Report

Intra Departmental Project - I

on

PATIENT HEALTH MONITORING SYSTEM

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(ACCREDITED BY **NAAC** WITH **"A"** GRADE)

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CERTIFICATE

This is to certify that the Minor project/IDP report entitled "IoT BASED HEALTH MONITORING SYSTEM "that students **D. Harsha Vardhini (201FA05010), V. Lakshmi Revanth Kumar (201Fa05043), B. Rahul (201FA05059), G. Balaji (211LA05021)** to the Department of Electronics and Communication Engineering, Vignan's Foundation for Science Technology and Research, is a record of work carried out by them under the guidance of **Mr. K. Janaki Ram** of ECE department.

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ABSTRACT

Nowadays, research and knowledge in the health-care environment are founded on Wireless-Sensing node Technology. Patients are in a difficult situation of unanticipated death owing to the specific cause of heart difficulties and attacks, which is related to the lack of adequate medical maintenance to patients at the required time. This is specifically for monitoring elderly individuals and notifying physicians and loved ones. As a result, we propose an innovative concept to reduce such unexpected death rates through the use of Patient Health Monitoring, which use sensor technology and the internet to connect with loved ones in the event of a crisis. Using sensors for temperature and heartbeat, this device keeps tabs on the patient's health. Both sensors are attached to the Raspberry Pi, which is interfaced with a wireless network to transmit data to a web server (wireless sensing node) in order to follow patient health. IoT is used to send a patient alert in the event of any sudden changes to the patient's body temperature or heart rate. Additionally, through the Internet, this technology displays real-time data on patients' heartbeat and temperature. In this way, patient health monitoring systems based on IoT use the internet to efficiently monitor patient health. They also assist users in keeping track of the daily activities of their loved ones, which helps save lives.

INTRODUCTION

In this project, we are leveraging the internet of things to monitor several characteristics of the patient. The Realtime parameters of the patient's health are communicated to the cloud utilising Internet connectivity in the patient monitoring system based on Internet of things project. These parameters are transferred to a remote Internet site so that users from all over the globe may view them.

One of the newest electronics project ideas with a focus on medical applications is this one. Another advantage of employing IOT is that this data may be seen on a desktop computer, laptop, Android smartphone, tab, or tablet. To see this data, all that is required of the user is an active Internet connection. You may see this data over the Internet using a variety of cloud service providers. Some renowned and user-friendly service providers among these are Things speak, Spark fun, and IOT Geek.

Two sensors are used in IOT patient monitoring. The first one is a pulse sensor, the second one is a temperature sensor. Since the doctor can check patient health parameters by simply visiting a website or URL, this project is very helpful. Additionally, a large number of IOT apps are currently being created. Therefore, using Android apps, a doctor or a patient's family can now keep an eye on or track the patient's health.

WIFI connectivity is required to use the IOT-based health monitoring system project. Wi-Fi is established via Raspberry Pi. Without an operational WIFI network, this project will not succeed. With the help of Hotspot on your smartphone, you may establish a Wi-Fi area. These 2 sensors provide input that the pi board continually reads. After that, it transmits this data to a certain URL or IP address and uploads it to the cloud. Then, after a predetermined amount of time, the procedure of transmitting data to IP is repeated. For instance, we submitted data after every 30 seconds in our project.

