# 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 24 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.

In the paper "Development and Implementation of Visual Exposure Indicator for Residential Development" emergency management system architecture is first constructed to adopt the different context, which provides another research point. According to the actual environment, authors build collaborative emergency resource scheduling model considering the task relations. Then, an improved HPSO is applied to solve the multi-objective NP-hard problem. Some simulation experiments are carried out to show us the effect and efficiency of proposed model and improved HPSO in smart city. In this paper it is assumed that in the course of emergency response process, the task remains unchangeable, therefore a possible future direction is to extend the mapping process to handle with dynamic structure of the emergency task. Meanwhile, a new effective algorithm should be put forward in the future to better solve the complex problem.

Paper "Development of Primitive Motion Library for Kinetic Typography Rendering Engine" constitutes primitive motion library using primitive motion API to substitute existing ways to manufacture the kinetic typography. For constructing the primitive motion library, authors analyze the features of texts and properties of motion and reorganize it as primitive motion API to visualize kinetic typography effectively. Also, design primitive motion library as format of standard web environment, as primitive motion API can provide users with a medium to yield particular kinetic typography conveniently and immediately in the social media environment. In addition, arranging the motion library for each domain can help the application build using kinetic typography. The reader should bear in mind that the study is based on primitive movement; accordingly, it should expand the range to express complicated motion. In other words, the combination of Primitive Motion API will be even advanced to diverse motions, promoting enrichment of users' emotions and kinetic typography.

The paper "Effect Research of Aspects Extraction for Chinese Hotel Reviews Based on Machine Learning Method" tries to use machine learning to extract aspect from Chinese hotel reviews. Through a lot of experiments, we find that machine learning methods are suitable for the aspect extraction of Chinese reviews. This paper adopts different dimensions of features, feature representation methods and classifiers to analyze the integral effect of aspect extraction. The experiment result shows that ME is the best classifiers and presence is most suitable feature representation method for aspect extraction.

In the paper entitled "Alone in the Game: Dynamic Spread of Churn Behavior in a Large Social Network a Longitudinal Study in MMORPG" for a better understanding of churn

behavior in MMORPG, authors use longitudinal statistical models to examine whether the churn behavior in one person is associated with the churn of his friends on a complete data set of an entire society. Discernible clusters of active persons and inactive persons are visible in the network, and the relationship between people's churn behavior extends up to three separations. Besides, they provide quantitative evidence for the strong ties hypothesis. The higher the number of common friends two persons have, the influence between them is more significant. At last, they use mixed effects cox models to predict churn in the future. This study can provide a long forecast horizon, it is an obvious advantage to prevent the churn of a person.

Authors of paper "A Study on Low-Power Sensor Node based on Event-based Sampling Using Renewable Energy in Greenhouse" proposed low-power sensor node that applied to perform events-based sampling algorithm and to harvest energy through irrigation equipment applicable in greenhouse environment. The system composition to achieve such a goal could be divided into three parts of sensors, data processing and control, and this paper suggests a solution to an unnecessary wasting energy problem by using the event-based sampling to effectively reduce data exchange between the control system composition. Sensor node based on energy harvesting are implemented through micro-hydro generators connected to the irrigation equipment and it is confirmed that transmitting or receiving stable data is possible, reducing energy consumption of sensor node by the algorithm.

The research paper entitled "A Study on Group Buying of O2O Mode using Generalized Stochastic Petri Nets" proposes a Group Buying model (paid in advance) of online-to-offline mode using Generalized Stochastic Petri Nets. As the time cost of consumers is getting higher and higher, time efficiency is getting much more important in all aspects of life, especially in catering industry, and one way that can lead to direct communication between store owners and consumers is Group Buying of online-to-offline mode, the center of which is the brand building and service efficiency. Although researches based on both users′ and sellers' perspective about online buying are very rich, these findings are not entirely applicable for this new e-commerce model, and most of current research on online-to-offline mode use qualitative methods. More importantly, few researchers have concerned about the efficiency of Group Buying process and come up with related solutions to improve it. By constructing a business model of GB and conducting time efficiency and performance analysis on it, authors find that the key transitions of the system only take up less than half of the time before the whole process has been completed. And when we shorten the feedback process, the percentage of finishing consumption in physical store in the whole Group Buying model can be improved by 14.5%. Thus, they suggest that suppliers and sellers should be more focused and efficient in encouraging customers review timely as well as giving consumers feedback as soon as possible, since consumer comments are proved to be significantly important for the retailers. Besides, site operators and store sellers can also use other ways like WeChat and microblogging to promote their site linkages and gain more market share.

