Wireless Health Monitoring System in Hospitals for Patients

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ABSTRACT

This paper presents the development of a microcontroller based system for wireless heartbeat and temperature monitoring using ZigBee .In India many patients are dying because of heart attacks and reason behind that they are not getting timely and proper help. To give them timely and proper help first we want to continuous monitoring of patient health. The fixed monitoring system can be used only when the patient is on bed and this system are huge and only available in the hospitals in ICU. The system is developed for home use by patients that are not in a critical condition but need to be constant or periodically monitored by clinician or family.[1] In any critical condition the SMS is send to the doctor or any family member.[2] So that we can easily save many lives by providing them quick service.

I.INTRODUCTION

Nowadays, the health care sensors are playing an essential role in hospitals. The patient monitoring system is one of the major developments because of its innovative technology. An automatic wireless health monitoring system is used to measure patient's body temperature and heartbeat by using embedded technology. The proposed system uses both the sensors like heartbeat sensor and temperature sensor. These sensors mainly involves in monitoring the condition of the patient.

Wireless technology is the best solution for mass emergency situations like natural and human-included disasters and military conflict where patients' records such as previous medication history, identification and other essential information are necessary. Through wireless communication technologies Health care effectiveness in several situations is improved. Using wireless continuous medical monitoring systems, patients' information such as blood pressure, heart rate, and electrocardiogram can be sent immediately to specialize medical centre's to store and process properly. In the new generation of communication and technology, the explosive growth of electronic devices, smart phones and tablets which can be communicated physically or

wirelessly has become the fundamental tool of daily life. Driven by technology advances in medical sensors, we have observed in recent years the emergence of internet. WBAN mostly uses Zigbee, or UWB standard. A main application of WBAN in medical domain is computer assisted physical rehabilitation. In a health tele monitoring system, a WBAN consists of a number of lightweight miniature sensors. The next generation of connected world defines itself that the term "Internet of Things" because all the vehicles, devices, sensors, appliances and other 'things' are connected with the internet. The things or objects may include the radio-frequency identification (RFID) tag, mobile phones, sensors, actuators and much more.[2]The proposed model named as 'k-Healthcare' used 4 layers; the sensor layer, the network layer, the Internet layer and the services layer. All layers work on a platform to access patient health information using smart phone. The rest of the paper contains following sections: Section II presents the related study; Section III Presents Comparison and Contrast

II.RELATED STUDY

WSN takes important places in medical care by using different sensing devices and e-health. There are many studies on minimizing WiFi interference by allocating channels that are less often used or unused by WiFi devices to ZigBee sensors. Zhao et al. propose "a multi-radio tested" for the collection of wireless sensor networks. Each WPAN is assumed to use only one channel .Jara et al [6] presented their own architecture for Remote Monitoring based on loT using sensors, integration of different systems like hospital information system, services provider system,Context Management Framework Knowledge Base System's for mart rehabilitation system in loT. Fig 1 represents an application Scenario of k-Healthcare model. In the field communications, real-time localization, and embedded sensors lets us transform everyday objects into smart objects that can understand and react to their environment. The sensors measure physiological parameters such as electrocardiography (EKG), electroencephalogram (EEG), body temperature and blood pressure. These measurements are transmitted to an external data aggregation device called a coordinator via wireless communication networks, and are then sent to a health telemonitoring centre (e.g., a hospital) via the Internet. At the hospital, medical professionals monitor their patients' health parameters continuously, so that there is no need for them to visit the hospital again and again.
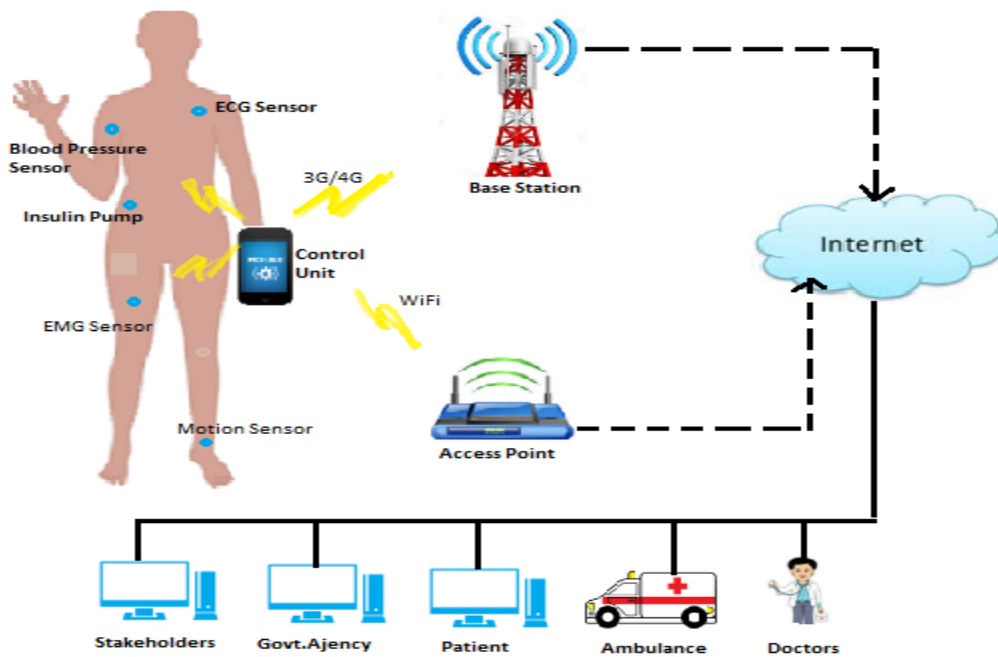
Fig1: An application Scenario of Healthcare model

