



A RECOGNITED, LOW-COST TECHNIQUE employing IOT TO MONITOR AND ALERT PATIENT HEALTH

¹Anusha G, ²Divya Kurapati, ³Navya Sree Vee Rapane Ni, ⁴Shahista Azneen

^{1,2,3}Assistant Professor, ⁴UG Student, ^{1,2,3,4}Department of Electronics and Communication Engineering, Rishi MS Institute of Engineering and Technology for Women, Kukatpally, Hyderabad.

ABSTRACT

Being healthy is essential for people to properly perceive, feel, and act, and as such, it plays a key role in the growth of both the individual and the environment they live in. In order to achieve the proper healthcare delivery based on parameter monitoring and direct provision of medical aid, it is required to offer enough ways and means. The development and application of new technologies, particularly the Internet and Wireless Sensor Networks (WSNs), or Internet of Things (IOT), provide a worldwide approach to the construction of the health care system's infrastructure. This results in an e-health system that, in real time, provides a useful collection of information pertinent to all stakeholders (patients, equipment used in medicine and paramedicine, and health insurance) regardless their current location. Commercial systems in this area usually do not meet the general patient needs, and those that do are usually economically unacceptable due to the high operational and development costs. In this paper, based on well-known low-cost technologies, there is a Do-It-Yourself (DIY) solution for a sustainable and adaptable patient-oriented infrastructure development, presented.

KEYWORDS: IOT, PULSEOXIMETER, TEMPERATURESENSOR, GSM MODULE.

INTRODUCTION

The project's goal is to create a system that can wirelessly transmit a patient's medical information, such as heart rate, temperature, and oxygen availability in a cylinder, to the doctor's office. The system will also announce the patient's medical information when the doctor requests it, along with a display system. Additionally, this system offers a means for urgently prescribing medication to patients. With timely action, this helps to lower the mortality rate. Everywhere in our everyday lives, technology is employed to meet our needs. We utilize various sensors for various purposes, and occasionally we could even use the same sensors differently for various applications. Whatever the case, the result is that life has gotten faster because to technology boosters. One of the ideal ways of using technology is to employ it to sense serious health problems so that efficient medical services can be provided to the patient in correct time. This brought the mentioned idea. The modules in the project are: heartbeat sensor which continuously gives the heartbeat, temperature sensor which gives the temperature, a pressure sensor which helps in monitoring the oxygen content in the cylinder, Wi-Fi for wireless transmission, Android based smartphone or tablet as receiver and display module. The controlling devices of the project are Microcontrollers. The medical parameters are read by Microcontroller and sent to the doctors section through Wi-Fi network and displayed there when requested by doctor through Android smart phone. The microcontrollers are loaded with intelligent programs written using embedded „C“ language. Various e-health scenarios are enabled by rapid advancements in information and communications (IC) technologies and with the increasing number of smart things (portable devices and sensors). IT powered e-health

solutions provide a great wealth of information that can be used to make Actionable decisions. By connecting information, people, devices, processes and context, IOT powered e-health creates a lot of opportunities to improve outcomes

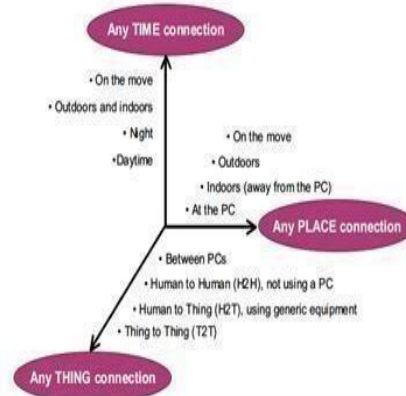


Figure.1: IOT Technology

The Internet of Things represents an evolution in which objects are capable of interacting with other objects. Hospitals can monitor and regulate pacemakers” long distance, factories can automatically address production line issues and hotels can adjust temperature and lighting according to a guest's preferences, to name just a few examples.

LITERATURE SURVEY

Daily monitoring of health condition at home is important for an effective scheme for early diagnosis, treatment, and prevention of lifestyle- related diseases such as adipose, diabetes and cardiovascular diseases. While many commercially available devices for home health care monitoring are widely used, those are cumbersome in terms of self-attachment of biological sensors and self- operation of them. From this viewpoint, we have been developing a non-conscious physiological monitoring system without attachment of any sensors to the human body as well as any operations for the measurement.

EXISTING SYSTEM

Diagnosing with help of a doctor Conventional devices that can only measure a particular parameter. Devices that have to be connected invasively to get measurements .No automated system exists. Smart watches are expensive and not specifically for healthcare. There are some system already present in market and but all they have some disadvantage

- >It only checks patients heart beat and temperature.
- >It does not provide any information about patients oxygen levels.