The paper entitled "The Analysis of the Comical Factors of 'Olaf' the Snowman in Frozen - Based on the Laughter Theory of Henri Bergson", focused mainly the "laughter effect" of the animation Frozen. Laughter is a main technique in communication and a persuasive way to give interest to the information. There are many theories by theorists on laughter and humor but on the basis of 'Le Rire' by Henri Louis Bergson, the Frozen had been applied to the laughter theory and one of the characters who had given a lot of laughter, the snowman, Olaf had been analyzed for its comical elements. Bergson had stated that there is no comical aspect if it is outside the boundaries of being humane, no emotional aspects should accompany laughter and that comedy should appeal for common

sense. Olaf, the snowman, had been created through magic in the film and with the humane expressions and exaggerated movements it was shown to be more human-like and the situation of non-reality of being created by magic has left us in a spectator state, where it was accepted as common sense. Additionally, it was a character of good will which met the socially reasonable requests. Bergson had also categorized the types of laughter by shape, movement, situation, word/speech and personality, therefore laughter effect of 'Olaf' can be analyzed in these 5 types of laughter. The laughter effect of 'Olaf' had been analyzed on the types of laughter theory from many years back and has confirmed that even a newly created character had conformed in the types for character personality and design.

In the thesis "Research on Building Customized Furniture Product Model and Assembly Sequence" a model of furniture product design and assembly for customization is proposed. It can decompose customers' needs and transform them into homologous modules set in the structure tree. Then through the assembly relationship graph and matrix of these product parts, an assembly sequence which can guide the assembly of products will be built by a genetic algorithm. This process will not only save manpower and resources, but also improve enterprise efficiency. In this article, an instance was given in order to verify the correctness of product design and assembly processes based on product family of mass customization.

In the paper "The Design of System about Cow Activity Based on SVM" a cow behavioral characteristic is designed. The system collects X, Y, Z axis acceleration data through triaxial accelerometer ADXL345, by ZigBee wireless network and RS485 sent to the information center, it's based on the support vector of binary tree to classify their behavior. The result shows, the algorithm for cow's stationary and moving classification accuracy was 93.26%, a slight and sharp motion accuracy was 84.81%, It provides an effective basis in judging cows in heat or in physical abnormalities. That system contributes to the refinement of cows feeding and health culture,and has great significance for the stable and healthy development of the dairy industry.

Authors of the paper "An Effective Self-test Scheduling for Realtime Processor based System" explore the effective time utilization, without influencing the deadline requirements of typical hard real time task ,there are no limitation on the new results each task can be periodic or sporadic ,with relative deadline which can be less than ,equivalent to or greater than its period, it  is too fast , best-effort ,effective  real time scheduling algorithm for a wide variety of job parameters.

The research paper "Research on Several Multicast Routing Algorithms" first describes the dynamic multicast routing and routing optimization standard, then puts forward the RPL protocol based energy efficient DODAG multicast routing algorithm. Through simulation experiments, we can compare and analyze the advantages and disadvantages of several kinds of dynamic multicast routing algorithm. And according to the simulation results obtained conclusion, EE - DODAG multicast in the process of each packet sent after more a small amount of forwarding nodes, and consume less energy in survival time.

