A PROJECT REPORT ON

"AUTOMATED PARALYSIS PATIENT HEALTHCARE MONITORING SYSTEM USING IOT"

SUBMITTED TO THE SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE IN THE PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE

BACHELOR OF ENGINEERING
IN
INFORMATION TECHNOLOGY

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UNDER THE GUIDANCE OF
"PROF A. N. KALAL"

DEPARTMENT OF INFORMATION TECHNOLOGY

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CERTIFICATE

This is to certify the project report entitled

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Is a bonafide work carried out by them under the supervision of **Prof. A. N. Kalal** and it is approved for the partial fulfilment of the requirement of Savitribai Phule Pune University for the award of the Degree of **Bachelor of Engineering** (Information Technology) 2019 -Course

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Acknowledgement

It is a matter of great pleasure to get the opportunity of highlighting a fraction of knowledge, we acquire during our technical education through this project.

This would not have been possible without the guidance and help of many people. This is the only page where we have the opportunity of expressing our emotions and gratitude from the care of our heart to them.

This project would not have been successful without enlightened ideas timely suggestion and been interest of our respected Guide and project Coordinator Prof. **A. N. Kalal** without their best guidance this would have been an impossible task to complete.

Being on the same line we express our deep sense of gratitude to our Head of Department **Dr. V. V. Puri** for the most valuable guidance provided by him.

We would also like to thank **Dr. S. B Thakare**, Principal of our institution Anantrao Pawar College of Engineering and Research, Parvati, Pune-09 for providing the necessary facilities during the period of working on this project work.

Last but not the least, we would like to express our thankfulness to teaching and non-teaching staff, our friends and all our well wishers.

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ABSTRACT

Fitness is a metric that assesses a person's overall health. People are pursuing healthy lives in many ways, such as decent eating, frequent exercise, and adequate sleep, as more people emerge from poverty. With the rise of the Internet of Things and smart phones, fitness is becoming increasingly popular through smart wearable's. Electronics are increasingly being employed in clothes nowadays, making it smart and fashionable at the same time.The main goal of this project is to create a smart wearable fitness monitoring system that will aid athletes and regular individuals who need to keep track of their health when exercising, yoga, meditation, or jogging. This technique will assist them in keeping track of their health and increasing the effectiveness of their everyday workouts. As a result, the idea offers a system that may provide information on our fitness, such as the amount of calories burnt. Health care is a major concern in our society. In the rising technology, the Internet of Things (IoT) technology, attracting everyone's attention towards it for its potential to revolutionize the traditional health care system and to resolve the problem caused by the rising aging population and the continuing increase in chronic illness in the health care system. This paper mainly study about the traditional healthcare system which is used in past for providing healthcare services and the convergence of a new technology named IoT in the health care system to modernize the way of treating patients. This paper outlines how IoT has changed the traditional way of healthcare monitoring and make the services fast and efficient in a smarter way. Finally a research study has done on various IoT based healthcare monitoring system and furthermore, a comparison is made between these IoT based healthcare systems represent their merits and demerits. Using ML we analysis health of person.

Keywords: Patient monitoring systems, Health surveillance, Raspberry pi sensors.

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Chapter 1

Design and Implementation of automated Paralysis Patient Healthcare Monitoring System

1.1 Introduction

Paralysis is the inability to move muscles on your own and with purpose. It can be temporary or permanent. The most common causes are stroke, spinal cord injury, and multiple sclerosis. Paralysis can be a complete loss of movement known as plegia, or a significant weakness called paresis. Paralysis is most often caused by damage in the nervous system, especially the spinal cord. Other major causes are stroke, trauma with nerve injury, poliomyelitis, cerebral palsy, peripheral neuropathy, Parkinson's disease, ALS, botulism, spina bifida, multiple sclerosis, and Guillain—Barre syndrome. For example, monoplegia/ mono paresis is complete loss of movement or weakness of one limb. Hemiplegia/hemiparesis is complete loss of movement or weakness of arm and leg on same side of the body. Paraplegia/paraparesis is complete loss or weakening of both legs. Tetraplegia /tetra paresis or quadriplegia/quadriparesis is complete loss or weakness of both arms and both legs. Paralysis is caused by injury or disease affecting the central nervous system (brain and spinal cord) which means that the nerve signals sent to the muscles is interrupted. Paralysis can also cause a number of associated secondary conditions, such as urinary incontinence and bowel incontinence. Though, there are innovative approaches for curing or treating paralysis patients, but the aim of treatment is to help a person adapt to life with paralysis by making them as independent as possible. Where we see a problem with these types of devices that are being developed is that they are very large and expensive machines. They seem to be only available in hospitals and not able to be used at the patient's home or at their convenience. Our goal is to make a device that will be able to retrain a patient's motion but have them be able to use the device themselves and have it be cheap enough for them to afford without much debt.

1.1.1 Motivation

- The main motivation of this project is to design a smart wearable fitness monitoring device which will help the athlete , normal people who need to monitor their health during exercise , yoga , running. This system will help them to monitor their health and boosts their daily workouts and makes them achievable.

1.2 Problem Statement and Scope

1.2.1 Problem Statement

- In today's social Health Insurance structure where patients stay at home after Operations they are not possible monitored 24-hours by a medical caretaker or a family member so. Many people now a days who work full time are facing a problem of monitoring especially old age patient's. So to overcome this problem we are using this patient health monitoring system using IOT.

1.2.2 Scope

- Recommendation for future works is to fitness is a measure of human being's healthy status. People pursue fit lives through various ways such as reasonable nutrition, regular exercise and sufficient sleep.
- Fitness is improving through smart wearable's more and more popularly with the prevalence of Internet of Things and smart phones

1.3 Goal and Objective

1.3.1 Goal

- Where we see a problem with these types of devices that are being developed is that they are very large and expensive machines, They seem to be only available in hospitals and not able to be used at the patient’s home or at their convenience.
- Our goal is to make a device that will be help the patient fully monitoring stay at home after operation and able to retrain a patient’s motion but have them be able.

1.3.2 Objective

- Because of expanding work cost, medical institutions would constrain to decrease nursing staff for patients. Our project aims to develop new innovation for the use of basic nursing care. It helps us to take care of patient health care without nurse. This system also takes care of the situation wherein no one is present to attend the patient and thus sending a message through GSM of what he wants to convey in SMS and also sound a speaker along with message.

Chapter 2

Literature Survey

2.1 Literature Survey

Paper name 1:- E-Fitness Implementation in Metro Rail using IoT with help of 5G
Author name:- Sukanya Vuppala [1]

As per Indian medical survey reports, MNC employees spend more than 1000 kilocalories of energy stored in their body. This is due to the different official timings and heavy working hours. So, it leads to various health problems like obesity and sometimes cardiac arrest. During the travelling period, the employees can utilize their time in efitness system at Metro/MMTS trains which reduces mental pressure and improves the physical strength and fitness thereby avoiding the wastage of traveling time of the persons. The e-fitness system with smart card facility will be available for all types of people and will be monitored by an expert fitness guide, with the help of IoT. The main aim is to connect the large city through a metro train track so that e-fitness will be made available for everyone. By introducing this E-Fitness system in metro, it generates electrical power which can be used for running the electrical things in metro trains

Paper name 2:- IoT Fitness Device with Real Time Health Assessment and Cloud Storage
Author name:- Tonny Heng Yew Ling [2]

In this paper, a smart fitness device is presented, This device monitors the heart rate and temperature of the human body using Arduino Uno as the main microcon- troller to collect the signal, interpret and send the data wirelessly using wifi module ESP 8266 to ThingSpeak IOT website, which is a server website that can host a variety of IOT devices. Using the website, the data can be sent wirelessly to the server which the user can monitor the heart rate and temperature data in real-time on the website. The data can also be stored on the ThingSpeak server which is then can be accessed by medical staff to do health evaluation of the users. This system is a cheap alternative for the end user to check their heart rate and body temperature to ensure that their health is in good condition at all time. This system allows t he users to save time and money by not going frequently to the hospitals to get their heart rate and body temperature checked.

Paper name 3:- Fitness Monitoring System Based on Internet of Things and Big Data Analysis
Author name:- YONGJIAN QIU1 , XINGHAI ZHU1 , AND JING LU [3]

Physical fitness monitoring is an important tool for disease prevention and early diagnosis and treatment. Efficient physical fitness monitoring can effectively reduce the risks of disease and relieve the medical burden. This paper analyzes the shortcomings of traditional clustering routing protocols, and proposes a new Internet of Things (IoT) clustering routing algorithm using Particle Swarm Optimization (PSO). The calculation method of the optimal number of clusters is granted, and the fitness function is redesigned. This function fully considers the remaining energy of sensor nodes, distance between clusters and node spacing, etc., and specifically introduces the process of applying PSO to select the optimal cluster head combination and the process of PSO cluster routing algorithm. Based on the traditional particle swarm algorithm, this paper proposes a monitoring algorithm based on two-way chaotic search by introducing chaotic search strategy and reverse learning strategy. This algorithm largely avoids the situation of particles falling into local optima. The exper- imental results show that the method gets closer to the optimal solution than the traditional particle swarm algorithm. A scheme for constructing Hbase secondary index using hidden column family is proposed, and Hbase table join optimization algorithm is proposed based on bloom filter and Hash join algorithm. On the overall load of Hbase, a pre-partitioned Hash algorithm and a load prediction algorithm based on exponential smoothing are proposed to improve the performance of Hbase to meet business needs. Experimental results show that the Hbase particle swarm optimization algorithm proposed in the article can effectively improve the functioning of Hbase from the perspective of data writing and query.

Paper name 4:- An IoT Tree Health Indexing Method Using Heterogeneous Neural Network
Author name:-Chung Kit Wu1, Kim Fung Tsang1, Yucheng Liu1, Hao Wang1, Hongxu Zhu1, Cheon Hoi Koo2, Wai Hin Wan2 and Yang Wei1[4]

Urban trees provide essential ecosystem services on regulating temperature and humidity, filtering urban pollutants, improving air quality etc. However, the increasing num- ber of urban trees put the pressure on maintenance and public safety. The total compensatory value of the trees, consisting of inspection, maintenance, settlement of tree damages etc., is more than 2 trillion USD. At this point in time, there is no known research on manifesting guidance on automated tree health assessment. The Internet-ofthings (IoT) proliferates the deployment of wireless sensors and networks. A concept of IoT trees is raised to implement various sensors on the trees for automated health monitoring and assessment. In this paper, an Urban Tree Health Index (UTHI) is first developed to indicate the health of urban IoT trees. The index will facilitate preventative measures on urban trees. To construct the indexing model, seven (7) dynamic (timeseries) features and seven (7) static features are extracted to explore the ambient effects on urban tree health. Afterward, a heterogeneous neural network (HNN) for UTHI modeling is developed to adopt the

heterogeneous feature structure. In HNN, the dynamic features are analyzed in Gated Recurrent Unit (GRU) layer and the static features are analyzed in hidden layer. The novel fusion layer then aggregates the outputs computed from those layers and further explores unseen correlations among all features. The experimental result verifies that the HNN-based modeling achieves high ac- curacy and model fitness with the error rate of less than 5 In addition, the HNN achieves 34other machine learning algorithms. The supremacy of the developed model is that all in- dexing features can be predefined or monitored by IoT sensors, thus rendering an automated and economic urban tree management.

Paper name 5:- Health Monitoring and Tracking System For Soldiers Using Internet of Things(IoT)
Author name:- Niket Patil[5]

The paper reports an Internet of Thing (IoT) based health monitoring and track- ing system for soldiers. The proposed system can be mounted on the soldier's body to track their health status and current location using GPS. These information will be transmitted to the control room through IoT. The proposed system comprise of tiny wearable physiological equipment's, sensors, transmission modules. Hence, with the use of the proposed equipment, it is possible to implement a low cost mechanism to protect the valuable human life on the battlefield.

Paper Name 6:-IoT Health care Monitoring and Tracking : A Survey
Author:-Subhra Shriti Mishra[6]

Hospitals all over the world are moving towards better and more advanced tech- nologies. In the recent times, integration of the Internet of Things with the available medical technologies as well as with patients and their environment has given a new scope for data collection and better decisions. This survey paper focuses on various ways the IoT devices can be used to improve the health of people along with ensuring that there are no mistakes in the process of medication and medicine delivery. Here we have taken many examples of the devices that are being used and which are and can be used in the future for more advanced and secure health care.

Paper Name 7:-IOT Based Patient Health Monitoring Portable Kit
Author:-Praveen Kumar Maduri1 , Yuvraj Dewangan2 , Durga Yadav3 , Shivam Chauhan3 , Kushagra Singh[7]
today's world, major problems related to healthcare and medicine are due to the lack of proper medication and proper monitoring in the required time. There are lots of electronic-based technologies and IoT based devices through which we can monitor the health of patient over the internet. The experts in India took advantage of these smart devices and technology to monitor the health condition of the patient. In this paper we in- troduce the kit which is based on these electronicbased technologies and which is able to measure the patient's different physiological parameters like blood pressure, the temperature of the patient, heartbeat, pulse rate, recording of the electrical activity of the

brain, electrical activity of the muscle, changes in the sweat gland activity, the oxygen carrying molecules in the blood and then the measured result is transmitted using internet connectivity to en- able health care providers far from the distance to monitor, control and analysis continuously

Paper Name 8:-IoT Based Emergency Health Monitoring System
Author:-Md. Raseduzzaman Ruman[8]

This paper represents the system for monitoring the patient's body 24/7 by us- ing IoT. Now a days, patient monitoring system is getting much more popularity to the researcher and patient guardian. This system has the capability to monitor physiological parameters form patient body at every 15 seconds. This system is responsible for collecting pulse, body temperature and heart bit from the patient's body and send the data into IoT Cloud platform by using WIFI-Module and health condition of patient stored in the cloud. It enables the medical specialist or authorized person to monitor patient's health, where the medical specialist or authorized person can continuously monitor the patient's condition on the cloud server. The proposed outcome of this research is to give suitable and effective health facilities to patients

Paper Name 9:- IoT based Real Time Health Monitoring
Author:- Vani Yeri[9]

conventional sensor based diagnosis in medial field requires more number of sensors and human efforts if it is processed in a large scale. It is a difficult task due to the shortage of medical professionals and system setup. To overcome this issue an IoT based health care application is proposed in the research work. The proposed system consists of the web and mobile application based on continuous wireless monitoring of patients. The objective is paper is to implement a low-cost system and transmit the patient vital signs in emergency situations. Sensors are being used for measuring the patient vital signs by using the wireless network. The sensors data are collected and transmitted to the cloud for storage via Wi-Fi module connected with the controller. The data is processed in the cloud and feedback steps are taken on the analysed data which can be further analysed by a doctor remotely.

2.2 Comparison of Literature Survey

2.1

Sr No.	Title	Author Name	Description
1	E-Fitness Implementation in Metro Rail using IoT with help of 5	J S Sujin; S Mukesh;M J Praveen Raj; M Sashwanth; R Ramesh Kumar.	This process of continuously tracking the patient's vital parameters suggested by the doctor. is designed to help the patient to convey their health issues/status.
2	IoT Fitness Device with Real Time Health Assessment and Cloud Storage	Tonny Heng Yew Ling	In this system is availability, flexibility, high speed, reduce cost of wiring and simple use of technologies.
3	Fitness Monitoring System Based on Internet of Things and Big Data Analysis	YONGJIAN QIU1 , XINGHAI ZHU1 , AND JING LU	This paper proposes an IoT based real-time electrocardiogram (ECG) monitoring system that is able to support both real-time and store-and-forward modes
4	An IoT Tree Health Indexing Method Using Heterogeneous Neural Network	-Chung Kit Wu1, Kim Fung Tsang1, Yucheng Liu1, Hao Wang1, Hongxu Zhu1, Cheon Hoi Koo2, Wai Hin Wan2 and Yang Wei	In this paper the patient can using mobile phone automatically handle home hardware and software.
5	Health Monitoring and Tracking System For Soldiers Using Internet of Things(IoT)	Niket Patil	In this paper we have to reduce mental pressure and improves the physical strength and fitness Using IoT
6	IoT Health care Monitoring and Tracking : A Survey	Subhra Shriti Mishra	In this paper this device monitors the heart rate and temperature of the human body using Arduino Uno as the main microcontroller

Table 2.1: Comparison of Literature Survey

Chapter 3

System Requirements and Specification

3.1 System Requirements

The proposed System requires the following hardware and software.

