

WIRELESS PATIENT MEDICAL DATA MONITORING USING IOT

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Abstract—In nowadays Technology shows the major role in healthcare not only for sensory devices but also in communication, recording and display device. It is very important to monitor various medical parameters for the patients. Hence the latest trend in healthcare communication method using IOT is adapted. Internet of things serves as a catalyst for the healthcare and plays prominent role in wide range of healthcare applications. In our project we present the wireless medical data transferring using Raspberry pi-3 module with sensor to check the human body. These sensor values are given to the Raspberry pi, then the received values from the sensors are uploaded in the IOT using Local Area Network (LAN) connection or WI-FI and having GSM module we send the SMS and internet link address. So we can monitor the patient status by anywhere in the world. Real-time and periodic structural health monitoring can reduce the possibility of collapse and the consequences of potential life-threatening situations. Due to the automated process manual monitoring can be reduced.

Keywords—GSM; IOT; RPI

1. INTRODUCTION

According to the constitutions of World Health Organization (WHO) the highest attainable standard of health is a fundamental right for an individual. Internet has turn into the important part of our updating life. It has changed how people live, work, play and learn. Internet serves for many purpose educations, finance, Business, Industries, Entertainment, Social Networking, Shopping, E-Commerce, military defense etc. we need to utilize it in a smart and efficient manner. We have proposed our ideas in this paper by turn to for information and considering their views and also highlighted them below. The entire concept of IOT stands on sensors, gateway and wireless network which enable users to communicate and access the application and information. The interconnected objects collect the data at regular intervals, analyse and used to initiate required action, providing an intelligent network for analyzing, planning and decision making. We developed in order to evaluate the patient's health and check the status for every time duration in the web link address and the image of the patient has been send in the required mail address of the doctor and family member after that incase of abnormality the recorded first aid information have been played through in order to save the patient lives. The advantages of a patient monitoring system are it can reduce the risk of infection and other complication in order to make the patients comfortable.

2. EXISTING SYSTEM

Robust healthcare is a requirement for both developed countries, where the cost of healthcare is high and security and privacy are critical issues and developing

countries like India, where there is a mass population to handle in hospitals and robust healthcare procedures are required. who stays in home during post operational days checking is done by overseer/ medical caretaker/ Doctors should visit the patient regularly and check the status. Situation may occur like they mistake while noting the report.

3. PROPOSING SYSTEM

When compared to the old existing system the queues can be avoided in this system and time can be reduced. In our proposed system when any of the sensors range has been changed higher than the threshold range automatically the camera capture the image of the patient and send to the required Electronic Mail, with real time web link address to check the status of the patient and incase of severalty the Audio of the first aid for the patient has been play simultaneously to save the patient life. this is added advantage in our project. it is helpful to the doctors to eventually take preventive measures for patients at any critical conditions.

4. BLOCK DIAGRAM



Fig.1:Receiving node

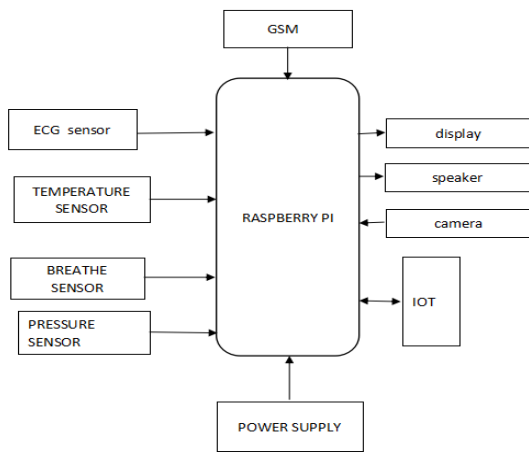


Fig.2: Monitoring node

5. HARDWARE DESCRIPTION

In the above block diagram the fig.1 it represents the features and functions of the system below:

A. The Lm35 Temperature Sensor:

The LM35 series are precision integrated circuit LM35 temperature sensors, whose output voltage is linearly proportional to the temperature in Celsius (Centigrade). The LM35 sensor thus has an advantage over linear temperature sensors, calibrated in °Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient centigrade scaling. The LM35 sensor does not require any external calibration or trimming to provide typical accuracies of $\pm\frac{1}{4}^{\circ}\text{C}$ at room temperature and $\pm\frac{3}{4}^{\circ}\text{C}$ over a full -55 to $+150^{\circ}\text{C}$ temperature range. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. As it draws only $60\ \mu\text{A}$ from its supply, it has very low self-heating, less than 0.1°C in still air.

B. ECG Sensor:

ECG is primarily a tool for examination of cardiac diseases. An ECG sensing device commonly consists of a group of electrodes to detect electrical events of a heart. The ECG is the electrical manifestation of the contractile activity of the heart, and can be recorded fairly easily with surface electrodes on the limbs or chest. The rhythm of the heart in terms of beats per minute (BPM) may be easily estimated by counting the readily identifiable waves. The amplifier takes the input from 3 electrodes which are connected to the patient.

C. Heartbeat Sensor:

Heart beat sensor is designed to give digital output of heart beat when a finger is placed inside it. This digital output can be connected to Ras directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger each pulse. IC LM358 is used for this sensor. Its dual low power operational amplifier consists of a super bright red LED and light detector. One will act as amplifiers and another will be used as comparator. LED

needs to be super bright as the light must pass through finger and detected at other end. When heart pumps a pulse of blood through blood vessels, finger becomes slightly more opaque so less light reach at the detector. With each heart pulse, the detector signal varies which is converted to electrical pulse

D. GSM Modem (SIM 900) :

GSM MODEM operates by accepting the SIM card to the subscribed mobile operator. i.e., just like a cellular phone. When GSM MODEM allows PC to communicate over the mobile network when connected to the computer. It operates over network to send and receive message. In order to control modems computer use AT commands similarly GSM uses AT commands in order to send, receive, write or delete messages.



