced the time and the coordinates of the target object were effectively collected in panoramic images. Accuracy analysis of the modeling result was performed by comparing coordinates with the total station. As a result of the accuracy evaluation of the 3D model, the horizontal and vertical deviations were 0.06m and 0.128m, respectively.

The paper "A Method for Missing Data Recovery of Waste Gas Monitoring in Animal Building Based on GA-SVM", presented a method for missing data recovery based on support vector machine (SVM) combined with genetic algorithm (GA). Multiple factors that influence monitoring values of the waste gas in animal building such as temporal, spatial and environmental, were considered to established a SVM regression prediction model to estimate the missing data of the waste gas monitoring. Meanwhile, to obtain better prediction accuracy, model parameters were optimized by the GA. The data processing of the ammonia (NH3) concentration was taken as an example; monitoring data of 3 days were randomly selected in a farm to test the presented model in this paper. It is shown that there was a very little error between the estimated data and the monitoring data, the maximal relative error was 6.99 % (percent), and the average relative error was 2.15 % (percent). It is an effective method for missing data recovery and a practical way of data processing for waste gas monitoring in animal building.

Paper "Autonomous Network-Based Integration Architecture for Multi-Agent Systems under Dynamic and Heterogeneous Environment" proposes a new strategy to solve such problem. Autonomous load distribution can be achieved through the integrated access method, which reduces the total load of the system for the number of Pull-MAs sent to the system decrease. In addition, the information structure of integrated service area is effective to improve the ratio of the satisfaction of Pull-MAs with joint request on one node. As a result, the homogeneous distribution of the separated services requests and correlated services requests is guaranteed autonomously.

Paper "Smart Integrated Multiple Tracking System Development for IOT based Target-oriented Logistics Location and Resource Service" developed an efficient target-oriented smart integrated multiple tracking system that looks up object location based on real time and guarantees the accuracy and reliability of logistics location and resource management by combining the function of multiple tracking system

The paper "The Finite Element Method for the Buried Pipes in Groud Source Heat Pump System" adopted a new finite element method to provide a finite element scheme for piles and U-bent tubes. And then a calculation on the term of heat transfer between the pile and the U-bent tube through the point integration method is made. Then the value of the convective heat transfer coefficient h will be determined through the definition of the Nussellt number. Finally three illustrative examples are given in this paper to verify the rationality of the format. The model proposed in this paper has broken through the restrictions of the traditional analytical solutions, making it able to be applied widely in various projects.

Paper "Relation of Reading Skills and Smart Device Experience at Home among Korean Kindergartners: the Mediation Effect of Vocabulary" tested eighty children with the tasks of vocabulary and reading skills (word reading and reading comprehension) and their mothers responded to home questionnaires regarding children's use of smart device at home. The purposes of this study were about how 5-year old children used smart devices at home and how their use of smart devices at home was related to children's vocabulary

and reading skills. Results were as follows: First, 77.2% of children used smart device at home. Second, the often use of communication applications by children was associated with vocabulary, and vocabulary was related to word reading and reading comprehension. According to mediation analysis, the use of communication applications contributed to word reading and reading comprehension by the mediation of vocabulary among Korean children.

In the paper "Design and Analysis of an Automatic Voltage Regulator Microcontroller-based Distributed Power Supply", the design of an automatic voltage regulator (AVR) microcontroller-based distributed DC power supply is presented. The system includes a photovoltaic (PV) power generation, commercial hardware drive power system, and a battery booster circuit. A software control technology is used for storage battery charging and discharging. The PID control algorithm is used to control AVR microcontroller to achieve maximum power point tracking (MPPT) and to improve system stability. In addition to the traditional battery power, the system can make full use of solar system for energy sustainability.

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