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ESP8266-BASED IOT-BASED PATIENT HEALTH MONITORING

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ABSTRACT

In this project, we created an IoT-based patient health monitoring system with ESP8266 and Arduino. Thing Speak is the IoT platform used in this project. Thing Speak is an open-source Internet of Items (IoT) application and API for storing and retrieving data from things via the Internet or a Local Area Network using the HTTP protocol. This IoT device may read the heart rate and assess the temperature around it. It continuously measures the pulse rate and ambient temperature and sends the data to an IoT platform.

Keywords: IOT On The Platform Of Things Talk, Health Monitoring System, Controller, Pulse Sensor, Temperature Sensor.

I. INTRODUCTION

Wireless technology has grown in popularity in recent years to meet the needs of a variety of industries. In recent years, the Internet of Things (IoT) has dominated the industrial sector, particularly in the areas of automation and control. One of the most current trends in providing improved health care is biomedical. IoT technology has opened doors not only in hospitals, but also in personal health-care facilities. As a result of having a smart system, numerous parameters that use power, cost, and boost efficiency are detected. Furthermore, doctors play a vital role, but the checkup process is lengthy, as a person must first register, then have an appointment, and finally, the checkup reports are prepared. Due to this lengthy process working people tend to ignore the checkups or postpone it. This modern approach reduces time consumption in the process. This contribution to society will be extremely valuable. Because humans can notice improper bodily behaviour before they get a major sickness. With the help of IOT, the person who is most concerned about any other loved one can monitor and care for his health from anywhere in the globe. The body temperature, heart rate, blood pressure, respiration rate are prime parameters to diagnose the disease. This project gives temperature and heart rate values using IoT.

OBJECTIVES

- Create a health-monitoring system that monitors body temperature and heart rate.
- Create a system that uses the cloud to store patient data over time.
- Analyze the sensor data that has been obtained.

II. MOTIVATION

As of my survey, there is a dearth of good health care for the people in rural areas. They also do not receive enough care. So many people receive care after their ailment or fever has progressed to the point of being life-threatening. When it comes to the cost of treatment, many rural residents are unable to afford it. As a result, this project is being designed to make the first step of the treatment procedure easier. Because the goal of this effort is to provide a prime parameter for diagnosing the condition. In poor countries, there are insufficient resources and management to address particular concerns. The cost of a daily health checkup is out of reach for the average person. Various methods that provide a simple and secure caring unit have been created for this purpose. With properly handled equipment, this approach saves time. This contribution to society will be extremely valuable. Because humans can notice improper bodily behaviour before they get a major sickness. With the help of IOT, the person who is most concerned about any other loved one can monitor and care for his health from anywhere in the globe.

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III. EXISTING SYSTEM

In a hospital, either the nurse or the doctor must physically travel from one patient to the next for a health check, which may make it impossible to continuously monitor their conditions. As a result, any serious problems cannot be easily identified unless a nurse or doctor examines the person's health at the time. This could put a strain on doctors who are responsible for a large number of patients in the hospital. In addition, when a patient has a medical emergency, they are typically unconscious and unable to press an Emergency Alert Button. The IoT Based Patient Health Monitoring System utilizing ESP8266 & Arduino is explained in this basic block diagram. BPM is measured by the Pulse Sensor, and environmental temperature is measured by the LM35 Temperature Sensor. The code is processed by the Arduino and displayed on a 16*2 LCD display. The ESP8266 WiFi module connects to WiFi and transfers data to a server for IoT devices. Thing speak is the IoT server in use here. Finally, by logging into the Thing speak channel from anywhere in the world, the data may be monitored.

IV. PROPOSED SYSTEM

Our technology continuously monitors the vital signs of the patient and detects any irregularities. Medical personal receive the monitored data. When the system detects irregularities, it sends a notification to the medical professionals. As a result, the necessity for manual monitoring by medical personnel is reduced. Our proposed system makes use of an Arduino and an esp8266 to relay data from to a cloud platform. The esp8266 module on the Arduino has been. Programmed using the API key obtained from the Thingspeak site. Using the thing speak access key, any number of people can view the medical record stored on the device.

A.RELATED WORK

New technologies, such as wearable gadgets and the cloud of things, are being introduced into the healthcare system. It allows for greater flexibility in terms of recording and transmitting patient monitored data via IoT. Secure data transfer is required for this connection. The goalof this study is to send data in a secure manner.

