Internet of Things over future internet

Everyday objects surrounding us including numerous sensors weaved into the daily fabric of life are becoming online, that is, readable and controllable via Internet, these days. By providing a new ecosystem of information, this notion, termed Internet of Things (IoT) will drastically change our ways to interact with real world. Meanwhile, current Internet is facing various challenges such as exponential growth in bandwidth demand. The realization of IoT is also putting current Internet under great pressure due to its unprecedented scale—according to some forecasts, IoT, an integral part of the "future" Internet, will consist of over 50 billion connected things. To cope with such bandwidth demand and complexity as well as to solve other issues, for example, seamless wireless access and mobility support, and security, with current Internet, new architectures for the future Internet have been proposed, for example, information/content centric network architectures and cloud-computing centric network architectures. However, several questions still remain: how IoT will be supported in the future Internet architectures, that is, when deploying large-scale wireless sensor networks do we need to fully integrate embedded sensors with Internet or use dedicated gateways to bridge sensors and Internet similar to state-of-the-art technologies? The aim of this Special Issue is to answer various open questions in realizing IoT over future Internet technologies. The Special Issue includes extended papers forwarded from the seventh International Conference on Ubiquitous and Future Networks (ICUFN 2015) and other contributions from outside the conference highly related to IoT in future Internet. Specifically, 6 high-quality papers out of 18 submitted have been accepted.

IoT is expected to become a driver in an emerging era of interconnected world through the advanced connectivity of smart devices, systems, and services. IoT goes beyond a broad range of machine-to-machine (M2M) communication technologies and covers a wide variety of networking protocols. There exist solutions like MQTT or SIP collecting data from sensors, CoAP for constrained devices and networks or XMPP for interconnecting devices and people. Also there is plethora of standards and frameworks (AllJoyn, UPnP)

bringing closer the idea of IoT vision. However, the main constraint of most existing platforms is their limited mutual interoperability. To this end, in the paper "Implementation of true IoT vision: survey on enabling protocols and hands-on experience" by P Masek et al., authors propose a comprehensive description of protocols suitable for IoT vision. They advocate an alternative approach to already known principles and employ the Session Initiation Protocol (SIP) as a container for M2M data. Furthermore, they provide description of data structures and practical implementation principles of the proposed structures (JSON and Protocols Buffers are discussed in detail) transmitted by SIP as a promising driver for efficient M2M communication in the IoT world. They reported that findings are based on extensive hands-on experience collected after the development of advanced M2M smarthome gateway in cooperation with the operator Telekom Austria Group.

The paper "Handover Management of Net-Drones for Future Internet Platforms" by K Park et al. considers three-dimensional aerial networks based on a fleet of unmanned aerial vehicles (i.e. drones) and propose a handover mechanism for such aerial networks. Also an algorithm trying to optimize the position of each drone has been proposed in the paper. In the algorithm, metrics such as the seamless handover success probability have been used in order to evaluate optimality.

The paper "Leveraging in-network caching in vehicular network for content distribution" by H Tian et al. looks at the problem of leveraging in-network caching, which is a fundamental building block in the Information-Centric Networking (ICN) paradigm, in vehicular networks. In the paper, a simple in-network caching-based algorithm for content distribution in vehicular networks has been proposed and evaluated via simulation.

The paper "An energy efficient multi-user uplink transmission scheme in the next generation WLAN for Internet of Things" by W Ahn et al. proposes a novel and energy-efficient IoT communication scheme for next generation wireless local area networks. In this paper, a random access–based wireless local area network (WLAN) uplink orthogonal frequency division

multiple access (OFDMA) transmission scheme is proposed and analytical modeling is provided.

The paper "Knowledge based open IoT service provisioning architecture on beacon enabled web-of-objects" by M Kibria and I Chong proposes an architecture of beacon-enabled Web of Objects. In this paper, a knowledge creation model has been presented and a use case scenario has been presented and a conceptual semantic ontology model has been designed to realize the knowledge-based service features on the proposed architecture.

The paper "Performance analysis of smart digital signage system based on software-defined IoT and invisible image sensor communication" by M Hossain et al. considers a novel prototype focusing on a smart digital signage system comprising software-defined IoT (SD-IoT) and invisible image sensor communication technology. Here, the authors discuss a software-defined networking (SDN) scheme with a view to initiating its flexibility and compatibility for an IoT network–based smart digital signage system.

Joon-Sang Park[1], Ling-Jyh Chen[2], Takeo Fujii[3] and Piedad Garrido[4]
[1]Department of Computer Engineering, Hongik University, Seoul, Korea
[2]Institute of Information Science, Academia Sinica, Taipei, Taiwan
[3]Advanced Wireless Communication Research Center, University of Electro-Communications, Chofu, Japan
[4]Department of Computer Science & Systems Engineering, University of Zaragoza, Teruel, Spain