Editorial

AI-enabled learning techniques for Internet of Things communications

Alireza Souri [a] and Mu-Yen Chen [b]

[a] *Department of Computer Engineering, Haliç University, Beyoğlu, Istanbul, Turkey*
E-mail: alirezasouri@halic.edu.tr
[b] *Department of Engineering Science, National Cheng Kung University, Taiwan*
E-mail: mychen119@gs.ncku.edu.tw

1. Introduction

By increasing high speed networks and interconnections between cloud-edge services and the Internet of Things (IoT) devices, the intelligent systems and applications must actively deliver performance guarantees in Quality of Service (QoS). Smart devices, sensors, actuators, and embedded systems are significantly an important area of the research and have an important role in the development of IoT communications. They effectively collaborate and transfer the information to numerous processes. With the rapid development of the IoT, Artificial Intelligent is applied as an attractive solution for optimizing dynamic processes and managing the information of IoT ecosystems. AI-enabled learning techniques such as fuzzy logic, machine learning, and deep learning, evolutionary algorithms, and neural networks investigate the massive quantity of complex information for IoT environments to help industry, education, smart cities, smart farming, medical systems, and other smart applications. Also, AI-enabled learning techniques improve the performance of data transformation and communications to achieve the minimum latency, high reliability and maximizing accuracy of intrusion detection in the IoT environments.

This special issue finalized peer reviewed original articles that present new efforts to solve new challenges of AI-enabled learning techniques in IoT environments. These contributions represent several different aspects of intelligent methods based on data mining, machine learning, swarm intelligent algorithms and linear programming for resource management analysis, recognition of routing protocols, and analysing transportation systems in the IoT environments.

2. This special issue

In the paper entitled "Single node repair algorithm for a multimedia cloud storage system based on network coding", Niu et al. presented a virtualized cloud storage platform for high-efficiency, easily scalable, and highly reliable storage systems. The algorithm stores the grouped multimedia file data in groups in the system, and performs XOR (exclusive OR) on the data in the group on the GF (2) finite field.

In the paper entitled "Real-time On-site Inspection System for Power Transmission based on Heterogeneous Computing", Yan et al. provided a real-time on-site inspection system using convolutional neural network (CNN) to improve the inspection efficiency, emerging as one promising solution.

Also, Ju et al. in their paper entitled "Energy-efficient Routing Sensing Technology of Wireless Sensor Networks based on Internet of Things" proposed a low-energy data collection routing algorithm and adaptive environment sensing method in WSN. The experimental results show that the proposed algorithm can effectively reduce the network energy consumption and increase the network life cycle of wireless sensor networks.

In another work, entitled "Urban Rail Transit Signal and Control Based on Internet of Things", Huang et al. proposed an intelligent traffic signal control machine is designed, and the traffic signal control effects under different algorithms are compared, and the relevant rail transit conditions are statistically studied. Studies have proved that sensors based on IoT technology can effectively improve the intensity and control effect of urban rail transit signals.

In the paper entitled "Accurate Mining of Location Data in the Communication Field Based on Big Data", Cai et al. provided the precise mining of location data in communication field based on big data. Signalling pre-processing layer mainly obtains signalling message through acquisition module, filters FISU message in signalling message, judges abnormal message frame, and stamp it with time stamp, which provides effective data source for next processing.

Li et al., in their paper entitled "A Complete Robust Control Network Based on Skewed Temporal Logic", proposed a time-series logic model under skewed distribution. In this study, the time series logic sequence is used to describe the measurement output loss.

Chen et al., in their paper entitled "Application of Internet of Things intelligent image-positioning studio classroom in English teaching", presented the application of the CNN algorithm in real-time image positioning. The results reveal that the CNN model can better extract and classify the features of intelligent images, and the extracted feature can position the image in real-time, reduce colour overflow, brighten edge colour, and minimize colour patches in images.

Finally, Hu et al., in their paper entitled "Application Research of Urban Subway Traffic Mode Based on Behaviour Entropy in the Background of Big Data", proposed the travel behaviour of subway passengers and calculates the behaviour entropy of users to predict the passenger behaviour of subway passengers. After analysing the crowding degree problem of the station, the redundant train redundancy time model of the subway train was established. It is proved that the model proposed in this paper can effectively suppress the influence of passenger flow arrival uncertainty, ensure the higher quality of service to passengers, and further improve the urban subway traffic mode.

3. Conclusion