

Smart Ambulance using IoT

Vikrant Mahale¹ Vishal Mali² Priyanka Suryawanshi³ Prof.P.P.Chaudhari⁴

^{1,2,3,4}Department of Electronics and Telecommunication Engineering

^{1,2,3,4}Sandip Institute of Engineering and Management Engineering, Sandip Foundation, Nashik, Maharashtra, India

Abstract— In India the emergency medical response are lagging behind the other countries. This is due to the lack of technology implementation at ground zero. For this we are introducing smart ambulance system using IoT for addressing this issue. It would help India to competitive position in emergency services around the globe. Over the last few years there is a revolutionary development in the field of Internet of Things (IoT). It can be used widely in large number of system where a large amount of data can be accessed and processed easily. IoT and smartphone technologies helps in building a platform for serving every smartphone user. The efficiently managed ambulance services in the areas will fulfill this need and will bridge the existing gap. The ambulance going along the path that time all possible medical data of patient will send to doctors. This is done by upgrading technology called Internet of Things. IoT means that the components are connected to the internet and those components can be controlled via internet from other places. This IoT has significance since the object that represents itself digitally making itself something greater than the object by itself. To overcome the drawback of existing system, we have to implement the new system in which there all basic body test report will send to hospital. The expectation is that around 50 to 100 billion things will be connected to internet in next ten years and we are now experiencing paradigm shift where in which the objects we use every day have become interconnected and smart. On a broader scale the IoT is applied to things for reducing waste and increase the efficiency of the things by reducing the energy usage. The scenario is operated by intelligent ambulance. The tele medical system focuses on the measurement and evaluation of vital parameters, e.g. Heart rate, pulse oximetry, temperature and humidity. The proposed system presents a personal healthcare system which is both flexible and scalable.

Key words: Passmatrix, Graphical Password

I. INTRODUCTION

In India large number of patients are dying because of heart attacks and reason behind that they are not getting accurate time and proper help. To provide them help first we want to continuous monitoring the patient health. The fixed monitoring system is used only when the patient is on bed and these systems are huge and available in the hospitals in ICU. Normally it is difficult to keep track on abnormalities in heartbeat count for patient itself. The average heart beat per minute for 25-year old ranges between 140-170 beats per minute while for a 60-year old it is typically between 115 to 140 beats per minute and body temperature is 37 degree Celsius or 98.6 Fahrenheit. Patients are not well known with manual treatment which doctors normally use for tracking the count of heart beat. So there must be some device which would help patient to keep track on their health by themselves. There are various instruments available in the

market to keep track on internal body changes. But there are many limitations regarding their maintenance due their heavy cost, size of instruments, and mobility of patients. Continuous or even occasional recording of biomedical signals is particularly critical for the diagnosis and treatment of cardiovascular diseases. For example, continuous recording of a patient's heart condition by tracking such factors as high blood pressure, stress, anxiety, diabetes and depression, during normal daily routines. To overcome these limitations a device use to keep track on heart beat count of patient should be easy to use, portable, light weighted, small size etc so that it give freedom of mobility for patient. The devices which can be carried everywhere to keep track on patient's health. This device that is a heartbeat sensor would help to keep track on heart beat counts of a patient and check for any abnormalities. If any changes takes place it is notified. This notification would help to take an appropriate action at an instance of a time. This would save patients from the future health problem which would arise. This would also help patient's concern doctor to take an appropriate action at proper time.

II. LITERATURE REVIEW

Most proposed frame works for remote health monitoring leverage a three tier architecture: a wireless Body area Network consisting of wearable sensor as the data acquisition unit communication and networking and the service layer. For instance proposes a system that recruits wearable sensors to measure various physiological parameter such as blood pressure and body temperature .sensor transmit the gathered information to a gateway server through a Bluetooth connection. The gateway server turns the data into an Observation and measurement file and stores it on a remote server for later retrieval by clinicians through the internet. Utilizing a similar cloud based medical data storage, a health monitoring system is presented in which medical staff can access the store data online through content service application. Targeting a specific medical application, WANDA an end to end remote health monitoring and analysis system is presented for supervision of patients with high risk of heart failure. In addition to the technology for data gathering, storage and access, medical data analysis and visualization are critical components of remote health monitoring system. Accurate diagnoses and monitoring of patient's medical condition relies on analysis of medical records containing various physiological characteristics over long period of time. Dealing with data of high dimensionality in both time and quantity makes data analysis task quite frustrating and error prone for clinicians. Although the use of data mining and visualization techniques had previously been addressed.

Solution to the aforementioned challenge, these methods have only recently gained attention in remote health monitoring system. While the advent of electronics remote

health monitoring system has promised to revolutionize the conventional health care methods, integrating the IoT paradigm into these systems can further increase intelligence, flexibility and interoperability. A device utilizing the IoT scheme is uniquely addressed and identifiable at anytime and anywhere through the internet. IoT based devices in remote health monitoring systems are only capable of the conventional sens tasks but can also exchange information with each other automatically connect to and exchange information with health institutes through the internet, significantly simplifying set up and administration tasks. As exemplified in, such system are able to provide services such as automatic alarm to the nearest healthcare institute in the event of a critical accident for a supervised patient.

III. METHODOLOGY

The "Smart Ambulance using IoT" is divided into two parts - Hardware & Software. The hardware unit is further divided into two units - Transmitter & Receiver. The Transmitter unit is consisting of raspberry pi.