In the paper "Development of Emulator for CSS3 Extension to Represent Web Contents on Stereo Device", authors extend CSS specifications which are needed to reconstruct standard-based 2D web contents in 3D space using CSS stylesheet, and we implement an emulator to confirm the result of representing written sample contents 3D-stereoscopically on a stereo device.  First, a new profile which is needed to set the view volume and layout web contents out in 3D space is proposed by extending CSS3 specifications.  Then, the user freely reconstructs the web contents from the browser in

3D space using the nwly extended CSS3 specifications and writes sample contents of various kinds. In sequence, the sample contents which were written through preprocessing process using the extended specifications are converted to original CSS code, so that it is executable in webkit-based browsers. Lastly, in system rendering engine emulator, stereo view volume is automatically created, and the user can verify the result of 3D-stereoscopic representation by emulating the final stereo image files, which can be obtained from virtual left and right cameras, on stereo device.

The paper "The Role of Switching Costs in O2O Platforms: Antecedents and Consequences" examined the effects of inertia; perceived ease of use, customization and quality of offering on the consumer's switching costs. These findings provide a theoretical foundation for academics and also practical guidelines for service providers in dealing with the promotion of loyalty at O2O platforms.

This research "The Construction of the Animal Husbandry Information System Based on the Technology of Map Conflation", aims to merge the sections of geographic information distribution of the large-scale farms information monitoring system and the farming enterprises filing system which are under the Animal Husbandry Bureau in Heilongjiang Province as a Geographic Information System (GIS) that based on the map conflation technology of topological relation. Applying a variety of algorithms of points, lines, surfaces to this study, and using optimized "Spider code" and matching algorithm based on area overlay rate to solve the map database conflation problem of two different sources but consistent geographic target. It not only improves the map accuracy and consistency, but also adds new space characteristics, and updates attribute information which associated with dataset spatial characteristics. It makes the personnel at all levels in the Animal Husbandry Bureau in Heilongjiang Province realize information sharing. It is conductive to promote the work of staff at all levels and provide decision support of data to the Animal Husbandry Bureau in Heilongjiang Province.

Authors of the paper "IoT-based Intelligent for Fire Emergency Response Systems" suggests an Internet of Things (IoT)-based intelligent fire emergency response system that can control directional guidance intelligently according to the time and location of a disaster and the design of an integrated control system using wireless sensor networks to address the problems with existing fire emergency response systems in times of fire or building collapse.

Authors of paper "Forest Fire Monitoring Based on Mixed Wireless Sensor Networks" propose a paradigm called the forest fire monitoring paradigm (FFMP). The purpose of the FFMP is for forest fire early detection and locating based on mixed wireless sensor networks (WSNs). Different from pure static and mobile WSNs, mixed WSNs are composed of both mobile sensor nodes and static sensor nodes. Mixed WSNs are a tradeoff between cost and coverage. In the FFMP, the mobile sensor nodes perform as cluster heads and they will construct a backbone network in which the mobile sensor nodes can connect with their neighbors and be capable of transmitting data to the base station. Each static sensor node chooses one neighboring mobile sensor node as its cluster head and uploads the generated messages to the cluster head. The mobile sensor nodes then fuses the information and transfers the fusion results to the base station, where the data were further processed to obtain the temperature distribution graph and locate the fires. The simulation illustrates that this approach performs well in early forest fire detection and locating. In addition, our approach can significantly prolong the lifetime of WSNs.

The research paper "A Common Data Storage Solution for SE-based Membership Card Applications", presents a common data storage solution for SE-based membership card applications, which can enable retailers not only to deploy membership cards on secure area easily, but also to access membership cards in a fast and secure manner. Since the proposed solution provides common and simplified interfaces for managing membership card application information, the service providers will not have to know much about the complicated application management mechanism within a SE and thus the overhead of developing and deploying a SE-based membership card application is greatly reduced.