3.1.1 Assumptions and Dependencies

- User must require the Python .
- User has to install the Python on his pc.
- User has to login to the system.
- User of the prediction system must be aware of the system functionalities.
- The user must be aware of the grading system.
- Every user should be educated enough to use the system.
- The user must be aware of the specified format.
- Every user must enter the data in the specified format

3.2 Functional Requirements

3.2.1 System Feature

- To have understanding of the problem statement.
- To know what are the hardware and software requirements of proposed system.
- To have understanding of proposed system.
- To do planning various activates with the help of planner.
- Designing, programming, testing etc.

3.3 System Features

3.3.1 EXTERNAL INTERFACE REQUIREMENT

3.3.2 Hardware Interfaces:

- Processor : Intel core 5
- Ram size : 8GB
- Hard disk capacity : 500 GB
- Monitor type : 15 Inch shading screen
- Keyboard type : web console

3.3.3 Hardware Informations:

3.3.4 Raspberry Pi:

Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost

Chapter 4

System Design

4.1 System Architecture

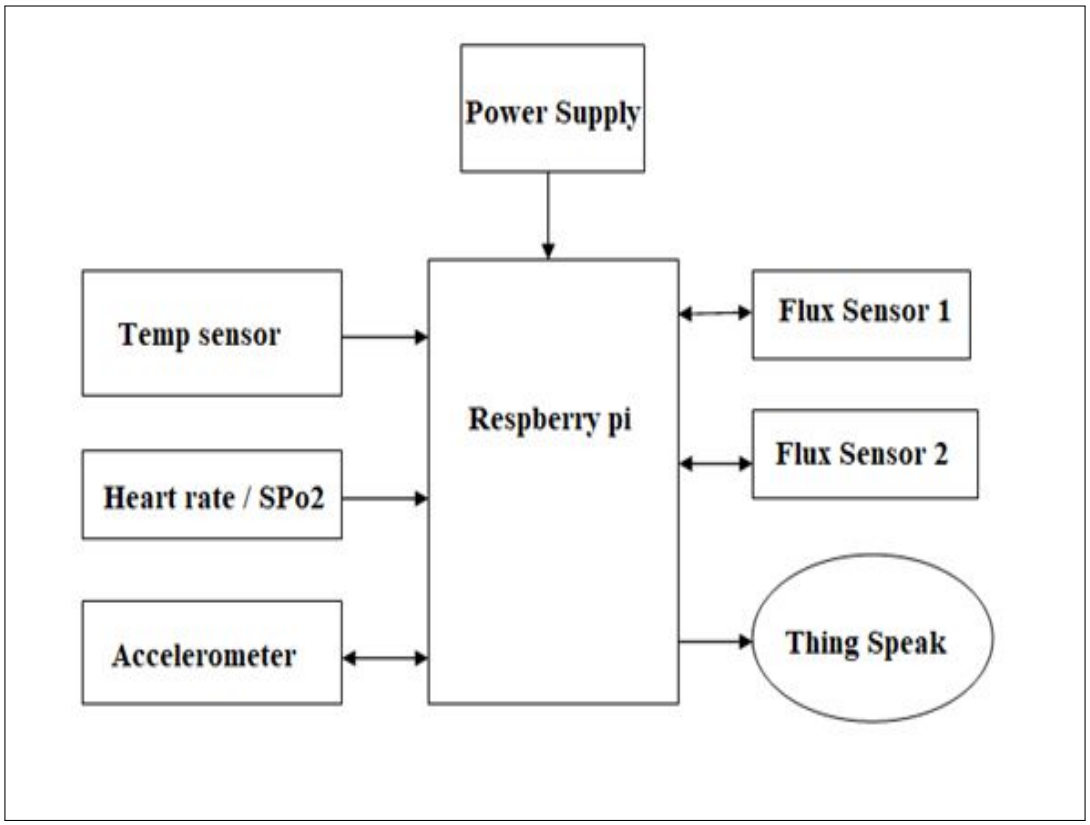

Figure 4.1: System Architecture

4.1.1 Circuit Diagram

circuit diagrams in a comprehensive way, understanding their purpose and what they consist of. Examples of circuit diagrams that showcase different circuit configurations and the symbols used in them are explained. We will also take a closer look at the components we often come across in circuit diagrams, such as resistors, capacitors, and switches, and explain how they are represented with symbols. By the end of this article, you'll have a solid understanding of circuit diagrams and how they represent

electrical circuits.

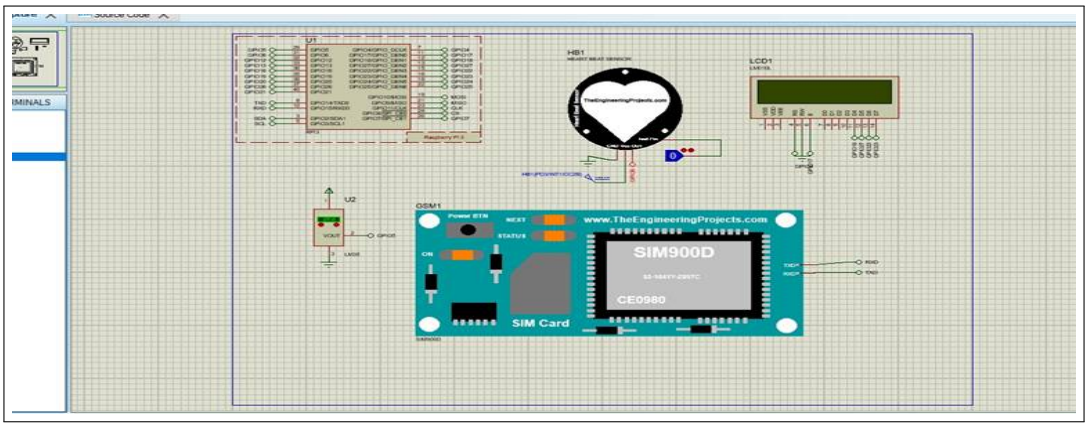

Figure 4.2: Circuit Diagram

4.2 Data Flow Diagram

- In Data Flow Diagram,we Show that flow of data in our system in DFD0 we show that base DFD in which rectangle present input as well as output and circle show our system,In DFD1 we show actual input and actual output of system input of our system is text or image and output is rumor detected like wise in DFD 2 we present operation of user as well as admin.

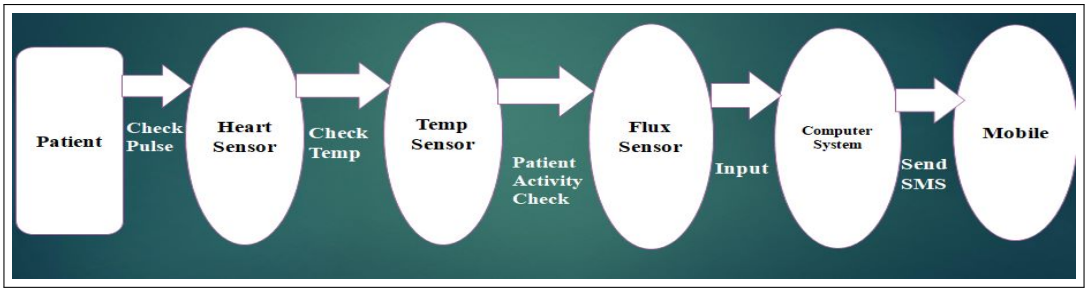

Figure 4.3: Data Flow 0 diagram

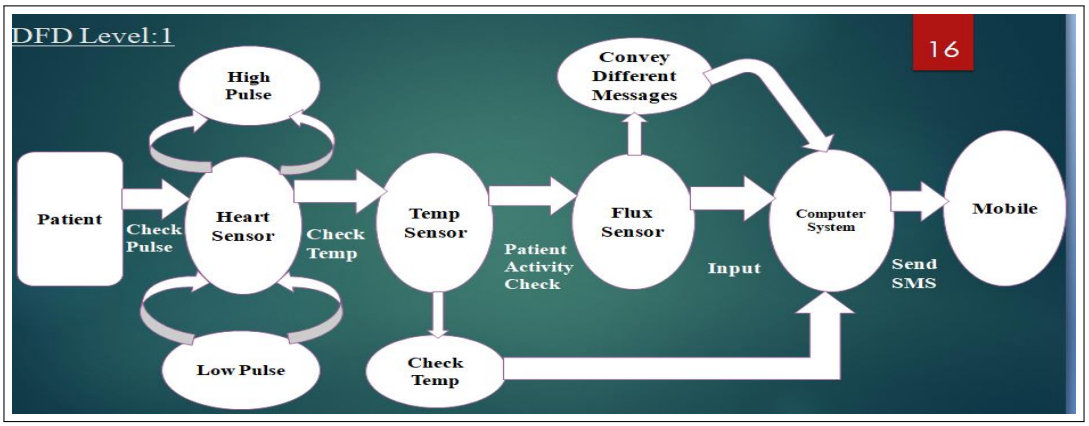

Figure 4.4: Data Flow 1 diagram

4.3 UML DIAGRAMS

Unified Modeling Language is a standard language for writing software blueprints.The UML may be used to visualize,specify, and document the artifacts of a softwar eintensive system.UML is process independent,although optimally it should be used in process that is use case driven,architecture-centric,iterative,and incremental.The Number of UML Diagram is available.
Use case Diagram.
Activity Diagram.
Sequence Diagram.
class Diagram.

4.3.1 Use Case Diagram

A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases and will often be accompanied by other types of diagrams as well. The use cases are represented by either circles or ellipses. circuit diagrams in a comprehensive way, understanding their purpose and what they consist of. Examples of circuit diagrams that showcase different circuit configurations and the symbols used in them are explained. We will also take a closer look at the components we often come across in circuit diagrams, such as resistors, capacitors, and switches, and explain how they are represented with symbols. By the end of this article, you'll have a solid understanding of circuit diagrams and how they represent electrical circuits. A use case diagram is used to represent the dynamic behavior of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a system/subsystem of an application. It depicts the high-level functionality of a system and also tells how the user handles a system.

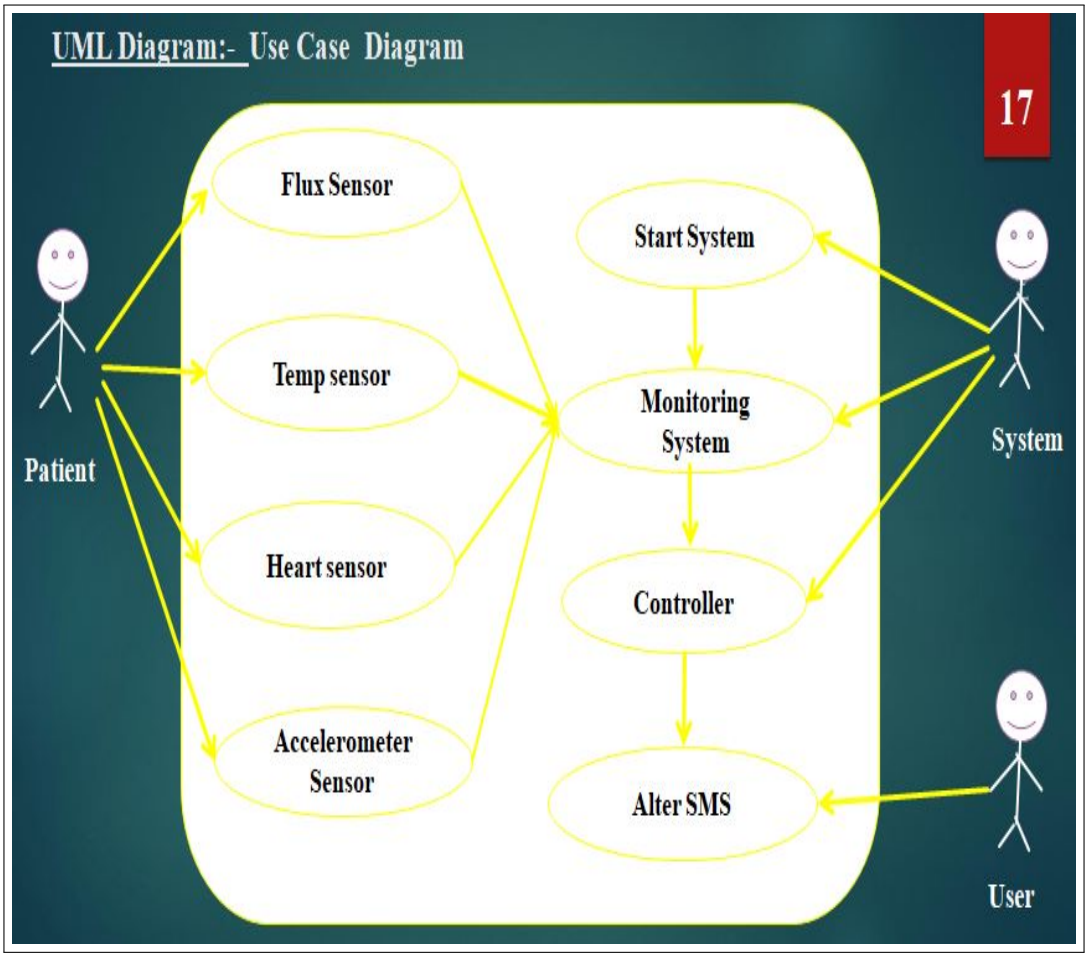

Figure 4.5: Use case Diagram

4.3.2 Activity Diagram

Activity diagrams are graphical representations of workflows of step wise activities and actions with support for choice, iteration and concurrency. In the Unified Modeling Language, activity diagrams are intended to model both computational and organizational processes (i.e workflows), as well as the data flows intersecting with the related activities. Although activity diagrams primarily show the overall flow of control they can also include elements showing the flow of data between activities through one or more data stores.

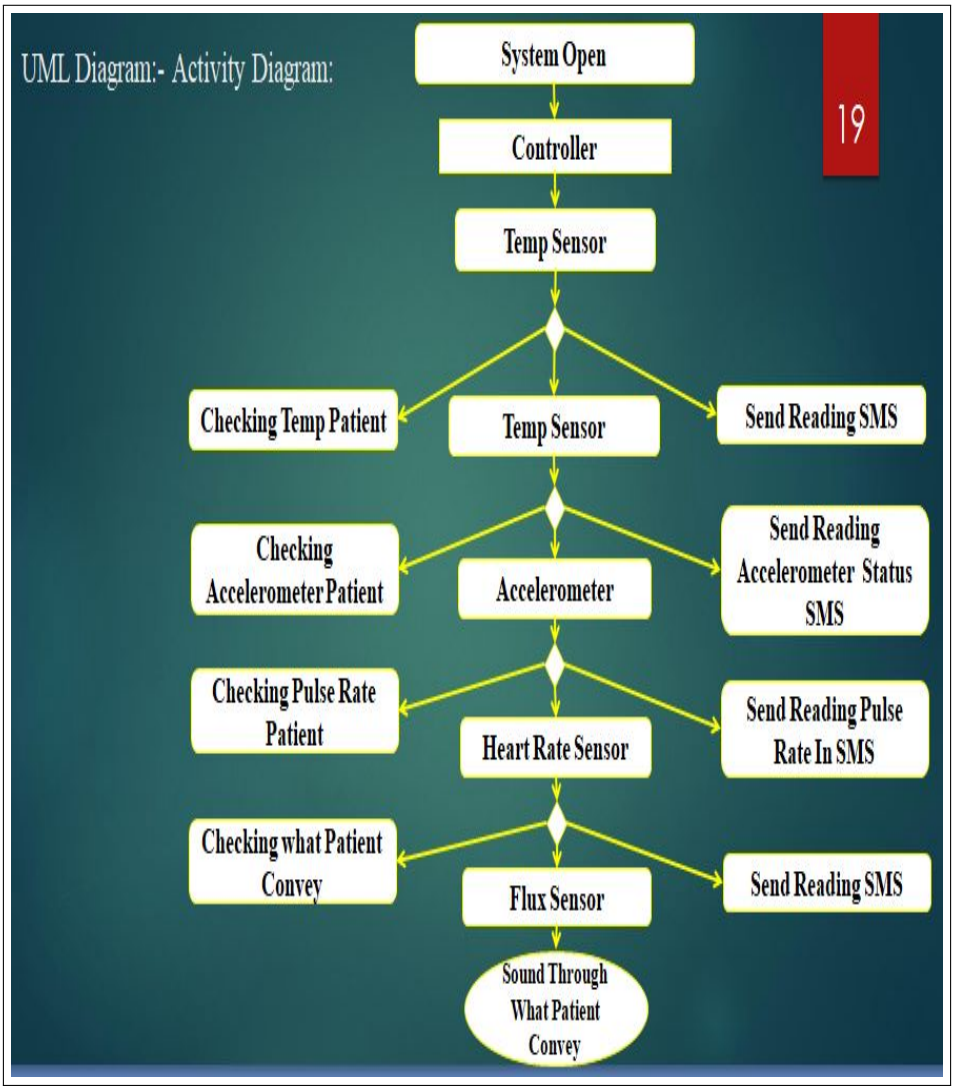

Figure 4.6: Activity Diagram

4.3.3 Class Diagram

In software engineering, a class diagram in the Unified Modeling Language (UML) is a type of static structure diagram that describes the structure of a system by showing the system's classes, their attributes, operations (or methods), and the relationships among objects.

