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Visvesvaraya Technological University

JnanaSangama, Belagavi-590018

A Project Report
on

"HYBRID TEMPERATURE SENSING AND MONITORING SYSTEM WITH BUILT IN SANITIZER"

Project Report submitted in partial fulfillment of the degree of

BACHELOR OF ENGINEERING

IN

ELECTRONICS & COMMUNICATION ENGINEERING

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CERTIFICATE

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in partial fulfillment for VIII semester B.E., Project Work in the branch of Electronics andCommunicationEngineeringprescribedby**VisvesvarayaTechnologicalUniversity,Belagavi** during the period of February 2021 to June 2021. It is certified that all the corrections and suggestions indicated for internal assessment have been incorporated in the report deposited in the department library. The Project Report has been approved as it satisfies the academic requirements in report of project work prescribed for the Bachelor of Engineering degree.

.....	.....	.....
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DECLARATION

We, the under signed students of 8th semester, Electronics and communication Engineering, KSIT, declare that our project work entitled "**HYBRID TEMPERATURE SENSING AND MONITORING SYSTEM WITH BUILT IN SANITIZER**", is a bonafide work of ours. Our project is neither a copy nor by means a modification of any other engineering project.

We also declare that this project was not entitled for submission to any other university in the past and shall remain the only submission made and will not be submitted by us to any other university in the future.

Place: Bengaluru
Date:

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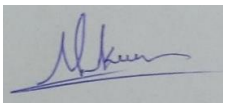
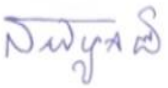
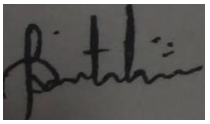
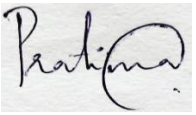
NAVIN KUMAR H. G	**1KS17EC062**	
NAVYA S	**1KS17EC063**	
PRATIMA P AGNIHOTRI	**1KS17EC071**	
PRATIMA V KASHYAP	**1KS17EC072**	

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ACKNOWLEDGEMENT

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ABSTRACT

COVID-19 is a widespread viral disease that has caused enormous loss of the populations around the world. The virus specially targets the respiratory organs like lungs. The spreading of virus starts with the droplets of the infected person's sneeze, cough or breath which might be present in the air or any other surfaces. If this virus comes in contact through either nose, eyes or ears will give a passage for it to the mucus membrane and down to the throat. After 2 to 14 days the person may show few symptoms like itchy throat, cough, increase body temperature (fever), breathlessness etc, So as precautionary measure protecting our nose with face masks is essential, with sanitizing hands and monitoring the body temperature from time to time.

As per instructions by government of India, certain standard operation procedure has to follow at any public places, organizations, institutes etc. The standard operating procedure includes of the following steps to be performed at the entrance of any buildings; they are:

- Temperature check for every individual
- Compulsory face mask
- Hand sanitizing

Although the above steps are currently performed by a person with a help of a temperature gun, Sanitization is done mostly using a hand pump sanitizer or a pedal sanitizer.

This project aims to build a completely automated and a contactless way of approach to follow the standard operating procedures. The design of the model does not involve any human; hence the people are subjected to no risks. Our project also enables a database to store details of individual temperature along with their name and time.

CHAPTER 1

INTRODUCTION

On 17 November 2019 a new virus emerged which created a history. No one could ever imagine the virus attack would turn into Pandemic until declared by the World Health Organization (WHO) on 11 March2020.A massive population has been victim all over the world. China was the first country with a widespread outbreak, followed by other countries like Italy, USA and more. Countries shut their borders, banned travel and issued orders of Lockdown to safe guard their citizens.

As the famous saying of famous scientist Benjamin Franklin "An Ounce of Prevention is worth a Pound of Cure". In this heated situation, it is really important for us to take precautions in order to keep ourselves safe and avoid the infection spread further. Daily routines have begun considering the social distancing and other precautions like wearing face masks and sanitizing the hands from time to time which is made mandatory. Every organization has ensured to check the temperature of every individual entering. These steps are also made compulsory by government of India as standard operating procedures.

In this project we aim to build an all in one and cost-effective contactless monitoring system for any organization with a built in a sanitizer dispenser, mask detecting system and temperature sensing system which records the temperature of every individual and then store into a database.

This model eliminates the dependency of a human to monitor standard operating procedures and record the data on a daily basis which can be used for future references for contact tracing, etc. It is a contactless and fully automated system which reduces the risk of the infection spread.

The following figure 1.1 illustrates how protective measures such as limiting travel, avoiding crowds, social distancing, temperature monitoring, frequent hand washing and contact tracing can slow down the development of new COVID-19 cases and reduce the risk of overwhelming the health care system.

