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Designing An Architecture For Monitoring Patients At Home: Ontologies And Web Services For Clinical And Technical Management Integration

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Abstract – *This paper is based on patients health monitoring. In today's world population care taking of people is very difficult these days. Hence patients shealth monitoring systems are highly emerging. We have developed the paper in such a way that it sends the parameters of the patients and enables the doctor for further measures to be taken. In proposed system we are monitoring using different sensors connected to the Arduino board along with this we have used emerging technique for user centric privacy access control which is highly reliable SPOC(Secure and privacy preserving opportunistic computing) framework. This framework is based on the relationship between doctor and the patient using new PPSPC(Privacy preserving scalar product computation) technique to fetch the data and provide service based on the participant.*

Key Words: **SPOC, Temperature Sensor, Pressure Sensor, Heartbeat Sensor, PPSPC, IOT.**

1. INTRODUCTION

The main concept of this paper is about pervasive monitoring patients at home without human interaction using Smartphone and it is proposed with new initiative called SPOC secure and privacy preserving opportunistic computing with user centric privacy access control. Advantage of using SPOC is that people from different location can be easily engaged with this application and are benefited as it avoids time consuming and highly reliable. The medical user will be equipped with wearable device which contains sensors such as heart beat sensor , pressure sensor and temperature sensor along with Bluetooth (Bluetooth is an wireless device most commonly used to establish connection between two electronic devices). Sensors are sophisticated devices that are frequently used to detect and respond as electrical signals to the processor. Processor sends the sensed values that are aggregated to the Smartphone via Bluetooth. Smartphone will classify the values and then store them on cloud as cloud storage (private cloud storage which is a user centric management of collected details in an secure manner) using Internet of Things (IOT will securely connect and manage data from dispersed devices). Stored PHI (personal healthcare information) will be generated as an normal message which automatically sent to the directed doctor in case of emergency period.

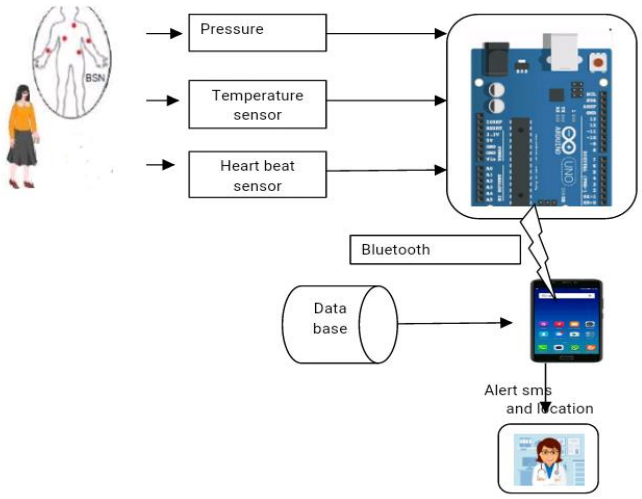


fig-1: Block diagram

Literature Survey

In this paper, we first identify some unique design requirements in the aspects of security and privacy preservation for communications between different communication devices in vehicular *ad hoc* networks. We then propose a secure and privacy-preserving protocol based on group signature and identity (ID)-based signature techniques. We demonstrate that the proposed protocol cannot only guarantee the requirements of security and privacy but can also provide the desired traceability of each vehicle in the case where the ID of the message sender has to be revealed by the authority for any dispute event. This paper faces the problem of storing and executing an application that exceeds the memory resources available on a single node. The proposed solution is based on the idea of partitioning the application code into a number of opportunistically cooperating modules. Each node contributes to the execution of the original application by running a subset of the application tasks and providing service to the neighboring nodes.