The class diagram is the main building block of object-oriented modeling. It is used for general conceptual modeling of the structure of the application, and for detailed

modeling translating the models into programming code. Class diagrams can also be used for data modeling.[1] The classes in a class diagram represent both the main elements, interactions in the application, and the classes to be programmed.

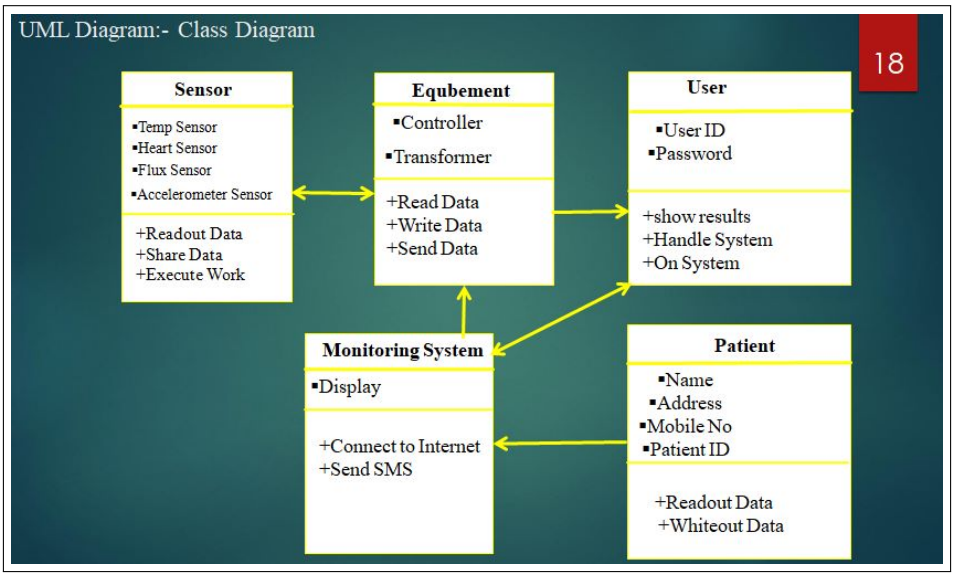

Figure 4.7: Class Diagram

Chapter 5

Benefits of automated Paralysis Patient Healthcare Monitoring System

5.1 Advantages

The main aim of this project is to help paralyzed patient to convey their mes- sage or need. The proposed system helps in communication for the paralyzed patients using simple hand gestures. The accelerometers are mounted on the gloves such that each accelerometer pertains to each finger.

5.1.1 Application

- health informatics, such as heart rate, blood oxygen level, blood pressure and temperature monitoring. .
- contactless payment and digital wallet applications.
- messaging and calling features, similar to those on a smartphone
- emergency calls for assistance if the watch detects the wearer has fallen.
- social media and other notifications from synchronized smartphone applica- tions

Chapter 6

Implementation

6.1 Algorithms And Methods Used

1. Setting up the Raspberry Pi

2.Running Python on the Raspberry Pi

6.2 Setting up the Raspberry Pi

Getting to Know the Raspberry Pi The Raspberry Pi is a single-board computer developed by the Raspberry Pi Foundation, a UK-based charity organization. Originally designed to provide young people with an affordable computing option to learn how to program, it has developed a massive following in the maker and DIY communities because of its compact size, full Linux environment, and general-purpose input–output (GPIO) pins.

With all the features and capabilities that are packed into this small board, there's no shortage of projects and use cases for the Raspberry Pi.

The Raspberry Pi 4 board contains the following components:

General-purpose input–output pins: These pins are used to connect the Raspberry Pi to electronic components.

Ethernet port: This port connects the Raspberry Pi to a wired network. The Raspberry Pi also has Wi-Fi and Bluetooth built in for wireless connections.

Two USB 3.0 and two USB 2.0 ports: These USB ports are used to connect peripherals like a keyboard or mouse. The two black ports are USB 2.0 and the two blue ports are USB 3.0.

AV jack: This AV jack allows you to connect speakers or headphones to the Raspberry Pi.

Camera Module port: This port is used to connect the official Raspberry Pi Camera Module, which enables the Raspberry Pi to capture images.

HDMI ports: These HDMI ports connect the Raspberry Pi to external monitors. The Raspberry Pi 4 features two micro HDMI ports, allowing it to drive two separate monitors at the same time.

USB power port: This USB port powers the Raspberry Pi. The Raspberry Pi 4 has a USB Type-C port, while older versions of the Pi have a micro-USB port.

External display port: This port is used to connect the official seven-inch Raspberry Pi touch display for touch-based input on the Raspberry Pi.

microSD card slot (underside of the board): This card slot is for the microSD card that contains the Raspberry Pi operating system and files..

6.2.1 Setting Up the Raspberry Pi

Unlike the Arduino, which requires only a USB cable and a computer to set up, the Raspberry Pi has more hardware requirements to get up and running. After the initial setup, though, some of these peripherals will no longer be required.

Required Hardware The following hardware is required for the initial setup of your Raspberry Pi. If you end up connecting to your Raspberry Pi over SSH, which you'll look at later in this tutorial, then some of the hardware below will not be needed after the initial setup.

Monitor You'll need a monitor during the initial setup and configuration of the operating system. If you'll be using SSH to connect to your Raspberry Pi, then you won't need the monitor after setup. Make sure your monitor has an HDMI input.

microSD Card Raspberry Pi uses a microSD card to store the operating system and files. If you buy a Raspberry Pi kit, then it will contain a preformatted microSD card for you to use. If you buy a microSD card separately, then you’ll need to format it yourself. Look for a microSD card with at least 16GB of capacity.

Keyboard and Mouse A USB keyboard and mouse are required during the initial setup of the Raspberry Pi. Once the setup is complete, you can switch to using Bluetooth versions of these peripherals if you prefer. Later in this tutorial, you’ll see how to connect to the Raspberry Pi over SSH. If you choose to connect this way, then a physical keyboard and mouse are not required after the initial setup.

6.2.2 Running Python on the Raspberry Pi

Running Python on the Raspberry Pi

Running Python on the Raspberry Pi One of the best things about working with Python on the Raspberry Pi is that Python is a first-class citizen on the platform. The Raspberry Pi Foundation specifically selected Python as the main language because of its power, versatility, and ease of use. Python comes preinstalled on Raspbian, so you'll be ready to start from the get-go. .

You have many different options for writing Python on the Raspberry Pi.

Using the Mu editor Editing remotely over SSH Let's start by looking at using the Mu editor to write Python on the Raspberry Pi.

Using the Mu Editor The Raspbian operating system comes with several preinstalled Python IDEs that you can use to write your programs. One of these IDEs is Mu. It can be found in the main menu:

Raspberry Pi Icon → Programming → Mu

When you open Mu for the first time, you'll be given the option to select the Python mode for the editor.

ThingSpeak site is a powerful platform that enables users to easily create and control IoT projects through a user-friendly interface. With Site, users can connect their IoT devices, such as sensors and actuators, to the app and remotely monitor and control them from anywhere in the world.

We have successfully set up a user profile for the smart helmet in the ThingSpeak application, allowing for seamless integration and notification functionalities.

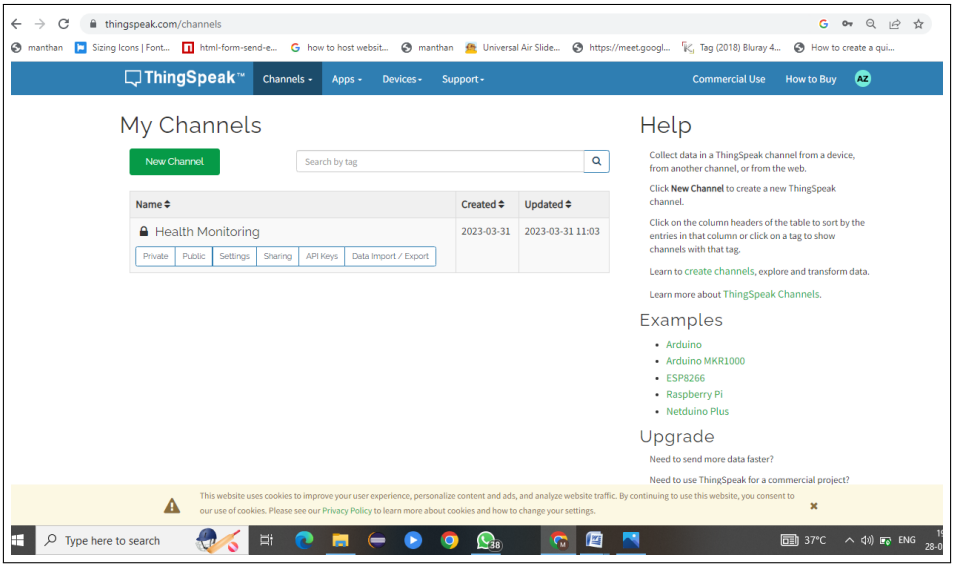

Figure 6.1: User-Interface-Profile

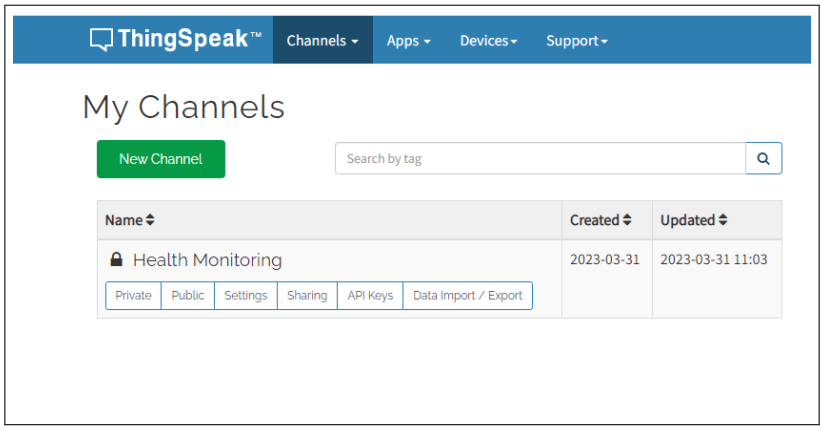

Figure 6.2: Channel Dashboard

The Tempreture Sensor has successfully detected the presence of alcohol, and the output is displayed on the ThingSpeak user interface in Graphically.

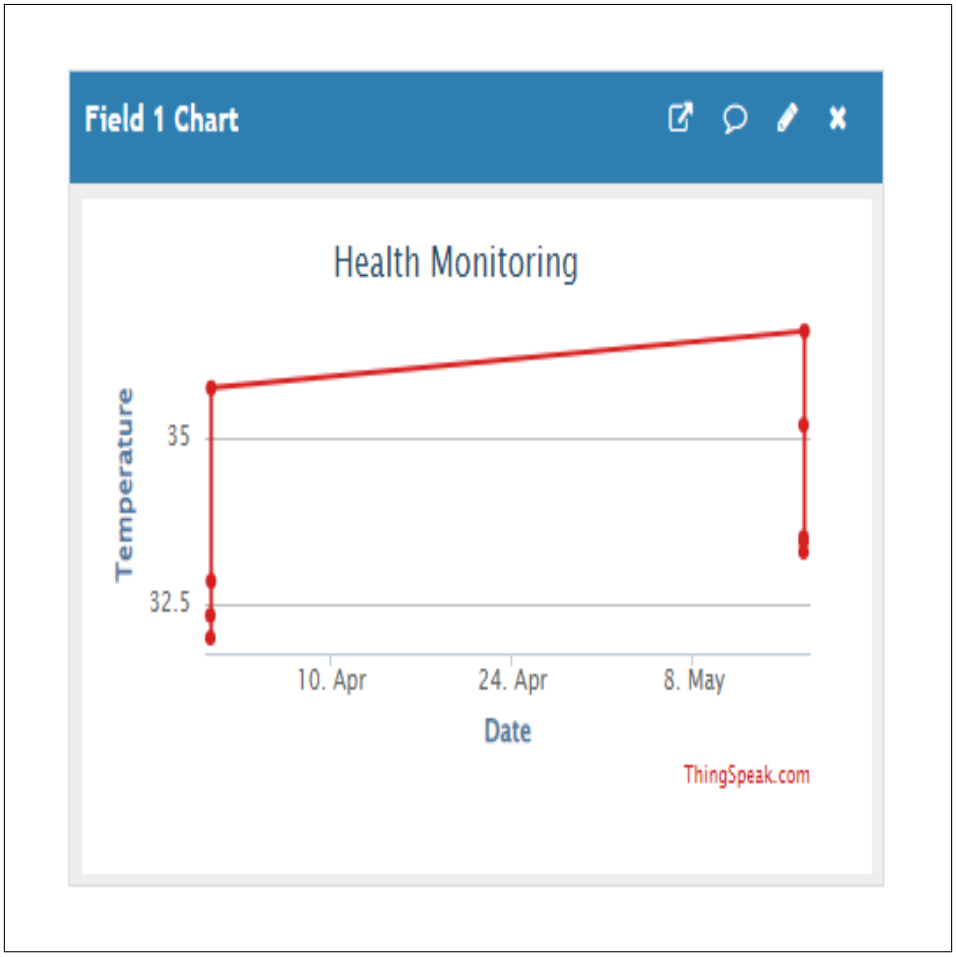

Figure 6.3: Tempreture Sensor Output

The Heart-Beat Sensor has successfully detected the current pulse rate of patient, and the output is displayed on the ThingSpeak user interface in Graphically.

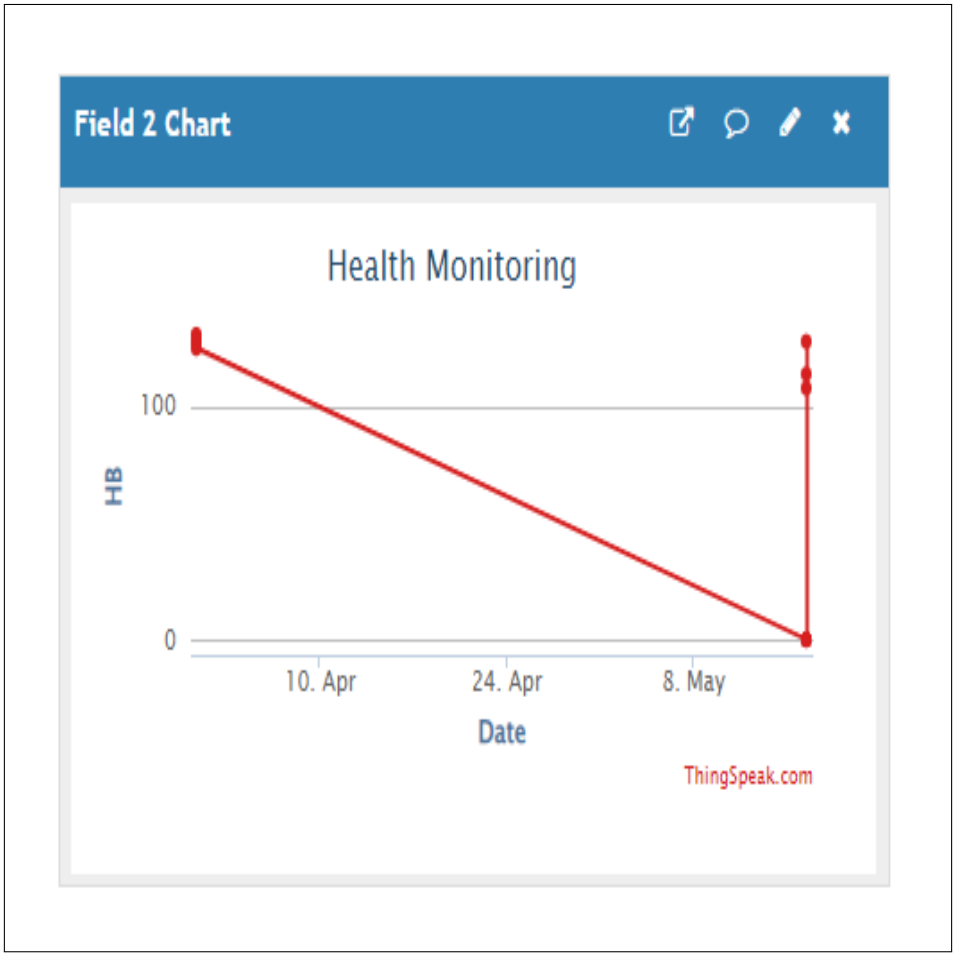

Figure 6.4: Heart-Beat Sensor Output

The SPo2 Sensor has successfully detected and reading on pulse oximeter show the percentage of oxygen level of patient, and the output is displayed on the ThingSpeak user interface in Graphically.