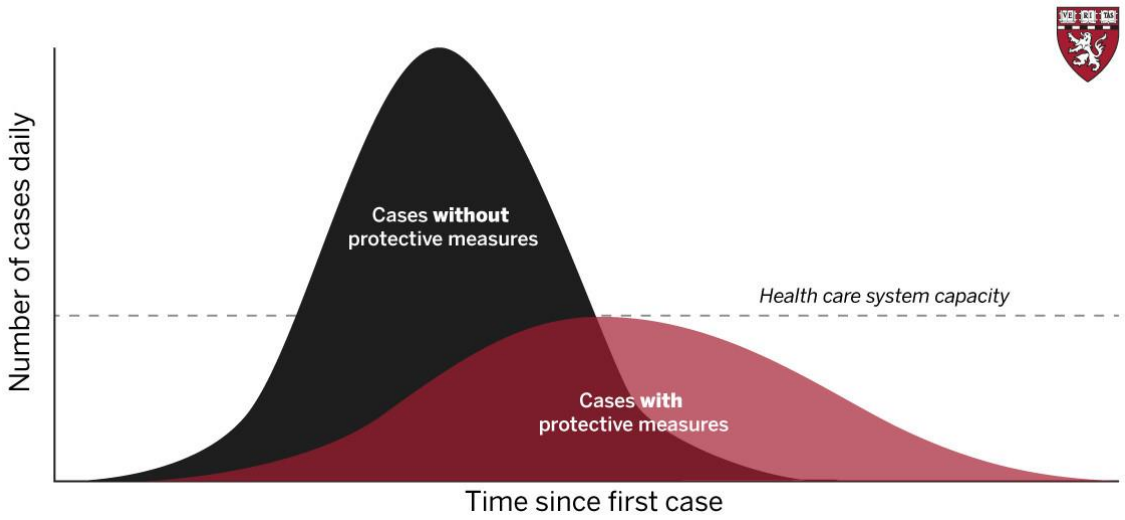


Figure 1.1 Analysis of taking precautions vs no precaution

CHAPTER-2

LITERATURE SURVEY

[1] Measurement of Temperature and Humidity by using Arduino Tool and DHT11

In this paper the process is divided into 3 steps:

- The 1st process is to measure the temperature using DHT11 sensors
- The 2nd process is to extract the output of the DHT11 sensor output in Celsius scale.
- The 3rd process is displaying the temperature recorded on an LCD.

The system connection is based on single wire serial communication. First Arduino sends a start signal to the DHT module and then DHT gives a response signal containing temperature data. A liquid crystal display is used for displaying temperature and humidity which is directly connected to Arduino in 4-bit mode.

This sensor has a resistive type humidity measurement component and NTC type temperature measurement component with an 8-bit microcontroller inbuilt which has a fast response and cost effective and available in 4-pin single row package. The DHT11 module works on serial communication. And the whole process time is about 4ms. It is ensured that the nested wired systems can be replaced by the wireless sensor networks to get accurate data as well as to avoid many hazardous issues.

[2] Design and Development of Arduino Based Contactless Thermometer

Here Arduino UNO, MLX90614 temperature sensor, OLED Display and a battery is used for developing this system. The thermometer built here has a wide range of -70 to 380˚C temperature measurement, has a resolution of 0.02 with an accuracy of 0.5˚C and is accessed by 2 wire serial SM Bus compatible protocol. Unlike traditional thermometers, the proposed thermometer does not need any contact to measure the temperature.

When the Arduino is powered on, the MLX90614 measures the temperature of the body/object in its range. The range is provided by a led/IR light for accurate target of desired object or body. This temperature is displayed using OLED.

[3] Automated Social Distancing Gate with Non-Contact Body Temperature Monitoring using Arduino Uno

The incoming person's body temperature is measured using MLX90614ESF-BAA-000-TU-ND non-contact IR temperature sensor and the temperature is displayed on a 4x20 blue LCD as soon as IR sensor GP2YOA21YK detects the forehead at a distance of 150cm. A buzzer of 0.5 watt, 8 ohms is used to notify the detection of abnormal temperature i.e., 37.5 degree Celsius or above. Also, a speaker is used to indicate the same. MLX90614ESF-DCx versions of the infrared thermometer sensor can be used instead of MLX90614ESF-BAA-000-TU-ND for better accuracy.

[4] Design of a contactless body temperature measurement system using Arduino

Here an Arduino CT uno controller, a type of Arduino mega controller is used to monitor the temperature parameters. Two sensors LM 35 as S1 and MLX-90614 as S2 are used for temperature measurement. LM35 is a contact type sensor and gives a precise output in the range -55 degree C to 150-degree C. Whereas the MLX-90614 is a contactless sensor. The S1 senses the ambience temperature where output voltage is directly converted into temperature in Celsius and S2 senses the human body

temperature through PWM output pins. The esp.-WIFI shield is a programmable microcontroller that is used to transfer and monitor the collected temperature data both wired and wirelessly and also displays the data in the online portal.

[5] RFID based Contactless Body Temperature Screening using Arduino and MLX90614 IR Temperature Sensor

When a person scans his RFID card, EM18 RFID Reader sends the data to the microcontroller Arduino nano, using UART communication. Now the temperature of the person is measured using a non-contact infrared thermometer using MLX90614 sensor. The temperature is measured only when the person is less than 25cm from the thermometer, an ultrasonic sensor is used for this purpose. This temperature is noted against the name read through RFID reader directly to an excel sheet.

This is also an attendance system which stores the temperature of every person. As this is not a completely contactless way of reading RFID tags, the possibility of spreading infection exists. Also, lack of RFID users in most of the places leads to lower number of users.

[6] Design of Automatic Hand Sanitizer with Temperature Sensing

Here there are two systems which work simultaneously, the first one is automatic sanitizer and second is the temperature sensing. The ultrasonic sensor PING SEN136B5B is used to detect the range of the human and the PIR sensor is used to monitor the motion of the human. The range of PIR sensors is 5 to 12m. Any detection of humans will activate the sanitizer pump1 and the sanitizer is sprayed and a blower is used to spread the sanitizer to the surroundings. Ultrasound sensor has a range less than 30m, any detection of human hand in that range will activate pump2 which sanitizes the hands using a DC motor.

Temperature sensor TMP 36 senses the temperature as soon as the contact is made, the sensor displays the temperature on the LCD display in Fahrenheit. A RGB led is made to glow green when the temperature is normal else it is made to glow red when the temperature is higher than normal and a piezo electric buzzer is used for the same.

The system has an efficient automatic sanitizing development but fails to provide a contactless temperature measuring unit, which can lead to spreading of infection.

