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J-BHI Special Issue on “Real-time Healthcare Monitoring with IoT Networks”

With the rapid development of wireless communication technology, the number of IoT devices may exceed 40 billion by 2025. Since lots of IoT devices are equipped with sensing modules, they can be used to realize healthcare monitoring in our daily life. For example, smartwatches can detect heart rate and blood pressure, smart air conditioners can detect oxygen levels in the room, and smart mattresses can detect sleeping posture and quality. Therefore, our healthcare states can be comprehensively monitored with the help of IoT Networks.

However, owing to the differences in the development environment, communication distance, energy consumption, and system scale, the networks composed of different IoT devices are with heterogeneous properties. In this regard, two main challenges in IoT networks need to be tackled when conducting real-time healthcare monitoring. On the one hand, the deployment complexity and additional hardware cost that result from the multi-radio gateway are high for signal conversion. On the other hand, the interference caused by incoming and outgoing traffic is serious, especially in multi-hop environment settings.

To solve the above-mentioned problems, in recent years, some efforts have been made to effectively and timely realize Cross Technology Communication (CTC)-enabled real-time healthcare monitoring. To be specific, as a promising enabler to bridge the devices with different communication protocols, CTC technique can bridge direct communication with heterogeneous networks. For example, Bluetooth technology is a promising enabler in portable medical devices, including glucose and heart monitors due to its low-power advantage. In the indoor environment, CTC technology, such as WiFi-to-Bluetooth CTC, can provide continuous alert service, especially when some patients leave their Bluetooth medical station. Moreover, such a promising application can also locate the patient with the position information from the WiFi terminal, making the healthcare system have a timely and effective medical response in the emergency case. Hence, it is urgent to realize real-time healthcare monitoring in heterogeneous networks with CTC.

The proposed special issue will focus on the intersection of healthcare monitoring, informatics, and industry. We aim to provide solutions for biosensing data collection and data analysis. We will explore how the data collected from IoT networks can be analyzed and used to enhance clinical decision-making, remote patient monitoring, and predictive analytics. Additionally, we will examine the role of industry in the development and deployment of real-time healthcare monitoring solutions.

Topics of interest include, but are not limited to, the following:

- Informatics-enabled real-time healthcare monitoring
- Mobile Crowdsensing (MCS)-enabled healthcare monitoring on the Age of Information (AoI) indicator
- Cross Technology Communication (CTC) for healthcare monitoring
- Heterogeneous IoT networks for healthcare monitoring
- Wearable biosensors and their applications in healthcare monitoring
- Clinical decision-making and predictive analytics in healthcare monitoring
- Industry perspectives on real-time healthcare monitoring
- Healthcare monitoring for vulnerable populations
- Ethical considerations in healthcare monitoring
- Remote patient monitoring and telemedicine in healthcare monitoring

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