VISVESVARAYA TECHNOLOGICAL UNIVERSITY

JNANA SANGAMA, BELAGAVI – 590018

A

Project Report

On

" DOCTOR-ROBO "

Submitted in partial fulfillment of the requirements for the award of degree of

Bachelor of Engineering

In

Electronics and Communication Engineering

Submitted by

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KARAVALI INSTITUTE OF TECHNOLOGY

Neerumarga, Mangalore-575029

2022-23

KARAVALI INSTITUTE OF TECHNOLOGY

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Certificate

Certified that the project report entitled **"DOCTOR-ROBO"** carried out by **Mr. AKSHAYA KUMAR (4KM19EC004), Ms. CHANDANA S.C (4KM19EC005), Ms. MOKSHITHA D.L (4KM19EC008), Ms. RAKSHA (4KM19EC011)** are the bona-fide students of **Karavali Institute of Technology,** Neerumarga, Mangalore, has submitted the report in partial fulfillment for the award of degree of **Bachelor of Electronics and Communication Engineering** of the **Visvesvaraya Technological University, Belagavi** during the academic year **2022-23.**

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DECLARATION

We hereby declare that the project work detail which is being presented in this report is in fulfillment of the requirement for the award of degree of Bachelor of Electronics and Communication Engineering in Visvesvaraya Technological University, Belagavi. We hereby declare that we have undertaken our project work on **“DOCTOR-ROBO”** under the guidance of **Ms. SWEETY.T.J,** Assistant Professor, Department of Electronics and Communication Engineering, KIT, Mangalore.

We hereby declare that this project work report is our own work and the best of our knowledge and belief the matter embedded in report has not been submitted by us for the award of other degree to this or any other university.

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ABSTRACT

IoT in healthcare is the key player in providing better medical facilities to the patients and facilitates the doctors and hospitals as well. The proposed system here consists of various medical devices such as sensors and web based or mobile based applications which communicate via network connected devices and helps to monitor and record patient health data and medical information.

The primary health test of patients in the hospital, instead of doctor we are using medical robotics is an interdisciplinary field that focus on preliminary testing of patients (pulse rating, temperature, oxygen saturation level etc..) these remotely operated robots are to possess certain characteristics for human robot interaction. However, tele-operated semi-autonomous robots can be used to perform assisted healthcare task during outbreak which would the time personnel meet to spend in dangerous contaminated areas and emergency situations. People's life expectancy is increasing due to technologies welfare, but the problem is that the health sector has always faced shortage of inadequate doctors.

In this prototype use of medical robots for various medical procedures. The measured medical parameters are broadcasted on an IoT network. Here ThingSpeak IoT core is used as an IoT cloud platform to monitor the parameters of a safety worker.

Keywords: IoT in Healthcare, ThingSpeak, Arduino Uno, MATLAB,

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CHAPTER 1

INTRODUCTION

Medical robots have evolved over the years and today it is in many different areas of applications, from homecare to social care and healthcare robotics. This project deals with a brief overview of the current and potential applications of robotics in healthcare settings. We present a comprehensive contextualization of robots in healthcare by identifying and characterizing active research activities on robot that can work interactively and effectively with humans to fill some identified gaps in current healthcare deficiency.

Medical robots that could be used to remotely carry out tasks are also very important. Such robots are endowed with human capabilities to assist caregivers and patients particularly in contaminated environments. These remotely operated robots are to possess certain characteristics for human robot interaction. However, tele-operated semi-autonomous robots can be used to perform assisted healthcare tasks during outbreaks which would reduce the time personnel need to spend in dangerous contaminated areas and pandemic situations.

Research on Medical robots for general or supportive patients care particularly for disease containment has hit the ground running in other developed countries due to the recent outbreak of Covid-19 that shook the world it is also important for those affected directly to find a solution to their problem.

We propose a broad overview of some of the current and potential applications of robotics in health care settings and we carefully selected some robots for patients care.

IoT Core is a managed cloud service that lets connected devices easily and securely interact with cloud applications and other devices. IoT Core can support billions of devices and trillions of messages, and can process and route those messages to Thing Speaks endpoints and to other devices reliably and securely.

1.1 Existing System

The primary health test of patients in the hospital. Instead of doctor we are using medical robotics is an interdisciplinary field that focus on preliminary testing of patients (Blood pressures, pulse rating, temperature, sugar level, oxygen saturation level etc..) these remotely operated robots are to possess certain characteristics for human robot interaction. However, tele-operated semi-autonomous robots can be used to perform assisted healthcare task during outbreak which would the time personnel meet to spend in dangerous contaminated areas and pandemic situations. People’s life expectancy is increasing due to technologies welfare, but the problem is that the health sector has always faced shortage of inadequate doctors.

In this prototype use of medical robots for various medical procedures. The measured medical parameters are broadcasted on an IoT network. Here Thing Speak is used as an IoT cloud platform to monitor the parameters of a safety worker.

1.2 Proposed System

The proposed system here consists of various medical devices such as sensors and web based or mobile based applications which communicate via network connected devices and helps to monitor and record patients' health data and medical information. The proposed outcome of the paper is to build a system to provide world-class medical aid to the patients even in the remotest areas with no hospitals in their areas by connecting over the internet and grasping information through about their health status via the wearable devices provided in the kit using an Arduino board which would be able to record the patient's heart rate, blood pressure, Temperate sensor.

CHAPTER 2

LITERATURE REVIEW

A few research papers related to medical robots have been reviewed and the following references show influence on the design of the Doctor-Robo.

[1]. Divya Ganesh, "AutoImpilo: Smart Automated Health Machine using IoT to Improve Telemedicine and Telehealth", 2021.

The purpose of the paper, according to Divya Ganesh, is to create an automated system that can quickly link to healthcare providers like hospitals or physicians in order to stop the spread of illness and lower the rising rates of death in rural regions.

[2]. Itamir De Morais Barroca Jr.-During the COVID-19 Outbreak, "An IoT-Based Healthcare Platform for Patients in ICU Beds,"

IoT appears as a promising paradigm because it offers the scalability necessary for this objective, facilitating ongoing and accurate global health monitoring. Based on this backdrop, the authors' earlier studies suggested an IoT-based healthcare platform to provide remote monitoring for patients in a life-threatening condition.

