

# 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 26 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 entitled “Research on the Evaluation of Coordinated Development Level of Industrialization, Informatization, Urbanization and Agricultural Modernization in China”, constructs a set of 4 categories and 16 indicators of evaluation system to measure the development level of industrialization, informatization, urbanization and agricultural modernization of 31 provinces, municipalities and autonomous regions in China. Based on this, provincial coupling level and coordinated development level of four modernizations are calculated by the coupling degree model and the coordinated development degree model.

In the research entitled “Middleware-based Cooperative Context Dissemination for Smart Home Application”, we propose a middleware architecture that shares context in a cooperative manner so that it can be reused among applications. Basically, this middleware generates a particular context at once for a time interval and disseminates among registered applications using a new mechanism. Measuring inequality of the context computing time over application-based implementation exposes the effectiveness of this middleware.

In paper “Study on the Dynamic of the Land Using Based on the RS and GIS Techniques”, will use the TM satellite remote sensing images of 3 different time phases as the main source of data, the author, based on RS and GIS, will interpret and extract the land use data of the studied region in 1992, 2001 and 2010 respectively, so as to obtain the basic data of land use change in Zhaozhou County during 1992-2010. Thus the author could calculate the dynamic transfer matrix of the land use type, the dynamic degree index of land use and undertake quantitative analysis of the land use changes in this region.

Paper “A Two-Phase Hybrid Optimization Algorithm for Solving Complex Optimization Problems”, for solving traveling salesman problem (TSP), the ant colony optimization (ACO) algorithm and simulated annealing (SA) algorithm are used to propose a two-phase hybrid optimization (TPASHO) algorithm in this paper.

The paper “A Study on the Interaction Envelop Design through Ned Khan's Works”, analyze the concept and form of interaction envelope design applied with natural elements, which could change according to energy saving and surrounding environments, which have become issues currently. This study also aims to examine the envelope technical elements where interaction design is applied through the analysis of Ned Khan's interaction envelope cases using natural elements in this study.

The paper “Face Recognition in Complex Background: Developmental Network and Synapse Maintenance”, introduces another biologically inspired mechanism - synapse

maintenance to achieve the object recognition. Synapse maintenance can automatically decide which synapse should be removed, kept or partial removed, thus it can weaken the complex background, strengthen the face features, reduce the bad influence of the complex background on the face recognition. Experimental results show that DN with the synapse maintenance can effectively recognize faces with complicated backgrounds and the recognition rate is over 95%.

In the research paper “Study on the Vulnerability Level of Physical Security And Application of the IP-Based Devices”, we analyze vulnerability of security with the classification of IoT devices and investigate the practice. And we look at the issues of vulnerability of physical security based on results of analysis. Based on this, it provides a baseline about standards of the security level of IP-based devices. Also, looking for the target and studying the ways to take advantage of this standard.

In the paper entitled “Research and Design on Auxiliary System for Citation Certificate of Academic Papers”, considering the special situation of great demand for citation of academic papers in China, we design and implement a special auxiliary system of citation certificate of academic papers. At the beginning, we analyze the primary system requirements and divide the system into four functional modules, which are the EI retrieving, and certificating module, the ISI retrieving and certificating module, the query as well as report module, and the original settings restoring module. Next, for the system design, we present details about these modules.

The paper about “Energy Efficient Traffic Allocation for Resource-constrained Multi-homed WSN Gateway” aims at minimizing the gateway's power consumption while guaranteeing the transmission the traffic optimally for the gateway with different constraints and configurations, and it can significantly promote the gateway's energy efficiency in comparison to the traditional method.

In the paper of “A Web-based System for Shelter and Evacuation Path Selection Using Spatial Models in Disaster Situations To generate such information in real-time, construction of spatial databases and complex spatial analysis models through Web Map Services (WMS) and Web Feature Services (WFS) based on Open Geospatial Consortium Web Services (OWS) is required. Focusing on the implementation of distributed OWS resources to provide more immediate information in the case of an emergency, we propose a Web-based system that identifies suitable shelters and provides the shortest evacuation path to each shelter for civilians who are within the danger zone. Specifically, (1) a search framework based on the OWS architecture is proposed and utilized to develop both Web-based and smartphone applications connected with WMS types of spatial data on the Web; (2) the spatial analysis models proposed include three sub-models, namely, data construction, shelter selection using scores by natural breaks, and an evacuation path model using network analysis.

The dissertation entitled “Fast Response Research of Magnetically Controlled Reactor”, the working principle of MCR has been analyzed, and a fast response structure of MCR has been designed with the novel fast response structure, fast excitation and rapid demagnetization can be achieved. According to the simulation and experiment results, the effectiveness of the proposed structure is verified by limiting the response time in 30ms.

The novel idea of paper “Analysis of Impact of Terrain Factors on Landscape-scale Solar Radiation”, Incident solar radiation is one of the major sources of energy for driving biological and physical processes on earth. In this paper, simple conversion factors are designed to determine how the four landforms (i.e. plain, plateau, hill and mountain) will

affect incident solar radiation at one month intervals using the ArcGIS tool appropriate for regional solar radiation analysis.

The paper “Layered Execution Event Detection System of Harmful Streaming Contents Activated from Android-based Smart Devices”, we analyze the mechanism by which streaming content is executed in Android-based smart devices and, consequently, propose a mechanism that automatically detects when harmful content such as a pornographic video is being viewed on a smart device. On the basis of the results of analysis of the mechanism by which harmful streaming content such as a pornographic video is executed on Android-based smart device, we developed and implemented a mechanism that extracts and analyzes the characteristics of internal events that occur at the time a harmful streaming content is executed.

