

# 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 and Engineering Research Support soCietY.

This issue contains 18 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 “The Deployment of Novel Techniques for Mobile ECG Monitoring” address the critical issues raised inmobile ECG monitoring and propose new solutions to resolve respective problem. A chest-belt type two-electrode wireless ECG measurement system and the specific android ECG monitoring application are presented. Furthermore, optimum filter-set for motion artifact removal in ECG recording was also proposed.

Paper “A ZigBee-Based Home Control System Using OSGi Management Platform” proposes replacing conventional wired networks with ZigBee wireless technology and integrating the OSGi (Open Services Gateway initiative) service platform to achieve the following objectives: (1) higher flexibility and mobility compared to wired control systems; (2) lower cost; (3) a mechanism for automatic recovery after node disconnection to adapt to highly mobile nodes; (4) support to web browser-based remote management functions, negating the need to install customer-end programs; and (5) an intelligent home control system with update functions. Through the management interface, users can control intelligent home appliances anywhere and anytime, which enhances convenience, home security, and energy conservation.

The paper “Structural Damage Detection using Wireless Intelligent Sensor Networks” introduces a wireless sensor network system based SHM, the system includes the self-developed sensor node for SHM and the artificial intelligence routing for data transmission. Using offline processing and online processing methods in artificial intelligence routing, it can discovery backbone for wireless sensor networks with low average dissipated energy and average delay.

The paper “Android Application for Accessing KNX Devices via IP Connection” presents an Android application programmed in Java for accessing KNX devices via IP packets using KNXNet/IP protocol. The work consists of a custom programmed Java library that implements the client part of the KNXNet/IP protocol and an application that uses it for graphically controlling KNX devices.

The Authors of “A Study on UI based Channel Simulator for Indoor LED Communication” presents a study of the simulator for LED communication channel in indoor. Indoor circumstance was supposed that the shape was hexahedron type and LEDs were located on the ceiling and receiver could be located anywhere. Simulator UI was designed so that upper considered parameters could be easily set. Channel characteristics was composed

of LOS(Line Of Sight) and NLOS(Non LOS) LED signal which navigated through indoor after starting at LEDs. Finally channel characteristics which was delay time and attenuated power of received signal was saved as a text file and the result graph was displayed after post-processing.

Paper “Energy Signal Scheduling: A Simple Scheduling Mechanism for Wireless Sensor Networks” proposed an energy efficient scheduling method called Energy Signal Scheduling (ESS). Then, QoS-aware Energy Signal Scheduling (QoS-ESS) was presented. The QoS-ESS method improves ESS by dividing the sensor network to some clusters and applying the ESS for each cluster separately. The effectiveness of the proposed method is evaluated using NS2 simulator.

In the paper “Automatic UI Generation Technique for Mobile Applications on Touch-Screen based Smart Phones”, Authors proposed the touch-screen UI generating technique based on content's source code by static analysis. To generate the UI automatically, we adopt the notion of key set graphs that store the UI status information of applications to identify UI states by referencing the graphs and generating optimized on-screen keyboards. This method uses effective graph data structures to effectively circumvent the overhead issues featured in the dynamic analysis method.

The paper “Scalar Multiplication Algorithms for Wireless Sensor Network” proposes efficient algorithms for scalar multiplication on Elliptic Curve can be applied on Wireless Sensor Network. These are secured against side Channel Attack. The window size may be a subject of trade off between the available RAM and ROM at that particular instance on sensor node. Due to physical characteristics of sensor node, the power consumption and time consumption using the secret key can be clearly observed. Thus Side Channel Attack (SCA) is a serious threat against these devices. The main target for Side Channel Attack (SCA) against ECC implementation is the algorithm used for scalar multiplication on elliptic curve.

The paper “A Study on the Smart Virtual Machine for Executing Virtual Machine Codes on Smart Platforms” deals with a virtual machine, SVM, based on stack and capable of being run on various smart devices. SVM receives a SIL code which is semantically equivalent to a program created with different languages and interprets it based on stack on a software level. Then it runs the programs so that specific smart device operation systems and devices can load them and therefore have the advantage of being platform independent.

