Chapter 11
IoT-Based Health Services Framework for Endless Ailment Administration at Remote Areas

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ABSTRACT

The objective is to build an IoT-based patient monitoring smart device. The device would monitor real-time data of patients and send it to the Cloud. It has become imperative to attend to minute internal changes in the body that affect overall health. The system would remotely take care of an individual's changes in health and notify the relatives or doctors of any abnormal changes. Cloud storages provide easy availability and monitoring of real-time data. The system uses microcontroller Arduino Nano and sensors – GY80, Heartbeat sensor, Flex sensor, and Galvanic Skin (GSR) sensor with a Wi-Fi Module.

INTRODUCTION

Continuous measurement of patient parameters such as heart rate and rhythm, respiratory rate, blood

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pressure, blood-oxygen saturation, and many other parameters have become a common feature of the care of critically ill patients. When accurate and immediate decision-making is crucial for effective patient care, electronic monitors frequently are used to collect and display physiological data. Increasingly, such data are collected using non-invasive sensors from less seriously ill patients in a hospital's medical-surgical units, labor and delivery suites, nursing homes, or patients' own homes to detect unexpected life-threatening conditions or to record routine but required data efficiently. usually think of a patient monitor as something that watches for—and warns against—serious or life-threatening events in patients, critically ill or otherwise. Patient monitoring can be rigorously defined as "repeated or continuous observations or measurements of the patient, his or her physiological function, and the function of life support equipment, for the purpose of guiding management decisions, including when to make therapeutic interventions, and assessment of those interventions"

A patient monitor may not only alert caregivers to potentially life-threatening events; many also provide physiologic input data used to control directly connected life support devices.

Motivation

Incorporating the patient monitoring system in chronic disease management can significantly improve an individual's quality of life. It allows patients to maintain independence, prevent complications, and minimize personal costs. This system facilitates these goals by delivering care right to the home. In addition, patients and their family members feel comfort knowing that they are being monitored and will be supported if a problem arises. Key features of this system like remote monitoring and trend analysis of physiological parameters, enable early detection of deterioration; thereby, reducing number of emergency department visits, hospitalizations, and duration of hospital stays. The need for wireless mobility in healthcare facilitates the adoption of this system both in community and institutional settings. The time saved as a result of the patient monitoring system implementation increases efficiency, and allows healthcare providers to allocate more time to remotely educate and communicate with patients.

The objective of the proposed system is to design a system that will be portable and easily wearable like a watch, and in any critical condition, an alert or a message will be sent to the doctor or any family member. So, with that can easily save many lives with just a small tap of a finger.

With the advancements in technology all over the world, health monitoring systems are used in every field such as hospitals, home care units, sports and many more. This health monitoring system is used for chronicle disease patients who have daily check-up. Normally it is difficult to keep track on abnormalities in heartbeat count for patient itself manually. Patients are not well versed with manual treatment that doctors normally use for tracking the count of heartbeat, skin response, body temperature, etc. There are various instruments available in market to keep track on internal body changes. But there are many limitations in maintenance part due to their heavy cost, size of instruments and mobility of patients. Researchers have designed different health monitoring systems based on different requirements. So, I will look to design a system as that will be portable and easily wearable like a watch, and in any critical condition, an alert or a message will be sent to the doctor or any family member. So, with that can easily save many lives with just a small tap of a finger.

The GY80 sensor includes gyroscope, temperature sensor, pressure sensor, accelerometer, and magnetometer reducing the cost of the system altogether. The sensors in GY80 increase the accuracy of Fall Detection in individuals to 100% (with a consistency of 99.38%). Fall Detection and Gait movements from the sensors are recorded and anomalies can be detected by comparison with the data from patients