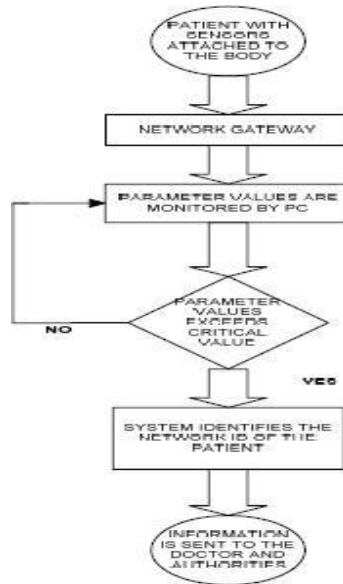


Figure.2: Existing System

PROPOSED SYSTEM

In this project, a system for 24x7 human health monitoring is designed and implemented . In this system, the ArduinoUno board is used for collecting and processing all data . Different sensors are used for measuring different parameters . All this data is uploaded to thing speak for remote analysis . An ESP8266 module is used for connecting to the internet . A Rectifier system is provided for powering all the sensors. The temperature sensor LM35 is used to measure the body temperature of the patient and the values are transmitted to the arduino . The IR sensor is used to measure the heart beat and oxygen levels of the patient and the values are retransmitted to the arduino. When ever the measurements of the sensors is grater then the threshold values when it was giving an alert by using the buzzer and gsm module.

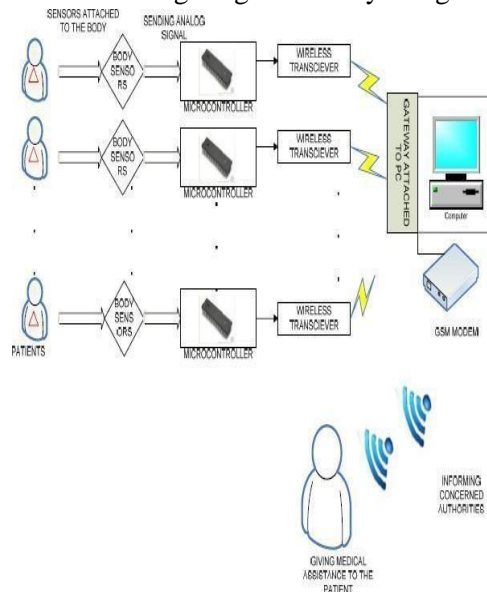


Figure.3: Block Diagram of Proposed System

SOFTWARE

For developing this project, we mainly used software is Arduino IDE 1.8.19. The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. The IDE application is suitable for different operating systems such as Windows, Mac OS X, and Linux. It supports the programming languages C and C++. Here, IDE stands for Integrated Development Environment.

METHODOLOGY

The project aims at developing a system which is capable of transmitting the patient’s medical parameters like heart rate, temperature and oxygen availability in cylinder wirelessly to the doctor’s section and announces the parameters when requested by the doctor along with a display system. Also, this system provides the mechanism of prescribing the medicine to patients in case of emergencies. This helps in decreasing the death rate by acting immediately. Technology is being used everywhere in our daily life to fulfill our requirements. We are employing different sensors for different applications sometimes we may even use same sensors differently for different applications. Whatever it may be the final output is life has increased its speed with the technology boosters. One of the ideal ways of using technology is to employ it to sense serious health problems so that efficient medical services can be provided to the patient in correct time. This brought the mentioned idea. The modules in the project are: heartbeat sensor which continuously gives the heartbeat, temperature sensor which gives the temperature, a pressure sensor which helps in monitoring the oxygen content in the cylinder, WiFi for wireless transmission, Android based smart phone or tablet as receiver and display module.

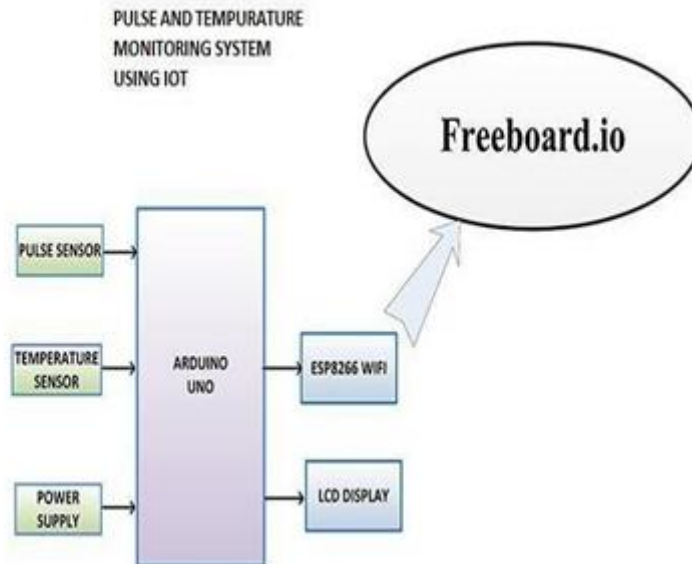


Figure.4: Block Diagram of Proposed System

ARDUINO UNO

The Arduino is a family of microcontroller boards to simplify electronic design, prototyping and