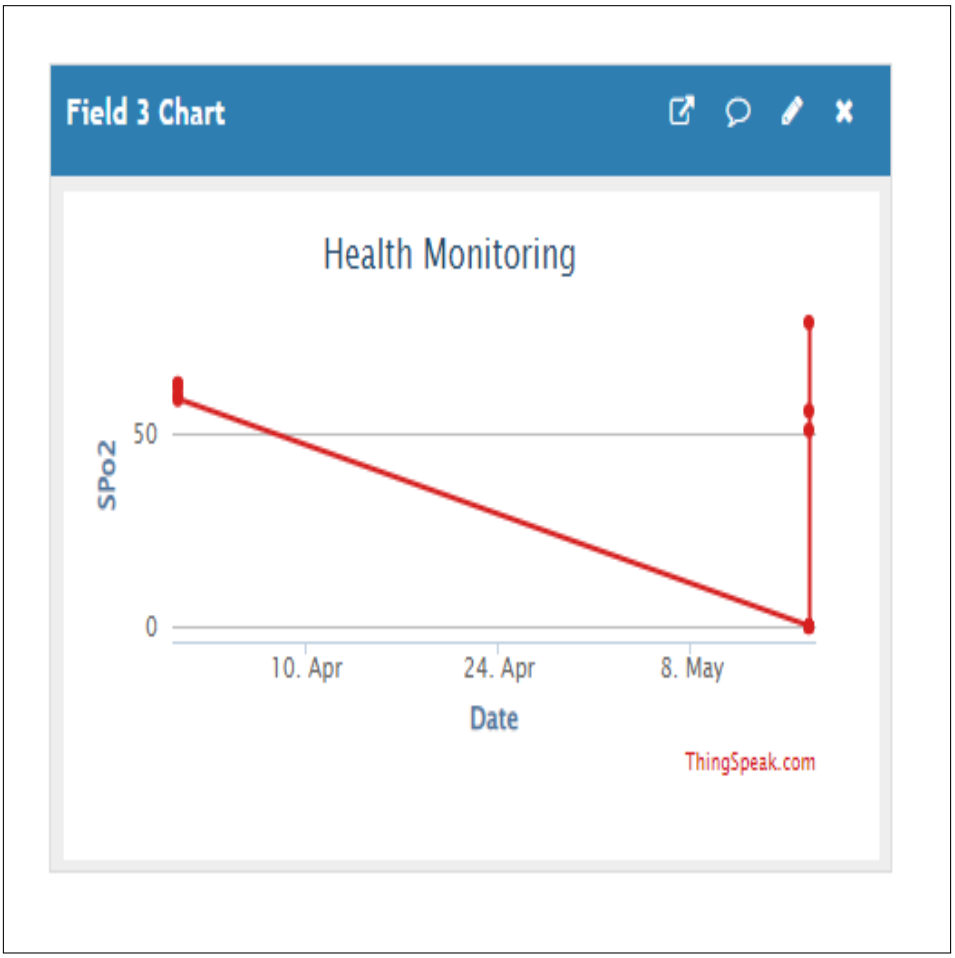

Figure 6.5: SPo2 Sensor Output

The SPo2 Sensor has successfully detected and reading on pulse oximeter show the percentage of oxygen level of patient, and the output is displayed on the ThingSpeak user interface in Graphically.

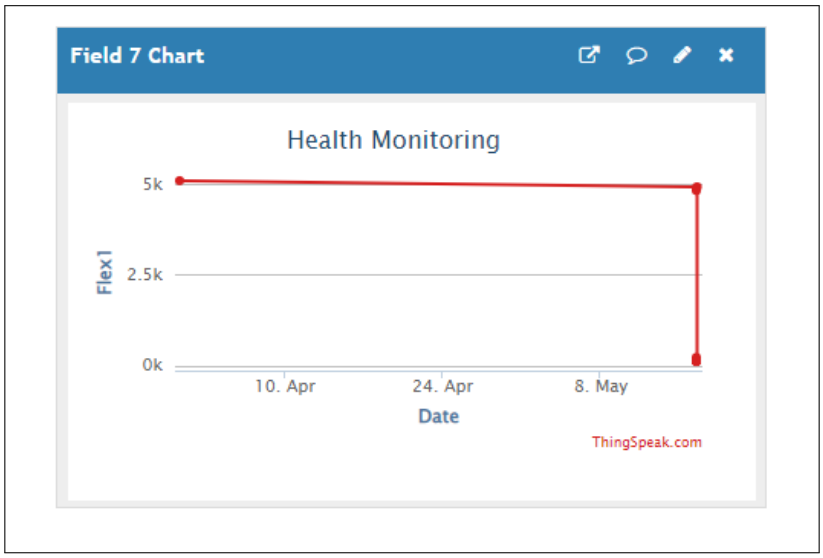

Figure 6.6: Flex Sensor1 Output

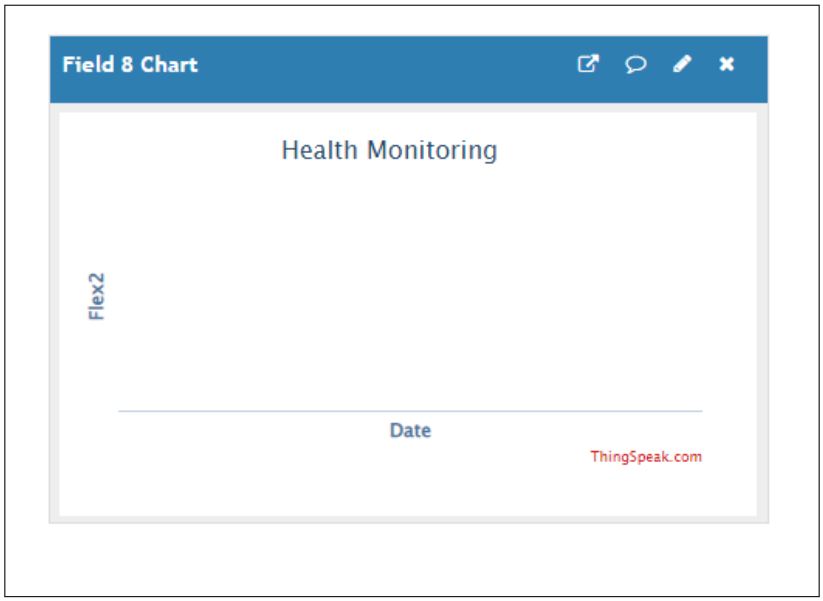

Figure 6.7: Flex Sensor2 Output

The Accumulator Sensor has successfully detected the Patient body fall detection and The notification message send to smart-phone regarding body Fall, and the output is displayed on the ThingSpeak user interface in Graphically X and Y Vertices.

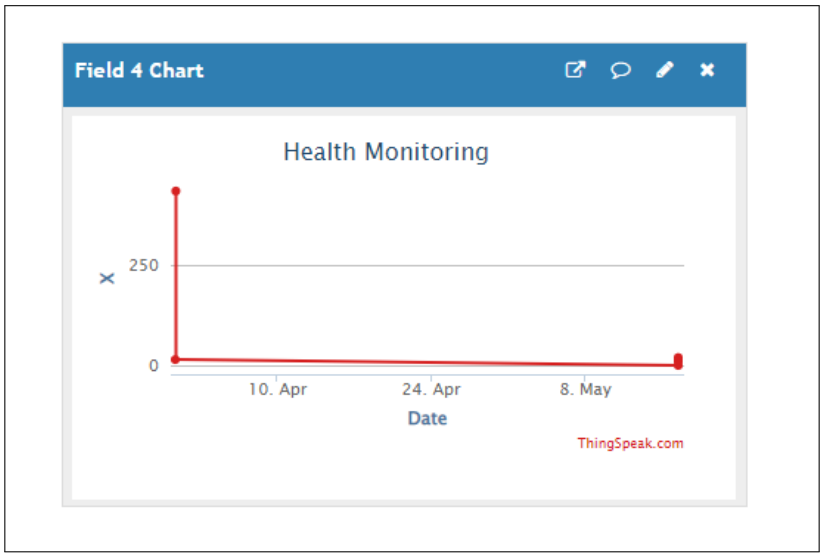

Figure 6.8: Body Fall Detection X Vertices

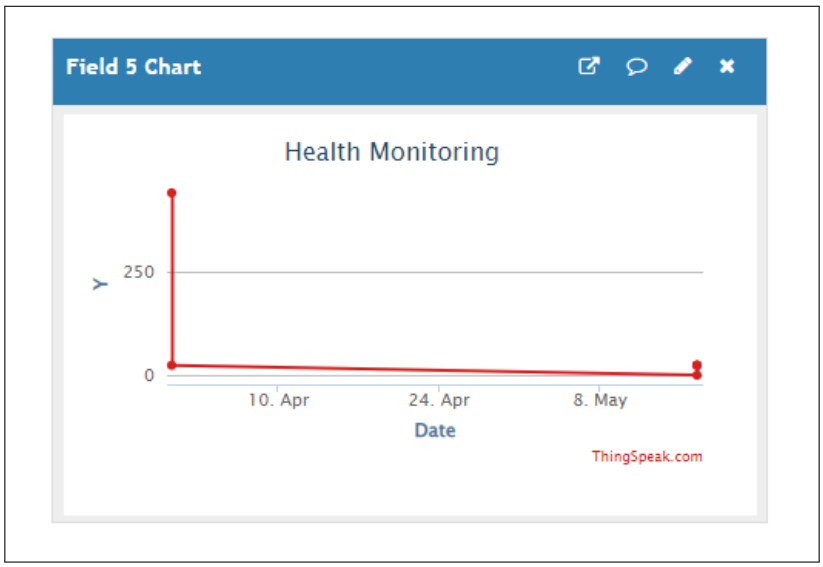

Figure 6.9: Body Fall Detection Y Vertices

The notification regarding Patient Fall detection and Location and position has been sent message to the smartphone to takecare person.

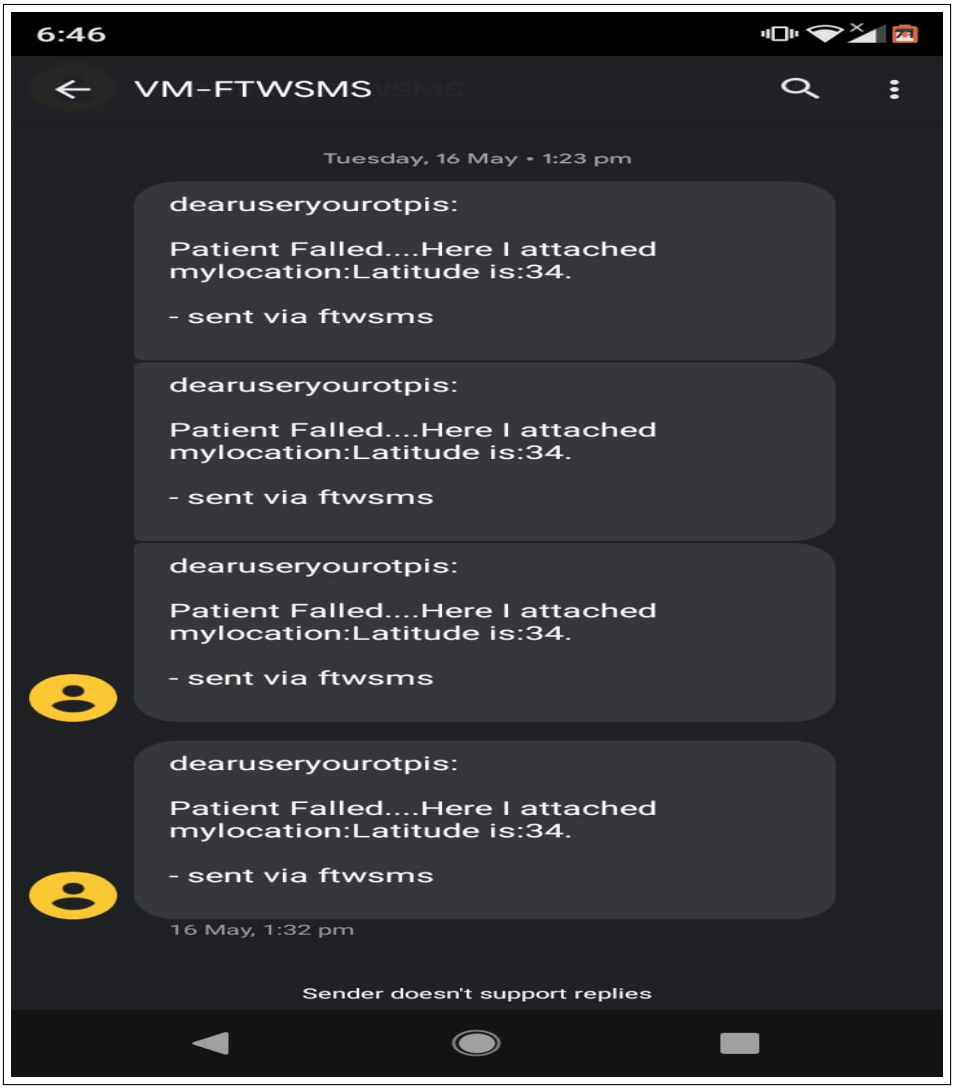

Figure 6.10: Notification Message On Smart-Phone

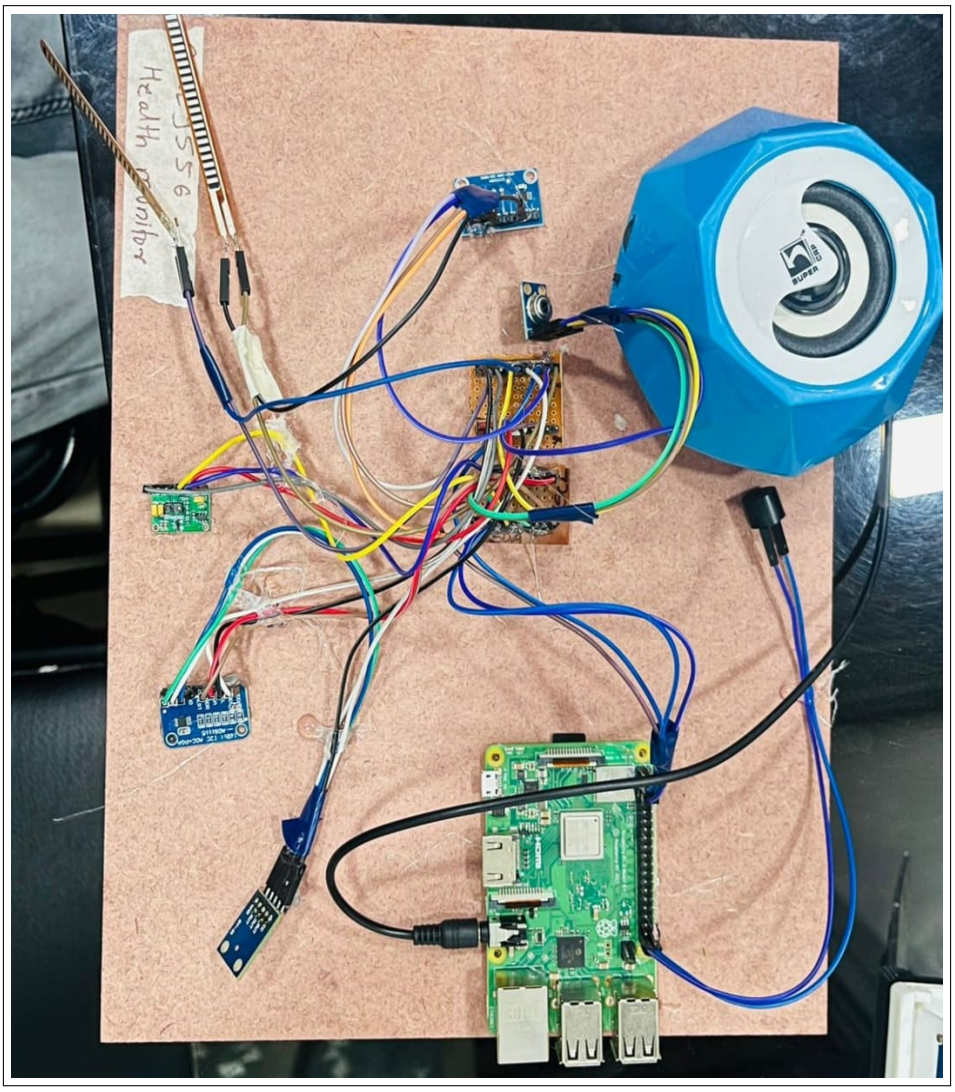

Figure 6.11: Healthcare Monitor System

Chapter 7

Result and Evalution

7.1 Testing modules for proposed system

1.system testing :

System Testing is a type of software testing that is performed on a complete integrated system to evaluate the compliance of the system with the corresponding requirements. In system testing, integration testing passed components are taken as input. The goal of integration testing is to detect any irregularity between the units that are integrated together. System testing detects defects within both the integrated units and the whole system. The result of system testing is the observed behavior of a component or a system when it is tested. System Testing is carried out on the whole system in the context of either system requirement specifications or functional requirement specifications or in the context of both. System testing tests the design and behavior of the system and also the expectations of the customer. It is performed to test the system beyond the bounds mentioned in the software requirements specification (SRS). System Testing is basically performed by a testing team that is independent of the development team that helps to test the quality of the system impartial. It has both functional and non-functional testing. System Testing is a black-box testing. System Testing is performed after the integration testing and before the acceptance testing..

