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 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 "Study on the OSMU (One-Source Multi-Use) Management for Smart Devices" suggests the OSMU (One-Source Multi-Use) management framework that ensures the fast and convenient use of one single content via the heterogeneous device and the integrated content management that enables the distribution of contents by grade. There has been a surge in the intelligent content services in the broadcasting and communication sectors as the convergence between the contents of various industries and highly-advanced IT is gathering momentum. As a result, the users can conveniently save, distribute, and disseminate the converged contents using the smart devices that have independent platform. However, there is technical limit in achieving the continuous replay after freely converting the single content via the independent devices. Furthermore, children and adolescents are easily exposed to violent and explicit contents amid the growing distribution of smart devices.

Paper "Two-party Authenticated Multiple-key Agreement Based on Elliptic Curve Discrete Logarithm Problem" proposes a protocol to generate n^2 keys in one session under the assumption of the intractability of the elliptic curve discrete logarithm problem and MQV protocol. The protocol has the advantage of requiring less computing time compared with other protocols. Therefore, it is easy to apply in resource-constrained key agreement such as wireless sensor networks, mobile Ad-hoc networks, and cell phones which are severely constrained processor, battery, and memory.

The paper "Zigbee Based Home Appliances Controlling Through Spoken Commands Using Handheld Devices" introduces home automation that is a wide and varied field that involves devices as small as temperature, light and motion sensor, and as powerful as modern home appliances. In today's world technology is available for home automation but these technologies are incompatible with each other and addresses only communication and physical media, the main objective of this work is to facilitate the user to control appliances by two ways one is remotely via voice command, second is using remote control to control the appliances which is also an override control.

The paper "Is the PMV Index an Indicator of Human Thermal Comfort Sensation?" examined how indoor environmental variables affect the human thermal comfort sensation. To examine the effect, both subjective comfort and thermal sensation were measured by the comfort sensation vote (CSV) and the thermal sensation vote (TSV) in thermal environmental conditions during heating or cooling. CSV was used by Tanabe (1998) and TSV was defined in ASHRAE (1989). In addition, physical environmental variables such as the air temperature,

relative humidity, mean radiant temperature, air velocity, and the predicted mean vote (PMV) were used as the indices of thermal comfort sensation, and then the relationships between physical environmental variables and subjective variables were examined.

The Authors of "A Circle-Based Data Dissemination Algorithm for Wireless Sensor Networks with Mobile Sink" propose circle-based data dissemination (CBDD) algorithm which utilizes mobile sink to relieve hot spot phenomenon. We assume sensor nodes are symmetrically deployed in a circle sensor field and sink moves around the circle. The sink sends a query message to a specific node for sensed data, which begins a data gathering process. All the nodes belong to different layers according to the distance to sink and the queried nodes communicate with sink layer by layer.

Paper "Development of Energy Saving Smart Home Prototype" aims to develop a prototype of smart home for energy saving. The prototype uses a microcontroller PIC18F458 with various sensors such as a temperature sensor, infrared sensor as well as actuators to control the lights, air conditions, as well as the fans appropriately etc. It detects the number of people in a room, adjusts a proper temperature for the air condition, turns on the fan if needed, turns on and off the light appropriately.

In the paper "Structural Damage Detection using Wireless Intelligent Sensor Networks", Authors 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 "Context-Aware Middleware Architecture for Smart Home Environment" deals that to realize smart home vision in an equipped domain, several types of context-aware applications should be deployed. Because of complex tasks of context gathering and processing, designing context-aware applications requires middleware support. Designing a context-aware middleware is a challenging issue because of specific characteristics of context and devices such as dynamic nature of context and resource limitation of devices. Furthermore, the middleware should provide a cooperative system in which application developers could easily exchange derived contextual information. To address these issues, in this paper architectural design of a smart-home context-aware middleware is proposed, which supports cooperation among application developers. The middleware is implemented as a Java package and validated through a case study.

The paper "CS-Mobile: A Cloud-based Distributed Storage Middleware for Mobile Devices" present a lightweight Cloud-based storage framework, which provides an easy-to-use file navigation service for attribute-based file querying or semantic-based data retrieving. It incorporates an effective mechanism for users to verify their data integrity, which can relieve much burden from mobile devices.