experimenting for artists, hackers, hobbyists, but also many professionals. People use it as brains for their robots, to build new digital music instruments, or to build a system that lets your house plants tweet you when they're dry. Arduinos (we use the standard Arduino Uno) are built around an ATmega microcontroller essentially a complete computer with CPU, RAM, Flash memory, and input/output pins, all on a single chip. Unlike, say, a Raspberry Pi, it's designed to attach all kinds of sensors, LEDs, small motors and speakers, servos, etc. directly to these pins, which can read in or output digital or analog voltages between 0 and 5 volts. The Arduino connects to your computer via USB, where you program it in a simple language (C/C++, similar to Java) from inside the free Arduino IDE by uploading your compiled code to the board.



Figure.5:Arduino UNO

GSM

GSM a mobile communication modem; it stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, the sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.



Figure.6: GSM

TEMPERATURE SENSOR

The LM35 is a low voltage, precision centigrade temperature sensor manufactured by Texas Instruments. It is a chip that provides a voltage output that is linearly proportional to the temperature in °C and is, therefore, very easy to use with an Arduino. The LM35 temperature sensor is fairly precise, never wears out, works under many environmental conditions and requires no external components to work. In addition, the LM35 sensor does not require calibration and provides a typical accuracy of $\pm 0.5^{\circ}\text{C}$ at room temperature and $\pm 1^{\circ}\text{C}$ over a full -55°C to $+155^{\circ}\text{C}$ temperature range. The sensor can be powered with a 4V to 30V power supply and consumes less than $60\mu\text{A}$ during active temperature conversions, providing very low self-heating.



Figure.7: Temperature Sensor

IR SENSOR

Heart attack (coronary artery disease) is one of the most common and very serious effects of aging. The cholesterol, fatty deposits, emotional stress, and drug intake lead to build spasm in blood vessel walls. As the spasm grows, less blood can flow through the arteries. As a result, the heart muscle can't get the



blood or oxygen what exactly, it needs. This can lead to a heart attack. In this article, We are developing a system which will help to decrease the death rate due to the heart attack by early heart attack detection. In our system, we will be using smart Heart Beat sensor which is easily available in the market.

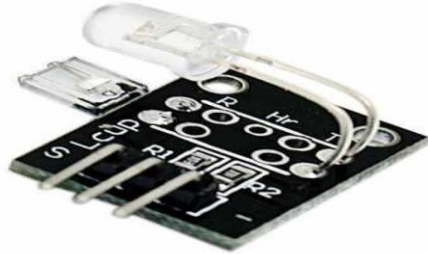


Figure.8: IR Sensor

EXPERIMENTAL RESULTS



Figure .9:Experimental Result

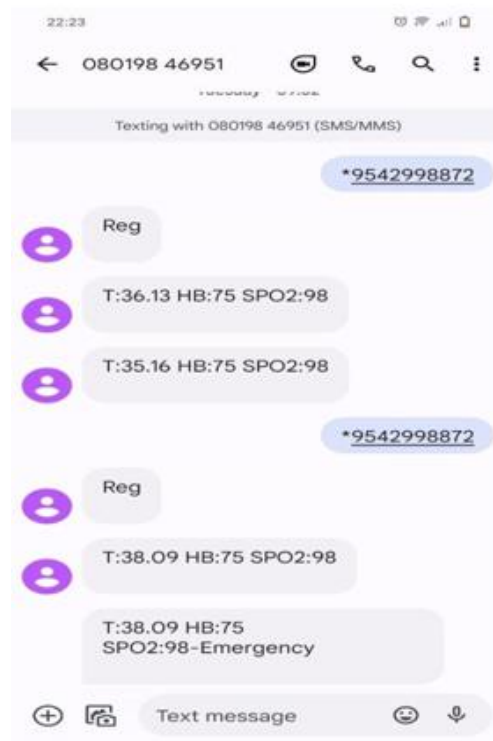


Figure .10:Message getting through GSM

Module

ADVANTAGES

- we can easily access the patients data.
- It is easy to operate.
- lower costs and higher efficiency.
- The ability to deliver higher-quality care to more patients with a lower risk of burnout .

APPLICATIONS

- It is best to use in rural areas.
- It is mostly used in medical purpose.
- smart hospital management.
- It improves the utilization efficiency of medical resources.

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.

FUTURE SCOPE

Physiological data collection

1. Home Ultrasound
2. Brain signal monitoring Remote viewing of data

1. Problems associated with having data online. Tackle Distributed denial of service. DDOS, and Data privacy/security especially of medical systems.

IoT based Remote Patient Monitoring System can be enhanced to detect and collect data of several anomalies for monitoring purpose such as home ultrasound, Brain signal monitoring, Tumor detection etc.

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