[7] Arduino UNO and GSM Based Wireless Health Monitoring System for Patients

The microcontroller is the heart of the system used here. An LM35 sensor is used to detect the temperature of the human body, when the temperature greater than normal temperature is detected, an SMS alert is issued using GSM module. The GSM module is used as RS232 serial communication interface and an alert SMS is sent via a GSM network which works via AT commands. This Arduino UNO with GSM module is easy to use, works quickly and can be used for long distances with lesser cost

[8] Design and Implementation of a Smart Hand Sanitizer Dispenser with Door Controller using ATMEGA328P – June [2020]

In this paper, ATMEGA328P microcontroller is used to develop an automatic hand sanitizer dispenser with door controller. When the person goes near the device, their presence is sensed through an ultrasonic sensor, where it will emit ultrasonic frequency from one side and note down the time taken for the sound wave to get reflected back. When the sensor senses the presence of the hand at an approximate distance of 10cm or less than that, it causes the servo motor to move from 0 degrees to 180 degrees in order to pour the sanitizer gel on hand. The time delay of 2 seconds is taken by the servo motor to go back from 180 degrees to 0 degrees. After sanitizing the hand, the electromagnetic door gets de-energized and a second servo motor will get activated which opens the door. The time taken to complete

this procedure is around 8 seconds. The major drawback of this device is the time taken to complete the full procedure.

[9] A Novel Automatic Sanitizer Dispenser [2020]

In this paper, the microcontroller used is Arduino nano which is smaller in size compared to other microcontrollers such as Arduino uno, ATMEGA328P. This automatic sanitizer dispenser consists of ultrasonic sensors which are used to sense the presence of the hand within a certain distance of 7-10cm. When there is presence of the hand within the required range, the sound waves from the sensor are sent to the Arduino nano which in turn triggers a relay board to activate the motor which causes the pumping of the sanitizer.

A relay board used between DC motor and Arduino because the required voltage for the DC motor to pump is 12V but the Arduino cannot generate more than 5V. The time taken to complete the whole procedure is approximately 4 seconds.

The drawback of this model is that there is no option for an external power supply source through the battery.

[10] Self-Activating Sanitizer with Battery Imposed System for Cleansing Hands [2020]

This paper speaks about battery imposed automatic sanitizer systems. AHWSWM microcontroller with Switch Mode Power Supply (SMPS) is used to control the whole setup. Battery Management Mode (BMM) is used for charging and discharging the battery. IR sensors are used to detect the presence of the human hand. The motor connected to RC timer delay pumps the sanitizer. RC timer delay is used to control the flow of sanitizer (2 to 3mL). LEDs are used considering the understanding of the user.

White LED indicates the system is in working mode and battery is in use. Red LED glows when the battery is charging and Green LED glows when the battery is fully charged.

The drawback of this system is battery replacement for the system usage.

[11] Automatic Water Level Controller with Short Messaging Service (SMS) Notification [2014]

This paper deals with automatic water level controllers with SMS notification. Whenever a system encounters low levels of water, a SMS notification is sent to the user using Global System for Mobile (GSM) technology. The system uses a battery for power supply and an Arduino uno is used as a controller. Sensor senses the level of water in the tank and is continuously given to the controller. If the empty level is encountered in the water level, a relay coil is energized using NPN transistor and SMS is sent to the user. Extra care to be taken as water is used as the conducting medium.

[12]Design and Development of Android based Attendance Management System [2004]

This app helps the faculties to reduce their work stress by reducing the time and calculations required to update the attendance manually. This new automation system is embedded into android application which runs in mobile phone. In proposed system the faculty will mark the attendance using their respective android OS based device. On real time, the attendance is made available in the database server (on live server) by the faculty during the class conduction duration.

[13]Attendance Management System an Android Application [2016]

Android based attendance system is designed which is less time consuming, safe and easy to implement. The project is strongly supported at the back end by Java-the most popular and successful object-oriented programming language. The front end is developed using Extensible Mark-up Language (XML). For the database connectivity we are using SQLite database. The attendance can be checked periodically, date wise or as desired by the teacher. The final attendance can then be used for various

purposes.

[14] QR Code Based Smart Attendance System [2017]

The main objective of the automated attendance system is to computerize the traditional way of recording attendance and provide an efficient and automated method to track attendance in institutions. Methodology involves development of a QR code generator android app using the details of student such as roll number, student ID. Develop an Android app that take the attendance with respect to the specific subject and generate the student attendance sheet as per attendance details.

[15] Application Development for Mask Detection and Social Distancing Violation Detection using Convolutional Neural Networks [2021]

This paper aims to detect face masks and social distancing on a video feed using Machine Learning and Object Detection. Tensor Flow and Kera's were used to build a CNN model to detect face masks and it was trained on a dataset of 3800 images. YOLO Object detection was used to detect people in a frame and check for social distancing by calculating the Euclidean distance between the centroids of the detected boxes. An Android app is used where the user will be notified and can monitor the violations through Firebase used as backend service. If a violation is detected it will upload the image to a Firebase Could, and the user will be able to view these images on their Android app along with the date and time. Firebase Cloud Messaging service was used to send notifications which will be handled in the android app. The app offers various features like viewing history, saving the image to the device, deleting the images from the cloud etc. A heat map can also be viewed which highlights crowded regions which can help officials identify the regions that need to be sanitized more often.

CHAPTER-3
PROBLEM IDENTIFICATION AND FORMULATION

3.1 PROBLEM IDENTIFICATION

Due to the wide-spread and outbreak of novel corona virus, a set of rules called as the standard operating procedure is made mandatory by the government of India, which includes thermal scanning and hand sanitizing at the entry of public places, shared work place, shopping malls, institutions etc., in order to control the spread of the infection.

As we are aware the current existing ways to constantly monitor our temperature requires a human inference who is subjected to high risks of infection or transmission of infection. Sanitizer dispensers which are used widely are hand pump sanitizer or pedal sanitizer which works on contact thereby leading to spread of infection. Negligence in wearing a face mask among people is a major hinderance in controlling the outbreak. There is nearly no or very less data storage and acquisition methods in order to contact trace.

Figure 3.1.1 Thermal scanning

Figure 3.1.2 Hand sanitizing

Figure 3.1.3 Improper way of wearing mask

3.2 PURPOSE OF THE PROJECT

The prime concern of the project is to provide a fully automated and completely contactless device for thermal scanning, sanitizing, mask detection and a database to store all the necessary information about the individual.