E. Ethernet:

Ethernet is the networking technology used in many offices and homes to enable computers to communicate and share resources. Many Ethernet networks also connect to a router that provides access to the Internet. IEEE 802.3 supports a LAN standard originally developed by Xerox and later extended by a joint venture between Digital Equipment Corporation, Intel Corporation and Xerox. This was called Ethernet.

6. SOFTWARE DESCRIPTION

A. Raspberry pi-3:

There are two giant upgrades in the Pi 3. The first is a next generation Quad Core Broadcom BCM2837 64-bit ARMv8 processor, making the processor speed increase from 900 MHz on the Pi 2 to up to 1.2GHz on the Pi 3. The second giant upgrade (and this is the one we're personally most excited about) is the addition of a BCM43143 WI-Fi chip BUILT-IN to your Raspberry Pi. No more pesky WI-Fi adapters - this Pi is WiFi ready. There's also Bluetooth Low Energy (BLE) on board making the Pi an excellent IoT solution (BLE support is still in the works, software-wise)

Lastly, there's an upgraded switched power source that goes up to 2.5 Amps instead of just 2 Amps - allowing your Pi to power even more powerful devices over USB ports



The best part about all this is that the Pi 3 keeps the same shape, connectors, and mounting holes as the Pi 2. The only difference is a slight change in where the LED's are. 99% of cases and accessories will still be fully compatible with the Pi 3, Pi 2, and Pi B + - though if you have a case with a metal top there might be some WI-Fi chip difficulties.

B. RTOS(Real Time Operating System):

An RTOS that can usually or generally meet a deadline is a soft real-time OS, but if it can meet a deadline deterministically it is a hard real-time. A key characteristic of an RTOS is the level of its consistency concerning the amount of time it takes to accept and complete an application's task; the variability is jitter. A hard real-time operating system has less jitter than a soft real-time operating system. The chief design goal is not high throughput, but rather a guarantee of a soft or hard performance category. It must be able to process data as it comes in, typically without buffering delays. A RTOS is an operating system intended to serve real-time application requests.

C. PHP:

The PHP Hypertext Pre-processor (PHP) is a programming language that allows web developers to create dynamic content that interacts with databases. PHP is basically used for developing web based software applications. PHP is a recursive acronym for "PHP: Hypertext Preprocessor". PHP is a server side scripting language that is embedded in HTML. It is used to manage dynamic content, databases, session tracking, even build entire e-commerce sites. PHP Syntax is C-Like.

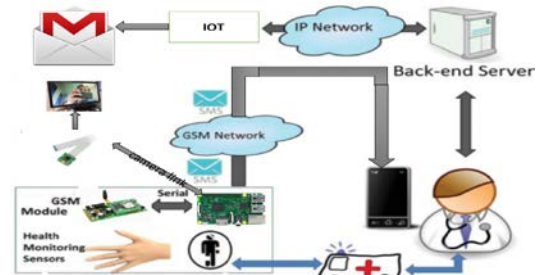
D. Python Language:

Python is a widely used general-purpose, high-level programming language. Its design philosophy emphasizes code readability, and its syntax allows programmers to express concepts in fewer lines of code than would be possible in languages such as C. The language provides constructs intended to enable clear programs on both a small and large scale. Python supports multiple programming paradigms, including object-oriented, imperative and functional programming or procedural styles. It features a dynamic type system and automatic memory management and has a large and comprehensive standard library.

7. WORKING OF THE PROJECT

The project works on the following process. First we create a webpage domain because to update the patient health condition in real time monitoring in internet .this

link contains all the information of the patient health and for example if the patient heartbeat increases above the given threshold level then GSM module send the SMS the abnormality of the patient status to mobile number with the Web link domain address.



the image of the patient has captured after it send to Gmail id which is coded in the python program with the real time domain address so the doctor/health visitor can receive the health condition and if there any first aid is required then our encrypted stored audio information for the emergency treatment will be run automatically by sensing the patients illness with this facility we can bring the patient to the back alive from threatening desired condition and it help to give the confidence to through patience.

8. APPLICATIONS

The smart monitoring system helps will be user friendly and also it reduces the precious time of the health visitors.

- Doctor can monitor the patient data by anywhere in the world.
- Time delay can be compensated by increase the performance
- Automatically checking the patient status and uploaded in internet.
- There is not possible to make mistake while noting the report &24/7 Hour monitoring.

9. CONCLUSION

The system the healthcare professionals can monitor, diagnose, and advice their patients all the time. The health parameters data are stored and published online. Hence, the healthcare professional can monitor their patients from a remote location at any time. The efficiency is better than any other existing system. During extreme conditions to alert the doctor warning message is sent to the doctor's cell phone through GSM modem connected and at the same time the website

Domain also sent. The doctors can view the sent data by logging to the html webpage using unique website and page refreshing option is given so continuously data reception achieved. Then speaker play the emergency medical treatment for the kind of abnormality due to we can increase the possibility of saving the patient life constant. Hence real-time patient monitoring system is designed.

10. FUTURE ENHANCEMENT

To rise up the patient's lives the system enhancement would be direct video interaction between the patient to doctor & family member to communicate each other from anywhere in the world to make the patient was free from the tension and patiently approach the situations at the exact time safeguard precautions also taken instant.

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