



AN IOT-AWARE ARCHITECTURE FOR SMART HEALTHCARE SYSTEM

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ABSTRACT

The advancement of Body Sensor Network in healthcare applications have made patient monitoring more accurate. The proposed method is an Android application based Health care system using Body Sensor Network (BSN), an IOT based application for monitoring patient. This paper implements an IOT-based health monitoring system for emergency measurements for collecting the flexible data, which can provide support to emergency services. The services like Intensive Care Units (ICU), where normal people can easily install the android app in their phones and get it available anywhere and anytime. The proposed model enables users to improve health related conditions and minimize cost by collecting, recording, analyzing and sharing huge amount of data sets in real time effectively and efficiently. The idea of this project is to decrease the waiting hour of patient to meet doctor every time for measuring the blood pressure, heart beat rate, temperature etc. With the help of this precious time of both patients and doctors are saved and doctors can also help in emergency situations as much as possible. The proposed outcome of the paper is to give proper and accurate medical services to patients by connecting and collecting information through the proposed health monitoring system. The modules highlighted in the proposed work include heart rate, blood pressure and ECG and sending alert to the doctors.

Keywords-Internet of things, Health care, Sensor, Arduino and android application.

INTRODUCTION

Earlier, In case of emergency health issues people had to go to the hospital directly. Since there might be rush in the hospital patients had to wait until the previous patients complete their treatment, which takes more time to consult a particular doctor. This is the only way where world connected to avoid this, we in this proposed model provide robust and comfortable. We introduce a proposed model which would solve these kind of problems by introducing an mobile application where measured data can share. This Android application can be used by anyone flexibly. The patient with some health issue like cardiac problem, blood pressure and with high fever can measure his own BP, heartbeat, or sugar level and store it in a cloud and share to the doctors who are available. Once the doctor's analysis the problem and measures shared by the patients and the doctor in turn sends his feed back by giving them a required prescription. Capturing and sharing those information of measured data through a network with connected devices in order to communicate with each other using IOT (internet of things) produced new information can record and analyze it for further use. Internet of things gains its full potential by using various sensors. The Internet of things in the field of healthcare also plays a important role in providing to patients and doctors. The android applications and devices that can help patients and doctors to review the patients conditions, track and record patient's measured data and medical information.

EXISTING SYSTEM

The related work states the merits and demerits of the existing system related to the proposed methodology. The paper title patient health monitoring system using IoT and android [1]. The merits of this paper is heartbeat, temperature and ecg can be measured easily but the demerit was that it uses complex algorithm which is time consuming and difficult to implement. BSN-care for secured IoT based modern health care system [2]. The merits of this paper is it can be accessed fastly and it is of low cost but the demerit of this paper is to they fail to embed strong security. Health care system using raspberry-pi [3]. Here we use SSL algorithm. In this paper the merit is wireless network so remote accessing can be done and the demerit is maintaining the database is very difficult and the cost is more. Secure IOT based health care system using BSN [4]. ECDLP and SHA algorithms are used and due to this algorithms high security is provided and the demerit is message is not sent to the concerned person regarding the health details. Patient monitoring system using IOT [5][7]. Here the methodology used is RFID, SHM and IPv6 the merit of the system is fast accessing can be done but the demerit is costly to implement. IOT based health monitoring system [6][8]. Here we are using BSN, WSN database, PIC controller and the tracking method the merits are data will be saved during the emergency and as we were using the android it is easy to use and the only demerit is complex implementation. Some of the existing devices include smart meters, wearable health bands, fitness shoes; RFID based smart watches and smart video cameras. Also, application for smart phones also helps in keeping a medical record with real time alert and emergency services.

PROPOSED SYSTEM

The smart healthcare monitoring system can provide useful physiological information in the home. This monitoring is useful for elderly or chronically ill patients who would like to avoid a long hospital stay. Wireless sensors are used to collect and transmit signals of interest and a processor is programmed to receive and automatically analyze the sensor signals. In this project, you are to choose appropriate sensors according to what you would like to detect and design algorithms to realize your detection. Examples are the detection of a fall, monitoring cardiac signals. Using a single parameter monitoring system an approach to a remote health monitoring system was designed that extends healthcare from the traditional clinic or hospital setting to the patient's home. The system was to collect a heartbeat detection system data, fall detection system data, temperature data and few other parameters. The data from the single parameter monitoring systems was then availed for remote detection.

The main Aim in the proposed model is to design a Patient Monitoring System Which uses the technique called two-way communication i.e. not only the patient's information will be posted to the doctor through Normal message and email on emergencies, but also the doctor can in turn replies the required prescriptions and advise to the patient or guardians through SMS or Call or Emails. And Patient or guardian can able to track patient's location at any point in time through Google Maps which would enable to send medical services in case of an emergency for non-bed ridden patients.

