

3.7 Introduction Wireless communication Techniques

In today's world, wireless communication has a major application in sharing of information anywhere and at anytime. We can use wireless networks in the form of WLAN or Wi-Fi in various fields such as education, healthcare, and industrial sector. As the technology is growing, the demands of users as well as the demand of ubiquitous networking is increasing. WBAN(Wireless Body Area Network) allows the user to move another without having the restriction of a cable for sharing information.

The communication in body sensor networks is of 2 types:

1. In-body communication
2. On-body communication

In-body communication is the communication between sensor nodes that are implanted inside human body. The MICS (Medical Implant Communication System) communication can be used only for in-body communication. On-body communication occurs between wearable devices which consist of sensor nodes. The ISM (Industrial Scientific and Medical) band and UWB (Ultra-wideband) communication can be used only for on-body communication.

A body area network (BAN), also referred to as a wireless body area network (WBAN) or a body sensor network (BSN) or a medical body area network (MBAN), is a wireless network of wearable computing devices. BAN devices may be embedded inside the body, implants, may be surface-mounted on the body in a fixed position Wearable technology or may be accompanied devices which humans can carry in different positions, in clothes pockets, by hand or in various bags. A WBAN system can use WPAN wireless technologies as gateways to reach longer ranges. Through gateway devices, it is possible to connect the wearable devices on the human body to the internet. This way, medical professionals can access patient data online using the internet independent of the patient location. In modern technology wireless communication provides a lot of possibilities to be able to share its information to each other at anytime and anywhere. Intelligent mobile communication network and WLAN, Wi-Fi are applied to various sectors such as education; health care service and industry in order to provide people a convenient way to communicate with each other. As the demand of ubiquitous network is increased, the devices for home, office and other information devices that can communicate wireless in short range have been getting more attention. The standard and technique development of ubiquitous network has rapidly put itself into the world market.

Wireless Body Area Network (WBAN) is becoming a special application of such technique. WBAN differs with other wireless sensor networks (WSN) with some significant points. First difference between a WBAN and WSN is mobility. In WBAN user can move with sensor nodes with same mobility pattern whereas WSN is generally used to be stationary. Energy consumption is much less in WBAN than other WSNs arrangement. In addition, WBAN sensor devices are found cheaper than WSNs. For reliability, node complexity and density, WBAN nodes are however traditional. WSNs do not tackle specific requirements associated with the interaction between the network and the human body . The WBAN performs like Virtual Doctor Server, by keeping the different responsibilities like- maintain the history of the patient, giving advices to the patient in general/emergency (first aid help from second person) case etc. To understand the communication approach of this emerging WBAN technology, we first need to know the conceptual structure of WBAN so that, one can easily know the flow of communication within the system and to the outside world, this has been achieved by the demonstration of a simple WBAN communication architecture. Where this architecture is mainly comprised with three different layers namely: Tier 1, Tier 2 and Tier3 and these are further described better in the given figure