Chapter 2
Patient Health Monitoring Using IoT

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ABSTRACT
In today’s world, health is one of the vital issues to solve through wireless communication technology. It should be efficient in terms of cost and reliable communication with suitable protocols. To monitor the health conditions of a patient, a mobile care system can be designed with the help of wireless sensor network using IoT. This can be done by integrating different sensors to sense physiological data from a human body and then transmit the data to a remote healthcare cloud through a smartphone as an interface. All the vital signs monitored are portable and will have the ability of short-range wireless communication. Then the data can be uploaded to the central server to keep track of the patient’s health condition. In emergency, a notification will be sent to the nearest hospital by sending a warning message through mobile application.

INTRODUCTION
Internet Of Things (IoT) technology has attracted much attention in recent years for its potential to alleviate the strain on healthcare systems caused by an aging population and a rise in chronic illness. Patient monitoring has advanced over the years, from bedside monitors in the hospital to wearable devices that can monitor patients and communicate their data remotely to medical servers over wireless networks. It is a process that involves monitoring major vital signs of a patient, to check if their health is normal or deteriorating within a period. In a remote situation, vital signs information can help health care providers to easily send help to patients when their health is at immediate risk. E-Health technology can bring

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a variety of benefits to patients, caregivers, and health institutions, by facilitating improved healthcare services through the utilization of Information and Communication Technologies (ICTs). The forthcoming generation of healthcare services will require advances in computing and Wireless Sensor Networks (WSNs) to leverage truly intelligent and adaptive features for smarter health services. This is possible through Internet Of Things where the values of the vital signs will be monitored continuously, and if any of the vital-signs values are less than the threshold value, then the notification will be sent to the doctor in the nearby hospital. If the vital signs values are critical i.e far beyond threshold value then precautions to be taken are sent to the patient’s mobile which is discussed below. You can see the process of how the data about the patient will be transferred to the hospital in the Block diagram of Figure 1. This chapter discusses every block in detail.

BACKGROUND

Stephanie Baker et al. have discussed many challenges, technologies and opportunities where they deal with types of vital signs and sensors and their principles required for vital signs monitoring and about cloud technology and its importance in Internet Of Things. The authors have discussed the need for security measures in the cloud, and the main focus was on wearable sensors for healthcare Michelle Omoogun et al. developed a prototype of wearable sensors where patient’s vital signs are monitored and if there is any deviation in the vital signs readings then message will be sent to the patient indication that there is a deviation in his vital signs readings. The patient can also view the location of the nearest hospital in case of an emergency.

PATIENT HEALTH MONITORING USING IoT

This chapter is mainly focused on designing a prototype for vital signs monitoring using IoT. This is used for patient’s health monitoring without the need for doctor and intimating the doctor if the vital signs cross their threshold value through the mobile application. Initially, we will be focusing on the type of microcontroller used for sensors to be controlled, and then we will go to the vital signs that are to be monitored and a sensor for each vital sign and their position to be kept to the body. Then, the next focus is the cloud platform where data of a patient’s vital signs are stored for future purposes. Finally, we end

Figure 1. Block diagram of patient health monitoring using internet of things