2. Component testing:

Component testing is defined as a software testing type, in which the testing is performed on each individual component separately without integrating with other components. It's also referred to as Module Testing when it is viewed from an architecture perspective. Component- based usability testing is a testing approach which aims at empirically testing the usability of an interaction component. The latter is defined as an elementary unit of an interactive system, on which behaviour-based evaluation is possible.

3. Integration testing:

Integration testing is a level of software testing where individual units are combined and tested as a group. The purpose of this level of testing is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in Integration Testing. Integration testing is the phase in software testing in which individual software modules are combined and tested as a group. Integration testing

is conducted to evaluate the compliance of a system or component with specified functional requirements. It occurs after unit testing and before validation testing. As discussed above, it helps in identifying integration issues between the modules. It helps in ensuring that the integrated modules work properly before moving to the system testing of the complete application. Bugs found at this level are easier to resolve as compared to the one found at later stages of testing – system and acceptance testing. It improves test coverage and provides an additional level of reliability.

7.2 Analysis of System

7.1

ID.	PARAMETER	EXISTING SYSYTEM	PROPOSED SYSTEM
1	Alert Notification	Notification is Transferred through the GSM	Transferred through inbuilt Wi-Fi of the Raspberry-pi
2	Location efficiency	Location is not precise	Longitude and Latitude gives precise and accurate location
3	Temperature Sensor	Low Frequency	High Frequency as temperature sensor faster as service
4	Accumulator Sensor/Body fall detection notification Message	User does not get message that the time of patient body fall detection rider is drunk	User gets notification message that the time of patient body fall detection
5	Data Transfer to the Raspberry-pi	Radio Frequency is used to transmitted the data	Wi-Fi transmits the data to the micro controller

Table 7.1: Analysis of System

7.3 Testing

Software testing methods are traditionally divided into white box testing and black box testing. These two approaches are used to describe the point of view that a test engineer takes when designing test cases. Testing a project or any software system forms the backbone of a good software system. Tests are conducted on the software to find out errors and bugs and remove them. Test plans are created with a view to remove errors that can plague or hamper the project in case the errors are encountered in runtime environment. A good test plan is created with a view to try to disintegrate a system to find out yet undetected errors and to correct them. Testing of software is done at each module and also at the macro level, that is, on integration of the entire package as a whole. A good test plan is the one which can detect maximum number of errors or bugs in the software system. Testing helps in enhancing the overall quality of the product as it helps in removal of errors which in turn increase its quality

7.3.1 Goals and Objective of testing

As said earlier, a good test plan is made with a view to find the maximum number of errors. The goals and objectives to be taken into consideration while testing any software system are as follows:

1. Extensive testing must be done with a view to uncover maximum number of errors.

2. Try to break down the system by giving it a variety of values with a view to find hidden bugs.

3.Testing every module in the project at the internal level as well as the boundary level.

4. Using various testing tools and strategies like black box and white box testing.

5. Removing errors and testing again for any unforeseen changes in the entire software product.

7.4 Diffrent testing tools

Software testing tools are required for the betterment of the application or software. That’s why we have so many tools available in the market where some are opensource and paid tools.

The significant difference between open-source and the paid tool is that the open-source tools have limited features, whereas paid tool or commercial tools have no limitation for the features. The selection of tools depends on the user’s requirements, whether it is paid or free.

The software testing tools can be categorized, depending on the licensing (paid or commercial, open-source), technology usage, type of testing, and so on. With the help of testing tools, we can improve our software performance, deliver a high-quality product, and reduce the duration of testing, which is spenton manual efforts.

The software testing tools can be divided into the following:

1.Test management tool

2.Bug tracking tool

3.Automated testing tool

4.Performance testing tool

5.Cross-browser testing tool

6.Integration testing tool

7.Unit testing tool

8.Mobile/android testing tool

9.GUI testing tool

10. Security testing tool

7.5 .Scope of testing

involves a very broad scope and has many advantages. Proper testing can help previously uncovered errors which may have been harmful to the proper working of the system. Thus, a good testing strategy would be to have a number of test plans for each individual module and then to rigorously t4est the entire software product as a whole. A good testing strategy helps in eliminating errors and the overall quality of the software is increased. The scope of a test defines what areas of a customer's product are supposed to get tested, what functionalities to focus on, what bug types the customer is interested in, and what areas or features should not be tested by any means. Test Scoping

1. Categorize the type of test to be completed.
2. Identify project stakeholders.
3. Identify indicators of test success.
3. Estimate the resources required to complete the test.
4. Identify risks.
5. Identify the timeline for completion.

7.6 Black Box testing

Black box testing treats the software as a ”black box”—without any knowledge of the internal implementation. Black box testing methods include: equivalence partitioning, boundary value analysis, fuzz testing, all-pairs testing, modelbased testing, specification-based testing, traceability matrix and exploratory testing

7.6.1 Specification Based Testing

Specification-based testing aims to test the functionality of software according to applicable requirements. Thus, the tester inputs data into, and only sees the output from, the test object. This level of testing requires thorough test cases to be provided to the tester, who then can simply verify that for a given input, the output value, either ”is” or ”is not” the same as the expected value specified in the test case. Specification-based testing is necessary, but it is not sufficient to guard against certain risks.

7.6.2 Advantages and Disadvantages

The black box tester has no any bonds with the code, and a tester’s perception is very simple: a code must have bugs. It uses the principle, ”Ask and you shall receive,” black box testers find bugs where programmers do not find bugs. But, on the other hand, black box testing has been said to be ”like a walk in a dark labyrinth without a flashlight,” cause the tester doesn’t know about how the software is being tested was actually constructed. As a result, there are some situations when a tester writes many test cases to check something that could have been tested by only one test case, and/or some parts of back-end are not tested at all. Therefore, black box testing has the one advantage of ”an unaffiliated opinion,” on the one hand, and the disadvantage of ”blind exploring,” on the other.

7.7 White Box testing

White box testing is when the tester has access to the algorithms internal data structures including the code that implement these. A level of white box test coverage is specified that is appropriate for the software being tested. The white box and other testing uses automated tools to instrument the software to measure test coverage.

The following types of white box testing exist:

1. API testing (application programming interface) - Testing of the application using Public and Private APIs

2.Code coverage - creating tests to satisfy some criteria of code coverage (e.g.,the test designer can create tests to cause all statements in the program to be executed at least once)

3.Fault injection methods - improving the coverage of a test by introducing faults to test code paths

4.Static testing - White box testing includes all static testing Code completeness evaluation White box testing methods can also be used to evaluate the completeness a test suite that was created with black box testing methods. That allows the software team to examine parts of a system that are rarely tested and ensures that the most important function points have been tested

Two common forms of code coverage are:

1. Function coverage, which reports on functions executed

2. Statement coverage, which reports on the number of lines executed to complete the test they both return a code coverage metric, measured as a percentage.

Advantages of White-box testing 1. A side effect of having the knowledge of the source code is beneficial to thorough testing.

Disadvantages of white-box testing:

1. White-box testing brings complexity to testing because the tester must have knowledge of the program, including being a programmer. White-box testing requires a programmer with a high level of knowledge due to the complexity of the level of testing that needs to be done.

7.8 Types of white Box testing

1. API testing (application programming interface) - Testing of the application using Public and Private APIs

2.Code coverage - creating tests to satisfy some criteria of code coverage (e.g.,the test designer can create tests to cause all statements in the program to be executed at least once)

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5.Path Testing - Path Testing is a white-box testing approach based on a program’s control structure. A control flow graph is created using the structure, and the different pathways in the graph are tested as part of the process. Because this testing is dependent on the program’s control structure, it involves a thorough understanding of the program’s structure.

6.Conditional Testing - In this type of testing, the logical conditions for every value are checked, whether it is true or false. This means that both the if and else conditions are verified, in the case of an IF-ELSE conditional statement.

7.9 User acceptance testing

User Acceptance Testing (UAT) is a type of testing performed by the end user or the client to verify/accept the software system before moving the software application to the production environment. UAT is done in the final phase of testing after functional, integration and system testing is done. User acceptance testing (UAT), also called application testing or end-user testing, is a phase of software development in which the software is tested in the real world by its intended audience.

The main Purpose of UAT is to validate end to end business flow. It does not focus on cosmetic errors, spelling mistakes or system testing. User Acceptance Testing is carried out in a separate testing environment with production-like data setup. It is kind of black box testing where two or more end-users will be involved.

7.9.1 Need of User Acceptance Testing

1. Developers code software based on requirements document which is their “own” understanding of the requirements and may not actually be what the client needs from the software.

2.Requirements changes during the course of the project may not be communicated effectively to the developers.

7.10 Test Case

7.2

Test Case ID.	Test Case Description	Expected Result	Actual Result	Final Test Result
1	Flex Sensor Test	The Flex Sensor Successfully Connected to system	Flex Sensor Connected to module	Pass
2	Acc. Sensor Test	The Accumulator sensor should connected to Raspberry-pi	Accumulator Sensor Should not connected to Raspberry-pi	Fail
3	Heart-Beat Sensor Test	Heart-Beat Sensor the correct H-B count of the patient	Heart-Beat Sensor are not given to current count of patient H-B	Fail
4	Temp. Sensor Test	The sensor detect the current temperature of patient	1-25 = Low 25-40 = Medium 40-50 = High	Pass
5	Emer. Alert Message Test	Whenever patient body are fall then it will send to the message take care persont	Patient Fall....Latitude:20 Longitude:34	Fail
6	Flex Sensor 1 Test for sound test	Test Flex Sensor 1 to system it is successfully connected and work	Sound Throw the voice like that “I Need To Go Washroom	Pass
7	Acc. Sensor/body fall detection for Y vertices	Test Accumulator Sensor to system it is successfully connected and work	Patient Falled.... Here I attached mylocation: Latitude is: 34	Pass

Table 7.2: Test Case

Chapter 8

Conclusion And Future Scope

8.1 Conclusion

The wearable landscape is in constant change. New devices and brands are released every year, promising improved measurements and user experience. At the same time, other brands disappear from the consumer market for various reasons. Advances in device quality offer new opportunities for research. However, only a few well-established brands are frequently used in research projects, and even less are thoroughly validated. With this project, we conclude that this system is going to be very helpful for athlete,for the people who wants to monitor the health parameters

All in all, this project achieved a lot of its goals. The project implemented a low cost, low power, LCD pulse rate display system using microcontroller technology. Lists of accomplishments include portability, reliability and analog to digital conversion and also the system is easily accessible.

Our system successfully proves that this system is an excellent approach to be implemented at hospitals for patient-nurs communication.

The ease of message conveyance is the main advantage of this system along with the real time user defined medicine alarm. By implementing this system, a simple device for paralyzed or disabled people can be achieved without the use of complex form of inputs. can also be transmitted to the nurse so that a real time record of all the patients is maintained.

8.2 Future Scope

The wearable landscape is in constant change. New devices and brands are released every year, promising improved measurements and user experience. At the same time, other brands disappear from the consumer market for various reasons. Advances in device quality offer new opportunities for research. However, only a few well-established brands are frequently used in research projects, and even less are thoroughly validated. With this project, we conclude that this system is going to be very helpful for athlete,for the people who wants to monitor the health parameters

Recommendation for future works is to fitness is a measure of human being's healthy status. People pursue fit lives through various ways such as reasonable nutrition, regular exercise and sufficient sleep.

Fitness is improving through smart wearable's more and more popularly with the prevalence of Internet of Things and smart phones

Appendix A

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Appendix B

Publication And Certification

Sr No.	Paper ID	Paper Title	Paper Link
1	IJSRDV11—20206	"Automated paralysis patient healthcare monitoring system"	ijsrd.com/articles/ IJSRDV11I20206.pdf

Automated Paralysis Patient Healthcare Monitoring System Using IoT

Prof.A.N Kalal[1] Manthan Jadhav[2] Aniket Zanje[3] Pavan Jadhav[4] Vishnu Rathod[5]

[1,2,3,4,5]Department of Information Technology

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Abstract — Fitness is a metric that assesses a person's overall health. People are pursuing healthy lives in many ways, such as decent eating, frequent exercise, and adequate sleep, as more people emerge from poverty. With the rise of the Internet of Things and smart phones, fitness is becoming increasinglypopularthroughsmartwearable's.Electronicsareincreasinglybeing employed in clothes nowadays, making it smart and fashionable at the same time. Them a in goal of this project is to create as mart wear able fitness monitoring system that will aid athletes and regular individuals who need to keep track of their health when exercising, yoga, meditation, or jogging. This technique will assist them in keeping track of their health and increasing the effectiveness of their everyday workouts. As a result, the idea offers a system that may provide information on our fitness, such as the amount of calories burnt. Health care is a major concern in our people. In the rising technology, the Internet of Things (IoT) technology, captivate everyone's attention towards it for its potential to change the traditional health care system and to resolve the problem caused by the rise aging population and the continuing increase in chronic illness in the health care system. This paper mainly study about the conventional healthcare system which is used in past for providing healthcare services and the convergency of a new technology named IoT in the health care system to update the way of treating patients. This paper outlines how IoT has modified the traditional way of healthcare monitoring and make the services fast and efficient in a smarter way. In the end a research study has done on various IoT based healthcare monitoring system and farther more, a connection is made between these IoT based healthcare systems represent their goodness and weakness. Using ML we analysis health of person.

Keywords: Raspberry Pi, Temperature sensor, Heartbeat, Fall Detection, Flux Sensor

I. Introduction

It has been scientifically proven that people of all ages and conditions that regularly practice physical activity and sports benefit from a wide range of physical, social and mental health benefits. Fitness increases productivity, interacts positively with diet, enhances functional capacity, promotes social interaction, and reduces health care costs. Companies and researchers worldwide are devoting an increasing attention to sports, fitness and physical activities. Anathlete always needs to monitor, watch and record our daily burned and step counts, body temperature. Self-tracking allows them or normal people to stick toa healthier diet, exercise more and sleep better. Regular use of fitness tracker boosts your daily work outs and makes the machievable.[1] The main motivation of this project is to design a smart wearable fitness monitoring device which will help the athlete, normal people who need to monitor their health during exercise, yoga , running. This system will help them to monitor their health and boosts their daily work outs and makes them achievable. These people in most cases are not able to give their needs as they are neither able to speak well nor do they give through sign language due to loss in motor control by their brain. In such a case we propose a system that helps damage person in displaying a message over the LCD by just simple motion of any part of his body which has motion abilities. This system also takes care of the condition wherein no one is present to attend the patient and thus sending a message through GSM of what he wants to give. If there was no one to manage to the message displayed on the LCD, the patient can choose to tilt the device for some more number of time which will trigger an SMS to be sent by a GSM modem to the registered care taker of the patient with the message that the patient wants to give.