The system built can reduce the spread of infection as it is contactless and automated, no human involvement is required hence can reduce the risk of spreading diseases. Also, a database is provided to trace an infected person and his contacts, so early precautions can be taken.

CHAPTER-4

OBJECTIVES

To build a hybrid temperature monitoring system with built in sanitizer and mask detection which also automates the door control. A smart sanitizer system to ensure contactless way for cleaning hands, A mask detection technology, an automatic data updating system. An automatic door control is to be implemented.

- To build an auto temperature monitoring system
- To implement smart sanitizing system
- To detect mask
- To deploy automatic data updating system
- To automate doors
- To develop a hybrid contactless monitoring system

CHAPTER-5

METHODOLOGY

5.1 Overview

`The idea for this project was conceived by witnessing the rapid spread of Corona virus diseases also known as Covid 19 across the world which emerged in December 2019. The disease spread has infected massive amount of people and caused tremendous loss of population in the year 2020, stepping to 2021 as well. The major symptoms of this disease are breathlessness and high temperature. It infects the respiratory organs like lungs thereby causing shortness of breath followed by high temperature or fever. It is need of an hour to prevent the spread of the virus further by following necessary steps such as

- Avoiding contact with surfaces
- Sanitizing the palms and monitoring our temperature from time to time
- Avoiding the touching of eyes, nose and ears when present in public
- Most importantly wearing face mask to avoid direct contact with people and virus from entering the mucus glands.

However, in public places there are security guard who does the job of monitoring every individual's temperature who's entering the organization. This process is not only a tedious job also put the guard in the risk of infection. The main aim of this project is to build an automatic monitoring system that checks the temperature of the individual and sanitizing the palms automatically without the need of human thereby preventing the risk of infection when people are at public places. Additionally, this system focusses the need of any organization to keep a daily track of their employees by collecting the daily records of temperature and storing in the database.

This system is completely contactless and eliminates the need of a human to monitor people. After building the concept, further design and modeling is carried out.

Key concepts of these projects are

- Sanitizing the palms of every individual
- Checking the temperature
- Detecting mask
- Reporting to higher authorities in case of irregulates like high temperature
- Updating and recording the data for future reference

Hence every aspect of design is being taken care to make sure that our design satisfies above mentioned criteria to the best extent. Fig 5.1 shows the overall block diagram of the proposed work. The model begins by detecting face mask, sanitizing the palms sensed by the Ultrasonic sensors followed by temperature sensing and with the help of android application, name and the temperature of the person is recorded and stored for the future use. The advantage of this model is it is completely contactless and automatic can be installed in every institution or organization which help in preventing the infection and reduce the further risk of spread.

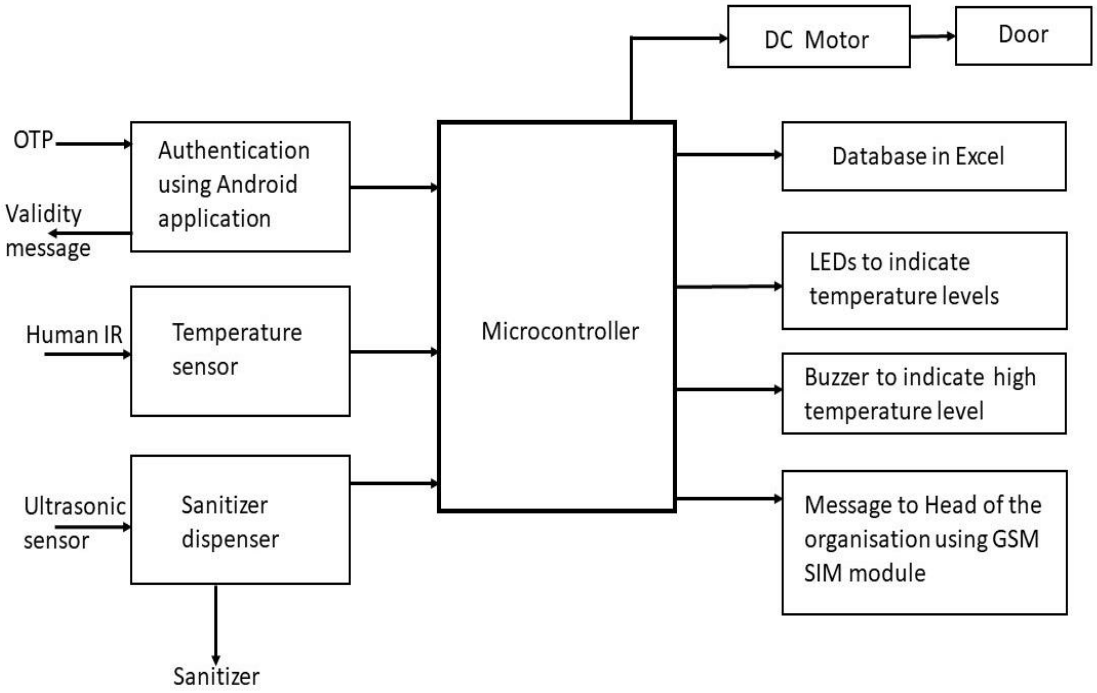


Figure 5.1.1 General block diagram

Fig 5.2 shows the general flow chart for the proposed work. The working begins with the help of sanitizer dispenser which pumps the sanitizer on detection of presence of hands using ultrasonic sensors. Once the hands are sanitized, user is supposed to check their temperature using a non-contact temperature sensor. If an abnormal temperature is detected, an alert message is sent to higher authority of the organization, a red LED and a buzzer is used to indicate the user the same. On detection of normal temperature, this data has to be stored in the database, here we are making use of an android application to detect mask. On successful detection of mask, an OTP is generated which is displayed on the LCD. The user has to enter the OTP in his application to validate it so that the temperature can be saved in the database. Then automatic door control is driven by the servo motors to open the doors for the user.