The suggested system incorporates healthcare security and the internet of things. The system divided into two stages: storage and data retrieval. Data is stored and modified in the storage stage for future usage. Retrieve data from the cloud during the data retrieval stage. According to the request, the cloud server can share with authenticated users. Every 5 or 10 minutes, a patient wearing wearable gadgets updates his record. It refreshes every 1 minute in emergency mode. The results of the worn will be sent to the phone using Bluetooth or NFC technology. This can be sent to a cloud server over GSM or 3G.

B.SYSTEM REQUIREMENTS

Table 1: Component and specification

Sr. No.	Components Name	Description
1.	Arduino Board	Arduino UNO/Nano or any other Board
2.	ESP8266-01	ESP8266-01 Wifi Module
3.	LCD Display	JHD162A 16X2 LCD Display
4.	Potentiometer	10K
5.	Pulse Sensor	Pulse Sensor for heart-rate sensor for Arduino.
6	Temperature Sensor	LM35 Analog Temperature Sensor
7.	Resistor	2K
8.	Resistor	1K
9.	LED	5mm LED any Color
10.	Connecting Wires	Jumper Wires
11.	Breadboard / PCB	Mounting Circuit Connections
12.	Automatic Sanitizer Kit	For Spray Sanitizer.

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C. SYSTEM AND OVERVIEW

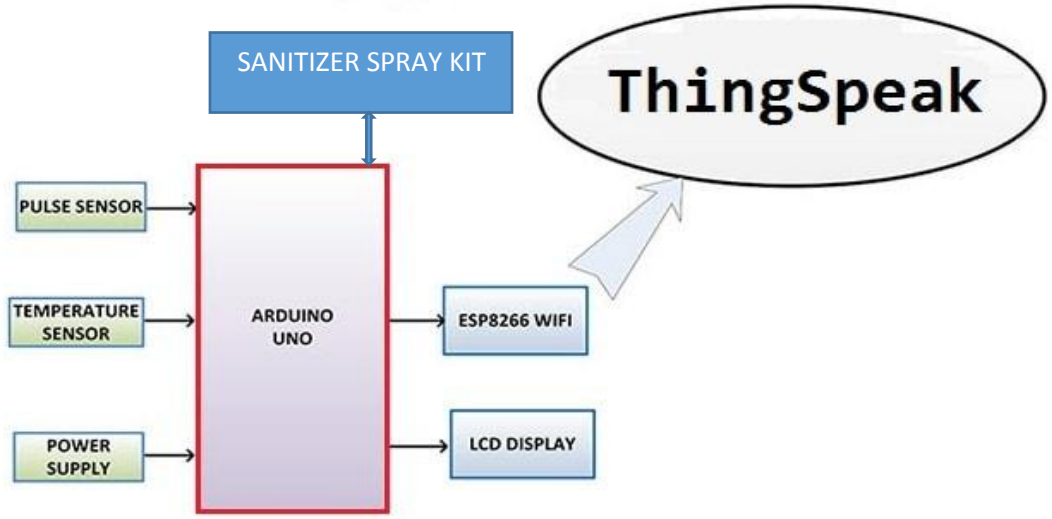

Figure 1: Block diagram of the system

The proposed system is depicted in Figure 1. The sensors for health monitoring are used to collect healthrelate d data, or data acquisition. The controller can communicate with the internet to send data wirelessly. The data was processed on the server. At the server, all data is collected and aggregated.

Data management can be used to display healthrelated information in an intelligible fashion on a web page.

V. DETAILED DESCRIPTION OF COMPONENTS

A. ARDUINO UNO :

The Arduino Uno is an opensource microcontroller board designed by Arduino.cc and based on the Microchip ATmega328P microprocessor. The board has a number of digital and analogue input/output (I/O) pins that can be used to connect to different expansion boards (shields) and circuits. The simulation is carried out using the Arduino IDE programme. The ATmega 16U2 includes a buil –in USB port that feeds serial data to the main processor. Standard A-BUSB cable for the Arduino Uno.

There are 14 digital I/O pins on this board.