II. Proposed Method

Our proposed method is based on automating the method of gathering patients data via sensors connected to medical devices and conveying this information to the medical center cloud for the purpose of storage and processing using Raspberry Pi. The proposed method of patient health monitoring system is to monitor patient's body temperature, heart rate using Raspberry Pi. The temperature sensor senses the temperature from the patient's body and sends the information to the Raspberry

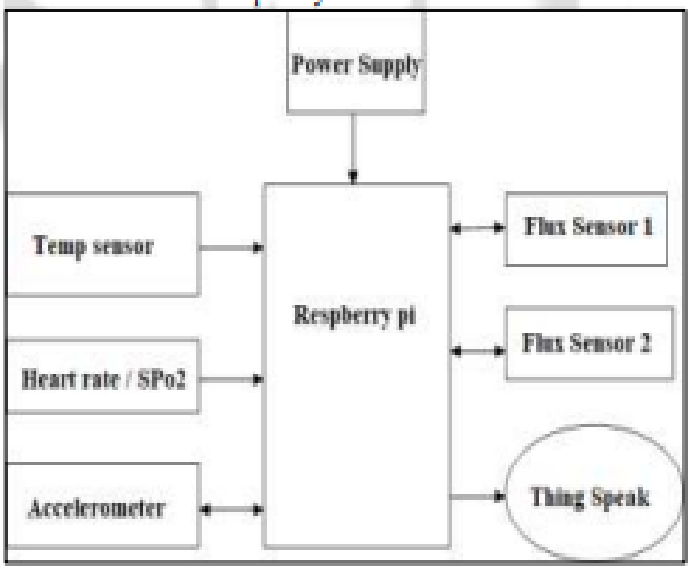

Fig. 1: Block diagram of Healthcare Monitoring System

The heart Rate sensor collect the heart beat from the patient, the information obtained from the heart beat sensor is in the analog form,in order to convert it into digital form Analog-to-Digital Converter is used. This obtained Digital output send to the Raspberry Pi. The output obtained from Raspberry Pi is displayed at the HDMI display and also the values are displayed in the LCD display. This Systemis made to avoid urgent situations and treatment on time and instantly. When abnormal data is announce, message will be transfer doctor's mobile. And it can avoid error and handle urgent situation. It also gives advantage that it reduces time laps between situation and their alert to doctor, that means doctor will know situation as immediately it happens.

III. IMPLEMENTATION METHODOLOGY

A. Hardware Description

This deals with the physical entity used in the system. The heart of the system is Raspberry Pi, which controls and monitors theoverall behavior of the system. The Hardware's are

1) Heart Beat Sensor
2) Raspberry Pi 3
3) Temperature Sensor
4) Accelerometer Sensor
5) LCD Display

1) Heart Beat Sensor (TCRT1000):

The Heart Beat Sensor is based on the principle of photo plethysmography. It count the variation in the volume of blood through any regions of the body which element a change in the light intenseness through that region (a vascular region).When the index finger is placed on the heart beat sensor, the form in an optical control place when the light falls on the index finger is scattered or absorbed by the pathway through the blood as the changein heartbeat.

2) Raspberry Pi:

This powerful credit - card sized single board computer can be used for many applications and supersedes the original Raspberry Pi Model B+ and Raspberry Pi 2 Model B. Raspberry pi 3 is a credit card size single board computer along 40 pin extended GPIO, Broad cam BCM2387 chipset, 1.2GHz Quad-core ARM Cortex-A53(64Bit), 802.11 B/G/N Wireless LAN and Bluetooth 4.1, GPU(Dual Core Video Core IV Multimedia Co-Processor), Camera connector, Display connector, Memory card slot,1GB LPDDR2 memory, Ethernet port, USB host, Micro HDMI on it. Raspberry pi3 is a general cause computer normally with Linux OS.

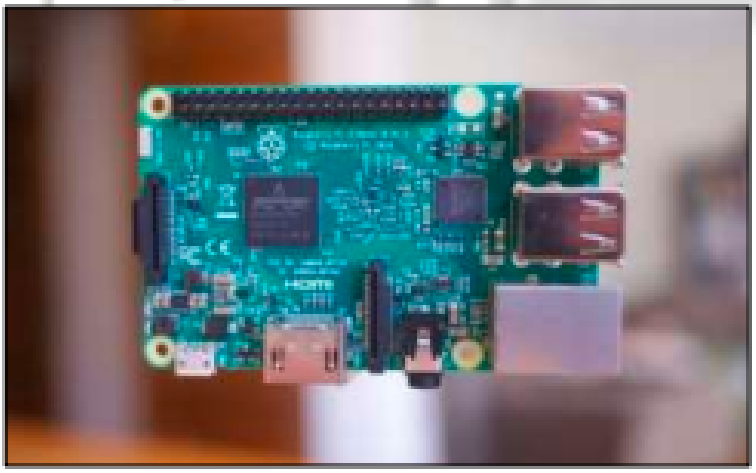

Fig. 2: Raspberry Pi 3 B Model

The Raspberry Pi is the Third generation Raspberry Pi as shown in Fig. 2. It has 10/100 Base Ethernet socket to quickly connect the Raspberry Pi to the Internet and Micro USB power source socket with 5V voltage and 2A current. The Raspberry Pi board proceed equipped with an SD card. This slot permits us to put an SD card and that can use it as our tools. The SD cardis a main storage tool for Raspberry Pi board like a hard disk of a personal computer.

3) Temperature Sensor (DHT11):

The DHT11 sensor is digital temperature and humidity sensor. It is very popular as it is very cheap but still providing great successful result. The temperature ranges from0 to 50 degrees Celsius with+/- 2degrees accuracy. And the Humidity range is from 20 to 80% with 5% accuracy. The sampling rate is 1Hz or one reading all second. The operating voltage is 3 to 5 volts, the max present used when measuring is 2.5mA. It includes humidity measurement component in order to scale the humidity and an NTC temperature measurement component for scale Temperature. It offers best quality, fast response, anti-interference ability and cost-efficacy.

4) Accelerometer Sensor (ADXL345):

The recently introduced ADXL345 is an iMEMS 3-axis accelerometer with digital output.It features a selectable ±2-g, ±4-g, ±8-g, or ±16-g measurement range, resolution of up to 13 bits; fixed 4mg/LSB sensitivity; a tiny 3mm × 5mm × 1mm package, ultralow power consumption (25 µA to 130 µA). iMEMS semi semiconductor technology combines micromechanical structures and electrical circuits on a single silicon chip. Using this technology, iMEMS accelerometers sense acceleration on one, two, or even three axes, and give analog or digital outputs. Depending on the application, the accelerometer may offer different ranges of find, from several g to tens of g. Digital versions may even have several interrupt modes. These features offer the user suitable and flexible solutions.

5) LCD Display:

Liquid Crystal Display a type of display used in digital watches and many portable computers. It is utilized to display the measured data. In this project 16 x 2 Alphanumeric Display are used, it can display two lines with maximum of 16 attribute in one line. A 16x2 LCD means it can display 16 aspect per line and there are 2 such lines. In this LCD all attribute is displayed in 5x7 pixel matrix.

This LCD has two registers, that is, Command and Data. Liquid Crystal Display has the distinct pros of having low power utilization than the LED. The command register stores the command order given to the LCD. A command is an order given to LCD to do a decided task like initializing it, clearing its screen, setting the cursor position, controlling display etc.

B. Software Description

It deals with the Raspbian Operating System (OS) that is utilized in the Raspberry Pi, python language such used for programming of Raspberry Pi and putty simulator.

1) Python:

Python is an interpreted, object oriented, high-level programming Language with dynamic definition. Its high-levelbuilt in data structures, combined with dynamic typing and dynamic binding makes it very attractive for Rapid Application Development, also for use as a scripting or glue language to connect existing components together. Python's simple, easy tolearn syntax emphasizes clarity and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourage modularity and code reuse. The python Convert and the large standard library are available in source or binary form without charge for all major platforms, and can be freely delivery. Python 2.7 version, like pre- installed in Raspbian OS, is applied in the project for programming of Raspberry Pi.

2) Putty Simulator:

The name "Putty" has no explicit meaning. Putty was originally written for Microsoft Windows, but it has been

Automated Paralysis Patient Healthcare Monitoring System Using IoT
(IJSRD/Vol. 11/Issue 2/2023/074)

V. APPLICATION

- health informatics, for example heart rate, blood oxygen level, blood pressure and temperature monitoring;
- contactless payment and digital wallet applications;
- messaging and calling features, similar to those on a smart phone;
- emergency calls for helper if the watch detects the wearer has fallen;
- social media and other notifications from synchronized smart phone applications;
- games, music, photos and other entertainment options; location features, for example maps, a compass and an altimeter;

VI. CONCLUSION

The wearable landscape is in constant change. New devices and brands are expressed every year, Hopeful improved measurements and user experience. At the same time, other brands dissipate from the consumer market for various reasons. Improve in device quality offer new opportunities for research. However, only a few well-established brands are frequently used in research projects, and even less are in depth validated.

With this project, we conclude that this system is going to be very helpful for athlete, for the people who wants to monitor the health parameters.

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are engaged for data that would be completely loaded into

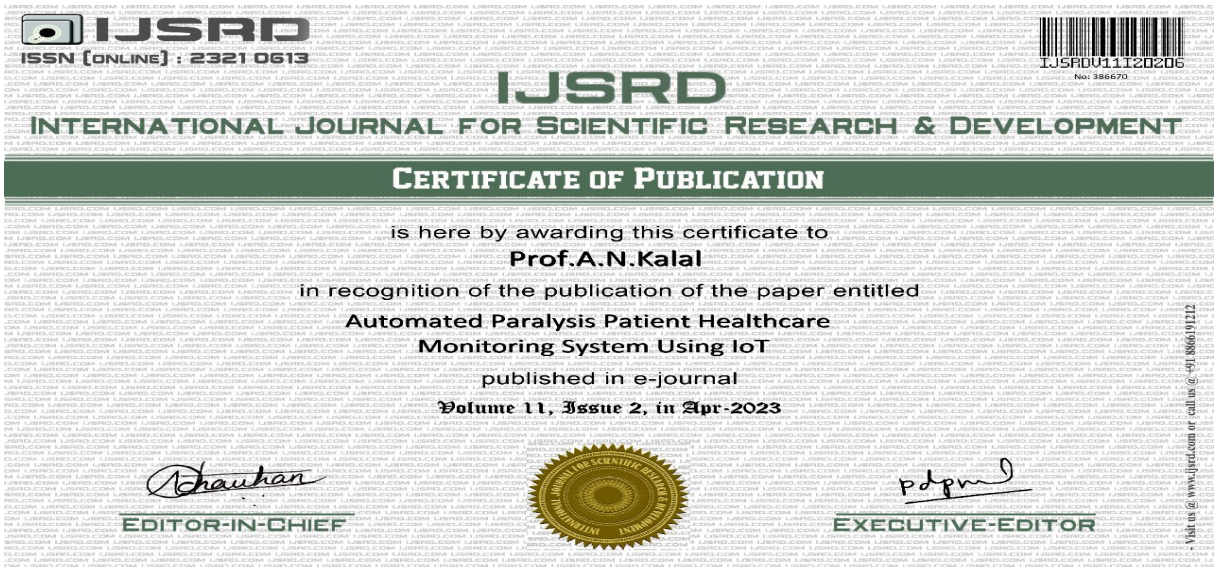
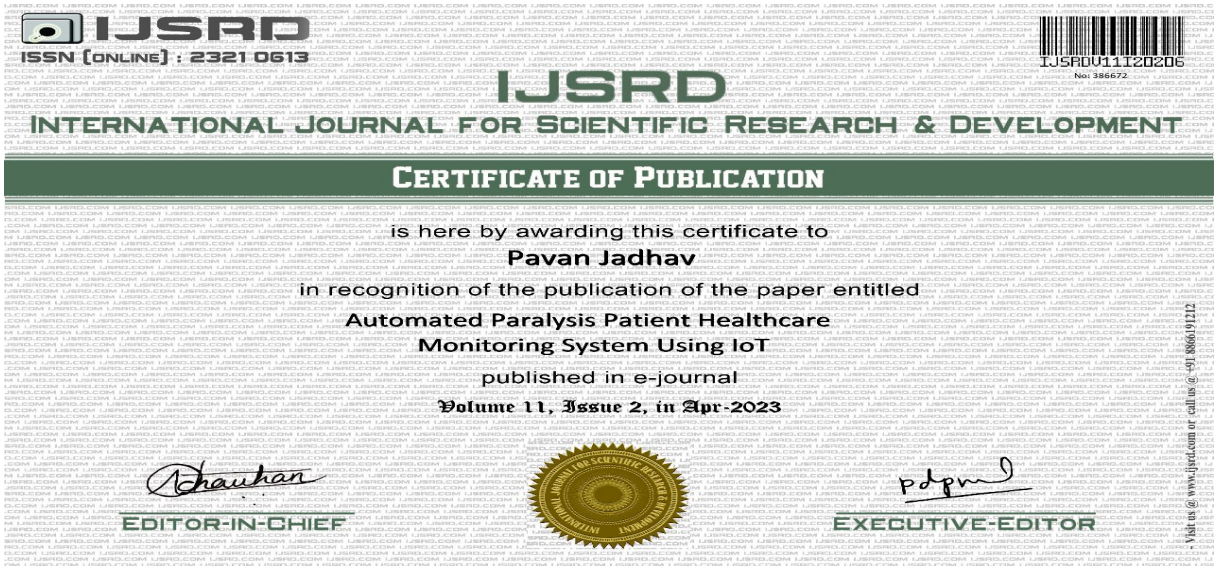


Figure 8.1: Certificate of Publication-Prof.A.N.Kalal

Figure 8.2: Certificate of Publication-Manthan Jadhav.

Figure 8.3: Certificate of Publication-Aniket Zanje.