[3]. Seyed Shahim Vedaei, "An IoT-based system for automated health monitoring and surveillance in post-pandemic life is called COVID-SAFE Invoking"

The Internet of Things (IoT) may assist in providing a remote diagnosis before reaching hospitals for more effective treatment in a smart healthcare system. Develop an Internet of Things (IoT) e-health system based on Wireless Sensor Networks to continually monitor patients' state of health for diabetic patients. Blood glucose data may be transferred through wearable sensors to physicians or cell phones (WSN).

[4]. Kashif Hameed, "An Intelligent IoT Based Healthcare System Using Fuzzy Neural Networks,"

The term "remote delivery of healthcare services" refers to telemedicine. Telemedicine provides a lot of advantages, but it also has some drawbacks. Both providers and payers as well as regulators are aware that there are certain murky regions that are difficult to monitor. Over the next ten years, the sector will expand rapidly, but it will also provide both practical and technical hurdles.

[5]. Mohd. Hamim. "Remote Health Monitoring System for Patients and Elderly People Using Internet of Things,"

IoT integration with health wearables may eliminate the need for patients to visit hospitals for basic health concerns. Additionally, patients' medical costs are much lower as a result of this. Additionally, by tracking a patient's health statistics over time through an application, physicians may prescribe appropriate drugs. To comprehend how the employed sensors operate, a thorough study of the data was collected with regard to fluctuations in physical and environmental activity.

2.1 Objective of Work

In India many patients are not getting proper help during critical condition like heart attacks and that why patients are dying in those periods.

The main objective of this framework is to give immediate necessary services where patient can measure body temperature, heart rate in bpm blood pressure and body position by themselves and promote hygienic environment. The framework is tested for a volunteer to check the body temperature, heart rate and observe the movement of body position.

The information is stored on a cloud server database and can be displayed through an online website or mobile application by authorized personnel only. The uploaded data will be sent to the physicians / Care takers. It provides necessary services near the patient if any problems in breathing due to the harsh environments. The message notification will also be sent if any serious abnormalities.

The major task of this project can be summarized as following:

- To collect and feed the real-time medical information about a patient to IoT.
- To obtain the real-time medical information about a patient via IoT.
- Processing and classification of information gathered about the patient.
- To interpret and predict any disease or disorder in preliminary stage itself using the data mining techniques that will also provide the approach advantageous for decision making.
- To provide Internet of Things based healthcare solutions at anytime and anywhere.

The concept involved in this model is:

- IoT (internet of things) - is the inter-connection of devices, apps, sensors and network connectivity that enhances these entities to gather and exchange data.

CHAPTER 3

REQUIREMENT ANALYSIS

3.1 Block Diagram

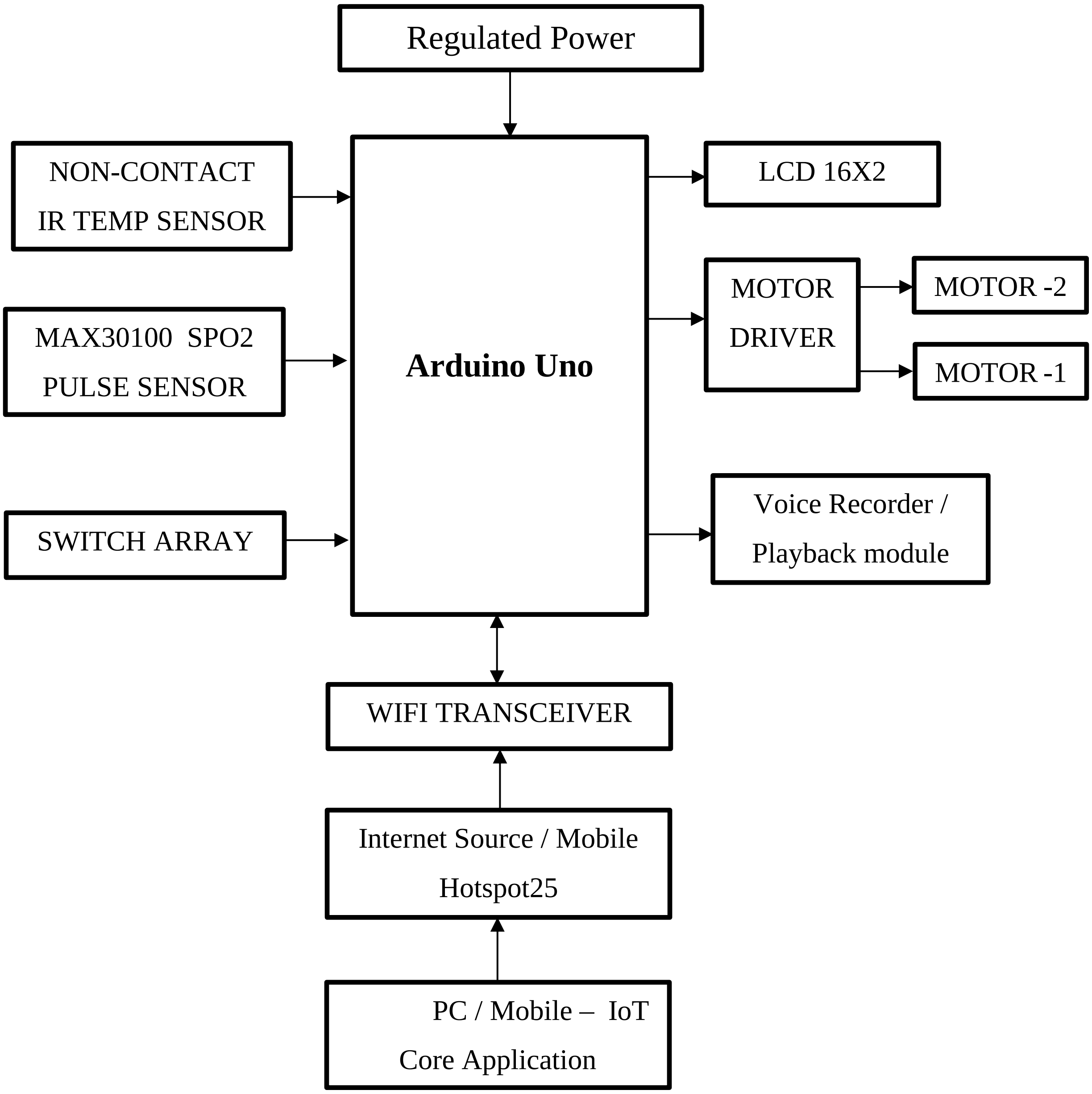

Fig.3.1: Block Diagram

3.2 Hardware Requirements

3.2.1 Arduino Uno:

Fig.3.2.1: Arduino Uno

The Fig:3.2.1 shows that Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your Uno without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

