Chapter 8
Lifetime Enhancement and Reliability in Wireless Body Area Network

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ABSTRACT

The wireless body area network (WBAN) consists of wearable or implantable sensor nodes, which is a technology that enables pervasive observing and delivery of health-related information and services. The network capability of body devices and integration with wireless infrastructure can result in pervasive environment deliver the information about the patients to health care service providers. WBAN has a major part in e-health observing system. Due to sensitivity and critical of the data carried and handled by WBAN, reliability becomes a critical issues. WBAN loads a high degree of reliability as it openly affects the quality of patient observing. A main requirement is that the health care professionals receive the monitored data correctly. Thus reliability can be measured to achieve reliable network are fault tolerance, QoS, and security. As WBAN is a special type of WSN. The objective is to achieve a reliable network with minimum delay and maximum throughput while considering power consumption by reducing unnecessary communication.

1. INTRODUCTION

Wireless technology has advanced to be become a vital part of our lives starting from mobile communication to health care departments. Recently, there has been growing interest from system inventors application and researchers on a newly designed type of network architecture usually known as body sensor networks (BSNs) or body area networks (BANs), one made feasible by novel advances on ultra-low-power, lightweight, small-size and intelligent observing wearable sensors. In BANs, sensors are

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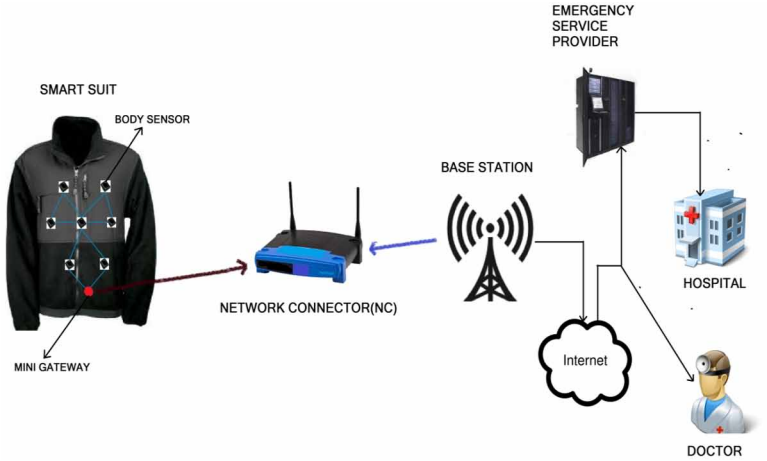
used to constantly monitor human's functional activities and movements, such as health position and movement pattern. A wireless healthcare application offers and brings many benefits and challenges to the healthcare sector. These benefits provide a convenient-environment that can monitor the daily lives and medical situations of patients at any time, anywhere and without limitations. The Figure 1 shows how WBAN provides a wireless connection between these devices and a Personal digital assistant (PDA) or a smartphone, which is responsible for the connection with other networks. For example, the obtained data can be forwarded to a hospital server.

Figure 1. Data transmission in WBSN



1.1 Wireless BSN Scenario

Wireless BSN applications are in great demand in medical care [1-3], sports and entertainment [4], the military-industrial sector [7], and the social public field [8-10], and BSNs have gradually become a research hotspot. BSNs is a type of WSN which is formed by physiological factors of sensors placed in the human body or on the body surface or around the body. The key performances it covers are sensors, data fusion, and network communication. It focuses on the advancements in universal health care, disease monitoring, and prevention solution, but also an essential component of the so-called Internet of Things. Its foremost purpose is to make available an integrated ubiquitous computing hardware, software, and wireless communication technology platform, and a vital situation for the imminent improvement of ubiquitous healthcare observing systems [11].BSNs initiated from WSNs, so there are many resemblances between them. However, the features are consistently different as of their different application resolutions. Initially, allowing for network deployment, WSNs can be deployed to the unreachable environments, such as forests, swamps or mountains. Several redundant nodes are positioned in the positions indicated above to resolve the problem of node failures, so node density is greater, however, BSN nodes are positioned in, on or around the human body, so the total number of nodes is usually up to a few dozens. Each node confirms the correctness of observing consequences by its robustness [12]. Moreover, considering attributes, nodes in WSNs accomplish the similar functions and have the identical properties. The size of nodes is not very critical. Formerly the node is deployed, it will probably no longer need to be relocated.