The study entitled "Remotely Controlled Management on a Small Firewall Server Using a Virtual Server" suggests a firewall management method using a virtual server in order to allow a manager equipped with a smart phone not only to detect and prevent security threats but also to control firewalls anytime, anywhere. Recently, hackers' threatening over security is constantly increasing, but companies or institutions operating a small PC server are exposed to a serious threat on security as they cannot afford to maintain manpower that can control it for 24 hours. As a solution for it, this study suggests a way to provide stable services and also save time and money by detecting an illegal access or intrusion at an early stage and reporting it to the server manager in a remote place via a smart phone so as to cope with it properly. For the solution proposed here, this researcher has designed and realized a system which conducts a pattern matching inspection on the packet using the virtual server and Aho-Corasick algorithm to monitor and detect an intrusion and can realize prompt safety management in a remote place with the system control that is realized by an android app.

Paper "Research on Improved Firefly Optimization Algorithm Based on Cooperative for Clustering", built an optimization model and proposed an improved firefly optimization algorithm called CFA, which is based on firefly Cooperative. The main idea of CFA is to extend the single population FA to the interacting multi-swarms by cooperative Models. In this work, firstly, CFA algorithm is used for optimizing six widely-used benchmark functions and the comparative results produced by, firefly optimization algorithm(FA) are studied. Secondly, CFA algorithm used in data mining, clustering analysis on several typical data sets. The performance of typical data clustering results showed that the biological heuristic algorithm based on clustering analysis algorithm with the existing success of FA compared to faster convergence, and the clustering of higher quality.

The paper "Developing and Evaluating Mobile Sensing for Smart Home Control" propose a system about smart home based on mobile sensing that does not requires interventions and commands from the user. Mobile Sensing is used to records daily routine activities of the user. Then the system automatically gives a response to user based on his/her daily routine activities. Authors have implemented our approach to demonstrate the feasibility and effectiveness of using mobile sensing for controlling smart home system. Furthermore, they evaluate the approach and present the details in this paper.

Paper "Research on the Construction of the High-efficiency Modern Agricultural Demonstration Park" establishes the framework of the modern high-efficiency agricultural demonstration park from six aspects, namely, development orientation, function composition, comprehensive planning, smart construction, standardized construction and innovation construction. The results show that these aspects are influenced by several factors or set up by several modules, and form the symbiotic network of the park. Positioning realistic development targets, arranging function division, allocating infrastructure, and integrating smart, standardized & innovative technologies will ultimately enhance the ecological, economic and social benefits of the park.

In the paper "Life Cycle Cost Prediction for Rolling Stocks in Maintenance Phase Based on VBA Language Program" in order to predict and analyze the LCC during rolling stocks' maintenance phase, provide the important support for the decision during rolling stocks' design, production, operation and disposal, mitigate the risks for high expenditure, the LCC prediction software is developed with VBA programming language in Microsoft Excel environment based on various rolling stocks' maintenance scenarios. This software can collect the LCC input and predict the LCC during rolling stocks' maintenance phase. The data input is based on the history data and RAMS information for each system and approved by the engineers. This software is validated by several systems and a specific metro project. It shows very wide applicability for LCC prediction for comparing and analyzing for customer and design and friendly interface to the users.

In the study "An Intelligent Analysis and Mining System for Urban Lighting Information" an IAMSULI (Intelligent Analysis and Mining System for Urban Lighting Information) is proposed. Using data analysis technology, case-based reasoning technology and data mining technology comprehensively, the system aims at providing better decision support for lighting management. IAMSULI is composed of system management, geographical information management, lighting information management, lighting data analysis, comprehensive classification statistics and event management. The system can help us quickly find lighting problems, provide early warning alarm of the problems, and also supply constructive information for the urban development.

In the research paper "Online Leakage Detection Test of High-pressure Heater at the Power Plant" Variations of acoustic emission signals of leakage of the heater versus inner pressure, leakage aperture, transmission distance and liquid state in the outer pipeline were studied through experiment and analysis. By changing one of the four factors each time, leakage failure reasons were concluded. Research results would be applied into leakage detection of heater.

March 2015

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