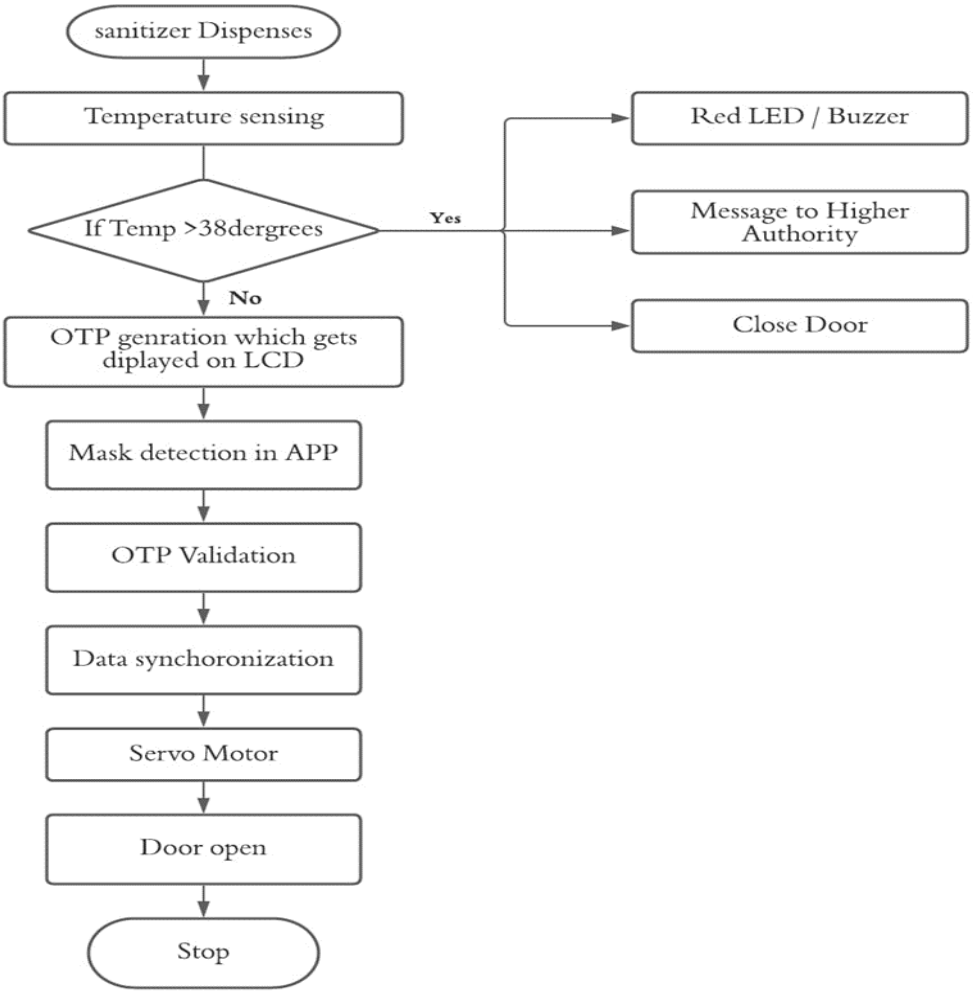


Figure 5.1.2 General flow chart

5.2 Automatic hand sanitizer dispenser:

Automatic hand sanitizer consists of a Node MCU ESP8266, relay module, ultrasonic sensor, Dc pump, batteries. The ultrasonic sensor transmits ultrasonic sound waves if human hand is detected then the message will be sent to relay node which will turn on dc pump for this process, we required Node MCU ESP8266. 1st component is the microcontroller (Node MCU ESP8266). It is attached to 2nd component ultrasonic sensor which is used to transmit ultrasonic sound wave and receives back, it measures the distance of the object by transmitting a ultrasonic sound waves and converts the reflected sound into electronic signal. The 3rd component is delay module which acts like a switch. When the presence of hands is detected from ultrasonic sensors, the microcontroller it will turn on dc pump. The 4th component is dc pump which used to pump the sanitizer. The 5th component is the portable batteries or external power supply to the system.

As shown in figure 5.2, flowchart of the automatic hand sanitizer starts with ultrasonic sensor. In this state the ultrasonic sound wave is transmitted and received, then the object identification done. When hand get detected, the system will enter into next state motor run where the dc pump starts running and at final state sanitizer will get dispensed. The controller programs were developed in Arduino IDE.

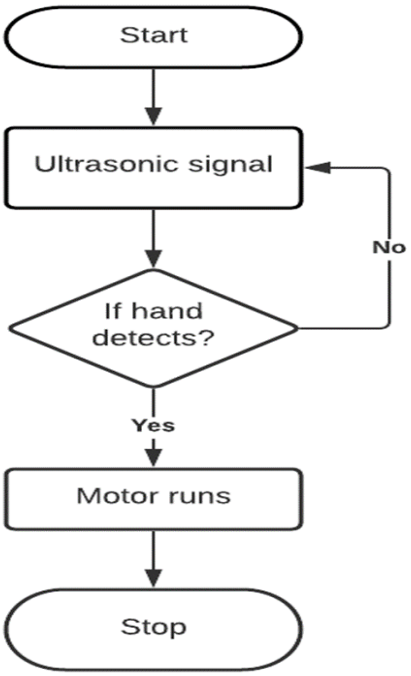


Figure 5.2 Flowchart for automatic hand sanitizer dispenser

5.3 Automatic temperature sensor:

The automatic temperature sensor consists of a Node MCU ESP8266 microcontroller, a non-contact temperature module, human IR sensor, an LCD display, LEDs and buzzer. Figure 5.3 shows the flowchart for automatic temperature sensor circuit. The user is supposed to check their temperature, the human IR sensor detects the presence of human hand, on detection the non-contact temperature sensor measures the temperature and displays the temperature on the LCD screen. If an abnormal temperature is detected, an alert message is sent to higher authority of the organization, a red LED and a buzzer is used to indicate the user the same. On detection of normal temperature, the data is saved in the database. Then an automatic door control drives the door to open for the user after certain delay, the door shuts back to repeat the process.