The Authors of “Multi-sensor Data Fusion with Dynamic Component for Context Awareness” propose about how to use multi-sensor data fusion to infer context in the dynamic circumstances. Dynamic circumstance means a changing of the situation or the surrounding itself, and particularly signifies that there is a changeable factor in a specific environment. It measures to recognize an expected situation of a moving object's approach, contact and collision in advance.

Paper “A Gesture Based Camera Controlling Method in the 3D Virtual Space” proposes a gesture user interface for controlling a virtual camera in the 3D virtual space, which can be used to navigate the 3D virtual space by users. In the proposed mechanism, Kinect is used as an input device for detecting positions of user gestures. After obtaining the positions information from Kinect, the sequences of positions are filtered to be recognized as any kind of gestures for controlling the virtual camera. The recognized gestures will push the

corresponding operation into the camera in the 3D virtual space so that the 3D space can be navigated according to the user-steered control.

The paper “A User’s Experience in Optimizing Smartphone Performance Using Overclocking and Memory Cleaning Techniques” present an approach to improve the performance of a smartphone. The approach involves two main techniques: increasing the speed of the device by overclocking it and optimizing memory usage by deleting unnecessary apps while replacing apps with more efficient ones. Detailed procedures of these optimization steps are provided which ordinary users can apply. Using these same techniques, optimizing experiments were performed on an Android phone and included the results.

Paper “Key Practices Circumscribing the Construction Complexities: Challenge for Chinese Construction Industry” aims to explore the basic complexity traits which trigger the construction projects towards complex premises. Complexity cannot be avoided during project execution but it can be managed by rehearsing key construction management practices. This research determines the impacts of key practices on construction projects in Chinese economy. To address the primary aim, a survey was conducted to determine correlations between variables. The analyses has evoked that weak design verification, business politics, ambiguities among stakeholders, ignorance of user inputs, lack of trust among stakeholders, commercialized glazing of construction industry and bureaucratic environment are major items of construction complexity continuum which make the construction projects complex.

In the paper “Software Fault-proneness Prediction using Random Forest”, Authors presents a novel prediction model using Random Forest classifier. Random Forest (RF) can be a promising candidate for software quality prediction because it is one of the most accurate classification algorithms available and has strengths in noise handling and efficient running on large data sets. The RF model is constructed and the attribute selection process of the input data is performed before the model evaluation.

In the paper “Design and Implementation of the Compiler with Secure Coding Rules for Developing Secure Mobile Applications in Memory Usages”, a compiler which can examine applications’ weaknesses at the software development stage has been designed and implemented based on existing weakness research. The proposed compiler analyzes the weaknesses within a program at the point of compilation, different to the existing development environments which separate compilers and weakness analysis tools. As a result, the new compiler enables mobile applications that are developed in rapid development cycles to be created safely from the very first stages of development.

The Authors of “Improving Data Accessibility in Vehicle Ad hoc Network” proposes an efficient method to improve data accessibility in VANET by utilizing the data replica of Roadside Unit (RSU). Both data access pattern and driving pattern are utilized to decide which data item should be replicated in RSU. The conducted simulations clearly reveal that the proposed methodology outperforms other schemes in a variety of environments.

Paper “Fast Frame Detection Method for Digital Radio Mondiale Plus in Spectra Reversion Status” proposed a joint frame synchronization and reversed spectrum signal differentiation method for DRM Plus digital broadcasting systems. The proposed scheme can detect the fast frame synchronization and determine whether normal spectrum signal or reversed spectrum signal without carrier frequency offset & sampling frequency offset

compensation, enabling fast frame synchronization. The proposed method shows outstanding performance in environments where symbol timing offsets and sampling frequency offsets exist.

The paper “An Adaptive Delay Compensation Technique for Wireless Sensor and Actuator Network” proposes an adaptive wireless-network-induced delay compensation technique for Wireless Sensor and Actuator Network (WSAN). It is well known that network delays and packet losses over wireless network incur a great challenge over performance as well as stability of WSAN-based control systems. A time-varying delay compensator exploiting Adaptive Smith Predictor with constant delay buffer was presented.

October, 2012

*Sajal K. Das, University Texas at Arlington, USA*

**Editor of the October Issue on  
International Journal of Smart Home**