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Review on Intra-Body Communication using Galvanic Coupling for Wearable Devices

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Abstract

In recent years, wearable devices have witnessed remarkable advancements, offering numerous possibilities for healthcare monitoring, human-computer interaction, and personalized applications. Intra-Body Communication (IBC) has emerged as a promising communication technique for wearable devices, enabling seamless and secure data transmission within the human body. This review paper presents an in-depth analysis of IBC using galvanic coupling, a prominent method for establishing reliable and efficient communication channels between wearable devices and the human body. The primary objective of this review is to provide a comprehensive understanding of the principles, applications, and technologies of IBC utilizing galvanic coupling. Firstly, we present an overview of IBC, emphasizing its advantages, such as low power consumption, electromagnetic interference immunity and miniaturization potential. Next, the fundamental concepts and working principles of galvanic coupling are discussed, including the use of electrodes, modulation schemes, and signal processing techniques. The paper further explores the wide range of applications for IBC using galvanic coupling. Furthermore, we discuss recent advancements in IBC technology, including novel electrode designs, signal processing algorithms and integration with other wireless communication technologies. By exploring its principles, applications, challenges and prospects, this review aims to advance this exciting field, facilitating the development of more efficient and reliable wearable devices for diverse applications in healthcare and beyond.

Keywords: *IBC, Galvanic coupling, Wearable, Healthcare monitoring*