III.PROPOSED SYSTEM

We proposed a novel framework for e-Health and m-Health which makes use of smart phone sensors and body sensors to obtain, process and transmit patient health related data to centralize storage in the cloud The k-Healtcare model proposed for efficient deployment of IoT using sensors in the field of medical and healthcare Fig.2. Proposed k-Healthcare model and transmit important data related to the patients' health.
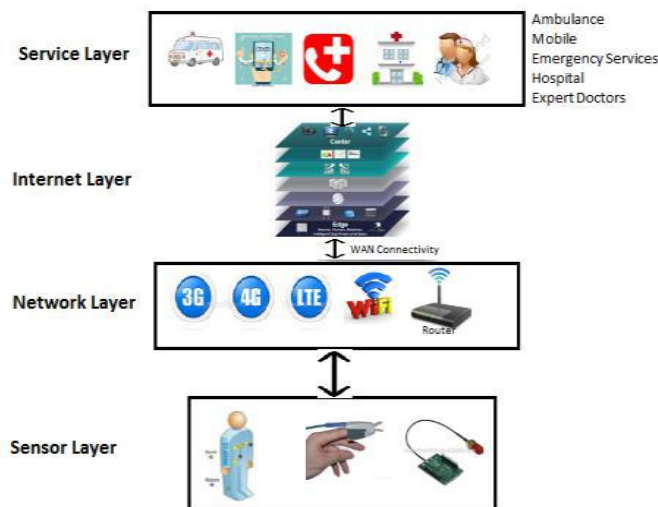

Fig2: Proposed k-Healthcare model

Fig. 2 Proposed k-Healthcare model It consists of four layer.A sensor layer is a bottom layer of model and it is a heart of the model. There are different sensors present on this layer e.g. wireless two-lead EKG, blood oxygen sensor, Smart Phone sensors. The main idea of WSN is to gather information from surroundings and pass data through the network to the centralized storage. Accelerometer, gyroscope, proximity, barometer, temperature, humidity, gesture sensors are used in the modern smartphones. In the model sensors are used to collect the information and it is passed to remote data storage for further processing. The sensors layers used in the network connection is 802.11b/g/n and IEEE 802.15.4, IEEE 802.15.6, ZigBee etc.

B. Network Layer

The Network layer plays the key role in communication to connect the devices with WAN using different protocols (TCP/IP), technologies and standards like 3G, 4G, ADSL, DSLAM,LTE(Long Term Evolution) LTE is developed by the Third Generation Partnership Project (3GPP), an industry trade group. It is a 4G wireless broadband technology. The device which is used as a sensor sends data to a connected device e.g.: RFID reader, smart phone, which is connected to the internet or via Ethernet/Wi-Fi, then the device sends the data to the server for further processing and updating the database.

C. Internet Layer

This layer provides the functionality of data storage and management. For this purpose, we use the cloud storage. The data is stored in logical pools which is the facility provided by cloud storage. The physical storage may be one server or multiple servers, typically owned and managed by a hosting company. The cloud provides different services and algorithms on demand like cloud storage, cloud data store, cloud SQL, BigQuery, RESTful services for iOS, Android, JavaScript and machine learning algorithms.

D. Services Layer

On this layer it gives direct access of data to professional medical facilities and stakeholders such as doctors, emergency centers, hospitals, and medicine supply chains. With the help of this layer .The doctor can easily manage the patients, view the medication history, and provide remote support in case of emergency.

IV.APPLICATIONS & ADVANTAGES OF THE HEALTH MONITORING SYSTEM

The applications of the automatic wireless health monitoring system mainly include the following.

- The wireless health monitoring system is used to transfer the data from the TX section to RX section wirelessly.
- The proposed system mainly focuses on the situation where the doctors and patients are at the distant location and it is very important to give the entire details about the heartbeat and the temperature of the patient to the doctor.
- Besides this if made particular changes in this project, it can also be applicable for acknowledging the students with the fastest mode of information about certain notices.

The advantages of the automatic wireless health monitoring system mainly include the following.

- Associating the gap between the patients and the doctor
- Best to be used in rural areas for multipurpose. So that all the conditions are simply measured
- Operation of this device is very simple
- It gives a good performance when we compare with compact sensor.

V.FUTURE SCOPE

Furthermore, this project can be enhanced by using different parameters such as retinal size, BP, weight and age can be included to control the parameters in the future. And also this system can be developed by using advanced technologies like GPS and GSM.

VI.CONCLUSION

Thus, this is all about automatic wireless health monitoring system which is a significant health service for next generations. It is portable, simple to use and prevention is better than cure. The coexisting ZigBee based WBANs overlaps the 802.11 overlaps wifi channels, which delays the Zigbee packets due to interface. To overcome this problem, we have proposed an adaptive load control algorithm that controls only the WiFi traffic created from delay-tolerant applications dynamically with the aim of guaranteeing that the delays experienced by ZigBee sensors do not exceed the maximum tolerable delay period.

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