Editorial: special issue on “Recent advanced in ubiquitous infrastructure technology”

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Ubiquitous Infrastructure Technologies (UITs), including RFID/USN, mobile/wireless network, home network, and optical network technologies to provide computing and communication services, are growing rapidly because they are an exciting new paradigm that offers a challenging model of computing and poses fascinating problems regarding services, security and data management. This special issue aims to foster the dissemination of high quality research in any new theory, technique, and research related to UIT, as well as to enhance its state-of-the-art. This special issue also provides a chance for the readers to present novel research on all aspects of UIT, as well as theoretical and experimental studies of fielded systems.

We finally selected 12 manuscripts for this Special Issue. Each manuscript selected was blindly reviewed by at least three reviewers consisting of guest editors and external reviewers.

The first paper in this special issue is on Policy-driven RFID Event Management Framework, by Hyungjin Ahn and Kwanghoon Kim. This paper proposes a referential policy-driven RFID event management framework consisting of unified RFID event-constraint specification and its managerial mechanisms. The essential components of this

framework are an XML-based RFID event management policy definition language and a policy exchanging protocol. It is expected for the RFID based application developers to be able to easily specify their event-constraints without acquainting with the technological details of the current specifications.

The second paper in this special issue is Navigation-based Self-Optimization Handover Mechanism for Mobile Relay Stations in WiMAX Network, by Jian-Ming Chang, Wei-Te Hsiao, Jiann-Liang Chen, Han-Chieh Chao, and Jong Hyuk Park. This paper proposed a Self-Optimization handover mechanism which uses GPS navigation system to combine with mobility characteristics of Mobile Relay Station. Especially, the concept of Self-Optimization of Organic Computing is integrated into this mechanism. Also the mechanism established a HMS in the ASN to receive the path planning information from navigation system. HMS will calculate the MR-BS list based on the path planning, and send the MR-BS list to MS to forecast handover. The simulation result reveals handover latency, handover time cost and the number of network handover for the new proposed mechanism is less than the standard one. The analysis results verified the effectiveness of the proposed novel mechanism.

The third paper in this special issue is Comparing Wireless Networks for Applying Digital Textbook, by Jaesung Song, Seong Jin Kim, Giseob Byun, Juho Song, and Bong Gyou Lee. This paper reviews selection criteria for the wireless network to be applied to digital textbook. Wireless LAN was selected for the digital textbook network environment in Korea, because it provides a better data rate and greater cost-effectiveness than the other wireless network technologies such as HSDPA, mobile WiMax. However, wireless LAN is inferior to the other technologies in terms of mobility and security. This paper has detailed comparison result of few dif-

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ferent network environment which can be install and communicate for digital textbook, also proposed most effective environment based on internal mobile WiMAX network effect.

The fourth paper in this special issue is Performance Analysis of Extended Non-Overlapping Binary Exponential Backoff Algorithm over IEEE 802.15.4, by Seung-Youn Lee, Youn-Soon Shin, Jong-Suk Ahn, and Kang-Woo Lee. The first contribution of this paper is to investigate the effect of the Extended Non-Overlapping Binary Exponential Backoff (ENO-BEB) algorithm, which somewhat arbitrarily selects the contention window out of doubled range after each failed channel capture over IEEE 802.15.4 networks. The second is to build its 2-dimensional Markov chain model to accurately predict its performance under saturated traffic conditions. As a result, the analytical model along with the corresponding simulations witnessed that ENO-BEB algorithm outperformed the conventional BEB one over heavily loaded networks especially if the next chosen backoff window was far apart from the previous one.

The fifth paper in this special issue is Fast-Handover Mechanism between 802.11 WLAN and 802.16 WiMax with MIH in PMIPv6, by Cheol Joong Kim, Seok Cheon Park, and Myung Kyu Yi. Nowadays network environment is changing to more faster and more mobility network. On this area of research, fast hand over mechanism was already proposed, but this paper proposed method show more effectiveness especially handover between 802.11 wireless network and 802.16 WiMAX network. The result presented shows that the suggested method has reduced latency time by 26 % and packet losses by 90 % (Avg.).