3.2.2 SPO2 Meter:

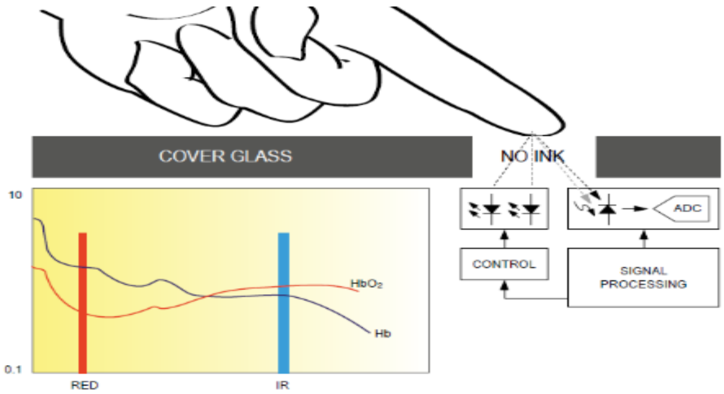

Fig.3.2.2: SOP2 Diagram

The Fig:3.2.2 shows that MAX30100 is an integrated pulse oximetry and heart- rate monitor sensor solution. It combines two LEDs, a photodetector, optimized optics, and low-noise analog signal processing to detect pulse oximetry and heart-rate signals. The MAX30100 operates from 1.8V and 3.3V power sup- plies and can be powered down through software with negligible standby current, permitting the power supply to remain connected at all times shown in Fig:3.2.3.1.

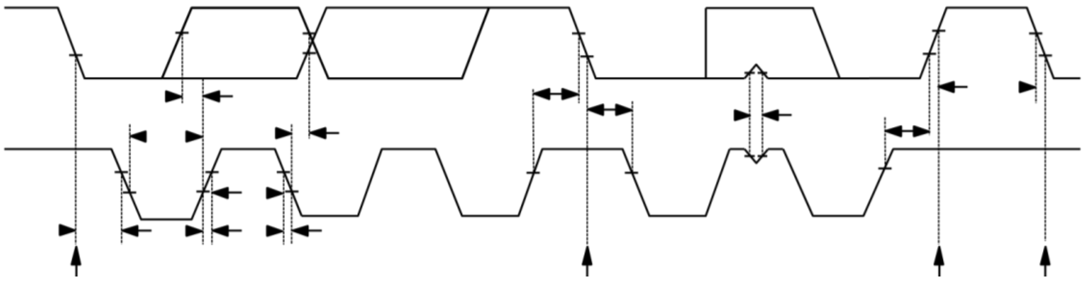

Fig.3.2.2.1: Timing Diagram of SPO2 Sensor

3.2.3 Temperature Sensor:

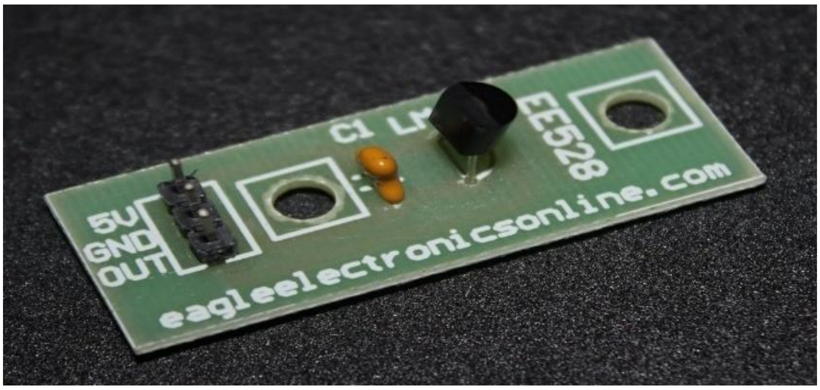

Fig.3.2.3: LM35 Temperature Sensor

The Fig: 3.2.3 shows that LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature.

The LM35 thus has an advantage over linear temperature sensors calibrated in ˚ Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1⁄4˚C at room temperature and ±3⁄4˚Cover a full −55 to +150˚C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35’s low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1˚C in still air. The LM35 is rated to operate over a −55˚ to +150˚C temperature range, while the LM35C is rated for a −40˚ to +110˚C range (−10˚ with improved accuracy). The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220

3.2.4 L298N Motor Driver Module:

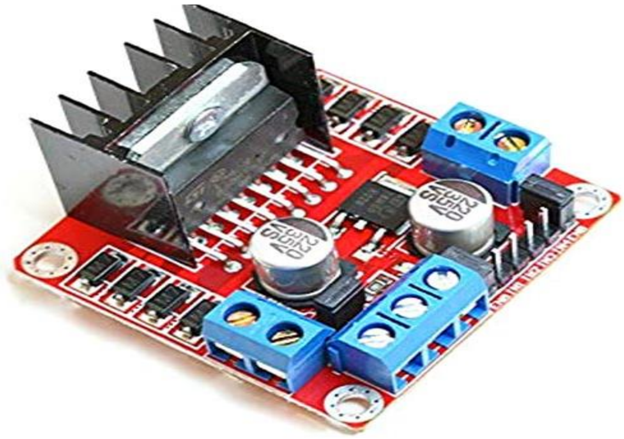

Fig.3.2.4: L298N Motor Driver Module

This L298N Motor Driver Module is a high-power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control.