BLOCK DIAGRAM

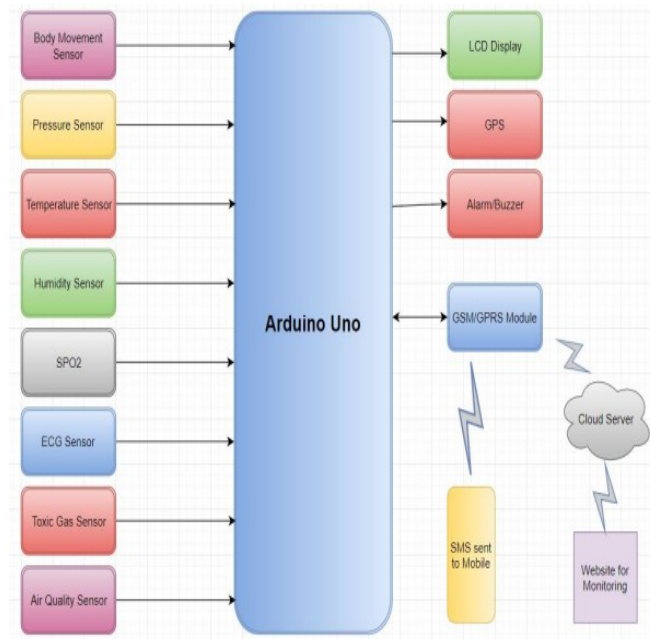


Figure 1: Block Diagram of Proposed system

Figure 1 is shows the proposed system model.

System Design: Systems design is the process of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. Overall view of the architecture, the modules that compose the system, and the way modules are assigned to processors are detail illustration using the System Design. UML is used to model system designs. Unified Modelling Language is a standard object-oriented analysis and design language. Use Case diagram and Sequence diagram, which are types of UML diagrams, of the application are shown below.

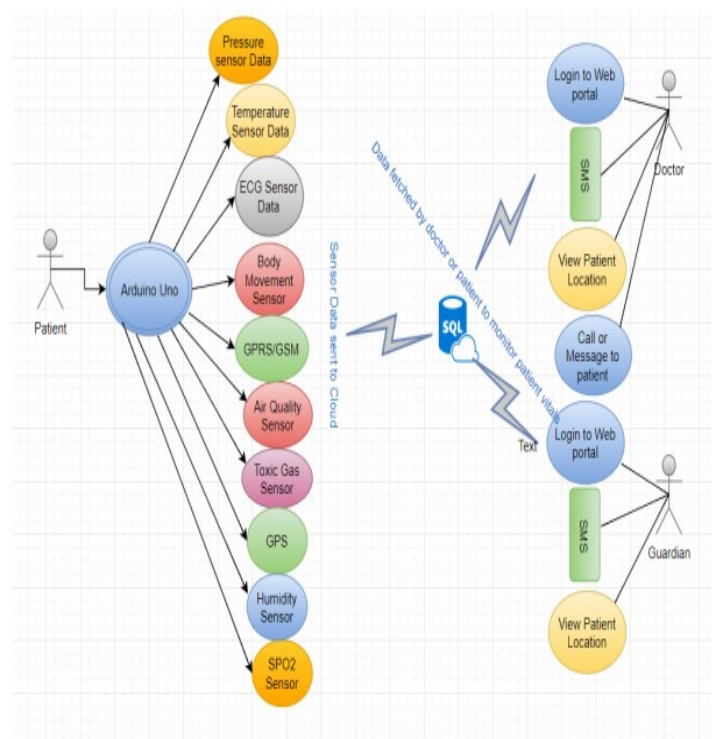


Figure 2 : Use Case Diagram

Figure 2 shows the use case diagram of proposed model. The common data base management we are using in this proposed model is cloud management, which is readily available in MYSQL cloud service. Relational database management system is one of the commonly used for developing applications. This Project is designed to make sure that user interface pages are easily understandable and the navigation between pages is obvious. Below are list of web pages that user can navigate between and are shown in details.

Web Page Login: here doctor or care taker enters patient's unique credentials. Once the credentials are verified, login page will be navigated to Patient vital monitoring page where doctor or caretaker can view current vital readings of the patient. Here patient's unique credentials must be kept confidential by the doctor and caretaker to protect privacy of the patient data.

Summary of the Study: The patient monitoring system was researched, designed and presented the concept of the Internet of things. Personal physiological data from the patient is collected that simulates fall detection, heartbeat, temperature, humidity, toxic gas, air quality control, pressure. The readings are collected in a simple cloud database and can be viewed remotely by a doctor or Healthcare giver. The data can also be used in research on medical issues affecting the elderly or chronically ill. On the security of the data, the database system is protected with Advanced Encryption Standard (AES). This generates the secret key which can be used to decrypt the patients' records ensuring that only authorized personnel access the data. This safeguards the patients' records from unauthorized users and hackers who may want to intercept.

CONCLUSION

The main objective of the experiment was successfully achieved. All the individual modules like Heartbeat detection module, fall detection module etc. and remote viewing module gave out the intended results. The designed system modules can further be optimized and produced to a final single circuit. More important fact that came up during project design is that all the circuit components used in the remote health detection system are available easily. With the development in the integrated circuit industry, Micro Electro Mechanical Systems (MEMs) and microcontrollers have become affordable, have increased processing speeds, miniaturized and power efficient. This has led to increased development of embedded systems that the healthcare specialists are adopting. These embedded systems have also been adopted in the Smartphone technology. And with increased internet penetration in most developing countries through mobile phones, and with use of Internet of things (IoT) will become adopted at a faster rate. The Remote Health Care system utilizes these concepts to come up with a system for better quality of life for people in society.

From an engineering perspective, the project has seen concepts acquired through the computer science and embedded study period being practically applied. The Electric circuit analysis knowledge was used during design and fabrication of the individual modules. Electromagnetic fields analysis used in the wireless transmission between microcontrollers and Software programming used during programming of the microcontrollers to come up with a final finished circuit system.

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