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Editorial

Software-Defined Industrial Internet of Things

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Despite the progress of embedded systems and the development of information and communication technology in recent decades, the industrial systems are still expected to evolve due to the constant science advancement. It is commonly believed that Cyber-Physical Systems (CPS) are Industry 4.0 enablers. Based on the context of Industry 4.0, Industrial Internet of Things (IIoT) is promoting and driving the industrial upgrading [1].

In order to implement the flexible, customizable, and efficient industrial systems, all related enabling technologies (e.g., industrial wireless networks, cloud computing, big data, and social networks) or devices (e.g., intelligent robots and flexible conveyors) must be developed as well for being integrated into IIoT systems. However, we still face some challenges: the efficient interaction and coordination between IIoT for the Industry 4.0 production, the configurable data acquisition node for more application scenarios, and a heterogeneous network for all kinds of transmission of information [2]. Fortunately, Software-Defined Networking (SDN) possesses the feature that can manage network services through abstraction of higher-level functionality [3]. Therefore, enlightened by SDN, there is a new idea for the information interaction of industrial environment by introducing software-defined IIoT to make the network more elastic.

This special issue targets innovative and validated solutions for improving the information interaction of IIoT. The following 8 papers were selected for inclusion in this special issue after rigorous reviews by experts in the respective domains.

The paper entitled "Analyzing Critical Failures in a Production Process: Is Industrial IoT the Solution?" by S. Ahmad et al. focused on analysis of machine failure causes. It motivated to investigate the main causes of failures (COF) due to material deficiency and production organizational environment which were adversely affecting the manufacturing processes.

The paper entitled "LAB: Lightweight Adaptive Broadcast Control in DSRC Vehicular Networks" by L. Ye et al. proposed a novel method, named Lightweight Adaptive Broadcast Control (LAB), for DSRC safety message to make full use of channel and avoid channel congestion. Extensive simulations were also designed to evaluate the method.

The paper entitled "Software Architecture Solution Based on SDN for an Industrial IoT Scenario" by J. L. Romero-Gázquez and M. V. Bueno-Delgado identified the main problems that could arise in the I4.0 adoption for a medium-high factory. After that, an open source software solution architecture based on ODL+IoTDM has been proposed to orchestrate the whole I4.0 infrastructure, enabling interoperability and management of IIoT devices from different vendors, including conventional industrial machinery and IT networks.

The paper entitled "PEMC: Power Efficiency Measurement Calculator to Calculate Power Efficiency and CO2 Emissions in Data Centers" by M. Uddin et al. proposed a novel PEMC metrics. It measured the overall performance of datacenter from time to time as it allowed the administrators to determine the exact utilization of already installed devices and their appropriate power consumption. It also aided in

measuring CO2 emission at the same time by applying the same tool hence reducing the costs and hassle involved with using a different tool.

The paper entitled "Impact of Packet Size in Adaptive Cognitive Radio Sensor Network" by M. Al-Medhwahi et al. investigated the impact of packet size on the performance of CRSNs in terms of two main metrics, namely, the average delay and the throughput. It also examined the interactivity between the packet size and the main parameters of the radio network and showed the resultant effects on the system performance

The paper entitled "TTEthernet Transmission in Software-Defined Distributed Robot Intelligent Control System" by C. Liu et al. provided architecture for a bus-based software-defined intelligent robot system and designed scheduling algorithms to make TTEhernet play the role of scheduling in the architecture. It solved the problem of nonreal-time and uncertainties of distributed robotic systems. Moreover, a fragment strategy was proposed to solve the problem that rate limits traffic and thus there was a large delay.

The paper entitled "Pipeline Leak Aperture Recognition Based on Wavelet Packet Analysis and a Deep Belief Network with ICR" by X. Lang et al. proposed the method for leak aperture recognition of pipeline based on WPA and DBNICR. Moreover, the method was tested on sound velocity of the ultrasonic data of an experimental pipeline to recognize the different leak apertures, which showed that the proposed method can reliably recognize the different leakage apertures.

The paper entitled "Industrial Internet of Things Based Efficient and Reliable Data Dissemination Solution for Vehicular Ad Hoc Networks" by S. Latif et al. proposed a new data dissemination protocol DDP4V to overcome the challenging broadcast storm, network partition, intermittently connected network. and optimum next forwarding vehicles (NFVs) selection problems, which showed the potential to provide an efficient data dissemination in diverse VANET scenarios with varying traffic conditions.

Conflicts of Interest

The editors declare that they have no conflicts of interest regarding the publication of this Special Issue.

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