As shown in the block diagram the sensors part consists of different health sensors like heartbeat sensor, temperature and humidity sensor, pulse oximetry sensor.

Sensors are wearable sensors that are placed on the patient's body. Sensors sense the patient body parameters. The sensed data from the sensors are sent to the sensor node.

In the block diagram there are sensors, Raspberry-pi, Internet, Server and Cloud. Pulse sensor is the pretty side with the Heart logo. This side makes contact with the skin. On the front there is a small round hole, which is where the LED shine from the back, and there is also a little square just under the LED. This square is an ambient light sensor, exactly like the one used in cellphones, tablets, laptops, to adjust the screen brightness in different light conditions. The LED shines light into the fingertip or earlobe, or other capillary tissue, and sensor reads the amount of light that bounces back. On the other side of the sensor there is rest of the parts are mounted. We put them so they would not get in the way of the sensor on the front. Even the LED we are using is reverse mount LED. An Oximetry sensor measures the oxygen level of patient. The sensors change its conductivity proportionally with the number of molecules of reduced gases. If there is greater the output signal of the sensor(0 ... 10 V), the worse is the air quality. Mixed-gas sensors are broadband, meaning the result of the sensor cannot be used to conclude neither the type of the gas not its concentration. The sensor cannot differentiate between pleasant and unpleasant smells. It is the people in the area who must ultimately decide whether these are satisfied with the air quality. The individual adjustment of the output signal is made via a pot on the sensor PCB. With this, the offset of the output signal is changed i.e it is either raised or lowered. The DHT11 that is Temperature & Humidity Sensor features of a temperature & humidity sensor is complex with a calibrated digital signal output. By using the exclusive digital-signal acquisition technique is used which is temperature & humidity sensing technology, it is convince high reliability and excellent stability. This sensor is includes a humidity measurement component and a temperature measurement component, and connects to a high-performance 8-bit micro controller, with excellent quality, fast response, anti-interference ability and cost is effectiveness. Each DHT11 element is manipulated in the

laboratory that is extremely accurate on humidity manipulation. The coefficients are stored in the OTP memory as a programs, which is used by the sensors are used for detecting internal signal process. The single-wire which is serial interface makes system combination is quickly and easy. Its small size, low power consumption and distance up-to-20 meter signal transmission making it the best choice for many applications, including those most demanding ones. The component are 4-pin single row pin package. It is kindly to connect and special packages are provided according to users request. The Heartbeat sensor is basic of biology studies and this is one of the first experiments for any science student should learn to perform. The Heart Rate sensor makes these is first step with fun and very easy. Students can take their pulse simply by slipping the sensor over their own finger. This is comfort of use makes it modal for use even in large classrooms. The use of Heart Rate sensor is to measure heart rate between 0 to 200 bpm (beats per minute).

The Heart Rate sensor measures heart rate with monitoring the change in infrared transmittance through blood vessels. As the heart forces blood through the blood vessels, the amount of blood changes and the corresponding variation in light intensities changes.

Raspberry-Pi:

The digital signals from the PIC are received at the Raspberry pi. Raspberry pi cannot process analog signals. Raspberry pi does not have in built ADC so that analog signal from the sensor are convert into digital signal using PIC controller and then sent to the Raspberry -pi. Raspberry pi send the received signals data to mobile devices through E-mail.



Fig. 1:

IV. OBJECTIVES

To start monitoring the patient itself in the ambulance. To utilize the time being wasted until reaching the hospital.

V. FUTURE SCOPE

It's beneficial for the users in case of emergencies as it saves time which gets consumed in searching for the ambulance by other means. Information about the hospitals provided helps in getting the appropriate hospital which is suitable for the patient's treatment. Sending patient's health information to the hospitals helps the hospital staff to get things ready required for the treatment. Here the patient need not to wait in any case. Hospitals information is directly provided

through maps and hence there is no need to visit the particular hospital's website for information. Live feeds will help for better medical procedures which helps in saving patient's life in an effective way. The ambulance unit with the hospital unit can be used by doctors to monitor conditions of certain patients at any given time and the data recorded over a long period can be stored and studied. Facility to store details of several patients over long periods of time can be provided. Also RFIDs can be placed on more traffic signals thereby increasing connectivity and routes. We can also measure blood pressure, heart rate in the ambulance in the future.

VI. CONCLUSION

This paper lends credence to the recommendation that patients and families should call for an ambulance, as opposed to driving themselves to the hospital, when they're experiencing heart attack symptoms. By breaking any existing communications barriers and cutting the time a patient spends in the emergency department triage system, the ambulance team can wirelessly save their lives.

REFERENCES

- [1] Jawbone Inc., "Jawbone fitness trackers," accessed April 2015. [Online]. Available: <https://jawbone.com/up/trackers>.
- [2] FitBit Inc., "flex: Wireless activity + sleep wristband," accessed April 2015. [Online]. Available: <https://www.fitbit.com/flex>
- [3] R. Paradiso, G. Loriga, and N. Taccini, "A wearable health care system based on knitted integrated sensors," *IEEE Trans. Info. Tech. in Biomedicine*, vol. 9, no. 3, pp. 337–344, Sept 2005.
- [4] P. P. Chaudhari, D. G. Agrawal, M. M. Kulkarni "An Application of Embedded System in Telemedicine Using Arm-7" *IJIET*, Volume-2, Issue-1, February-2013.