The Sixth paper in this special issue is Parallel Approach for Processing Itinerary-based RNN

Query in Object Tracking WSNs, by Jae-Hwa Chung, Hong-Jun Jang, Kyung-Ho Jung, Soon-Young Jung, and Won-Gyu Lee. This paper addresses the Reverse Nearest Neighbor (RNN) query processing in object tracking WSNs, called Parallel Itinerary-based RNN (PIRNN). PIRNN provides efficient algorithms to process the RNN query with parallel processing and space pruning. This paper also suggests two optimization techniques, called Peri-Segment Completion (PSC) and Look Forward (LF), to minimize the searching area with additional communication cost. Lastly, this paper proves the efficiency of the PIRNN with PSC and LF against the conventional schemes through the extensive experiments.

The seventh paper in this special issue is Posted Price Model Based on GRS and Its Optimization for Improving Grid Resource Sharing Efficiency, by Mingbiao Li, Naixue Xiong, Bo Yang, Zhonghua Li, Jong Hyuk Park, and Changhoon Lee. The proposed model based Grid sharing resource is based on negotiating about the usage duration time, the usage fee, Quality of Service and some other items

between the owner or his broker and the consumer of grid resource. Many case of Grid Resource sharing reduce effectiveness. Therefore, this paper presents a scheme which is combined by 3 aspects: the first one is GRS (Grid Resource Supermarket), the second one is posted price model based on GRS, the third one is optimization based on MOGAP (Multi-Objects Generalized Assignment Problem), could be one of effective solution.

The eighth paper in this special issue is Towards More Reliable and Secure Source Routing in Mobile Ad Hoc and Sensor Networks, by Imad Jawhar, Zouheir Trabelsi, and Jameela Al-Jaroodi. The proposed routing protocol, the nodes maintain a reliability factor, which is increased when they participate successfully in data transmissions. Several strategies for the maintenance of the reliability factor are offered and discussed. Positive and passive acknowledgements are used along with additional optimizations that are designed to increase the efficiency and improve the performance of the network.

The ninth paper in this special issue is Attack Containment in Mobile Ad-hoc Networks through Fair Distribution of Processing Resources, by Zeeshan Shafi, Farzana Azam, Khaled Alghathbar, Muhammad Sher, and Muhammad Khurram Khan. This paper introduces few techniques for attack containment by distributing the processing resources fairly among the users. These techniques increases the legitimate remote work as well as results in efficient and more legitimate use of available energy of the nodes.

The tenth paper in this special issue is An Enhanced Two-Factor User Authentication in Wireless Sensor Networks, by Jianjun Yuan. User authentication is a critical issue in wireless sensor networks (WSN) since WSN are often deployed in an unattended environment and sensor nodes are equipped with limited computing power modules. This paper points out that in the scheme proposed by Khan and Alghathbar, there is no provision of non-repudiation, it is susceptible to the attack due to a lost smart card, mutual authentication between the user and the GW-node does not attained, and the GW-node cannot prove that the first message comes from the user. To overcome these security weaknesses, the author proposes security patches and proves the new scheme.

The eleventh paper in this special issue is An Efficient and Low Cost Windows Mobile BSN Monitoring System Based on TinyOS by Orlando Pereira, Joao Caldeira, Lei Shu, and Joel Rodrigues. Many area of network is more develop to mobility customization especially Body Sensor Network, is one of important issue and it's monitoring technology. Its inherent evolution offers good solutions based on biofeedback technology, since such networks feature small sensors generally called biosensors that capture bio-physiological signals from people. The proposed monitoring system is optimized for sensor node monitoring effectiveness and low cost by using mobile devices with Windows Mobile technology.

The last paper in this special issue is A Domain Specific Sub-Ontology Derivation End-User Tool for the Semantic Grid, by Bernady O. Aduhan, Toshihiro Uchibayashi, and Norio Shiratori. Generally, Large-scale ontology data can be optimized by extracting the required sub-ontology that reflects the user requirements. In this paper, proposed End-User tool is visual view for users to adopt sub-ontology extraction methods with the aim of providing users a front-end tool to perform a particular sub-ontology extraction. Also it constructed a Semantic Grid prototype environment to perform sub-ontology extraction and conducted preliminary evaluation through illustrations with UMLSSN.

Finally, our special thanks go to Editor-in-Chief, Bezael Gavish and all editorial staffs for their valuable supports throughout the preparation and publication of this Special Issue. We would also like to thank all authors for their contributions to this special issue. Moreover, we extend our thanks to all external reviewers for their excellent help in reviewing the manuscripts.

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