www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 7 Issue 4 April 2018, Page No. 23871-23874
Index Copernicus Value (2015): 58.10, 76.25 (2016) DOI: 10.18535/ijecs/v7i4.12

Wellness Program Counsel

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Abstract:
Internet of Things (IoT) is a new technological paradigm that can connect things from various fields through the Internet. Smart healthcare will be the most dominant Internet of Things (IoT) application. The adoption of information and communication technologies (ICT) within the healthcare sector led to the concept of electronic health (e-health), which is contributing to reduced costs and increased efficiency. E-Health systems depending on a modern technology play a vital role in eradicating the problems and faster curing of the patients. Also, a lot of advancement has been done in order to improve the systems in various terms of size, speed mobility and faster communication in emergency situations. Sensor data getting Activity from blue-tooth. New smart health monitoring systems have proved to be of great help to the healthcare of the patients. But the major constraint of this system is that patients are supposed to be bed fitted and kept in the smart rooms and are immobile.

Keywords: IoT, Information and Communication Technologies, electronic health, Smart health, Bluetooth

Introduction

Smart healthcare applications and services can perform real- time patient monitoring and medical device actuation, use cloud- based data analytics to improve healthcare quality and the patient experience, and cut costs. In
this project, we are monitoring various parameters of the patient using internet of things. In the patient monitoring system based on IOT project, the real-time parameters of patient's health are sent to a remote Internet location so that user can view these details from anywhere in the world. In IOT based system, details of the patient health can be seen by many users. The reason behind this is that the data needs to be monitored by visiting a website or URL. IoT Healthcare is the most demanding field in the medical area. This project is for, elderly person in our home. Also for the senior citizen living alone or living with 1 or 2 members. The current Health Management System is only able to store patient's medical history and its personal information. The older Health Management System was not able to communicate with the patient. So, That was not helpful in the absence of the doctor. Using e-Health Monitoring Architecture has an older management tools functionality as well as the communication portal. This is easy to handle one or many patients at a time with the same problem. E-Health systems play a vital role in eradicating the problems and faster curing of the patients. New health monitoring systems have proved to be of great help to the healthcare of the patients.

Problem Definition

The proposed system uses mobile devices and wireless sensor networks. Sensor data getting Activity is done by using blue-tooth. This system provides the history of patient like sensor data in Graph format so that the evaluation of raw data can be done easily. It checks the physical parameters of the patient and if this data is more than threshold data it sends message by SMS API. It is easy for doctors and the caregivers to immediately act in emergency cases and Chat patient with doctor. Also to provide medication

depending on the health parameters without the physical presence of the doctors.

Scope

This system uses Bluetooth sensor to gather information of the patient and forward to the respective doctor. This application is storing all medical history of the particular patient as well as he can able to chat with the Doctor using WSN. Doctors will be able to see all stored data. This application will provide emergency SMS to the patient's registered contact details. The system is such that, remote monitoring of patients can be done by a diagnosis of the patients with the help of the environmental and medical sensors. The sensor monitors the health of patients and in real time and the collected data is sent to a server. This data is received by the doctors and caregivers through a server which is analyzed by the doctors. The server helps to store the data, medical history of the patient for future use. The system architecture is such that the patients can be monitored and treated privately at home.

Related Work

In [1] authors designed a system to attain the people-centric information, provided by the smart city infrastructure, to improve "smart health" applications: user data from connected wearable devices can be accompanied with ubiquitous environmental sensing and versatile actuation. For smart health using IoT, this allows designing more complex health applications with limited re-sources, using sensors both on the user and in the surrounding spaces.

ECG based authentication [2] can authenticate patient identities in a healthcare system while protecting the privacy of their trans- mitted electrocardiogram signal. The technique hides the ECG sensitive data based on the Linear Prediction Coding (LPC). This solution comes as an alternative to the fuzzy vault scheme. protects the sensitive data transmitted by a wireless connection usually known as an untrusted channel. In addition the authentication device and the receiver agree upon a key without sharing it.

Infrastructure for Secure and Smart Healthcare[3] is an agile, softwarized infrastructure that embraces cloud and fog computing, blockchain, and message brokers for flexible, cost-effective, secure, and private IoT deployment for smart-healthcare applications and services. We propose a system architecture for our infrastructure, a novel platform with machine-to-machine (M2M) messaging, rule-based beacons for seamless data management, and the use of data fusion and decision fusion to facilitate smart-healthcare applications and services.