The L298N Motor Driver module consists of an L298 Motor Driver IC, 78M05 Voltage Regulator, resistors, capacitor, Power LED, 5V jumper in an integrated circuit. 78M05 Voltage regulator will be enabled only when the jumper is placed. When the power supply is less than or equal to 12V, then the internal circuitry will be powered by the voltage regulator and the 5V pin can be used as an output pin to power the microcontroller. The jumper should not be placed when the power supply is greater than 12V and separate 5V should be given through 5V terminal to power the internal circuitry. ENA & ENB pins are speed control pins for Motor A and Motor B while IN1& IN2 and IN3 & IN4 are direction control pins for Motor A and Motor B.

3.2.5 Wi-Fi Module:

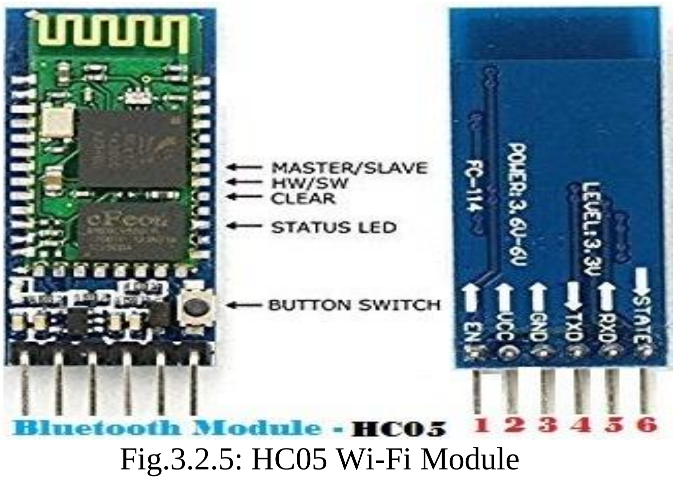

Fig.3.2.5: HC05 Wi-Fi Module

Fig.3.2.5 shows that HC-05 module is a Bluetooth module, designed for transparent wireless serial (SPP – Serial Port Protocol) connection setup. It provides unsurpassed ability to embed Wi-Fi capabilities within other systems, or to function as a standalone application, with the lowest cost, and minimal space requirement.

HC-05 is a Bluetooth device used for wireless communication with Bluetooth enabled devices like smartphone. It communicates with microcontrollers using serial communication (USART). The HC-05 Bluetooth module has 3.3 V level for RX/TX and microcontroller can detect 3.3 V level, so, there is no need to shift TX voltage level of HC-05 module. But we need to shift the transmit voltage level from microcontroller to RX of HC-05 module.

3.2.6 ISD1760 Voice Recorder:

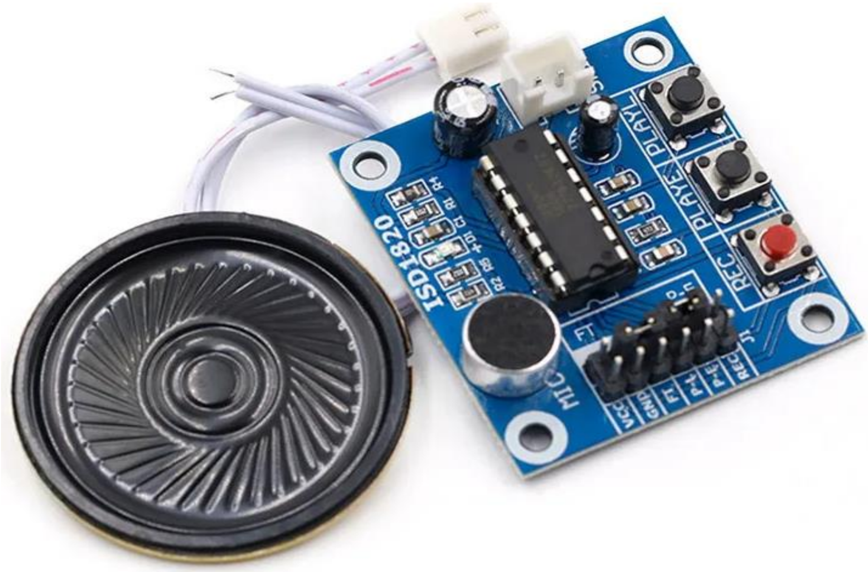

Fig.3.2.6: ISD1760 small Voice Recorder/Playback module

The Fig: 3.2.6 shows that ISD1760 is a small Voice Recorder/Playback module that can do the multi-segment recording. The user can achieve a high quality of recording for each application with the adjustment of the on-board resistor (4k to 12k). This Voice Recorder/Playback module is designed to operate in two-mode standalone or microcontroller-based SPI mode. Additionally, it has a special feature that is vAlert.

This ISD1760 Voice Recorder/Playback Module reproduces high-quality, natural voice and audio from the recorded audio by Mic or SPI or Analog Input. Because of its dual operation mode (Standalone and SPI), we can easily use this as per requirement and with a slight change of the onboard resistor, we can get flexibility in the sampling frequency of the recording duration & quality.

It can offers true Single chip voice recording, no volatile storage, and playback capability around 10 seconds. This module is easy to use which you could direct control by push button on board or by Microcontroller such as Arduino, STM32, ChipKit etc. From these, you can easy control record, playback and repeat and so on.

3.2.7 LCD 16*2:

Fig.3.2.7: LCD Display

Fig.3.2.7 shows that LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on.

A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

3.2.8 Push Button:

Push button is a kind of switch which is used for controlling a process. Buttons are usually made of plastic or metal. It can connect two points in a circuit when someone presses it. When button is not pressed it is open because there is no connection between the two legs of the push button and reading will be high. When the button is pressed, it is closed and reading will be low because it makes a connection between two legs and connect pin to ground. One point is connected with 12v and another point of the resistor is connecting 10kÙ resistor with the ground.