HARDWARE DESIGN

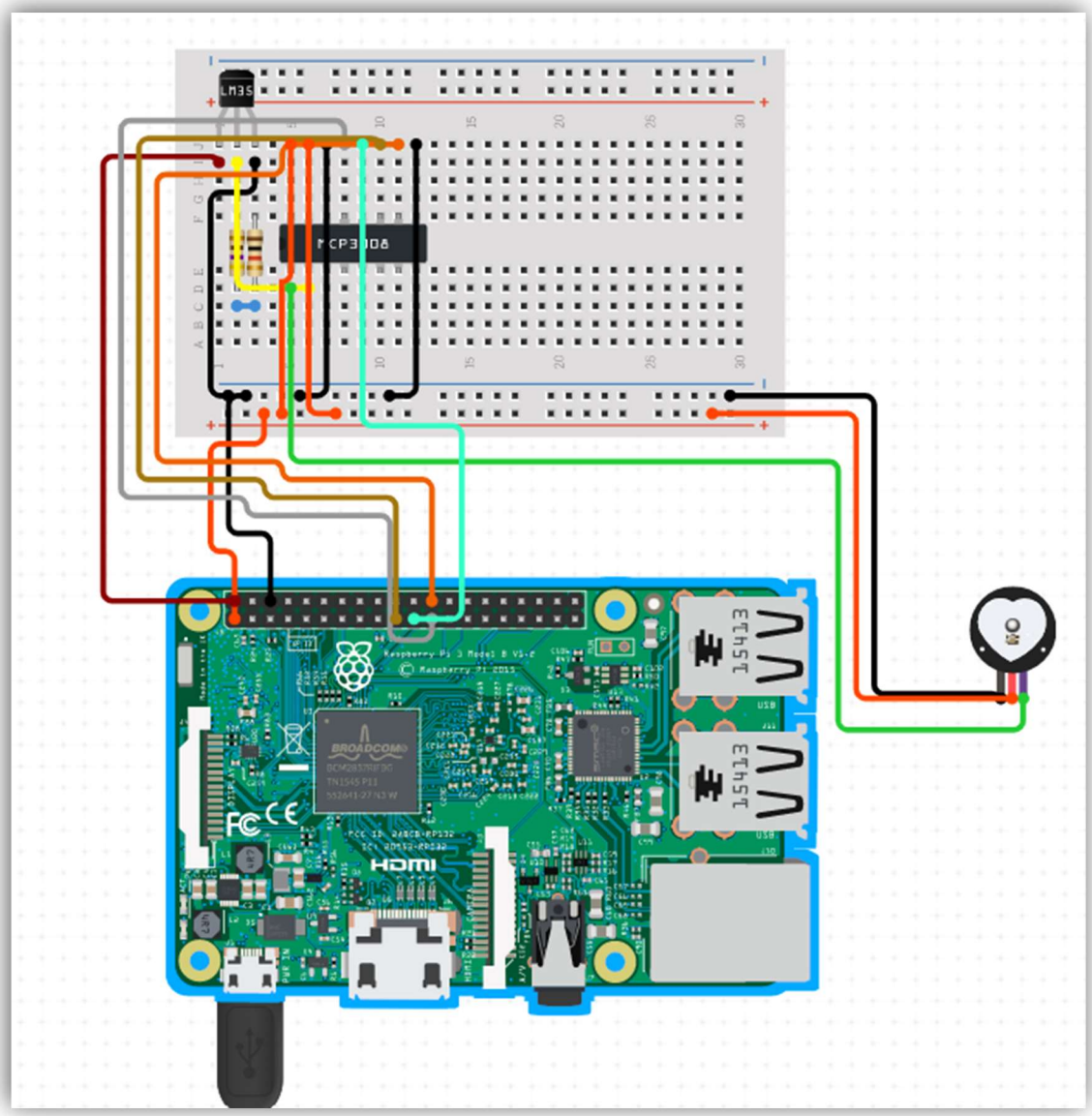


Fig1: Health monitoring system

COMPONENTS REQUIRED

Hardware Requirements:

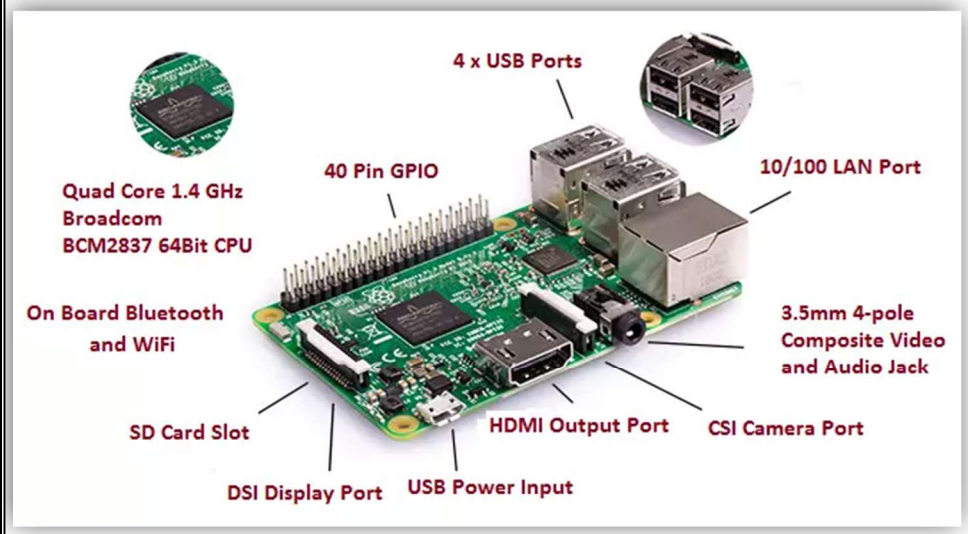
- Raspberry pi model 3b
- Pulse Sensor
- LM35 (Temperature Sensor)
- Breadboard
- Jumper Wires

