A REVIEW OF HEALTHCARE USING INTERNET OF THINGS (IOT)

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Abstract

The healthcare field remains among the fastest to adopt the Internet of Things (IoT). The reason for this is that integrating IoT features into medical devices greatly improves the quality and effectiveness of medical-service. Health monitoring of a patient distantly has become an easy task with the advent of this technology.

Keywords: IoT

1. Introduction

The IoT is network of physical objects connected through the Internet. Advancements are happening at a very high rate in the field of IoT. It is making our lives smarter, secured and convenient. It is causing a huge impact in modern healthcare. IoT has numerous applications in healthcare.

2. Related Works

I. WE-CARE

We-Care is IoT based health care system which monitors and records vital data of elderly people. This system detects body and environment temperatures, detect falls and sends alerts. This wearable device consists of three components: We-Watch wristband, the service board and the cloud service. The We-Care board connects the We-Care system to the Internet and the cloud. It runs the webserver for remote client connection. The We-Watch wristband uses the SensorTag and it is supported by Contiki-OS. The wristband consists of a push button which can be used to send immediate distress messages to the caretaker and uses a wireless charging system. The fall detection is done by reading the accelerometer data which detects movements of the elderly person. The wireless communication is secured by strong cryptographic algorithm like Advanced Encryption Algorithm. The web application collects all the data retrieved and sends it by wristband to the server, and also alerts the caretaker in case of emergencies. The IoT architecture enables the WE-Care system to track the activities of a person.

II. BLOOD BANK APPLICATION AND POLIO VACCINATION REMINDER

People find it difficult to get blood at the time of emergency. The paper discussed helps to find the availability of blood and nearest blood bank centre using GPS tracker and also Polio Vaccination reminder based on child's age. There are already applications that allow users to request blood via SMS and E-mail but it doesnot provide updates of availability of blood, it does not give the details of nearest blood bank centers and also has a bad graphical user interface. The drawbacks of the existing application are overcome in this paper. The availability of blood will be sensed with the help of load sensor and the data of available will be collected by Arduino Uno board and transferred to cloud storage like amazon, azure, etc. The distance between user's current location and blood bank centre's location is calculated using Haversine Formula. This application's primary purpose is to maintain the records of various blood bank organizations. It has an automated database (MySQL) for storage where the administrator has options to add, modify or delete any records from the system.

III. SMART AND PERVASIVE ICU (ADSA)

Intensive Care Units (ICUs) of an hospital are of great importance because of the seriousness of the health status of patients staying and therefore need special attention. To help patients to stay alive, a partial or total ventilator support is mandatory depending on the severity of the

condition of the patient. The limitations of the performance of these systems are obvious. Smart and pervasive environment is created by installing new patient monitoring intelligent system in ICUs to improve medical care service performance. A hybrid architecture over a single platform for Automatic Detection of risk Situation and Alert (ADSA) is discussed here. It uses a multi-camera system and collaborative medical sensors network. The three-layer architecture of this system are: (1) The physical layer that has all the radio specifications and organizational structure of data collection networks. (2) The logical layer is responsible for media access management protocol in the network. (3) The application layer provides all support services to healthcare personnel in decision-making. The proposed system in ICUs has potential to provide many advantages to patients, medical staffs, and society at large through continuous monitoring of various physiological vital signs and provide real-time feedback to the user and medical staff.

IV. BODY SENSOR NETWORK (BSN)

A BSN is a network designed to operate autonomously to connect various medical sensors and implants located inside or outside human body. A patient can be monitored using a collection of lightweight wearable sensors for real time sensing and analysing various vital parameters of patients. In this system, different sensors are connected to the Arduino Fio Transmitter board. The sensed values are wirelessly transmitted to the Arduino receiver which is connected to the patient side computer and the values are read in LabVIEW which is connected to the Internet. An URL is generated by LabVIEW which can be accessed from any computer. The different sensors are placed at respective locations on human body and are connected to the Arduino board. With each heart beat the detector signal varies and this variation is converted into electrical pulse. This system can be used to transmit the patient vital parameter information in real time to the care taker.

V. PATIENT ECG MONITORING SYSTEM

The ECG system proposed here saves time which people spend in traveling to hospitals and waiting in long queues; instead they can be diagnosed from their home. The system is proposed to monitor the ECG of distant patients. In this system, the Bio signals are collected from the body of the patient using ECG sensor and after processing it is sent to distant cloud named as Bluemix (owned by IBM) for analysis by a physician. There already exists an indoor ECG monitoring system but its range of operation is limited by the Bluetooth technology (around 10 meters). This proposed system overcomes all the drawbacks and provides state of art solution. This system consists of Raspberry Pi Model 2 which is a small sized minicomputer, Arduino which is an open source microcontroller board and an AS8232 ECG Sensor which is used to measure the electrical activities produced by heart.

3. Conclusion

The aim of IoT-based health care system is to increase the welfare of patients and the quality of life. Works like We-Care system, ADSA, BSN, and so on mentioned above is aiming at providing a better health care facility especially for remote applications. There are many wearable sensors invented in recent years which uses IoT for personal health care, fitness and activity awareness. Integrating IoT features into medical devices greatly improves the quality and effectiveness of medical services bringing especially high value for the patients with chronic conditions and those requiring constant and real time monitoring.

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