Fig.3.2.8: Push buttons

3.2.9 DC Motor:

Fig.3.2.9: DC Motor and wheel

The Fig: 3.2.9 shows that DC Motor and wheel, this yellow DC motor is ideal for robotics and model vehicles. It has a 1:48 gear ratio and maximum torque of 800g/cm at a minimum of 3V. The motors are DC motors that will work between 3-12VDC. Speed of rotation will depend on the drive voltage and whether a PWM motor controller is added for speed and direction control. The tires can be mounted to either side of the motor for mounting flexibility. They are a simple press fit.

3.2.10 Regulated Power Supply:

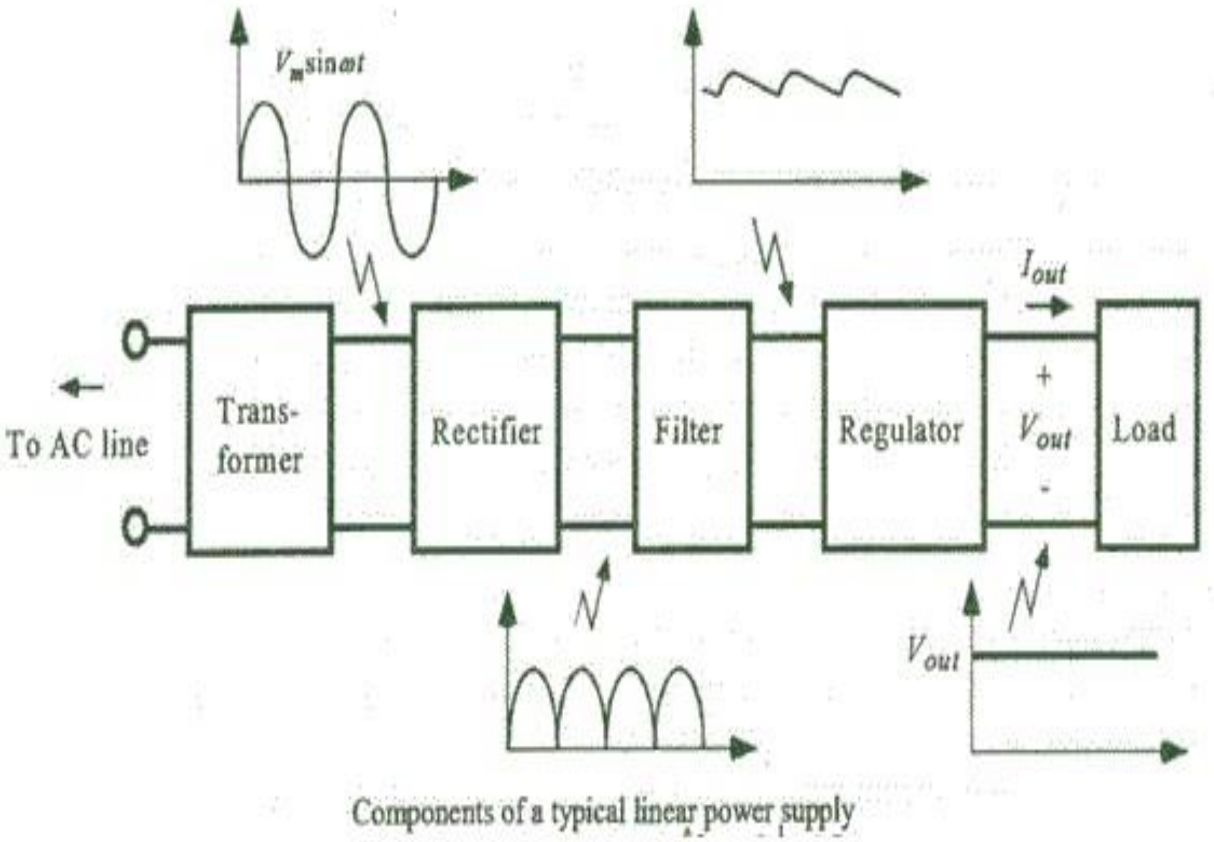

Fig.3.2.10: Regulated Power Supply

Step Down Transformer

A step-down transformer will step down the voltage from the ac mains to the required voltage level. The turn's ratio of the transformer is so adjusted such as to obtain the required voltage value. The output of the transformer is given as an input to the rectifier circuit.

Rectification

Rectifier is an electronic circuit consisting of diodes which carries out the rectification process. Rectification is the process of converting an alternating voltage or current into corresponding direct (dc) quantity. The input to a rectifier is ac whereas its output is unidirectional pulsating dc. Usually, a full wave rectifier or a bridge rectifier is used to rectify both the half cycles of the ac supply (full wave rectification). Figure below shows a full wave bridge rectifier.

DC Filtration

The rectified voltage from the rectifier is a pulsating dc voltage having very high ripple content. But this is not we want; we want a pure ripple free dc waveform. Hence a filter is used. Different types of filters are used such as capacitor filter, LC filter, Choke input filter, π type filter. Figure below shows a capacitor filter connected along the output of the rectifier and the resultant output waveform.

Regulation

Fig:3.2.10. This is the last block in a regulated DC power supply. The output voltage or current will change or fluctuate when there is change in the input from ac mains or due to change in load current at the output of the regulated power supply or due to other factors like temperature changes. This problem can be eliminated by using a regulator. A regulator will maintain the output constant even when changes at the input or any other changes occur. Transistor series regulator, Fixed and variable IC regulators or a Zener diode operated in the Zener region can be used depending on their applications. IC's like 78XX and 79XX are used to obtained fixed values of voltages at the output. With ICs like LM 317 and 723 etc. we can adjust the output voltage to a required constant value.

3.3 Software Requirements

3.3.1 IOT (Internet of Things)

The Internet of things (IoT) describes physical objects (or groups of such objects) with sensors, processing ability, software, and other technologies that connect and exchange data with other devices and systems over the Internet or other communications networks. Internet of things has been considered a misnomer because devices do not need to be connected to the public internet, they only need to be connected to a network and be individually addressable.

The field has evolved due to the convergence of multiple technologies, including ubiquitous computing, commodity sensors, increasingly powerful embedded systems, and machine learning.[7] Traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), independently and collectively enable the Internet of things.[8] In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", including devices and appliances (such as lighting fixtures, thermostats, home security systems, cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. IoT is also used in healthcare systems.