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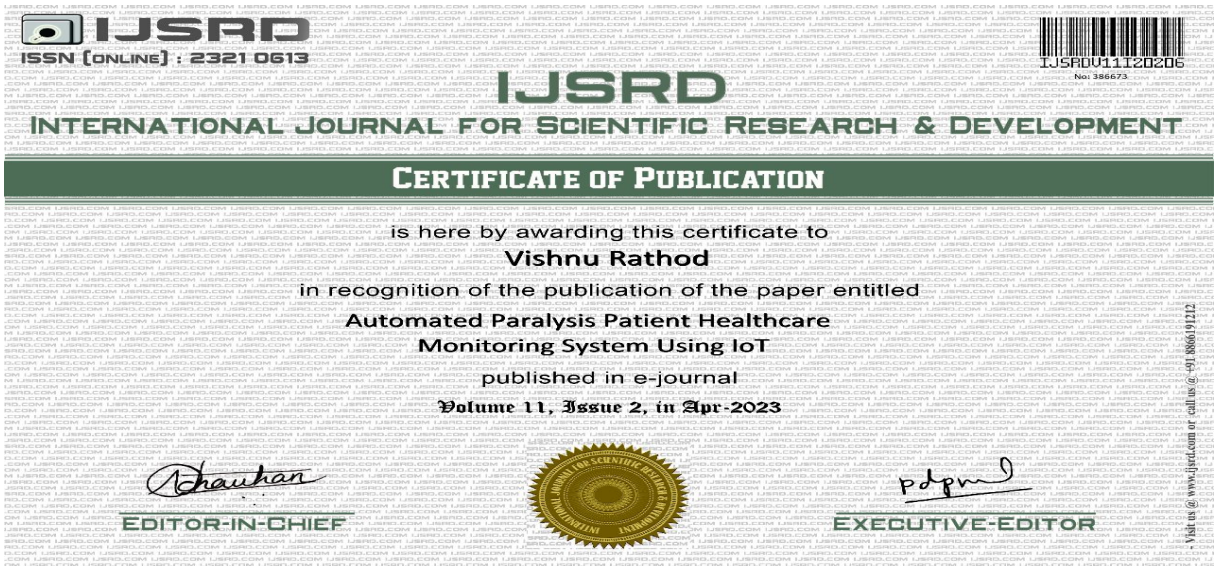
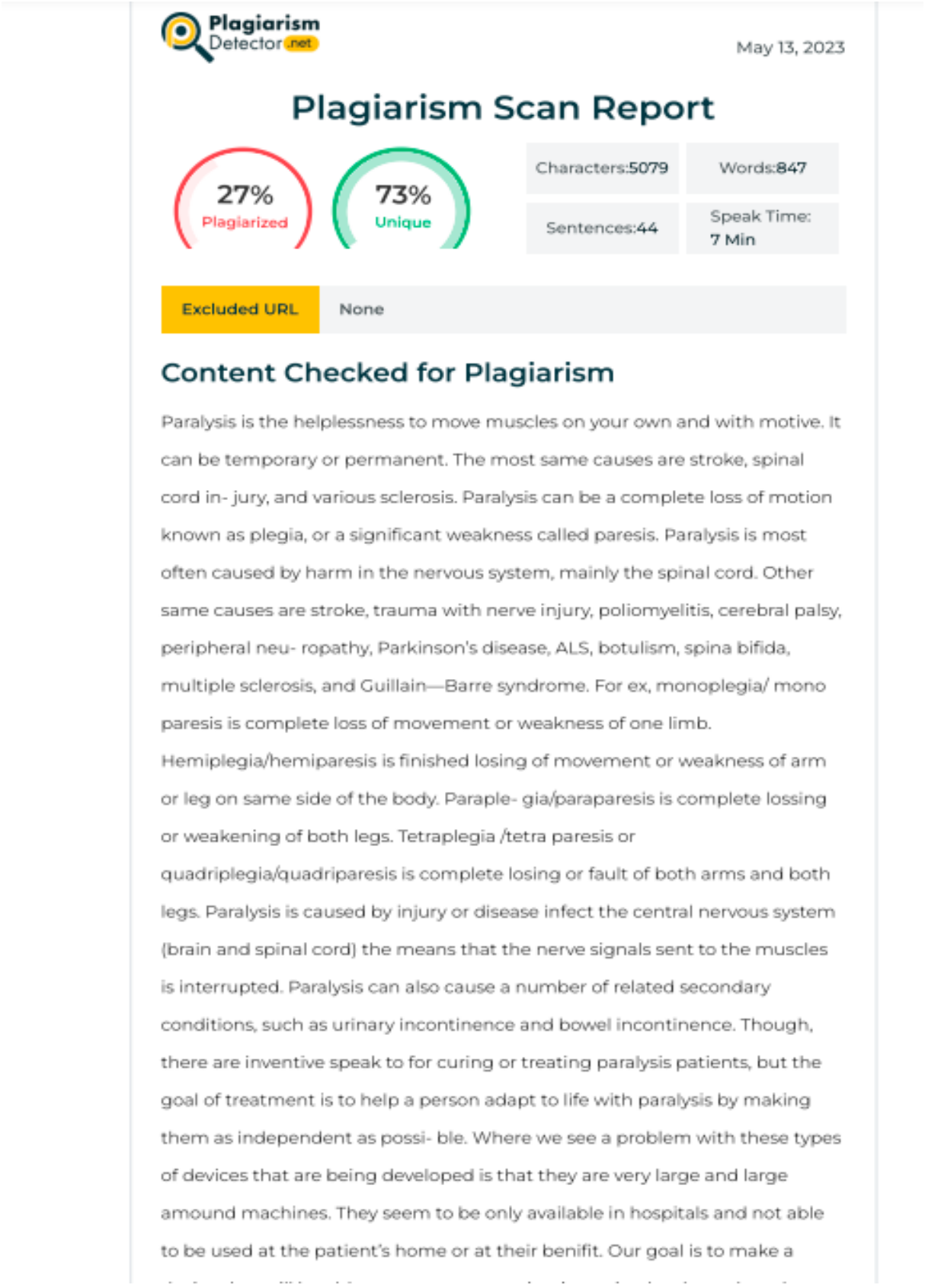


Figure 8.5: Certificate of Publication-Vishnu Rathod

Appendix C

Plagarism Report



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Paralysis is the helplessness to move muscles on your own and with motive. It can be temporary or permanent. The most same causes are stroke, spinal cord in- jury, and various sclerosis. Paralysis can be a complete loss of motion known as plegia, or a significant weakness called paresis. Paralysis is most often caused by harm in the nervous system, mainly the spinal cord. Other same causes are stroke, trauma with nerve injury, poliomyelitis, cerebral palsy, peripheral neu- ropathy, Parkinson's disease, ALS, botulism, spina bifida, multiple sclerosis, and Guillain—Barre syndrome. For ex, monoplegia/ mono paresis is complete loss of movement or weakness of one limb. Hemiplegia/hemiparesis is finished losing of movement or weakness of arm or leg on same side of the body. Paraple- gia/paraparesis is complete lossing or weakening of both legs. Tetraplegia /tetra paresis or quadriplegia/quadriparesis is complete losing or fault of both arms and both legs. Paralysis is caused by injury or disease infect the central nervous system (brain and spinal cord) the means that the nerve signals sent to the muscles is interrupted. Paralysis can also cause a number of related secondary conditions, such as urinary incontinence and bowel incontinence. Though, there are inventive speak to for curing or treating paralysis patients, but the goal of treatment is to help a person adapt to life with paralysis by making them as independent as possi- ble. Where we see a problem with these types of devices that are being developed is that they are very large and large amound machines. They seem to be only available in hospitals and not able to be used at the patient's home or at their benifit. Our goal is to make a

goal of treatment is to help a person adapt to life with paralysis by making them as independent as possi- ble. Where we see a problem with these types of devices that are being developed is that they are very large and large amound machines. They seem to be only available in hospitals and not able to be used at the patient’s home or at their benifit. Our goal is to make a device that will be able to antonyms a patient’s motion but have them be able to use the device themselves and have it be cheap enough for them to afford without much debt. Motivation The main motivation of this project is to design a smart wearable fitness moni- toring device which will help the athlete , normal people who need to monitor their health during exercise , yoga , running. This system will help them to monitor their health and boosts their daily workouts and makes them achiev- able. Recommendation for future works is to fitness is a measure of human being’s healthy status. People pursue fit lives through different ways such as reasonable nutrition, continuoes exercise and sufficient sleep. Fitness is growth through smart wearables more and more popularly with the prevalence of Internet of Things and smart phones Assumptions and Dependencies · User must require the Python . · User has to install the Python on his pc. · User has to login to the

system. · User of the prediction system must be aware of the system functionalities. · The user must be aware of the grading system. · Every user should be educated enough to use the system. · The user must be aware of the specified format. · Every user must enter the data in the specified format FUNCTIONAL REQUIREMENTS System Feature · To have understanding of the problem statement. · To know what are the hardware and software requirements of proposed system. · To have understanding of aim to the system. · To do planning various activates with the help of planner. · Designing, programming, testing etc. System Features EXTERNAL INTERFACE REQUIREMENT Hardware Interfaces: · Processor : Intel core 5 · Ram size : 8GB · Hard disk capacity : 500 GB · Monitor type : 15 Inch shading screen · Keyboard type : web console Hardware Informations: Raspberry Pi: Raspberry Pi is the minicomputer the size of a credit card that is

Raspberry Pi is the minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a minimumm cost Features of Raspberry Pi 1. Central Processing Unit (CPU) Every computer has a Central Processing Unit, and so does the Raspberry Pi. It is the computer's cpu and carries out instructions using logical and mathematical working. Raspberry Pi makes use of the ARM11 series work on its boards. 2. HDMI port Raspberry Pi board has an HDMI or High Definition Multime- dia Interface port that allows the device to have video options of the output from the computer displayed. An HDMI cable attachted the Raspberry Pi to an HDTV. The supported versions include 1.3 and 1.3. It also comes with an RCA port for other show options. 3. Graphic Processing Unit (GPU) This unit, GPU or Graphic Processing Unit, is another part of the Raspberry pi board. Its primary purpose is to hasten the fast of image calculations. 4. Memory (RAM) Random Access Memory is a core part of a computer's processing system. It is where real-time information is stored for easy access. The initial Raspberry Pi had 256MB RAM. Over the years, developers gradu- ally and significantly improved the size. Different Raspberry Pi models come with varying capacities. The model with the maximum capacity presently is the Raspberry Pi 4 with 8GB RAM storage..

Sources

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motion but have them be able to use the device themselves and have it be cheap enough for them to afford without much debt. Block diagram Fig: Paralyzed patient monitoring system Methodology In this monitoring system, the implementation of the module is for the paralyzed patients.This module comprises of

http://www.ishitvtech.in/pdf/sajet-vol-3-no2-10.pdf

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by N Jaiswal - Cited by 1 — To know what are the hardware and software requirements of proposed system. 3. To have understanding of proposed system.

https://www.ijres.org/papers/Volume-9/Issue-9/Ser-2/E09093544.pdf

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Aug 26, 2022 - It is where real-time information is stored for easy access. The initial Raspberry Pi had 256MB RAM. Over the years, developers gradually and significantly improved the size. Different Raspberry Pi models come with varying capacities. The model with the maximum capacity presently is the Raspberry Pi 4 with 8GB RAM space. 5. Ethernet port

https://www.spiceworks.com/tech/networking/articles/what-is-raspberry-pi

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To do planning various activates with the help of planner. · Designing, programming, testing etc. 3.3 External interface requirements. 3.3.1 User interfaces

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1. Central Processing Unit (CPU) Every computer has a Central Processing Unit, and so does the Raspberry Pi. It is the computer's brain and carries out ...

https://mroopxrn.paxtonfirm.com/post/computer-organization-raspberry-pi/24724434

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Aug 26, 2022 - It is where real-time information is stored for easy access. The initial Raspberry Pi had 256MB RAM. Over the years, developers gradually and significantly improved the size. Different Raspberry Pi models come with varying capacities. The model with the maximum capacity presently is the Raspberry Pi 4 with 8GB RAM space. 5. Ethernet port

https://www.spiceworks.com/tech/networking/articles/what-is-raspberry-pi

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This unit, GPU or Graphic Processing Unit, is another part of the Raspberry pi board. Its primary purpose is to hasten the speed of image calculations.

https://osgamers.com/faq/is-there-a-gpu-in-raspberry-pi

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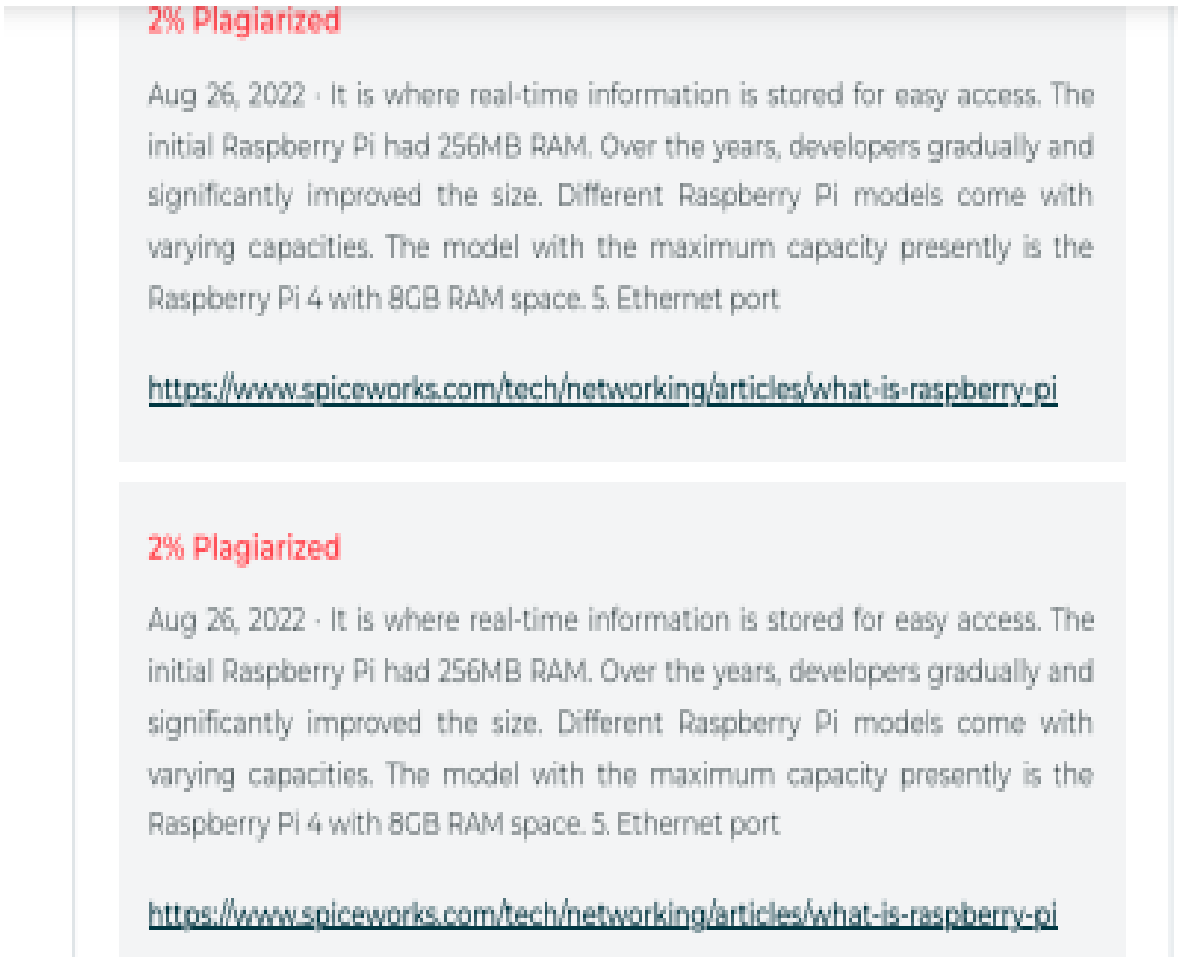
Aug 26, 2022 - It is where real-time information is stored for easy access. The



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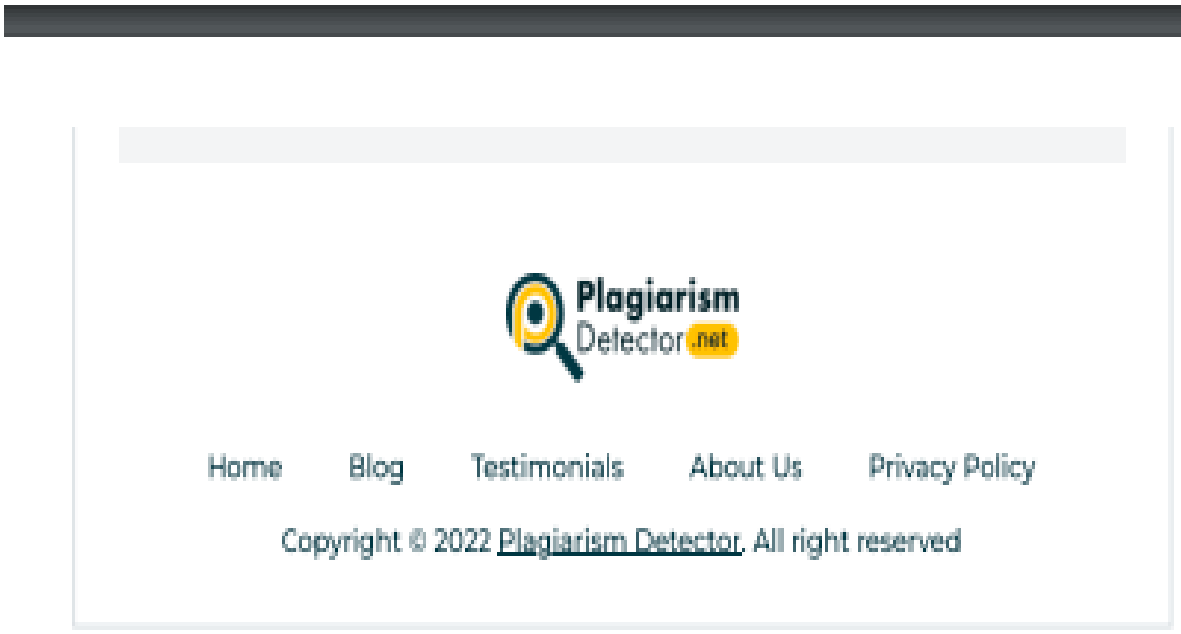

Appendix D

Code

- max30100.py
  """" Library for the Maxim MAX30100 pulse oximetry system on Raspberry Pi

  Based on original C library for Arduino by Connor Huffine/Kontakt https: // github.com / kontakt / MAX30100