Software Requirements:

- Raspberry pi OS with Thonny IDE
- Think speak (web server)

Raspberry pi:

The low-cost Raspberry Pi is a credit-card sized computer that fits inside a computer display or TV and operates with a mouse and regular keyboard. With the help of this little, powerful gadget, individuals of all ages may learn about computers and how to write programmes in languages like Python and Scratch. Raspberry Pi is built on an Arm CPU and can interface with sensors and actuators via the general purpose I/O PINS. Raspberry Pi runs many flavours of Linux and can practically do all tasks that a typical desktop computer can.



	Pin No.		
3.3V	1	2	5V
GPIO2	3	4	5V
GPIO3	5	6	GND
GPIO4	7	8	GPIO14
GND	9	10	GPIO15
GPIO17	11	12	GPIO18
GPIO27	13	14	GND
GPIO22	15	16	GPIO23
3.3V	17	18	GPIO24
GPIO10	19	20	GND
GPIO9	21	22	GPIO25
GPIO11	23	24	GPIO8
GND	25	26	GPIO7
DNC	27	28	DNC
GPIO5	29	30	GND
GPIO6	31	32	GPIO12
GPIO13	33	34	GND
GPIO19	35	36	GPIO16
GPIO26	37	38	GPIO20
GND	39	40	GPIO21

Fig2: Raspberry pi 3b & Pin Configurations

Pulse sensor:

A well-designed plug-and-play heart-rate sensor for the Raspberry Pi is called Pulse Sensor. The sensor connects directly to the Raspberry Pi by clipping onto a fingertip or earlobe. It also comes with a free monitoring app that displays a real-time graph of your pulse.

Heart-shaped branding may be seen on the sensor's front. The skin is in contact with this side of the object. The LED glows through a tiny round hole on the front of the device; behind the LED is a smaller square hole. Similar to the ones seen in laptops, tablets, and mobile devices, the square is an ambient light sensor that controls the brightness of the screen depending on the lighting. A sensor measures how much light is reflected back when the LED emits light into a capillary tissue, such as an earlobe or fingertip. The heart rate is determined in this way. The remainder of the components are installed on the sensor's opposite side.

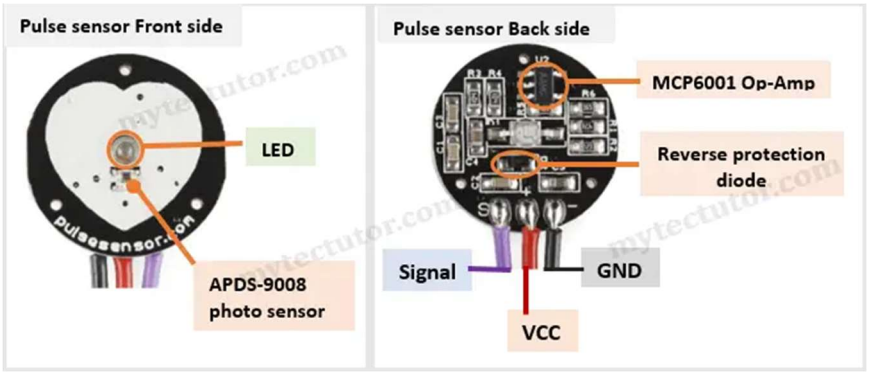


Fig3: Pulse Sensor

To achieve precise readings and prevent a short circuit caused by perspiration, we must shield the exposed side of the sensor before using it. Use black tape or Velcro strips for this.