Architecture of Internet of Things:

IoT architecture refers to the tangle of components such as sensors, actuators, cloud services, Protocols, and layers that make up IoT networking systems. In general, it is divided into layers that allow administrators to evaluate, monitor, and maintain the integrity of the system. The architecture of IoT is a four-step process through which data flows from devices connected to sensors, through a network, and then through the cloud for processing, analysis, and storage. With further development, the Internet of Things is poised to grow even further, providing users with new and improved experiences.

Fig. 3.3.1. IOT Architecture

Architecture of Internet of Things contains basically 4 layers:

Sensing Layer

Network Layer

Processing Layer

Processing Layer

Sensing Layer:

The first layer of any IoT system involves “things” or endpoint devices that serve as a conduit between the physical and the digital worlds. Perception refers to the physical layer, which includes sensors and actuators that are capable of collecting, accepting, and processing data over the network. Sensors and actuators can be connected either wirelessly or via wired connections. The architecture does not limit the scope of its components nor their location.

Network Layer:

Network layers provide an overview of how data is moved throughout the application. This layer contains Data Acquiring Systems (DAS) and Internet/Network gateways. A DAS performs data aggregation and conversion functions. It is necessary to transmit and process the data collected by the sensor devices. That is what the network layer does. It allows these devices to connect and communicate with other servers, smart devices, and network devices. As well, it handles all data transmissions for the devices.

Processing Layer:

The processing layer is the brain of the IoT ecosystem. Typically, data is analyzed, pre-processed, and stored here before being sent to the data center, where it is accessed by software applications that both monitor and manage the data as well as prepare further actions. This is where Edge IT or edge analytics enters the picture.

Application Layer:

User interaction takes place at the application layer, which delivers application specific services to the user. An example might be a smart home application where users can turn on a coffee maker by tapping a button in an app or a dashboard that shows the status of the devices in a system. There are many ways in which the Internet of Things can be deployed such as smart cities, smart homes, and smart health.

3.3.2 ThingSpeak

ThingSpeak is an open-source software written in Ruby which allows users to communicate with internet enabled devices. It facilitates data access, retrieval and logging of data by providing an API to both the devices and social network websites. ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IoT applications.

ThingSpeak has integrated support from the numerical computing software MATLAB from Math Works, allowing ThingSpeak users to analyze and visualize uploaded data using MATLAB without requiring the purchase of a MATLAB license from Math Works.

ThingSpeak has been the subject of articles in specialized "Maker" websites like Instructorless, Code project, and Channel 9.

3.3.3 Arduino IDE Software

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software. This software can be used with any Arduino board. The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU tool chain, also included with the IDE distribution.

CHAPTER 4

WORKING METHODOLOGY

4.1 Working

The figure depicts how to retrieve the information about patient health status by monitoring various parameters and use the same information to predict if the patient is suffering from any kind of chronic disorder or other such disease.

In level-1, unprocessed data from various IoT devices is obtained and stored on the server. Fig:4.1.1 Shows That Storing a real-time data to the IOT. These devices include various sensors such as temperature sensor, vibration sensor, BP sensor and pulse sensor. Since some of the sensors give analog output which cannot be used by Arduino, we first convert the analog values into digital form and using convertor IC. Then using the Arduino on which Arduino OS is installed, that reads the values from the sensors and update them into the database at regular intervals.

Fig.4.1.1: Storing Real-time Data to IOT

In level-2, the relevant information is obtained as a result from the data stored by filtering, classifying and categorizing it. This information is nothing but the patient's realtime health data and symptoms that the patient has. These data are collected using a voice recording module and are directly sent to the doctor. The doctors have live access to the patient and their data. An integrated storage compartment and tray are present on the robot for material handling and transfer of medicines or medical reports to the doctor or the patients. Fig.4.1.2 describes the working protocol of the medical assistant robot.

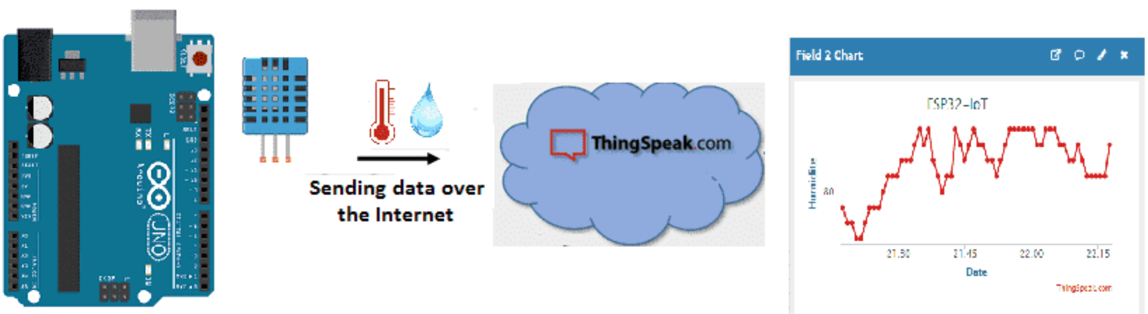

Fig.4.1.2: Prediction Process

4.2 Healthy and Unhealthy Range

Healthy and Unhealthy Range when blood pressure consistently ranges at 140/90 mm Hg or higher. At this stage of high blood pressure, doctors are likely to prescribe a combination of blood pressure medications and lifestyle changes. This stage of high blood pressure requires medical attention. If your blood pressure readings suddenly exceed 180/120 mm Hg, wait five minutes and then test your blood pressure again. If your readings are still unusually high, contact your doctor immediately.