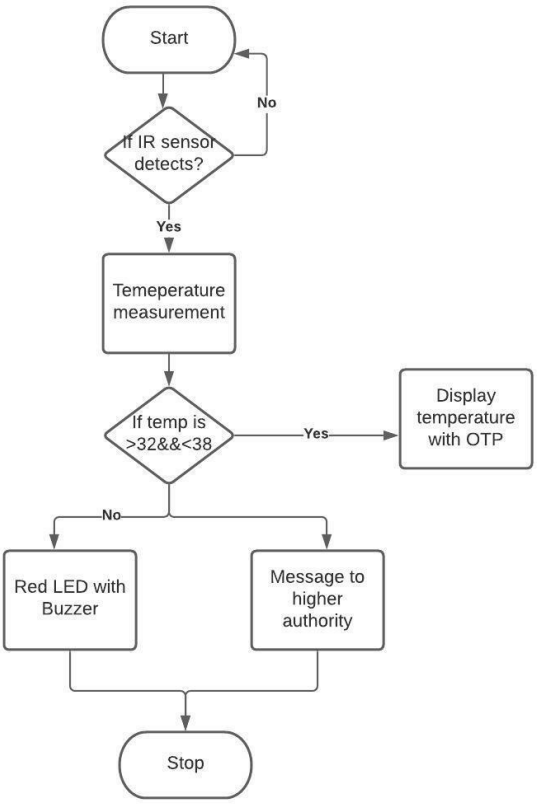


Figure 5.3 Flow chart for automatic temperature sensor

5.4 Face mask detection and authentication using Android application:

The application used to build the system is MIT app inventor which is an open-source web application integrated development environment. It allows newcomers to computer programming to create application software (apps) for Android and iOS. The first step is to install the App and create a profile by giving minimum information like name and organization the user belong to.

Figure 5.4 shows the flowchart for face mask detection and authentication using android application. When the person enters the organization, their hands will be sanitized first using Ultra sonic sensors followed by temperature checking and an OTP generation that happens simultaneously, for every new temperature recorded through the sensors, a new OTP is generated and is displayed on the LCD connected to the Node MCU ESP8266 board.

Once the temperature is sensed, it is stored in a variable named Temp in the database. For the database Firebase is used which is Google's mobile platform for building applications, Things like analytics, authentication, databases, configuration, file storage etc. these services are hosted in the cloud which is maintained by Google.

Next the users click selfie using their phone camera for mask detection. After the picture is clicked and the mask is successfully recognized the user has to enter the same OTP displayed on the LCD for the first time that is during temperature sensing. This step is authentication. If the mask is not recognized then the user has to click the picture again. The option for entering the OTP for the second

time is available only after the mask is detected successfully.

Once the OTP is entered for the second time, the data is fetched from the database to match the OTP, with successful authentication a Validity message is sent to user's phone which says "Successful Authentication". After this along with the name of the user, temperature and the time at which the temperature was sensed will be recorded in the database for future. Any mismatch in OTP or connection problems occur an "authentication failed" message is displayed. In this case the temperature will be sensed again with new OTP and the process continues from step one. Once all the processes are successfully completed a door is used for controlling the entry n exit which opens. In case of High temperature sensed the door remains shut but the temperature stills get recorded in the database and a message to higher authority is sent.

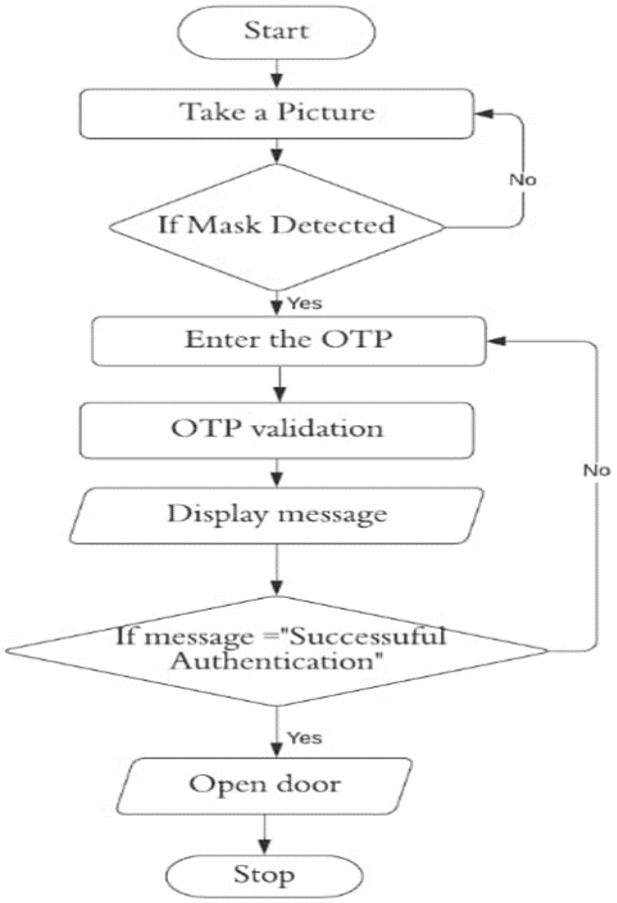


Figure 5.4 Face mask detection and authentication using android application

CHAPTER-6
DESIGN DETAILS OF PRODUCT AS PER SPECIFICATION

A system requirements specification (SRS) is a comprehensive description of the intended purpose and environment for the design under development. The SRS fully describes what the software will do and how it will be expected to perform. Software requirements specification permits a rigorous assessment of requirements before design can begin and reduces later redesign. It should also provide a realistic basis for estimating product costs, risks, and schedules.

The software requirements specification document enlists enough and necessary requirements that are required for the project development. To derive the requirements, we need to have clear and thorough understanding of the products to be developed or being developed. This is achieved and refined with detailed and continuous communications with the project team and customer till the completion of the software.