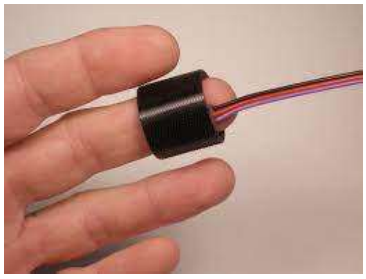


Fig4: Velcro strip or black tape

LM35 Temperature Sensor:

An analogue linear temperature sensor is the LM35. Its production varies with temperature (measured in degrees Celsius). The temperature range for operation is between -55°C and 150°C. Each °C of temperature change causes a 10mV change in the output voltage. It can be run on both 3.3 V and 5 V power supplies, and its standby current is under 60 uA.

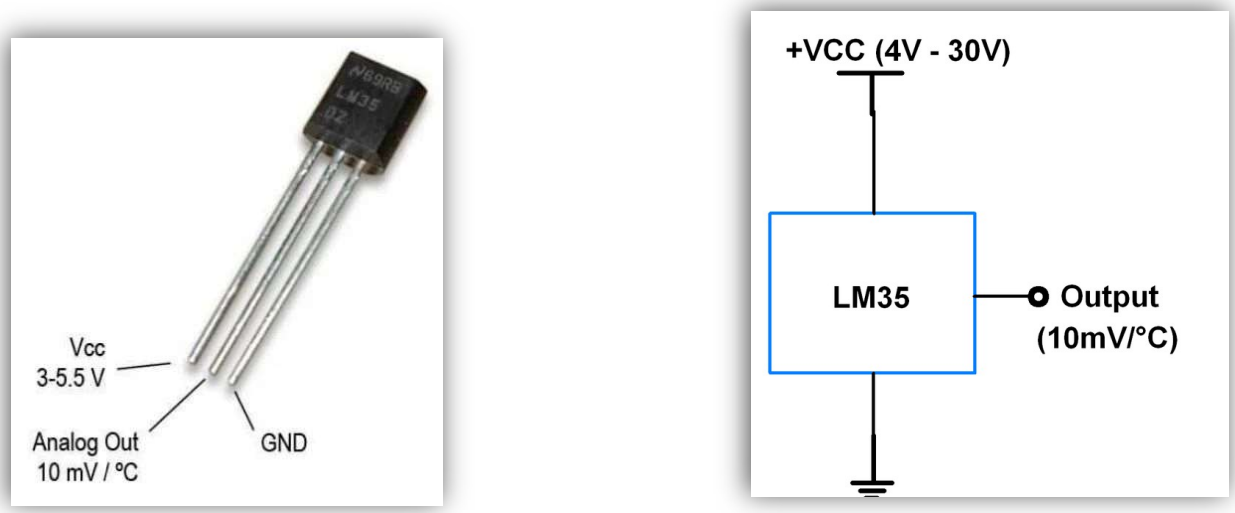


Fig5: LM35 -Temperature Sensor

Breadboard:

A breadboard is a solderless tool used to test circuit designs and create temporary electrical prototypes. The majority of electrical components in electronic circuits may be linked by slipping their leads or terminals into the corresponding holes, and then, when necessary, forming connections through wires. Underneath the breadboard are metal strips that link the holes on top of the board. The arrangement of the metal strips is seen below. Keep in mind that while the remaining holes are connected vertically, the top and bottom rows of holes are connected horizontally and divided in half.

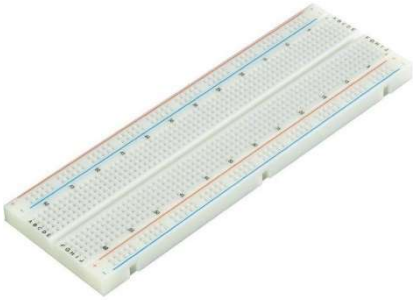


Fig6: Breadboard

MCP3208 A/D Converter:

One of the well-known A/D converter ICs is the MCP3208. This chip will give your microcontroller or microcomputer project 8 channels of 12-bit analogue input. Only 4 pins are needed because it utilises SPI and is really simple to operate. Since the Raspberry Pi does not have an ADC but does have exciting analogue inputs, we thought this chip would be a perfect addition to the Pi.