In Blood Pressure There Are Two Types Systolic and diastolic. normal ABG oxygen level for healthy lungs falls between 80 and 100 millimeters of mercury (mm Hg). If a pulse ox measured your blood oxygen level (SpO2), a normal reading is typically between 95 and 100 percent. Normally, a SPO2 reading below 80 mm Hg or a pulse ox (SpO2) below 95 percent is considered low. It is important to know what is normal for you, especially if you have a chronic lung condition. if your breathing is unassisted, it is difficult for your oxygen levels to be too high. In most cases, high oxygen levels occur in people who use supplemental oxygen. Color-coded temperature ranges are aligned to healthy indoor air temperatures set by the government and industry standards. Temperature measurements outside of the green zone may require attention if unexpected or outside of the normal range for this sensor location.

	systolic	Diastolic	Pulse Rate	Temperature	SPO2
Healthy	110-120	70-80	70-90	35-37 Degrees	95-100%
Unhealthy	<100&>125	<65&>85	<65&>95	>37 Degrees	<95%

Table:4.2. Healthy and Unhealthy Range

4.3 Prototype

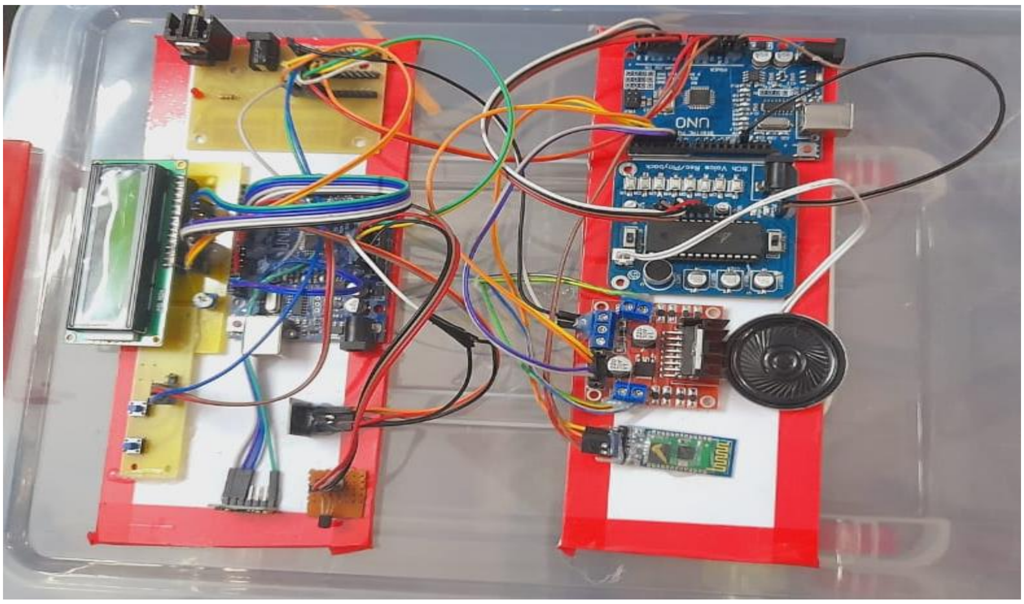

Fig.4.3: Prototype

We have presented and proved the prototype for an automatic system that guarantees a constant monitoring of various health parameters and prediction of any kind of disease or disorder that prevents the patient from the pain of paying frequent visits to the hospitals. The proposed system can be set-up in the hospitals and massive amount of data can be obtained and stored in the online database. Even the results can be made to be accessed from mobile through an application. Since coronary illness is that the principle purpose for death around the world. Human services field contains a tremendous measure of information, for handling those information certain methods are utilized. Handling or processing is one in all methods regularly utilized. Thus, this paper focuses on the real time data for more accurate prediction and accuracy using IOT.

The proposed hardware as well as software system helps patient to predict heart disease in early stages. It will be helpful for mass screening system in villages where hospital facilities are not available, i.e., rural areas. If a patient's health parameters are changing in the same pattern as those of a previous patient in the database, the consequences can also be estimated. If the similar patterns are found repeatedly, it would be easier for the doctors and medical researchers to find a remedy for the problem.

4.4 Input

The Internet of things is the inter-connection of devices, apps, sensors and network connectivity that enhances these entities to gather and exchange data. The distinguishing characteristic of Internet of Things in the healthcare system is the constant monitoring a patient through checking various parameters and also infers a good result from the history of such constant monitoring. a system is designed to continuously monitor the vital parameters such as heart rate, blood pressure and body temperature. The information is stored on a cloud server database and can be displayed through an online website or mobile application by authorized personnel only. We have additionally observed Arduino Uno procedures being utilized in ongoing improvements in different territories of the Internet of Things (IoT). This system has much future scope as the data collected by monitoring is so valuable and can be used for any kind of research by the medical community.

4.5 Processing

These devices include various sensors such as temperature sensor, vibration sensor, BP sensor and pulse sensor. Since some of the sensors give analog output which cannot be used by Arduino, we first convert the analog values into digital form and using convertor IC. Then using the Arduino on which Arduino OS is installed, that reads the values from the sensors and update them into the database at regular intervals. the relevant information is obtained as a result from the data stored by filtering, classifying and categorizing it. This information is nothing but the patient's real-time health data and symptoms that the patient has. This information will be further used in the next level to predict if the patient is suffering from any kind of disease. This helps to make the system smart and efficient.

We use data mining techniques to predict the type and nature of the disease or the disorders for which the system was designed. Using artificial intelligence can further improvise the system by making it smarter. Hence we can infer the disease or disorder by using the existing knowledge base and categorize the result in various categories such as Ideal, Normal, and with Symptoms etc. ThingSpeak is an open-source software written in Ruby which allows users to communicate with internet enabled devices. It facilitates data access, retrieval and logging of data by providing an API to both the devices and social network websites. ThingSpeak was originally launched by ioBridge in 2010 as a service in support of IoT applications.

4.6 Output

The Output of Medical-Robo is of extreme use to patients and doctors as well. The patient can check their health status anytime from the comfort of their homes and visit hospitals only when they really need to. This can be done by using our system whose result are brought online and can be seen from anywhere around the world. Since it is a prototype model, our system shows the almost real time values of various health parameters and emulates how the same can be implemented in the real world. The doctors can also use the log of the patient body condition to study and determine the effect of medicine or other such things

Thus, health disease which is the death cause all around the world can be reduced by the proper treatment and early diagnosis. This project deals with internet of things which helps to record the real time (patient) data using pulse rate sensor and Arduino and is recorded using thing speak. Thus, Arduino uno and IoT were used to make prediction of heart disease in humans.

