Editor's Note

As the Internet of Things (IoT) further develops and expands to the Internet of Everything (IoE), high-speed multimedia streaming data processing, analysis, and shorter response times are increasingly becoming the demands of today. Driven by the Internet of Things (IoT), a new computing paradigm, Edge computing, is currently developing rapidly. Compared with traditional centralized general-purpose computing, Edge computing is a distributed architecture. The operations of applications, data and services are moved from the central node of the network to the edge nodes on the network logic for processing. Under this structure, the analysis of data and the generation of knowledge are closer to the source of the data, so it is more suitable for processing. However, with the rapid development of 5G, IoT and other services and scenarios, there are more and more intelligent terminal devices. Multimedia streaming processing in IoT becomes a very prominent problem. To overcome this problem, the adoption of intelligent Edge or Artificial Intelligence (AI) powered Edge computing (Edge-AI) can achieve the goals of lower cost, higher security, lower latency, and ease of management.

Recently, many network modeling methods, computing algorithms, and signal processing technologies have been successfully developed and applied to multimedia streaming processing in IoT with Edge Intelligence. A total of 13 papers are presented in this special issue for the purpose of collecting the latest developments and results on this research topic. We divide them into three categories: production and life applications, security, and text and image processing.

In the first set, Shi et al., in medical signal processing, constructed a framework for Electroencephalogram (EEG) signal recognition of epileptic seizures based on cloud-edge computing. Through local signal acquisition, edge signal processing and cloud signal recognition, the diagnosis of epilepsy is realized, which provides new ideas for real-time diagnosis and feedback of EEG during epileptic seizures. In addition to this, there is another paper in Electromyography (EMG) signal processing in which Proaño et al. proposed an adaptive filtering system based on embedded processing, which is an excellent alternative to sensor-computer-actuator systems and classical digital signal processors (DSP) devices. Romany et al., in intelligent surveillance, developed an integrated artificial intelligence technology for video surveillance in IoT-enabled wireless multimedia sensor networks (WMSN). The innovation of this study focuses on the object detection design of compression and clustering technologies for WMSN. In the Internet of Things for agriculture, aiming at the Unmanned Aerial Vehicle (UAV) path planning problem involved in monitoring technology in agricultural information monitoring, Qun et al. proposed an Improved Grey Wolf Optimization (IGWO) algorithm, which realizes the flight path planning of UAV in crop pest monitoring. Finally, in urban planning, Wen et al. proposed an integrated model of street tree detection and extraction from remote sensing images based on YOLOv4 and Unet network, which realizes the automation of street tree contour extraction and more accurate estimation of street tree coverage ratio.

Security has always been an important topic in the computer field. This special issue features three related studies, one focusing on doppelganger attacks on connected networks, one focusing on IoT software chain security situational awareness and the last focusing on information security in agricultural IoT.

The former is authored by Deepak et al., who developed a new technology called Steering Convention for Vitality Effective Systems (SC-VFS) to detect doppelganger attacks in IoT-based intelligent health applications. The main advantage of this study is that it improves vitality proficiency, a key constraint in the WSN framework. The second, by Xu et al., proposed an IoT software chain security situational awareness framework, which mainly includes two processes: IoT security situation classification based on support vector machines and security situation awareness based on Markov game model. It shows great potential in IoT system protection. Finally, Guo et al. proposed a general IoT blockchain terminal system architecture that integrates cryptography, blockchain and Interplanetary File System (IPFS) technologies, which strongly supports the integration of IoT and blockchain technologies.

The third set of articles focuses on the processing of text and images. For example, in text processing, Yong et al., with the help of the recently proposed Extended Variational Inference (EVI) framework, proposed a new function to replace the original variational object function to avoid the intractable moment computation, which can be used in an efficient way to derive analytically tractable solutions to invert Beta-Liouville mixture model (IBLMM). Chao et al., found that the interactive causality of the correlation between labels was often ignored, and proposed an Interactive Causal Correlation Space Reshape Multi-Label Classification (CCSRMC) algorithm, which reduces redundant information in the model and improves the performance of multi-label classifiers to a certain extent. In image processing, Shao et al. improved the representation power of importance maps using a Squeeze-and-Excitation (SE) block, and proposed a multi-depth structure to reconstruct non-important channel information at low bit rate. Dynamic Receptive Field Convolution (DRFc) is introduced to improve the ability of ordinary convolution to extract edge information, thereby increasing the weight of edge content in the importance map and improving the reconstruction quality of edge regions. Hong et al. proposed a novel end-to-end dehazing method, using the Encoder-Decoder structure to extract the texture and semantic features of hazy images, and obtained very good dehazing performance. Finally, Rabia et al., proposed a Diverse Domain Generative Adversarial Network (DD-GAN) for style transfer on real-time photographs, which realizes fast diverse domain style transfer on human face images with higher efficiency.

Finally, we would like to thank both the authors and reviewers who contributed to the special issue. Thank you so much for your hard work and support throughout the process.

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