The paper “Analysis on Modeling and Motion Simulation Based on Manipulator End Executor of Small Satellite during the Grasping Process”, introduces the components and functions of institution aiming at docking capture link of the small satellite manipulator end executor. Putting forward to Euler method and quaternion as the theoretical basis, kinetics of grasping institution the relative position and attitude are modeling and analyzed.

In the paper “Energy Efficient Traffic Light Controller Design on 28nm FGPA” our focus is on study and analysis of power and junction temperature at different temperatures and at different capacitance values. Kintex7 is 28-nm FPGA on which we implement our circuit to re-assure power reduction and reduction in junction temperature in sequential circuit. Varying the values of capacitance and temperature enhance the efficiency of the Energy Efficient Traffic Light Controller design. This paper basically deals with FSM (Finite State Machine) and is implemented on FPGA. FGPA is preferred because of its high speed and is inexpensive.

Paper “The Study of Synchronous Belt Transmission Stability with the Influence of Rotation Speed and Tension”, The vibration dynamic measurement device was developed based on the laser displacement triangulation measurement principle, aiming at RU style arc teathed synchronous belt transmission process, measured the variety of amplitude over time at the middle of the belt span when rotation speed was 600r/min, 1200r/min, 1800r/min and tensile force was 320N, 480N, 640N, obtained the rules of amplitude and frequency change along with the variation of rotation speed and tensile force. It has significance on improving the transmission stability of arc teeth synchronous belt, reducing the transmission noise and prolonging the service life of belt.

The paper entitled “A New Fuzzy Neural Network Algorithm for Rural Public Service Performance Evaluation”, the paper advances a new fuzzy neural network algorithm to overcome the defects of original BP neural network algorithm and evaluate rural public service performance. First, the paper designs a new calculation structure based on fuzzy and BP neural network theory, and selects new self-training methods for the improved fuzzy neural network algorithm; Second, the performance of the advanced algorithm is also analyzed form four aspects in theory; Finally, based on analyzing and constructing the evaluation indicator system, the improved fuzzy neural network algorithm is applied to evaluate rural public service performance and the experimental results show that the superiorities of the improved algorithm include high evaluation accuracy, fast convergence speed, small oscillation, simple algorithm process.

In the paper about “I a Study on the Communication Agent Model for One-way Data Transfer System”, proposes a one-way data transmission system. The proposed system

receives and processes information which is sent to a business network from a control system, but does not transmit control information of a business network. In this way, under any circumstances, it is impossible to access an infrastructure system via an internal control network from an outside network, and thus it is possible to protect national infrastructure facilities safely.

Paper “Research on the Inquiry Teaching Model of Men's Basketball Teaching in College Physical Education based on Network Information Technology”, Network education is a new concept of modern information technology applied to education, which is the education of the use of network technology, according to a series of outstanding problems in the traditional basketball teaching, we discussed the application value and effect of inquiry teaching in college basketball education.

In the research entitled “A Novel Task Communication and Scheduling Algorithm for NoC-based MPSoC”, a novel task scheduling algorithm which statically schedules both communication transactions and computation tasks onto heterogeneous NoC architectures under real-time constraints is presented. Our algorithm is capable of assigning tasks onto different processing elements (PE) automatically and scheduling their execution. We map tasks onto an  $8 \times 8$  NoC-based MPSoC to show that our scheduling algorithm leads to reduction in the total execution time, energy consumption. Experimental results show that for a multimedia application, more than 40% energy savings have been observed compared to the schedules generated by a standard scheduler.

In the paper “Home Electricity Consumption Monitoring Enhancement Using Smart Device Status Information”, Electricity consumption monitoring to understand energy consumption status and patterns is the first step in reducing the electric cost for a house. Conventional electricity consumption monitoring systems usually rely on specially designed power measuring equipment such as a smart meter or sub-metering device. However, it is not easy to obtain enough information for energy monitoring because the limited number of measuring equipment can be installed due to their costs and privacy issues. Therefore, the status of devices could be usually inferred from limited information using the technology called non-intrusive appliance load monitoring. However, the limited information causes inaccuracy in estimating operation status of the devices.

In paper “An Improved DV-Hop Localization Algorithm Based on the Node Deployment in Wireless Sensor Networks”, an improved DV-Hop algorithm based on the node deployment was proposed. The proposed algorithm improves the localization accuracy by taking the advantage of the node deployment when computing the distance between the unknown node and the anchor. Simulation results prove that the improved DV-Hop algorithm offers the better performance compared to the original DV-Hop algorithm in localization accuracy without requiring additional hardware.

In the paper about “Model-Based Design Methodology for Blind Image Restoration”, is a kind method of image processing by estimating both the original image and the point spread function from degraded images, when there is unknown or not completely know the prior knowledge of the original image and point spread function of imaging.

In the paper “Message Aggregation in VANETs for Delay Sensitive Applications”, A Vehicular Ad-Hoc Network (VANET) is categorized as a Mobile Ad-Hoc Network (MANET) which delivers wireless network services with an aim to improve road safety and enhance driving comfort. Diverse applications of Vehicular Ad-Hoc Networks such as infotainment, road safety and public safety have made VANETs as a notable and emerging area of research and development.

In the paper “Online Marketing Strategy and Service Quality Evaluation System: An E-commerce Perspective”, Network education is a new concept of modern information technology applied to education, which is the education of the use of network technology. According to a series of outstanding problems in the traditional basketball teaching, we discussed the application value and effect of inquiry teaching in college basketball education, the data was collected from Jiangxi Normal University; experiment object is 36 students, and we put them in the experimental group (18) and the control group (18).

In the paper “Distributed Localization Algorithm for Large-Scale Wireless Sensor Network”, gives the method to realize OMNeT++ in the simulation environment, and carries out the simulation analysis.

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**Editor of the October Issue on  
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