# The 5G/6G enabled Future Internet of Things

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## Abstract

The advances in 5G, 6G, artificial intelligence (AI), edge computing, are expected to accelerate the future Internet of Things (FIoT) by providing intelligent, secure, and automatic connectivity for IoT services. However, there are still a number of challenges in FIoT needs to be addressed. This editorial introduces four key techniques solutions in 5G/6G communications, network model, network managements, and IoT applications in education.

## 1. Introduction

In recent, the development of fifth generation of mobile communication technology (5G) is in its commercial deployment and the evolving 6G has attracted extensive research attentions. Both the 5G and 6G are promising to accelerate the future Internet of Things, which feature higher system capacity, higher data rate, ultra-low latency, and ultra-low energy consumption. On the other hand, the advances in artificial networks (AI), virtual networking, and edge computing also shows great potential to the FIoT.

Specifically, 5G/6G and AI are expected to play key role in the future IoT by addressing following challenges: (1) How AI can be used to enable dynamic spectrum sharing in 5G and terahertz 6G communications; (2) The emerging networking management techniques, including *software defined network (SDN)*, *Network Functions Virtualization (NFV)*, *Dynamic Network slicing, etc.*, that enable efficient coexistence of enhanced mobile broadband (eMBB) and IoT services; (3) Security and privacy issues are still very challenging in the FIoT, including *outdated firmware*, *weak credentials*, *malware/ransomware*, *predicting/preventing attacks*, *data privacy, etc.*

The convergence of new technologies will significantly speed up the implementation of FIoT that will make huge impact in many aspects, such as smart cities, industrial IoT, smart home, etc. Many technical challenges, business challenges, and social and legal challenges need to be addressed. In this issue, four research papers are presented to introduce intelligent medical service in 5G/6G IoT environment, mesh networks, 5G-NR network, and IoT applications in higher education. Details will be introduced in Section 2.

## 2. The Papers

In the paper entitled "A Vision on Intelligent Medical Service for Emergency on 5G and 6G Communication Era" [1], Nayak *et al.* discussed the emergency services (specifically in e-healthcare) in 5G/6G enabled IoT environments. Specifically, comprehensive AI-driven future communication networks analysis were provided, in terms of security, computation, *etc*. Also, emergency medical services, including Patient Aid Medical Service (PAMS), Accident Aids Medical Service (AAMS) and Fire Aid Medical Service (FAMS), will discussed.

In the paper entitled "Link Scheduling for Wireless Mesh Networks Considering Gateway Feature" [2], Lin *et al.* investigated the mathematical models for the wireless mesh networks in complicated IoT scenarios. Also, a new WMN link scheduling model was proposed using an approximate dynamic programming algorithm. The experimental results were presented to demonstrate the effectiveness of proposed models.

In the paper entitled "UAV Assisted 5G Het-Net: A Highly Supportive Technology for 5G NR Network Enhancement", Mahbub *et al.* focused on

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UAV assisted 5G NR network. In this work, UAVs were utilised to provide dependable and cost-effective wireless communication for IoT, which is specifically useful in some scenarios that the cellular networks are unavailable. The experimental results demonstrated the proposed solution can provide effective wireless connectivity.

In the paper entitled "To Design a Network That Delivers Reliable Performance 24 Hours a Day 7 Days a Week for Higher Education in Uganda" [4], Makeri *et al.* investigated the reliable IoT services in higher education in Uganda. In this works, a dynamic multipoint virtual Provate Network (DM-VPN) solution was proposed and implemented, which can provide reliable and QoS guaranteed connectivity for IoT services.

## 3. Concluding Remarks

This editorial introduces four key techniques solutions in 5G/6G communications, network model, network managements, and IoT applications in education.

## References

[1] Sabuzima Nayak and Ripon Patgiri (2020) *A Vision on Intelligent Medical Service for Emergency on 5G and 6G Communication Era. EAI Endorsed Transactions on Internet of Things*, 2020(22):1-13.

[2] Chun-Cheng Lin, Shu-Huai Chang, and Chien-LiangChen (2020) *Link Scheduling for Wireless Mesh Networks Considering Gateway Feature. EAI Endorsed Transactions on Internet of Things*, 2020(22):14-23.

[3] Mobasshir Mahbub (2020) *UAV Assisted 5G Het-Net: A Highly Supportive Technology for 5G NR Network Enhancement. EAI Endorsed Transactions on Internet of Things*, 2020(22):24-42.

[4] Yakubu Ajiji Makeri (2020) *To Design a Network That Delivers Reliable Performance 24 Hours a Day 7 Days a Week for Higher Education in Uganda. EAI Endorsed Transactions on Internet of Things*, 2020(22):43-53.