6.1 HARDWARE COMPONENTS:

- Node MCU ESP8266
- Temperature sensor (GY906-BCC module)
- DC pump and Servo motor
- Ultrasonic sensor and Human IR sensor (HC-SR501)
- Relay module
- GSM SIM Module
- Buzzer and LED
- Adafruit LCD with I2C module

6.1.1 Node MCU ESP8266

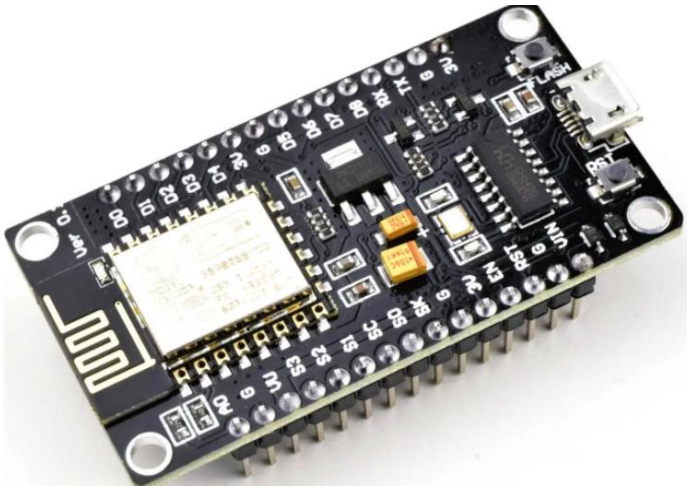


Fig 6.1.1 Node MCU ESP8266

Overview

The heart of the project is microcontroller. It includes firmware that runs on the ESP8266 Wi-Fi So C and hardware which is based on the ESP-12 module. Node MCU ESP8266 has high processing power with in-built Wi-Fi / Bluetooth. It has a pair of UART interfaces (UART0 and UART1), which offer asynchronous communication (RS232 and RS485). There are four power pins and three 3.3V pins. I2C Pins are used to connect I2C sensors and peripherals. Both I2C Master and I2C Slave are supported. Node MCU ESP8266 has seventeen GPIO pins. Control pins Chip alter pin (EN), Reset pin (RST) and WAKE pin are used to regulate the Node MCU ESP8266.The board has four channels of Pulse breadth Modulation (PWM).

Features and specifications:

- Microcontroller: Tensilica 32-bit RISC CPU Xtensa LX106
- Operating Voltage: 3.3V
- Input Voltage: 7-12V
- Digital I/O Pins (DIO): 16
- Analog Input Pins (ADC): 1
- UARTs: 1
- SPIs: 1
- I2Cs: 1
- Flash Memory: 4 MB
- SRAM: 64 KB
- Clock Speed: 80 MHz

6.1.2 Temperature sensor (GY906-BCC module)

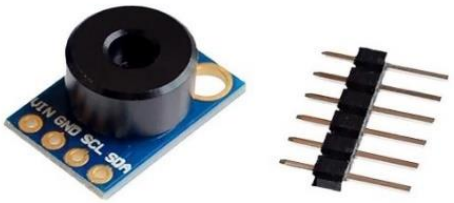


Fig 6.1.2 GY906-BCC module

We have used GY906-BCC module which is an infrared thermometer designed for non-contact temperature sensing. It has a sensing range of 4-10cms approximately and has a field view of 35 degrees.

Features and specifications:

- Input 3V
- Small size, low cost.
- Mounted on a breakout board with two types of pins.
- 10k Pull up resistors for the I2C interface with optional solder jumpers
- Easy to integrate
- High accuracy with wide temperature range of -40 to +125°C for sensor temperature and -70 to +380°C for object temperature.
- Single and dual zone versions
- Customizable PWM output for continuous reading
- Sleep mode for reduced power consumption

6.1.3 DC pump

Fig 6.1.3 DC pump

We have used 9V DC pump to pump the sanitizer out. It is a small size submersible pump motor which can be operated from a 2.5 ~ 9V power supply. It can take up to 120 per hour with very low current consumption of 220ma.To turn on the DC pump we have used a relay module.

6.1.4 Servo motor

Fig 6.1.4 SG90 Servo motor

We have used SG90 Mini Gear Micro Servo 9g motor for controlling the closing and opening of the door. It is 180 degrees rotation digital servo motor. It has an operating voltage of 3.0 -7.2 Volts and operating

speed of 0.10 seconds/60 degrees. Advantages of SG90 servo motors are high resolution, accurate positioning, fast control response and excellent holding power.

6.1.5 Human IR sensor

Fig. 6.1.5 HC-SR501sensor

PIR sensor module helps us to sense motion. We have used this sensor in temperature sensing. The PIR sensor module provides an output "HIGH" when a human body is detected within its range and an automatic Delay "LOW" when the body leaves its range.

Specifications:

- Voltage: 5V – 20V
- Power Consumption: 65mA
- TTL output: 3.3V, 0V
- Lock time: 0.2 sec
- Trigger methods: L – disable repeat trigger, H enable repeat trigger
- Sensing range: less than 120 degrees, within 7 meters
- Temperature: – 15 ~ +70

6.1.6 Ultrasonic sensor

Fig. 6.1.6 HC-SR04 sensor

Ultrasonic sensors are used to measure proximity and distances using ultrasonic waves. The presence or absence of the object can be determined by ultrasound. We have used to sense the presence of human hand. Ultrasonic sensors have two units. They are transmitter unit and a receiver unit. The transmitter unit emits an ultrasonic wave and receiver unit receives the wave reflected back from the target.