The Authors of "Indoor Location Estimation Using Visible Light Communication and Image Sensors" proposed an algorithm for high precision indoor positioning using lighting LEDs, VLC and image sensors. In the proposed algorithm, four LEDs transmitted their three-dimensional coordinate information which were received and demodulated by two image

sensors near the unknown position. The unknown position was then calculated from the geometrical relations of the LED images created on the image sensors.

Paper "An Interplatform Service-Oriented Middleware for the Smart Home" analyzes that in domotic scenarios, where ubiquitous computing pervades housing, the capability to effectually discover, integrate and coordinate different devices with diverse implementation details, communication protocols, and functionalities is a central aspect. Basing on a layered domotic architecture for smart embedded devices which builds on the paradigm of Service Oriented Computing, this paper focus on the pervasive layer and the requirements it has to fulfill, so as to realize a high degree of automation and serve the needs of the higher application levels of the architecture. It shows how a discovery framework can take care of new devices independently of their protocols through the use of proxies. Because with the development of home network and service applications, different protocols and transmission modes are proposed. There are more digital devices and home appliances which compliance to the protocols. The proposed protocols are different and they are typically unable to interconnect with each other. A middleware framework is designed and implemented for smart homes to integrate protocols which are popular such as UPnP on OSGi framework and collaborating Zigbee and Bluetooth to converge various service oriented applications.

The paper "An Energy-Efficient Routing Protocol for CCN-based MANETs" presents a discussion that the content-centric network (CCN) paradigm is well suited to mobile ad-hoc networks (MANETs), because MANET scenarios are data-centric in nature. CCN-based MANETs implement named-data routing, in-network caching, and receiver-driven data dissemination. However, because resources such as energy are limited, this network faces many challenges, such as reduced lifetime of the entire network. Therefore controlling energy consumption is important for effective communication in MANETs. If popular contents are transferred repeatedly in the same routing path, each node is down by short of energy. Then node carrying data packet may fail and energy imbalance occurs in entire network. To solve these problems, using added residual energy and frequency of node usage as routing parameters, an energy-efficient routing protocol for CCN-based MANETs is proposed and the energy consumption of routing protocols were evaluated.

Paper "A Three Dimensional Model for Dual Polarized MIMO Channel of the Planar Array Antennas" deals with the geometry-based stochastic model (GBSM) that describes the excess delay, direction of arrival, and direction of departure of multipath has been used extensively in multiple-input and multiple-output (MIMO) channel modeling. Many two dimensional and very few three dimensional (3D) GBSMs with linear array antennas have appeared in the literature. The models lack properties of the 3D channel for dual polarized planar array antennas, which are practically used in MIMO systems due to its applicability to space division multiple access (SDMA) or beamforming in three spatial dimensions. This paper proposes the 3D channel model for dual polarized planar array antennas where the departure and arrival angles are modeled in both azimuth and elevation. The closed form expression of the channel coefficients was derived. Using the proposed channel coefficient, the effect of azimuth and elevation angular spread on channel capacity was investigated.

In the paper "Frequency-Domain Packet Scheduling for Low PAPR in 3GPP LTE Uplink", Authors presents a discussion on a single carrier frequency domain multiple access (SC-FDMA) that has been adopted for the 3GPP long-term evolution (LTE) uplink multiple access scheme due to the power consumption issue of mobile handsets. Like OFDMA in the

downlink, SC-FDMA enables multiple users to be served simultaneously in the uplink. However, all subcarriers allocated to a single user must be contiguous in the frequency domain at each time slot due to its single carrier property. This contiguous allocation constraint makes scheduling difficult. A scheduling scheme in such systems needs to keep this constraint whilst trying to satisfy its own objectives. Therefore, a frequency-domain packet scheduling algorithm is proposed to lower the PAPR of the mobile handset under this constraint.