  September 2017 """"

  import smbus

  $\text{INT}_{S}TATUS = 0x00Whichinterruptsaretripped$
  $INT_{E}NABLE = 0x01Whichinterruptsareactive$
  $FIFO_{W}R_{P}TR = 0x02Wheredataisbeingwritten$
  $OVRFLOW_{C}TR = 0x03Numberoflostsamples$
  $FIFO_{R}D_{P}TR = 0x04Wheretoreadfrom$
  $FIFO_{D}ATA = 0x05Ouputdatabuffer$
  $MODE_{C}ONFIG = 0x06Controlregister$
  $SPO2_{C}ONFIG = 0x07OximetrysettingsLED_{C}ONFIG = 0x09PulsewidthandpowerofLEDs$
  $TEMP_{I}NTG = 0x16Temperaturevalue, wholenumber$
  $TEMP_{F}RAC = 0x17Temperaturevalue, fraction$
  $REV_{I}D = 0xFEPartrevision$
  $PART_{I}D = 0xFFPartID, normally0x11$

  $\text{I2C}_{A}DDRESS = 0x57I2CaddressoftheMAX30100device$

  $\text{PULSE}_{W}IDTH = 200 : 0, 400 : 1, 800 : 2, 1600 : 3,$

  $\text{SAMPLE}_{R}ATE = 50 : 0, 100 : 1, 167 : 2, 200 : 3, 400 : 4, 600 : 5, 800 : 6, 1000 : 7,$

$\text{LED}_{C}URRENT = 0 : 0, 4.4 : 1, 7.6 : 2, 11.0 : 3, 14.2 : 4, 17.4 : 5, 20.8 : 6, 24.0 : 7, 27.1 : 8, 30.6 : 9, 33.8 :$

def $_{g}et_{v}alid(d, value) :$
$try :$
$returnd[value]$
$exceptKeyError :$
$raiseKeyError("Value$

def $_{t}wos_{c}omplement(val, bits) :$
$"""computethe2'scomplementofintvalueval"""$
$if(val(1 << (bits - 1)))! = 0 : ifsignbitissete.g., 8bit : 128 - 255$
$val = val - (1 << bits)$
$returnval$

$\text{INTERRUPT}_{S}PO2 = 0$
$INTERRUPT_{H}R = 1$
$INTERRUPT_{T}EMP = 2$
$INTERRUPT_{F}IFO = 3$

MODE$_HR = 0x02$
$MODE_SPO2 = 0x03$

class MAX30100(object):

def $_{init}(self, i2c=None, mode=MODE_HR, sample_rate=100, led_current_red=11.0, led_current_ir=11.0, pulse_width=1600, max_buffer_len=10000)$:
Default to the standard I2C bus on Pi.
self.i2c = i2c if i2c else smbus.SMBus(1)

self.set$_mode(MODE_HR)Triggeraninitialtemperatureread.$
$self.set_led_current(led_current_red, led_current_ir)$
$self.set_spo_config(sample_rate, pulse_width)$

Reflectance data (latest update)
self.buffer$_red = []$
$self.buffer_ir = []$

$self.max_buffer_len = max_buffer_len$
$self._interrupt = None$

@property
def red(self):
return self.buffer$_red[-1]if self.buffer_redelse None$

@property
def ir(self):
return self.buffer$_ir[-1]if self.buffer_irelse None$

def set$_led_current(self, led_current_red = 11.0, led_current_ir = 11.0)$:
$Validatethesettings, converttobitvalues.$
$led_current_red =_g et_valid(LED_CURRENT, led_current_red)$
$led_current_ir =_g et_valid(LED_CURRENT, led_current_ir)$
$self.i2c.write_byte_data(I2C_ADDRESS, LED_CONFIG, (led_current_red << 4)|$
$led_current_ir)$

def set$_mode(self, mode)$:
$reg = self.i2c.read_byte_data(I2C_ADDRESS, MODE_CONFIG)$
$self.i2c.write_byte_data(I2C_ADDRESS, MODE_CONFIG, reg0x74)masktheSHDNbit$
$self.i2c.write_byte_data(I2C_ADDRESS, MODE_CONFIG, reg|mode)$

def set$_spo_config(self, sample_rate = 100, pulse_width = 1600)$:
$reg = self.i2c.read_byte_data(I2C_ADDRESS, SPO2_CONFIG)$
$reg = reg0xFCSetLEDpulsewidthto00$
$self.i2c.write_byte_data(I2C_ADDRESS, SPO2_CONFIG, reg|pulse_width)$

def enable$_spo2(self)$:
$self.set_mode(MODE_SPO2)$

def disable$_spo2(self)$:
$self.set_mode(MODE_HR)$

def enable$_interrupt(self, interrupt_type)$:
$self.i2c.write_byte_data(I2C_ADDRESS, INT_ENABLE, (interrupt_type + 1) << 4)$
$self.i2c.read_byte_data(I2C_ADDRESS, INT_STATUS)$

def get$_number_of_samples(self)$:
$write_ptr = self.i2c.read_byte_data(I2C_ADDRESS, FIFO_WR_PTR)$
$read_ptr = self.i2c.read_byte_data(I2C_ADDRESS, FIFO_RD_PTR)$
$returnabs(16 + write_ptr - read_ptr)$

def read$_sensor(self)$:
$bytes = self.i2c.read_i2c_block_data(I2C_ADDRESS, FIFO_DATA, 4)$
$Addlatestvalues.$
$self.buffer_ir.append(bytes[0] << 8|bytes[1])$
$self.buffer_red.append(bytes[2] << 8|bytes[3])$
$CropourlocalFIFObuffertolength.$
$self.buffer_red = self.buffer_red[-self.max_buffer_len :]$
$self.buffer_ir = self.buffer_ir[-self.max_buffer_len :]$

def shutdown(self):
reg = self.i2c.read$_byte_data(I2C_ADDRESS, MODE_CONFIG)$
$self.i2c.write_byte_data(I2C_ADDRESS, MODE_CONFIG, reg|0x80)$

def reset(self):
reg = self.i2c.read$_byte_data(I2C_ADDRESS, MODE_CONFIG)$
$self.i2c.write_byte_data(I2C_ADDRESS, MODE_CONFIG, reg|0x40)$

def refresh$_temperature(self)$:
$reg = self.i2c.read_byte_data(I2C_ADDRESS, MODE_CONFIG)$
$self.i2c.write_byte_data(I2C_ADDRESS, MODE_CONFIG, reg|(1 << 3))$

def get$_temperature(self)$:

$intg =_t wos_complement(self.i2c.read_byte_data(I2C_ADDRESS, TEMP_INTG))$
$frac = self.i2c.read_byte_data(I2C_ADDRESS, TEMP_FRAC)$
$returnintg + (frac * 0.0625)$

def get$_r ev_i d(self)$:
$returnself.i2c.read_b yte_d ata(I2C_A DDRESS, REV_I D)$

def get$_p art_i d(self)$:
$returnself.i2c.read_b yte_d ata(I2C_A DDRESS, PART_I D)$

def get$_r egisters(self)$:

$return"INT_S TATUS" : self.i2c.read_b yte_d ata(I2C_A DDRESS, INT_S TATUS), "INT_E NABLE" : sel$
$MLX90614 - TEMPRETURESENSOR$
$fromsmbus2importSMBus$
$frommlx90614importMLX90614$
$importtime$
$fromtimeimportsleep$

import sys
import urlopen
import urllib

from time import sleep
Enter Your API key here
User1API = ’1F2P837WKTCOUF85’

URL where we will send the data, Don’t change it
baseURL1 = ’https://api.thingspeak.com/update?api$_k ey =$

import RPi.GPIO as GPIO
import time

GPIO.setmode(GPIO.BCM)
GPIO.setwarnings(False) This command is to Disable Warning....!!!!
buzzer = 21
GPIO.setup(buzzer, GPIO.OUT)
while True:

bus = SMBus(1)
sensor = MLX90614(bus, address=0x5A)
print (”Tempreture is :”,sensor.get$_o bj_t emp()$)
$conn = baseURL1 +' field1 = request = urllib.request.Request(conn)$
$responce = urllib.request.urlopen(request)$
$responce.close()$
$if(sensor.get_o bj_t emp() > 38.00)$:

$print(”HighTempretureDetected...”)$
$GPIO.output(buzzer, True)$
$time.sleep(1)$
$GPIO.output(buzzer, False)$
$bus.close()$
$sleep(1)$

- spo2

import time
import max30100

mx30 = max30100.MAX30100()
mx30.enable$_spo2()$
$importsys$
$importurlopen$
$importurllib$

from time import sleep
Enter Your API key here
User1API = ’1F2P837WKTCOUF85’

URL where we will send the data, Don’t change it
baseURL1 = ’https://api.thingspeak.com/update?api$_key = while1$:
$mx30.read_sensor()$

mx30.ir, mx30.red

hb = int(mx30.ir / 100)
spo2 = int(mx30.red / 100)

if mx30.ir != mx30.buffer$_ir$:
$print(”Pulse : ”, hb);$
$if mx30.red! = mx30.buffer_red$:
$print(”SPO2 : ”, spo2);$
$conn = baseURL1 +' field2 = request = urllib.request.Request(conn)$
$responce = urllib.request.urlopen(request)$
$responce.close()$
$time.sleep(2)$
$FLEX1$

import Adafruit$_{A}DS1x15$
$importserial$
$importtime$
$importrequests$
$importrandom$
$importjson$
$importurllib$
$fromgttsimportgTTS$

rate = [0]*10
amp = 100
GAIN = 2/3
curState = 0
stateChanged = 0

ser = serial.Serial (”/dev/ttyS0”, 9600)

import random
import json
import urllib
Enter Your API key here
User1API = ’FFKD5BXO78M7P2NK’
URL where we will send the data, Don’t change it
baseURL1 = ’https://api.thingspeak.com/update?api$_{k}ey$ = $importpygame$

def pmusic(file):
pygame.init()
pygame.mixer.init()
clock = pygame.time.Clock()
pygame.mixer.music.load(file)
pygame.mixer.music.play()
while pygame.mixer.music.get$_{b}usy$() :
$print$(”$Playing...$”)
$clock.tick$(1000)

def stopmusic():
pygame.mixer.music.stop()

def getmixerargs():
pygame.mixer.init()
freq, size, chan = pygame.mixer.get$_{i}nit$()

$returnfreq, size, chan$

def initMixer():
BUFFER = 4096 audio buffer size, number of samples since pygame 1.8.
FREQ, SIZE, CHAN = getmixerargs()
pygame.mixer.init(FREQ, SIZE, CHAN, BUFFER)

def $send_to_processing1(data1) : fortempretureSensor$
$ser.write(str(data1).encode())$

def flex():
adc = $Adafruit_ADS1x15.ADS1115()$
$whileTrue :$
$Signal = adc.read_adc(0, gain = GAIN)$
$send_to_processing1(Signal)$
$message = str(Signal/3.5)$
$print(”Flex : ” + str(message))$
$conn = baseURL1 +' field7 = request = urllib.request.Request(conn)$
$responce = urllib.request.urlopen(request)$
$responce.close()$
$ifmessage <' 0' :$
$message = 0.0$

if str(message) ¿= ’4800’:
tts = gTTS(’I want water for drinking’)
tts.save(’1.mp3’)
initMixer()
file = ’/home/pi/22E9556-$Health_Monitoring/1.mp3'$
$pmusic(file)$
$print(”Iwantwaterfordrinking”)$
$print(”Theirisbendoccuredinthebridge”)$

$send_to_processing1(message)$
$time.sleep(0.5)$

flex()

- FLEX2

import $Adafruit_ADS1x15$
$importserial$

$importtime$
$importrequests$
$importrandom$
$importjson$
$importurllib$
$fromgttsimportgTTS$
$EnterYourAPIkeyhere$
$User1API =' FFKD5BXO78M7P2NK'$
$URLwherewewillsendthedata, Don'tchangeit$
$baseURL1 =' https://api.thingspeak.com/update?api_key =$

rate = [0]*10
amp = 100
GAIN = 2/3
curState = 0
stateChanged = 0

ser = serial.Serial (”/dev/ttyS0”, 9600)

import random
import json
import urllib
Enter Your API key here
User1API = ’FFKD5BXO78M7P2NK’
URL where we will send the data, Don’t change it
baseURL1 = ’https://api.thingspeak.com/update?api$_k$ey = $importpygame$

def pmusic(file):
pygame.init()
pygame.mixer.init()
clock = pygame.time.Clock()
pygame.mixer.music.load(file)
pygame.mixer.music.play()
while pygame.mixer.music.get$_b$usy() :
$print(”Playing...”)$
$clock.tick(1000)$

def stopmusic():
pygame.mixer.music.stop()

def getmixerargs():
pygame.mixer.init()
freq, size, chan = pygame.mixer.get$_i$nit()
$returnfreq, size, chan$

def initMixer():
BUFFER = 4096 audio buffer size, number of samples since pygame 1.8.
FREQ, SIZE, CHAN = getmixerargs()
pygame.mixer.init(FREQ, SIZE, CHAN, BUFFER)

def send$_t o_p rcessing1(data1) : fortempretureSensor$
$ser.write(str(data1).encode())$

def flex():
adc = Adafruit$_A DS1x15.ADS1115()$
$whileTrue :$
$Signal = adc.read_a dc(1, gain = GAIN)$
$send_t o_p rcessing1(Signal)$
$message = str(Signal/3.5)$
$print(”Flex : ” + str(message))$
$conn = baseURL1 +' field8 = request = urllib.request.Request(conn)$
$responce = urllib.request.urlopen(request)$
$responce.close()$
$if message <' 0' :$
$message = 0.0$

if str(message) ¿= ’4800’:
tts = gTTS(’I want water for drinking’)
tts.save(’1.mp3’)
initMixer()
file = ’/home/pi/22E9556-Health$_M onitoring/1.mp3'$
$pmusic(file)$
$print(”Iwantwaterfordrinking”)$
$print(”Theirisbendoccuredinthebridge”)$

send$_t o_p rcessing1(message)$
$time.sleep(0.5)$
flex()

- ACCELEROMETER
!/usr/bin/python

import time
import requests
import json
import Adafruit$_A DS1x15$
$importsmtplib$

$importrequests$
$importjson$
$fromemail.messageimportEmailMessage$

location$_req_url$ =′ $http://api.ipstack.com/103.51.95.183?access_key = fcdaeccb61637a12fdf64626569ef$
$r = requests.get(location_req_url)$
$location_obj = json.loads(r.text)$
$print(location_obj)$
$lat = location_obj['latitude']$
$lon = location_obj['longitude']$
$city =$ ”

import requests
import random
import json
import urllib
import urlopen
Enter Your API key here
User1API = ’1F2P837WKTCOUF85’
URL where we will send the data, Don’t change it
baseURL1 = ’https://api.thingspeak.com/update?api$_key$ =

Create an ADS1115 ADC (16-bit) instance.
adc = Adafruit$_ADS1x15.ADS1115()$
$VALMAX = 15000$
$GAIN = 1$
$adcValue = 0;$
$offsetVoltage = 100;$
$msg =$ ”$PatientFalled....HereIattachedmylocation : Latitudeis :$ ” + $str(latitude)$ +
”$Langitudeis :$ ” + $str(longitude)$
$defsms_send() :$
$url =$ ”$https://www.fast2sms.com/dev/bulk$”
$params =$

”authorization”:”fvaKUPuNimZCWE8MOpB9YjLGs4nyeg6lzRqS71JXH5QFw3cktDIm3puGNrOFLP2
”sender$_id$” : ”$SMSINI$”,
”$message$” : msg,
”$language$” : ”$english$”,
”$route$” : ”p”,
”$numbers$” : ”9607181257”
$rs = requests.get(url, params = params)$

def mapp(x, in$_min, in_max, out_min, out_max) :$
$return(x - in_min) * (out_max - out_min)/(in_max - in_min) + out_min;$

def sensor$_position() :$
$pos = 0$
$x = adc.read_adc(0, gain = GAIN)$
$y = adc.read_adc(1, gain = GAIN)$

$z = adc.read_adc(2, gain = GAIN)$

Xval = mapp (x,0,VALMAX,0,255)
Yval = mapp (y,0,VALMAX,0,255)
Zval = mapp (z,0,VALMAX,0,255)
print (”X:”+str (Xval))
print (”Y:”+str (Yval))
print (”Z:”+str (Zval))
conn = baseURL1 + ’field4=request = urllib.request.Request(conn)
responce = urllib.request.urlopen(request)
responce.close()
time.sleep(2)
if (Xval ¿ 429 or Xval ¡ 410) :
pos = 1
return pos
if (Yval ¿ 442 or Yval ¡ 420) :
pos = 1
return pos
else:
pos = 0
return pos

Main loop.
while True:
pos = sensor$_p osition()$

if pos == 1 :
print(”Patient Falled”)

else :
print(”Normal Condition”)

time.sleep(1)