

A Study on Smart Body Area Network Physical Layer for Human Monitoring System

Kento Takabayashi*⁽¹⁾, Hirokazu Tanaka⁽²⁾, and Katsumi Sakakibara⁽¹⁾

(1) Department of Information and Communication Engineering, Okayama Prefectural University, Soja, Japan, takabayashi.kento.xp@gmail.com, sakaki@c.oka-pu.ac.jp

(2) Graduate School of Information Sciences, Hiroshima City University, Hiroshima, Japan, hi.tanaka@m.ieice.org

Due to the evolution of technologies and platforms such as sensing, mobile computing, and cloud servers, the Internet of Things (IoT) is recognized as a very important technology all over the world. Applications using IoT technology are widely deployed. In particular, the Internet of Medical Things (IoMT) is attracting attention for constructing home medical care and telemedicine systems using medical / healthcare devices and robots [1, 2]. Then, wireless body area networks (WBAN) are well-known IoMT systems [3-6]. WBAN consist of a collection of low power, miniaturized, invasive or non-invasive lightweight sensors with wireless communication capabilities that operate near the human body. As one of the standards for WBAN, system specifications for a physical layer (PHY) and a media access control layer (MAC) in smart body area networks (SmartBAN) were issued in April 2015. These specifications represent a standard for medical and other health care advanced by the European Telecommunications Standards Institute (ETSI) [4-6]. This research examined the requirement of the SmartBAN PHY for the use case as shown in Figure 1. The worker wearing the SmartBAN is monitored by an operator in a factory and so on. The operator monitors vital sign data, video and audio from the worker. In addition, the operator transmits instruction information to the worker's smart glasses or head mounted display. A data rate of the conventional SmartBAN PHY is insufficient for the use case. Therefore, differential 16 phase shift keying (D16PSK) as multi-level modulation and several BCH codes were applied for high-definition (HD) video transmission. Effectiveness of those PHY techniques was confirmed by numerical results.

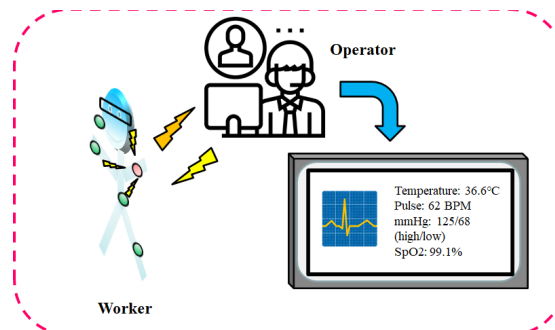


Figure 1. Supposed use case: The operator monitors vital data of the worker in the factory wearing the SmartBAN.

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