



Editorial: Networking and Communications for the Next Generation IoT

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Editorial:

Recent years, both cellular networks and wireless local area networks (WLAN) are payed great attentions in the next generation Internet of Things (NG-IoT) to meet the demands of the massive connectivity and ubiquitous networking. Several solutions have been proposed such as narrow band IoT (NB-IoT), LORA, LPWAN, Zigbee, Bluetooth, and IEEE 802.11 based IoT. Networking and communications technology is one of the most important technologies for IoT. This is because each IoT device cannot exchange information with Internet or other IoT devices without networking and communications. However, the increasingly diverse services, continuously growing data, and ever-increasing devices pose significant challenges. Therefore, the networking and communications technologies for the NG-IoT need to be fully designed and further studied urgently. Therefore, this special issue focuses on the networking and communications technologies for the NG-IoTs.

This special issue features twelve selected papers with high quality. The first article, “Crowdsourcing Based Disaster Monitoring System Using Software Defined Fog Computing” proposed an architecture named SAFER (SDN Assisted Fog computing for Emergency Resilience) which provisions Fog computing and Software-Defined

Networking for efficient disaster management. Using SAFER architecture disasters can be detected early than conventional cloud-based disaster management schemes so that more human lives can be saved.

The second article titled “DRA-OFDMA: Double Random Access Based QoS Oriented OFDMA MAC Protocol for the Next Generation WLAN” presented a double random access QoS oriented OFDMA MAC protocol for the next generation WLAN, named DRA-OFDMA. Users with high priority which were failed in the first round random access were allowed to perform second random access phase on the remaining available sub-channels, thus the QoS for the high priority traffic was well guaranteed.

In the next article with the title “Stochastic Cooperative Communications Using a Geometrical Probability Approach for Wireless Networks”, the authors proposed a cooperation scheme for wireless networks, called stochastic cooperative communications based on geometrical probability (SCCGP). SCCGP had a low operational overhead and provides link capacity guarantee statistically.

The fourth article titled “Joint Downlink and Uplink Edge Computing Offloading in Ultra-Dense HetNets” aimed at edge computation offloading of joint downlink (DL) and uplink (UL) together with communication and computing resource allocation. The authors formulated the computation offloading optimization problem and proposed an efficient joint downlink and uplink offloading algorithm for ultra-dense HetNets. Numerical results validate the efficiency of the proposed algorithm in terms of the delay and energy saving of system.

WLAN is a quite important network type for IoT. The fifth article, “Survey and Performance Evaluation of the Upcoming Next Generation WLANs Standard - IEEE 802.11ax” surveyed the key technologies of IEEE 802.11ax. Performances of IEEE 802.11ax were evaluated via a proposed systems and link-level integrated

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simulation platform (SLISP). Simulations results confirmed that IEEE 802.11ax significantly improved the user experience in high-dense deployment WLAN scenario.

The sixth article titled “FrameTalk: Human and Picture Frame Interaction through the IoT Technology” utilized the IoT technology to create human and picture frame interaction. An application-layer IoT device management platform called IoTTalk was used to quickly establish connections and meaningful interactions between IoT devices.

The seventh article, “EELCM: An Energy Efficient Load-Based Clustering Method for Wireless Mobile Sensor Networks” proposed a clustering method to improve energy conserving and to balance the energy consumption of cluster head. The proposed approach presented a solution for the challenge of short lifetime of heavy burdened cluster heads around the base station.

The eighth article titled “ABEP Performance of AF System Employing QSSK over IoT Network” analyzed the quadrature space shift keying (QSSK) for complete uplink and downlink transmission system between a base station and a connected device for Internet-of-Things (IoT) application with dual-hop amplify-and-forward (AF) relaying systems using a single relay, multiple relays and relay selection techniques.

In the next article with the title “MOTCO: Multi-Objective Taylor Crow Optimization algorithm for cluster head selection in energy aware wireless sensor network”, the authors proposed Multi-Objective Taylor Crow Optimization (MOTCO) algorithm to select the optimal cluster head for Wireless Sensor Networks by combining the Taylor series and the Crow Search Algorithm (CSA).

The tenth article titled “Weak k-Barrier Coverage Problem in Underwater Wireless Sensor Networks” investigated weak k-barrier coverage problem in underwater wireless sensor networks, and proposed a parallel movement manner, based on which an effective algorithm called Hungarian Method-based sensor assignment algorithm.

The eleventh article, “SDSN: Software-defined Space Networking—Architecture and Routing Algorithm” introduced software-defined networking (SDN) into space networking and proposed software-defined space networking, named SDSN.

In the last article, titled “A Distributed Priority-Based Rebroadcasting Protocol for VANETs: Mitigating the Storm Problem”, by considering environmental factors such as the number of received messages and distance to the event location, dynamic hybrid broadcasting protocol (DHBP) was proposed for VANETs to mitigating the storm problem.

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