Biomedical Systems Sensing Layer Technologies and Networking

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Abstract. Biomedical systems use engineering ideas and design in medicine and biology to enhance healthcare results. This area aims to link engineering with medicine by combining the creative and analytical skills of engineering with medical and biological knowledge, leading to better methods for diagnosing, monitoring, and treating patients.

The Internet of Medical Things (IoMT), as a tool for biomedical implementing, refers to a network of connected medical devices, applications, and services that are designed to enable real-time health monitoring and management through the use of internet-connected technology. It combines the capabilities of the Internet of Things (IoT) in the healthcare domain [1], offering significant opportunities to improve patient care, enhance clinical workflows, and facilitate data-driven decision-making for healthcare providers. Overall, IoMT represents a transformative approach in healthcare, emphasizing proactive and personalized care while addressing the challenges of security and patient privacy.

The sensing layer plays a crucial role in the process of collecting and organizing information from various physical devices, it is particularly important in the context of the IoMT, where it interacts directly with medical devices and sensors. In this environment, the sensing layer gathers data from devices such as heart rate monitors, glucose meters, and other wearable technology. This sensing layer serves as a vital connection between the

physical world of medical devices and the digital environment where data are processed and analyzed.

This article aims to review the main approaches and organization of IoMT sensing layer: medical devices and intelligent sensors, biomedical sensors, wireless technologies, communication protocols, reliability and security challenges [2]. The few points that have to be considered especially in IoMT network design: body movements, temperature change, energy efficiency, range of transmission, heterogeneous environment, Quality of Service for real-time applications and security.

References

[1]   Dang, L.M.; Piran, M.J.; Han, D.; Min, K.; Moon, H. A Survey on Internet of Things and Cloud Computing for Healthcare. Electronics 2019, 8, 768. https://doi.org/10.3390/electronics8070768
[2]   Banka S., Madan I., and Saranya S. S., Smart healthcare monitoring using IoT, International Journal of Applied Engineering Research. (2018) 13, no. 15, 11984.