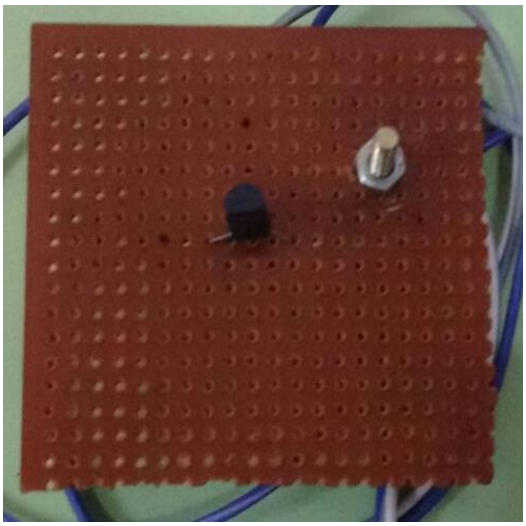
2. Working Modules

2.1 Sensing Values

The patient will be equipped with sensors like temperature sensor, pressure sensor and heartbeat sensor connected along with the Arduino board and the values are read from it.

2.1.1 Temperature Sensor

The LM35 series are precision integrated-circuit temperature device with the output voltage linearly proportional to the Centigrade temperature. The temperature sensor IC can operate over the nominal IC temperature range of 55°C to +150°C, which is a broadest possible range of temperature monitor. The advantage of using LM35 is low output impedance, linear output and precise inherent calibration which can read and control circuit easily.



2.1.2 Pressure Sensor

A blood pressure monitoring device measures the blood pressure when the heart is pumping and when at rest. It is important to monitor the blood pressure to prevent damage to the blood vessels and the heart.

2.1.3 Heartbeat Sensor

Heartbeat sensor is used to give digital output of heartbeat when the finger is placed over it. The digital output is connected to the Arduino directly to measure the beats per minute rate.

2.2 Hardware Tethering

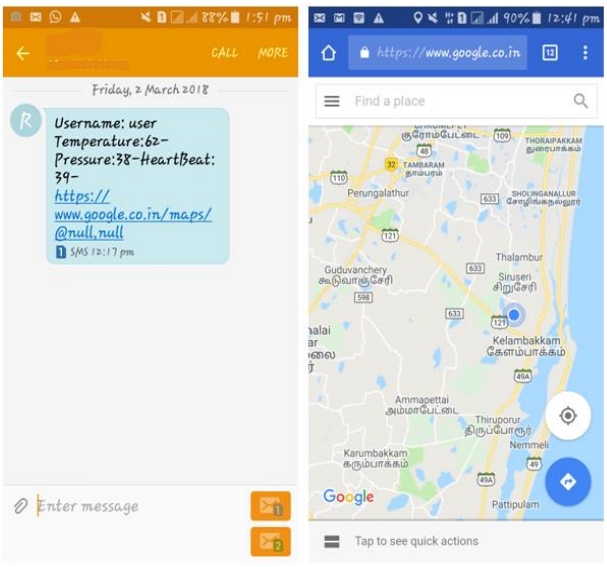
For each data transmitted from BSN will be aggregated by the Smartphone that the medical users having with them using Bluetooth communication. This received medical information or symptom will be transmitted to healthcare centre periodically with the help of mobile network.

2.3 Analysing Values

After getting readings from the hardware part, we do mining to verify that received readings because of hardware values are added with noise values. In order to remove the noise from the original information which will be stored in database. By applying Naive Bayes classification, analysis of the input which is the previous value to find the patient condition. Example: consider the temperature value normally it ranges from 96°F -99°F if exceeds more than 100°F an abnormal sign of illness like fever.

2.4 Sending Alert Message

We propose SPOC that is a secure and privacy-preserving opportunistic computing framework for m-Healthcare emergency. With SPOC, the resources available on other opportunistically contacted medical users' smart-phones can be gathered together to deal with the computing-intensive PHI process in emergency situation. These personal healthcare information in critical situation will be generated as an message and search for availability of the doctors for the associated disease and symptoms already acquired in patient body will also accommodate with the details that are sent to doctors .The location of the patient is also informed by providing latitude and longitude values and a link to view the exact location of the patient so that it will be easy for the doctor to make immediate action to save the patient life in case of emergency.



3. CONCLUSION

This will be useful for patient because there is no need for additional man power to monitor the patients at home as we as avoids time consuming and reliable. We are also able to monitor the patients from remote areas at any time such that providing a simple system.

4. FUTURE WORK

The future work of this paper can be still designed in a more advanced way using Wi-Max that may result in faster uploading of data into the database and can also be enhanced using more parameters.

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