CHAPTER 5

FEATURES

5.1 Applications:

- Hospitals & Clinics
- Emergency Centers

5.2 Advantages:

- Doctors' ability to be at anyplace anytime
- Doctors can move around in operation theatres
- Doctors can move around the patient with ease
- Hospital Stays are minimized due to Remote patient Monitoring.
- Hospital visits for normal routine check-ups are minimized.
- Patient health parameter data is stored over the cloud. So, it is more beneficial than maintaining their cords on printed kept in the files. Or even the digital records which are kept in a particular computer or laptops or memory device like pen-drive. Because there are chances that these devices can get corrupted data might be lost. Whereas, in case of IOT, the cloud storage is more reliable and does have minimal chances of data loss.
- Doctors can see medical reports remotely via video calls

5.3 Disadvantages:

- Requires Battery Charging
- Need to attach a Tab or Mobile Phone

CHAPTER 6

RESULT

As the title says, the result of Doctor-Robo is of extreme use to patients and doctors as well. The patient can check their health status anytime from the comfort of their homes and visit hospitals only when they really need to. This can be done by using our system whose result are brought online and can be seen from anywhere around the world. Since it is a prototype model, our system shows the almost real time values of various health parameters and emulates how the same can be implemented in the real world. The doctors can also use the log of the patient body condition to study and determine the effect of medicine or other such things.

Thus, health disease which is the death cause all around the world can be reduced by the proper treatment and early diagnosis. This project deals with internet of things which helps to record the real time (patient) data using pulse rate sensor and Arduino and is recorded using thing speak. Thus, machine learning algorithms were used to make prediction of heart disease in humans.

The design of proposed system solves the health care problems by developing a medical robot which provides a contactless solution for patient to prevent this ongoing pandemic, the sensor connected to measure the body temperature ,heart rate ,oxygen saturation level and displayed on LCD screen .It incorporate quick learning real time environment recognition technology of its locomotion in a crowded hospital.

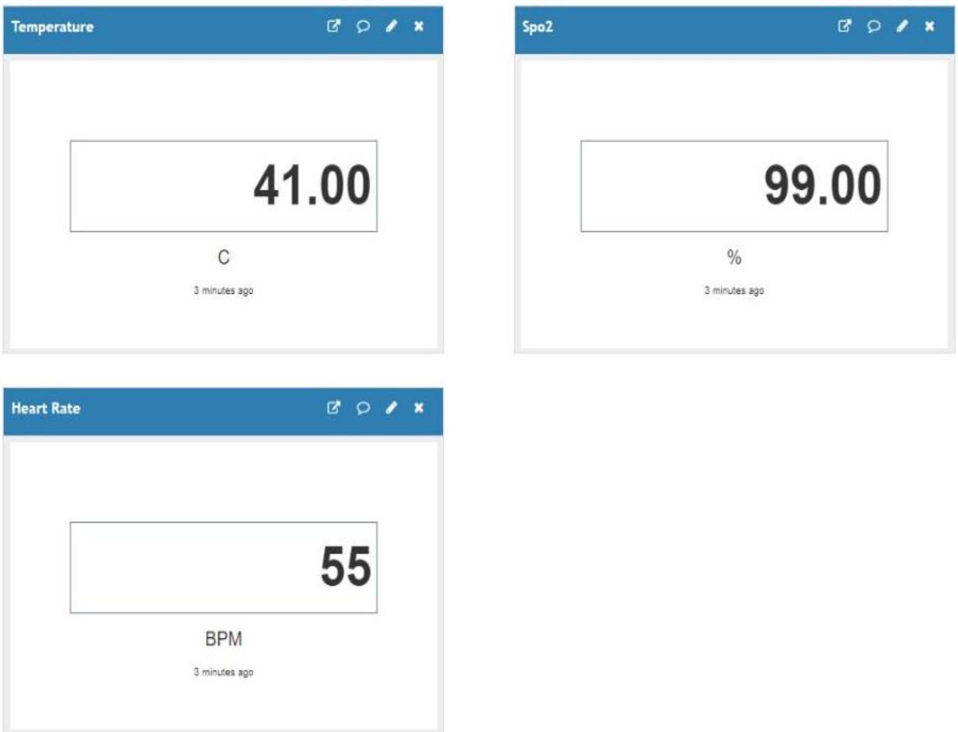

Fig:6.1: Temperature Sensor, Spo2 and Pulse rate meter Output using IOT

CHAPTER 7

CONCLUSION

The design of the Doctor-Robo has been presented in this project. The internal structure of the robot has been tested for safety with a load of 500N (50kgs) using Ansys and Fusion 360. The outer casing of the robot was chosen to be made of medical grade plastics to maintain the global medical standards of sanitation and being biocompatible. The components are designed and selected with consideration to reduce the weight of the robot and at the same time be safe and efficient.

The proposed system can be used extensively in an emergency condition as they can be monitored daily, recorded and stored as a database. In the future IOT device can be integrated with computer computing so that the database can be shared across intensive care and treatment hospitals. And also, in this pandemic this health monito-ring is very useful, we can avoid go to hospital regularly in this pandemic and check our self in our house only.

The current scenario requires innovative contactless solutions to prevent the spread of contagious diseases. Our project has the potential to be a viable solution for this. The fabrication and testing of the robot are the next stage in this project. Real time environment recognition technologies like LIDAR and SLAM can be implemented along with Artificial Intelligence and Machine learning to make the robot adaptive to changing environment and being more approachable to the patients. Speech recognition technology can be used to understand the feedback from patients of different backgrounds and help interact with them more efficiently in the future. Accurate heart rate measurement through image processing, facial recognition and retinal scanning techniques can also be implemented for the identification of patients and for advance contactless tests..

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A

Project Report

On

“ DOCTOR-ROBO ”

Submitted in partial fulfillment of the requirements for the award of degree of

Bachelor of Engineering

In

Electronics and Communication Engineering

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