Chapter 32
Design of WSN in Real Time Application of Health Monitoring System

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ABSTRACT

Health monitoring is emerging topic in recent era for safety and healthy public life in remote place. In health monitoring system, sensor devices have major role to collect data, communication and analysis the data for real time applications, such as automation of old-age home, industry, ICU, etc. It can measure different parameters of the body through different physiological body sensors. The body sensors can be used to sense the data from the body and send to the remote system for analysis. The condition of the health of a body can be analyzed and monitor remotely by using concept of body sensors in health monitoring system through different communication media, such as WiFi, ZigBee, etc. The parameter values of body can be transmitted to remote data centre with reliability, simplicity, low power, low bandwidth and low cost, in lightweight wireless networks. This may be used in real time application like; emotion and stress analysis, psychological study, physiological study, health condition, etc.

1. INTRODUCTION

The rapid growth in Physiological sensors, low-power integrated circuits, and wireless communication has enabled a new generation of wireless sensor networks (WSNs), can be used for monitoring the health. The body sensor network (BSN) field is an interdisciplinary area which could allow inexpensive and continuous health monitoring with real-time updates of medical records. It can be used to analyze the data in WSN environment. With recent advances in wireless body sensor networks (WBSN) and embedded computing technologies, reduced pervasive health monitoring system has become practically feasible. In addition to providing nonstop monitoring and analysis of physiological parameters, the newly proposed

BSN includes environment aware sensing for improved sensitivity and specificity. To assist research and development in wireless body sensor networks and multi sensor data fusion, a WBSN hardware development platform is required to present. With its low power, elastic and close design, the WBSN nodes provide a multipurpose environment for wireless sensing research and development. The community can benefit greatly from learning the most salient human measures of Physiological parameters of body.

Recent years have witnessed a thrust towards the extensive use of sensor devices in the health monitoring systems for reliable and energy efficient. The use of electronic health technologies in healthcare improves the quality of health services. The application of these technologies helps to pursue early detection of physical condition of human body and its abnormal status of it. BSNs are a type of wireless sensor networks aimed to be deployed on persons in order to collect psych-physiological parameters for healthcare monitoring and are composed by several small sensors placed along with body, and capable to send the data wirelessly from remote place to desired places. BSNs need to operate and analyze every time and everywhere to transmit these important parameters.

The developments in WSNs are reported in three sub areas of wireless sensor networks that is, wireless sensor node (hardware and software), Communication & Networking issues in WSNs and application areas (Mittal, Aggarwal & Maskara, 2012). The WSNs are characterized by huge data hence research work in aggregation & mining is also required to discuss. Contemporary issues of integration of WSNs with other prevalent networks, sensor enabled smartness and role of artificial intelligence methods is elaborated. Insight into future directions & research avenues in all the above areas is provided.

The information derived from wearable sensors, such as illness/fall alarms, can be enhanced with context information to provide advanced health care and assisted living applications (Ko, Lu, Srivastava & Stankovic, 2010). The architecture that combines sensor and context data into a telecommunication service to detect emergency situations and generate alarm calls according to user's preferences and contacts geographic proximity has been describe.

It has been reviewed the recent studies present some representative applications in the healthcare domain and describe the challenges. Wireless sensor networks introduced due to the required level of trust worthiness and the need to ensure the privacy and security of medical data (Salmeri, et al., 2009). These challenges are exacerbated by the resource scarcity that is inherent with wireless sensor network platforms. The prototype systems outlined spanning application domains from physiological and activity monitoring to large-scale physiological and behavioral studies and emphasizes ongoing research challenges.

To design and develop wireless sensing hardware in wireless network for collecting physiological parameters of health like GSR, EMG, Heartbeat Rate, etc., for psychological study and their analysis. The System has been presented for the remote monitoring to collect and analysis of different parameters of human body like, heart rate and body temperature of a patient in by means of a wireless sensor network and mobile augmented reality (González et. al., 2014). It can be evaluated the suitability of the implemented protocols using simulator and the actual hardware. Then it can be implemented these protocols to fit in existing components. In this chapter we tried to place the design of WSN in real time application of Health Monitoring System (HMS).

The rest of the chapter described start with background in section 2 followed by architecture of WSN network in section 3. Components of WSN architecture described in section 4 and section 5, discuss the experimental setup to sensing data in wireless environment. Result and discussion has been discussed in section 6. The conclusion has been discussed in section 7.

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