In the paper “Hey Home, Open Your Door, I'm Back! Authentication System using Ear Biometrics for Smart Home”, Authors propose an ear biometrics as an alternative to popular facial biometrics. One of the ways to implement biometrics authentication system is by authenticating them via image or video captured using a dedicated terminal as biometrics enrolment module. This biometrics module is pricey thus adding cost to overall cost of having smart properties for people. In addition, it can be destroyed by thieves to bypass biometrics authentication after alarm system being turned off. Authors perceive that smartphone camera can be used as replacement of dedicated enrolment module instead. The replacement will result a biometrics enrolment terminal that is firstly mobile and automatically practical unlocking home while user is within home proximity. With location-based service (LBS) support, it can enable convenient and implicit owner authentication system when accessing the protected smart premise and property (like smart home). In a situation that user calls to home then LBS could detect user's location within close range of proximity thus authenticating a user via its front camera that faces to ear while being used on calling home. Furthermore, it is cost-efficient because eliminating the necessity to install dedicated enrolment terminal in a property like smart home. This paper presented a novel approach to ear biometrics which considers both shape and texture information to represent ear image during ear recognition computation for authentication. Local invariant patterns is used as ear image descriptor during recognition to have lightweight but accurate ear biometrics system on securing smart homes.

The Authors of “Design of Network Adaptation Proxy for DASH Services in Wireless Networks” introduce and implement the design of a Network Adaptation Proxy(NAP) server for non-DASH clients by considering various network conditions with information of the data link layer in this paper. It provides stable DASH services and also guarantees the quality of the media contents to non-DASH clients.

Paper “XFS File System and File Recovery Tools” discuss major features of XFS file system and two file explore and recovey tools. XFS file system is a designed to suppot very large system and parallelism efficiently. This is feature attracks different organizations which handle big data. Even there consumers electronic devices which use XFS file systems. But there are very few file explorer and recover tools that can work on XFS file system.

The paper “The Role of Human Capital in Entrepreneurial Process of IT Ventures in Korea” examined public companies by comparing the effect of human capitals of entrepreneurs on each stage of entrepreneurial process in Korean venture industry. In the sample of 260 KOSDAQ-listed firms, Authors sought to find what characteristics of human capitals influence each stage of entrepreneurial process. The primary objective was to help close a research gap regarding human capital. The comparative importance of various types was examined, such as age, school prestige, educational level, related industry experience and functional background, on the each stage of entrepreneurial process.

In the paper "Detecting Trend and Bursty Keywords Using Characteristics of Twitter Stream Data", a new scheme for detecting trend and bursty keywords from Twitter stream data is proposed. The scheme is very robust in that it can handle typical usages such as various abbreviations, minor typing errors and spacing errors that occur very frequently when writing tweets on various mobile devices.

The Authors of "A Study on Performance Evaluation of the Human Resources Training Program" understood characteristics of the human resources training project to design a performance analysis model that could be used for objective analysis and evaluation. The performance analysis model was designed after considering utilization of human resources and R&D performance for the region in detail, and an empirical analysis was carried out for some projects. This could be used as an objective evaluation index for the local R&D human resources training projects, which are currently in operation or to be implemented in the future, of every nation and department.

Paper "A Study on Tachograph based Security Network" deals with tachographs that are used in vehicles for keeping track of driver's hours and for other purposes of fraud detection, overspeeding and accident investigation. Their usage and benefits are in danger beacuse of increasing levels of frauds and manipulation. Most of these frauds are stimulated by economic pressure on vehicle operators and can be reduced if improved tachograph systems are introduced. Tachographs are used in vehicular environments. Vehicular communication networking is a promising approach to facilitate traffic mangement, road safety and infotainment dissemination for drivers and passengers. Due to this fact, the security, privacy and protection of a private user have became rudimental part of the deployment of technology. The flaws in security of vehicular ad hoc networks can be exploited by even common users, who can interrupt or disable it if some strong and practical security enhancing features are not applied. This paper proposed a new network for vehicular communications based on improved tachographs. The advance features in the tachographs can be helpful in the security and wireless communication vehicular Ad hoc networks.

In the Paper "The Study of the Impact of Perceived Quality and Value of Social Enterprises on Customer Satisfaction and Re-Purchase Intention" Authors aims the following: First, to find the customer value for the products and services of social enterprises. Second, to examine whether the positive relationships between quality and value of products/services reported in numerous previous studies applies to social enterprises. Third, to find out whether satisfaction from social enterprise products and services affect the actual repurchase intention. Finally, in order to find dynamic interaction among the variables, this study models the key flow of the factors influencing the social enterprise consumers' repurchase intention: perceived quality → perceived value → customer satisfaction → repurchase intention.

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