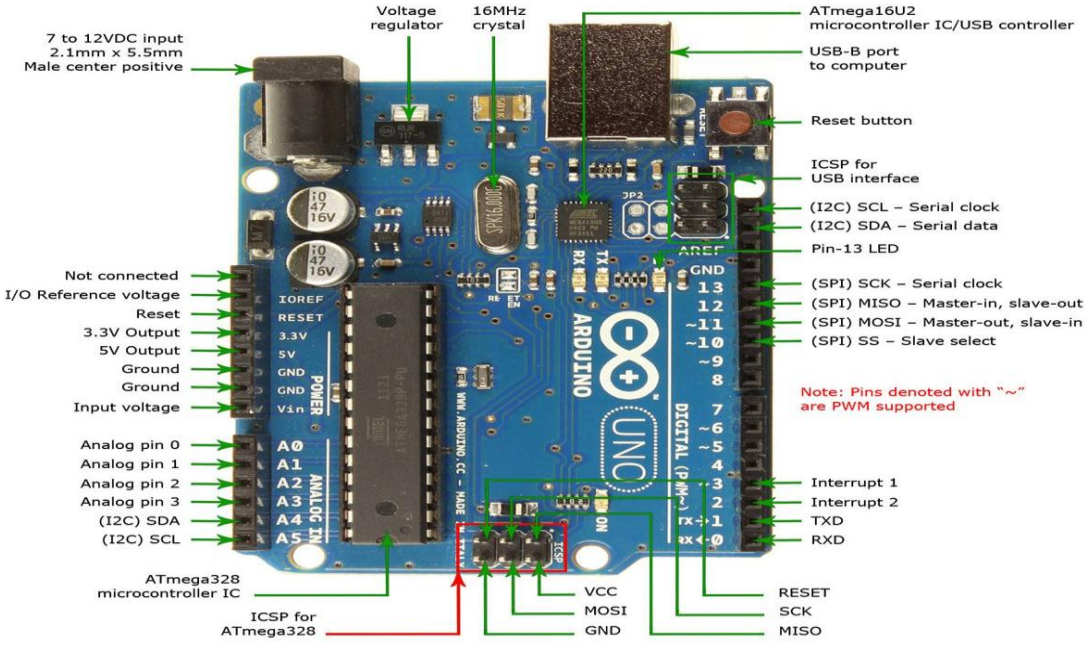

Figure 2: Arduino uno

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B. Temperature Sensor :

The LM35 series are precision integrated circuit temperature devices having a linearly proportional output voltage to the temperature in degrees Celsius. In comparison to linear temperature sensors calibrated in Kelvin, the LM35 device has the advantage of not requiring the user to remove a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 gadget requires no external calibration or trimming to achieve typical accuracies of 1 C at ambient temperature and 34°C throughout a temperature range of 55°C to 150°C.

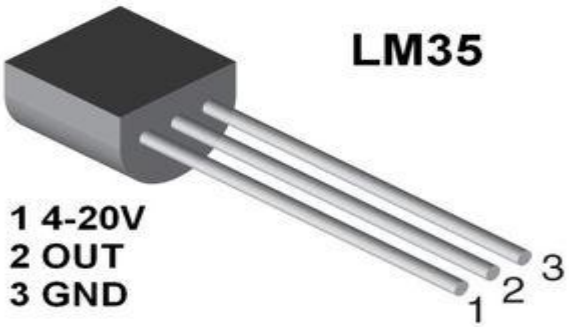

Figure 3: LM35

C. PULSE SENSOR :

The Pulse Sensor is an Arduino compatible heart rate sensor. Students, artists, athletes, makers and game and smartphone developers who wish to incorporate live heart rate data into their work can use it. An integrated optical amplification circuit and a noise reducing circuit sensor are at the heart of the system. You may now read heart rate by clipping the Pulse Sensor to your earlobe or fingertip and plugging it into your Arduino. It also comes with an Arduino demo code, making it simple to use.

Figure 4a: Pulse sensor

The pulse sensor has three pins: VCC, GND & Analog Pin.

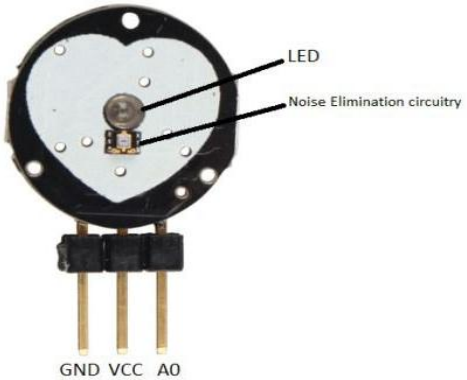

Figure 4b: Pulse sensor

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This sensor module also has an LED in the centre that aids in the detection of heartbeat. A noise elimination circuitry is located beneath the LED and is supposed to keep noise from impacting the readings.

D. WI-FI MODULE :

The ESP8266 wifi module is a self contained SOC with an integrated TCP/IP protocol stack that can provide access to a wireless network to any controller. The 802.11 b/g/n protocols are used. The use of standby power is less than 0.1MW.