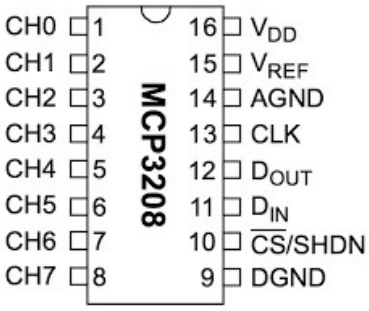


Fig7: A/D Converte

Raspberry pi OS:

A Unix-like operating system known as Raspberry Pi OS (formerly Raspbian) is designed for the Raspberry Pi series of small single-board computers and is based on the Debian Linux distribution.

The Raspberry Pi with ARM CPUs is well suited to Raspberry Pi OS. Except for the Pico microcontroller, it works on all Raspberry Pi models. The desktop environment in Raspberry Pi OS is a customised version of LXDE with the Open-box stacking window manager and a special theme. VLC, the lightweight Chromium web browser, and Wolfram Mathematica are all included in the default package.

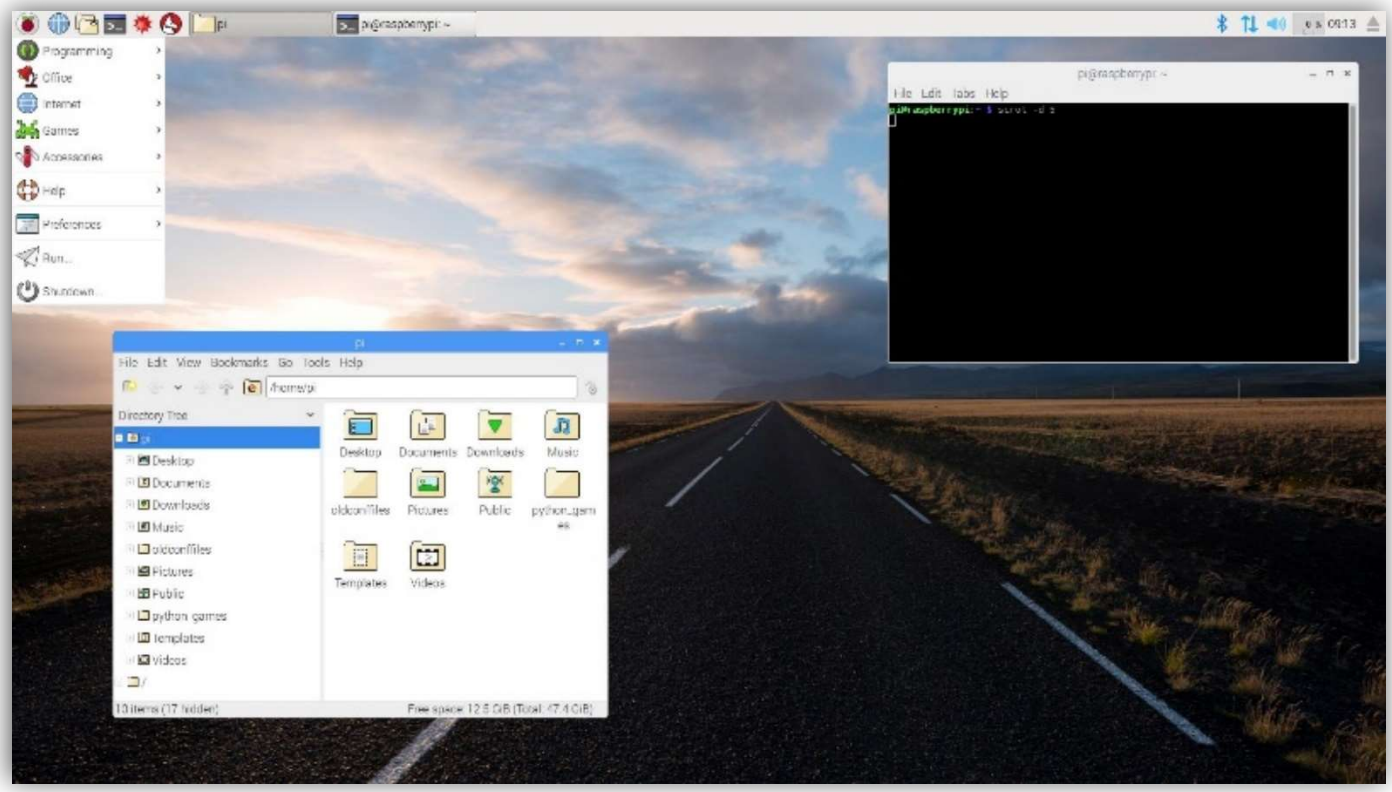


Fig8: Raspberry pi OS

Thonny IDE:

Thonny is a free Python Integrated Development Environment (IDE) that was especially designed with the beginner Pythonista in mind. Aivar Annamaa, an Estonian programmer, was the one who made it. It offers several methods for iteratively traversing the code, step-by-step expression evaluation, thorough call stack visualisation, and a mode for illuminating the principles of references and heaps.

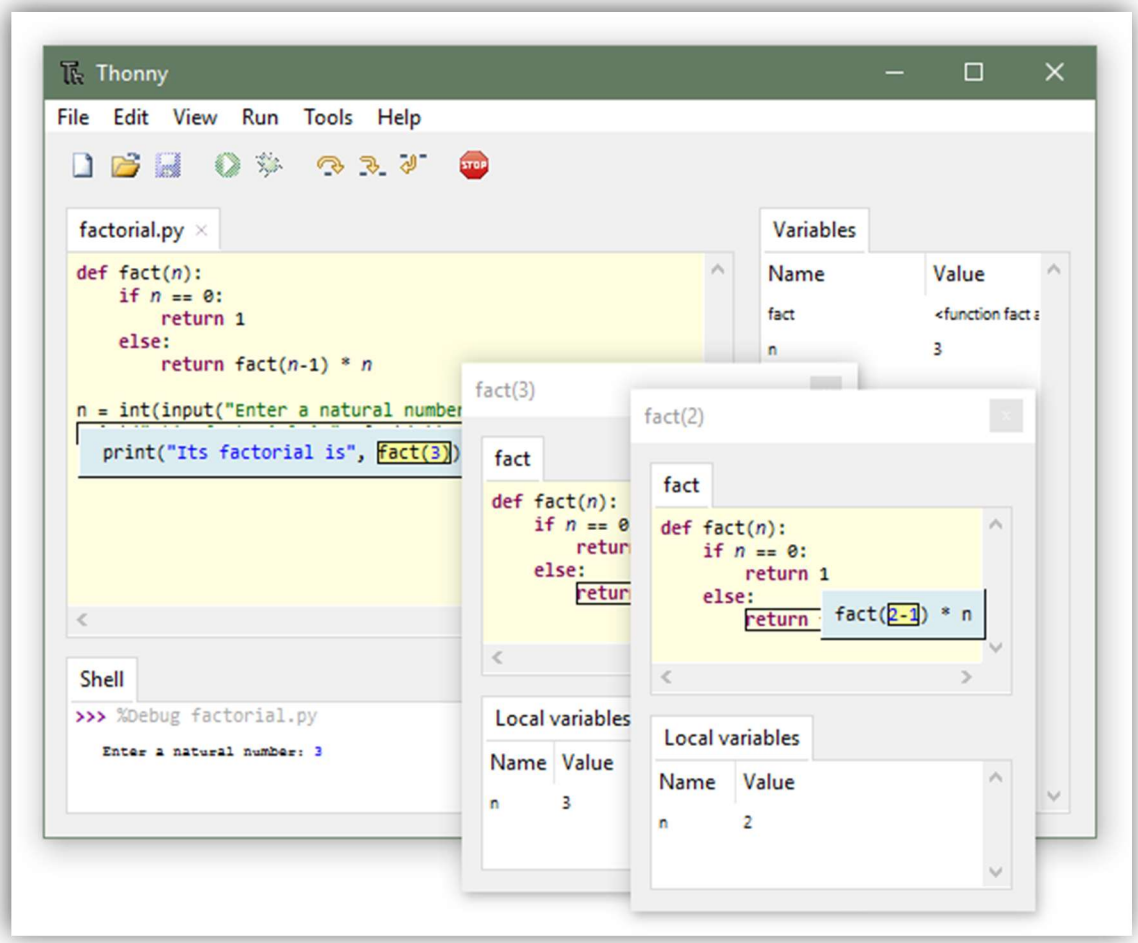


Fig9: Thonny IDE

ThinkSpeak:

A platform offering a variety of services specifically designed for developing IoT applications is called ThingSpeak. It gives the ability to gather data in real-time, visualise the data in charts, and build plugins and apps for interacting with online services, social networks, and other APIs.

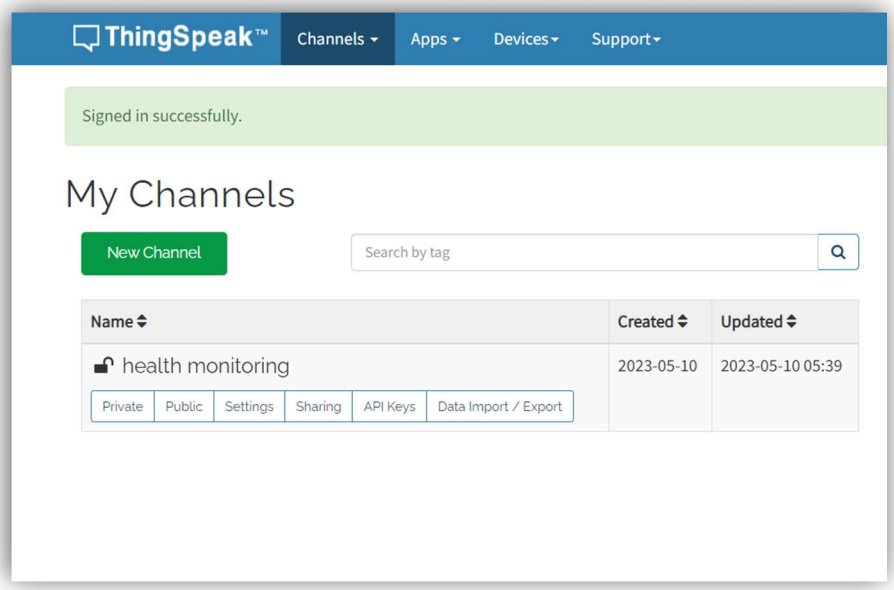


Fig10: ThingSpeak

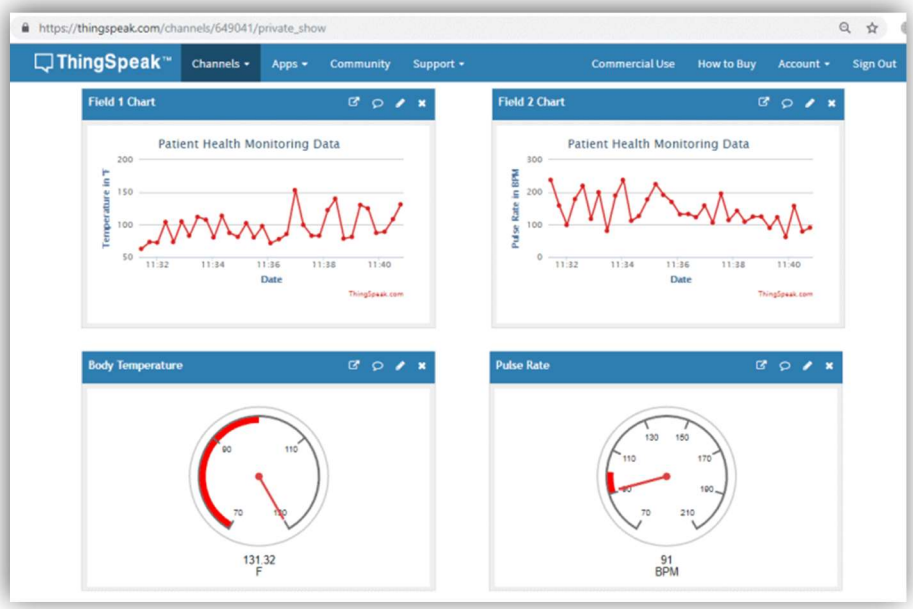


Fig11: Data Visualization

Expected Output:

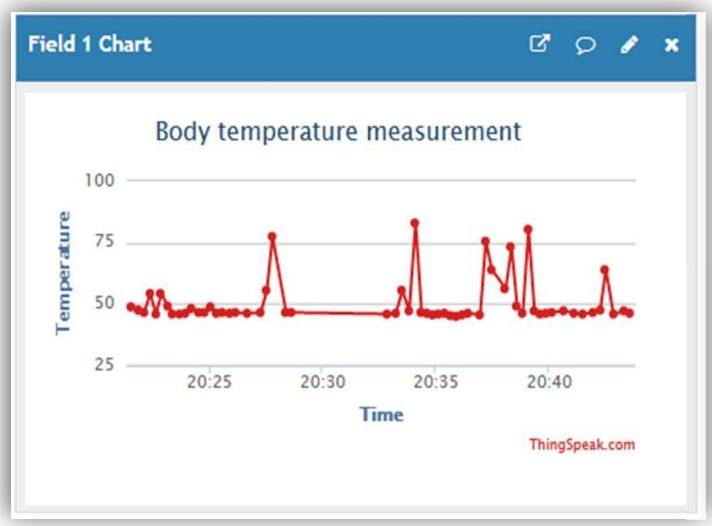


Fig12: Body Temperature Data

Fig13: Pulse Data

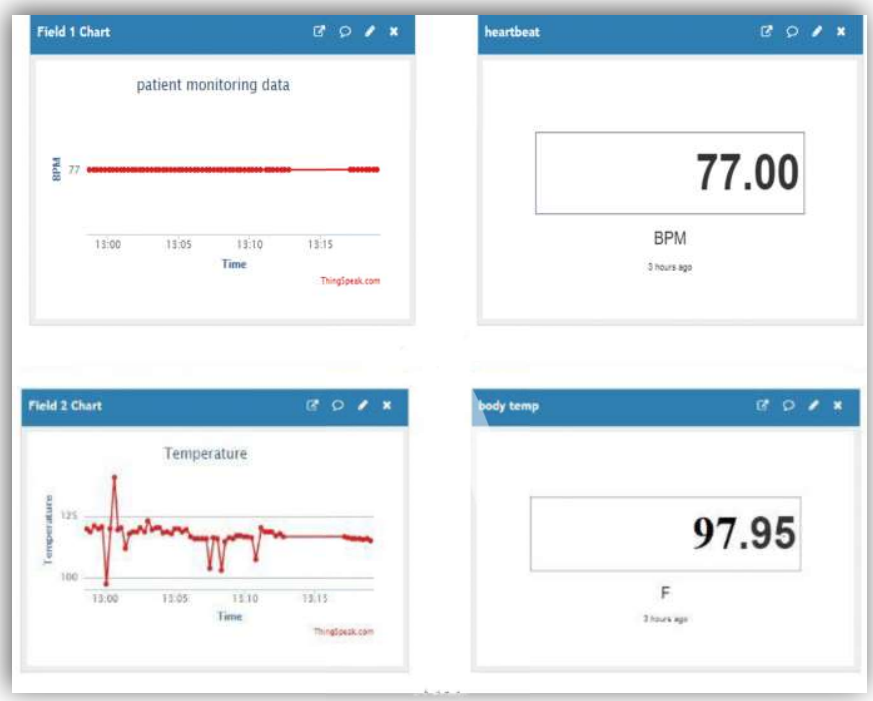


Fig14: pulse & Temperature Data in Thingspeak.

Advantages:

- Easy to monitor
- Used for both personal and hospital
- Doctor need not to touch the patient physically
- We can monitor continuously
- It is mechanism can be understood by every one

Applications:

- Patient Monitoring Systems communicate vital data such as electrocardiograms, respiration rate, blood pressure, and so on.
- Avoid numerous doctor's appointments and interactions between patients and medical professionals**.**

Conclusion:

So finally with help of our project doctors can monitor the heart beat and temperature of their patients with in their mobile phones and without touching patient physically

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