Conference Name: STRA International Conference on Engineering & Technology, 09-10 October 2024, Istanbul
Conference Dates: 09-Oct- 2024 to 10-Oct- 2024
Conference Venue: Nippon Hotel, Taksim, Istanbul, Turkey
Appears in: MATTER: International Journal of Science and Technology (ISSN 2454-5880)
Publication year: 2025

Mohammadreza Balouchestani, 2025
Volume 2025, pp. 93-94
DOI- https://doi.org/10.20319/icstr.2025.9394
This paper can be cited as: Balouchestani, M.(2025). Advanced Version of Ieee802.15.6 Based on Compressed Sensing for Intelligent Body Sensor Networks. STRA International Conference on Engineering & Technology, 09-10 October 2024, Istanbul. Proceedings of Scientific & Technology Research Association (STRA), 2025, 93-94

"ADVANCED VERSION OF IEEE802.15.6 BASED ON COMPRESSED SENSING FOR INTELLIGENT BODY SENSOR NETWORKS"

Mohammadreza Balouchestani
Professor, Ph.D., P.Eng
Department of Research and Innovation, Georgian College, Barrie, ON, Canada, L4M 3X9
705.728.1968, ext. 5297 GeorgianCollege.ca
Mohammadreza.BalouchestaniAsli@georgiancollege.ca

Abstract

Intelligent Body Sensor Networks (IBSNs) based on IEEE 802.15.6, have emerged as a key technology to provide wearable wireless health care systems to establish real-time health monitoring algorithms for long-term recording of the vital signals and diagnose many life-threatening diseases. IBSNs allow continuous monitoring of patients at anytime and anywhere in the hospital and help in prevention medicine and early detection of pathologies to improve the quality of life. The IBSN system is also used in different types of wireless healthcare systems, including monitoring patients with chronic disease, patients in hospitals, elderly patients at home, or even real-time monitoring of patients in any kind of environment. In particular, it can be used for establishing a wearable and wireless health care system. The current version of IEEE 802.15.6 is based on conventional sampling approaches which suffers from many samples and power consumption. In addition, it is not enough to support high data rates applications for advanced wearable and wireless healthcare systems. The main purpose of this paper is to present an advanced version of IEEE 802.15.6 based on Compressed Sensing (CS) and focuses the most important features for wearable and

wireless healthcare systems to support low data rate, low power consumption wireless communication in, on or around the body. The advanced version of IEEE 802.15 standard based on a CS focus on low complexity, low cost and ultra-low-power consumption infrastructures using a random sensing matrix to establish a wireless communication standard optimized for ultra-low-power in-body/ on-body wireless nodes to serve a variety of wearable and wireless medical applications. The proposed algorithm out-performs existing algorithm by achieving a good level of Quality of Service (QoS) and Signal-to Noise Ratio (S/N) at the receiver of each wireless node. This ability allows reducing 12 % of Average Packet Delay (APD) at the receiver of each wireless node. The proposed architecture is increased 10 % of throughput and 8 % of S/N at the receiver of each wireless node, which provide a good background for establishing high qualified Wireless Body Area Networks (WBANs).

Keywords:
Intelligent Body Sensor Networks, Compressed Sensing, Sampling-Rate, Power Consumption