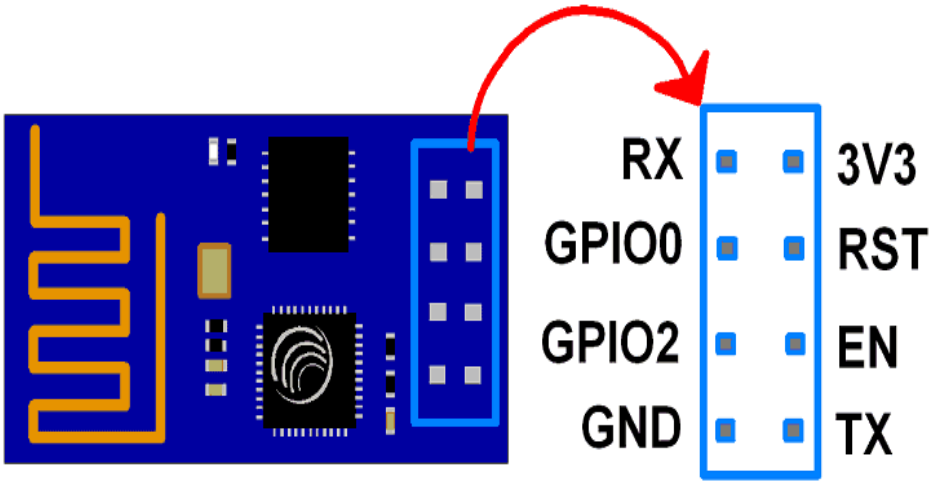

Figure 5: ESP8266

E. IOT PLATFORM (THING SPEAK):

a) Send data to the cloud via the Think Talk platform from any Internet-connected device.

b) You can then set up actions and alerts based on your realtime data and use visual tools to uncover the value of your data.

c) Make use of ThinkSpeak, which provides a framework for developers to simply take sensor data and transform it into usable information.

d) Thing Speak is an open data platform and API for the Internet of Things that allows you togather, store, analyse, visualise, and act on sensor data.

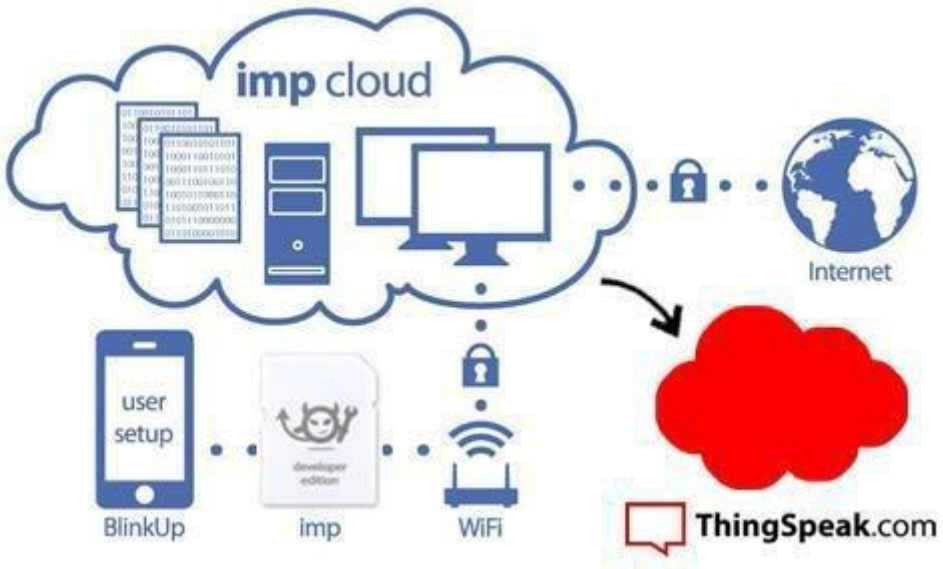

Figure 6: overview of Thing speak

F. AUTOMATIC SANITIZER SPRAY KIT:

An automatic hand sanitizer allows the sanitising liquid to be discharged without the need to press any nozzles. The automatic hand sanitizer's design is focused on the mechanism for pressing the hand sanitizer's nozzle,

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which entails a conversion from a rotational movement to a translational movement. The automatic hand sanitizer is designed using the VDI 2221 approach, which includes an Arduino Nano as the microcontroller, a servo motor as the moto , an ultrasonic sensor for detecting movement in the surroundings, and a rack and pinion system for pressing the nozzle from the hand sanitizer.

Figure 7: Ultrasonic Sensor and Nozzle Assembly

VI. CONCLUSION

Regardless of whether or not the doctor is there , an effective PHMS is established to keep track of the patient's current status. The technology captures data from the patient, such as temperature, blood pressure, and pulse rate, and sends it to the doctor. The system was tested in an experimental setting, with ten patients' data collected to validate their status . The doctor can periodically examine the status of the patients' health and provide them with health advice.

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