System Implementation

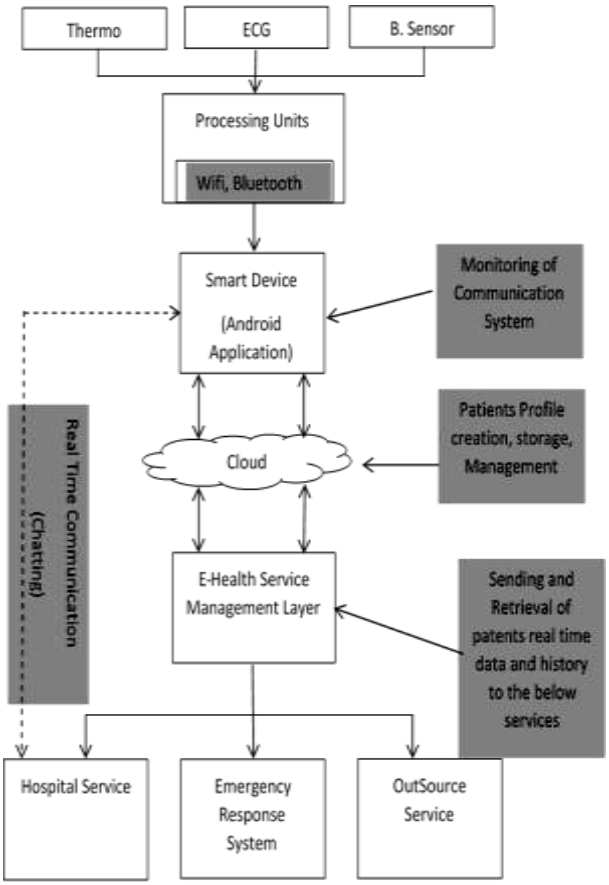

Figure 1: System Architecture

1) GUI(Graphical User Interface):

i Mobile App module: It has login portal from where the patient gets a login, also have a Register page where the patient can register with the help of its credentials this app getting Sensor data from Bluetooth and send it to the sensors. Mobile App module has a Chat application for the patient and doctor. This module shows all sensor data.

ii Embedded Module: Build all data with sensor and send data to mobile via Bluetooth

iii Web Portal side: Web portal has various modules like Admin module which Manage Patient like Add/Delete patient, Doctor Module which can use to chat with a doctor

with patients, See Patient Sensor data Graph, if sensor value more or below the threshold then SMS will send to emergency contact number.

iv Web services: This is used for communication between mobile and admin database.

2) Design Module:

i. Sensing Module: The various health parameters are sensed from different sensors like Arduino, Temperature sensor, Oximeter sensor being used by smart healthcare system. Arduino sensor computes the heart beat rate by processing the analog pulse signal output from the Easy Pulse Plugin sensor. Temperature Sensors measure the amount of heat energy or even coldness that is generated by an object or system, allowing us to "sense" or detect any physical change to that temperature producing either an analogue or digital output. Oximeter sensors used to continuously measure the Oxygen saturation (SPO2) of hemoglobin in blood. It displays the percentage of blood that is loaded with oxygen.

ii. Processing unit: All the data collected from sensors can be transmitted to the system using Bluetooth or WIFI. In this project we are using Bluetooth to collect the data because it gives accurate measure as compared to WIFI. So, the right wireless sensor for our application is Bluetooth. Transmitters use scientific sensors to measure a specific property in a process, and then transmit the data via radio signals to a receiver. Receivers receive and interpret the wireless data.

iii. Threshold Computing Module: DP is use for comparing incoming patient health data with threshold values.

iv. Smart Device (Android Application): This module will contain the Android Application which will be used for monitoring the communication. This application will also provide real time communication between patient and doctors and will serve Hospital Services. It will be easy for doctors and the caregivers to immediately act in emergency cases, and also to provide medication depending on the health parameters without the physical presence of the doctors.

v. Data Aggregation Module: This module serves as a warehouse for all the relevant data aggregated from various components of the system. Cloud is used for creation of patients profile, storage and management. Patient will login to this system and their profile information including health parameters of patients are stored using cloud. The patients health data will be represented as the graph format so all the related data will be accessed through cloud.

vi. Messenger Platform: Real Time Communication can be achieved using Messenger API. It is easy for doctors and the caregivers to immediately act in emergency cases and patient can chat with doctor. The Messenger Platform is the toolbox for building bots.

I. Experimental Result Of The System

i. Send message if it crosses threshold value.

ii. Real Time communication between Patient and doctor.

iii. Patient can be added and removed from admin panel.

iv. Send SMS if threshold data is above by using SMS API.

v. Show history of patient like sensor data in graph format.

Software Requirement And Tools

Hardware Interfaces:

- Arduino
- Bluetooth
- Temperature sensor
- HeartRate
- Oximeter sensor

Software Interface:

- JDK 7
- Android studio 1.5
- Eclipse Kepler,
- Tomcat 7
- Mysql 5.2 and Workbench 6

II. ALGORITHM

Naive Bayes theorem works on conditional probability. Conditional probability is the probability that something will happen, given that something else has already occurred**.** Using the conditional probability, we can calculate the probability of an event using its prior knowledge.Below is the formula for calculating the conditional probability.

$$P(H|E) = \frac{P(E|H) * P(H)}{P(E)}$$

Where,

P(H) is the probability of hypothesis H being true. This is known as the prior probability.

- P(E) is the probability of the evidence(regardless of the hypothesis).
- P(E|H) is the probability of the evidence given that hypothesis is true.
- P(H|E) is the probability of the hypothesis given that the evidence is there.

Advantages

- Reduce manual work
- Increase Efficiency
- Easy to contact with doctor
- Easy to make patient Sensor data Graph

Conclusion

So, We conclude, this system uses mobile devices and wireless sensor networks .It is easy for doctors and the caregivers to immediately act in emergency cases, and also to provide medication depending on the health parameters. which helps for without the physical presence of the doctors with Patients real time and historical Details. It also provide emergency SMS on stored contact details of the Patient.

Future Scope

In the future, more practical results will be retrieved and analyzed to deploy the proposed method everywhere. Furthermore, in addition the data from wearable devices can also be collected and accessed to check daily fitness.

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