Technical specifications:

- Power Supply − +5V DC
- Quiescent Current − <2mA
- Working Current − 15mA
- Effectual Angle − <15°
- Ranging Distance –4cm – 10cms
- Resolution − 0.3 cm
- Measuring Angle − 30 degree

6.1.7 GSM sim module

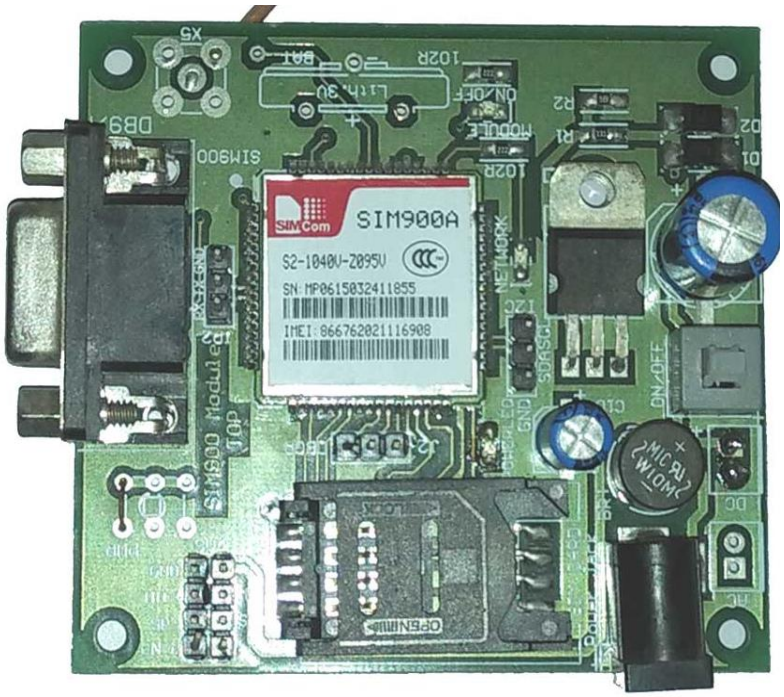


Fig. 6.1.7 SIM900A GSM Module

We have used SIM900A GSM Module to send a message to higher authorities in case of high temperature. This module offers GPRS/GSM technology for communication with the use of a SIM card. It uses a 900 and 1800MHz frequency band and allows users to send/receive SMS.

Features:

- Single supply voltage: 3.4V – 4.5V
- GPRS connectivity: GPRS multi-slot class 10 (default), GPRS multi-slot class 8 (option)
- Transmitting power: Class 4 (2W) at EGSM 900, Class 1 (1W) at DCS 1800
- Operating Temperature: -30ºC to +80ºC
- Storage Temperature: -5ºC to +90ºC
- DATA GPRS: Download transfer max is 85.6KBps, Upload transfer max 42.8KBps
- Supports MIC and Audio Input
- Keypad interface and display interface
- Features Real Time Clock
- Supports UART interface
- Supports single SIM card

6.1.8 Adafruit LCD with I2C module

Fig. 6.1.8 Adafruit LCD with I2C module

We need LCD to display the temperature measured and OTP to be entered in the application. Connecting an LCD display directly to an Node MCU ESP8266 will consume a large number of GPIO pins on our microcontroller, leaving us with less pins for other sensors and actuators. We combined an LCD I2C backpack with our LCD to solve this problem. The PCF8574 Remote 8 bit I/O Expander is used in this I2C Backpack. I2C Module has an inbuilt PCF8574 I2C chip that converts I2C serial data to parallel data for the LCD display.

Features:

- Operating Voltage: 5V
- Backlight and Contrast is adjusted by potentiometer
- Serial I2C control of LCD display using PCF8574
- Compatible for 16x2 LCD

6.1.9 Relay module

Fig. 6.1.9 Relay module

The relay is an electro technical switch that is used to trigger high volt applications using low volt signals. To turn on the DC water pump, we are using this 5V relay module. The reason for using this is that the microcontroller cannot generate more than 5V on its GPIO pins so we have used a relay module to power the 9V DC water pump.

Specifications:

- Supply voltage – 3.75V to 6V
- Quiescent current: 2mA
- Current when the relay is active: ~70mA
- Relay maximum contact voltage – 250VAC or 30VDC
- Relay maximum current – 10A

6.1.10 Buzzer

Fig. 6.1.10 Buzzer

A **buzzer** is a small yet efficient component to add sound features to our project/system when the temperature is high.

Features:

- Rated Voltage: 6V DC
- Operating Voltage: 4-8V DC
- Rated current: <30mA
- Sound Type: Continuous Beep
- Resonant Frequency: ~2300 Hz

6.1.11 **LED**

Fig. 6.1.11 Red LED

An LED or a Light Emitting Diode is a semiconductor device having a PN junction diode which emits light when forward biased. In our project it helps to indicates the user by glowing red LED in case of high temperature.

Features:

- Low Power Consumption
- Small Size
- Fast Switching

6.1.12 Smart phone

Fig 6.1.12 Smart phone

Smart phone with installed application is required in mask detection and maintaining the record of the data in database. A smart phone is a cellular telephone that can replace almost anything that computers can do these days and other features not originally associated with telephones, such as an operating

system, web browsing and the ability to run software applications. The following are some of the other key features of a smart phone:

- Touch screen
- Digital camera with video capability
- Internet connectivity
- Wi-Fi
- Mobile browser
- Ability to download applications and run them independently
- Support for third-party applications
- Ability to run multiple applications simultaneously
- Display time and date and other functions such as alarm clock, stopwatch, and timer.
- Wireless synchronization with other devices, such as laptop or desktop computers
- Unified messaging
- Virtual assistant using Siri, Google Assistant, or Cortana.
- GPS - Global Positioning System.

CHAPTER-7

SOFTWARE DESCRIPTION

7.1 MIT App Inventor:

Fig 7.1 MIT App Inventor

We have used MIT App Inventor to build our app which is used for Mask detection and maintaining record of the data. It is a web application IDE to build Android Apps where we can customize functions and features of the app. It consists of two parts:

1. App Inventor Designer
2. App Inventor Block Editor

In App Inventor Designer we select the components for our app and in App Inventor Block Editor we assemble program blocks that specify how the components should work.

7.2 Arduino IDE:

Fig 7.2 Arduino IDE

We have used Arduino IDE to program our ESP8266 Node MCU development board. Arduino IDE is an open-source software which can run on Java for Windows, Mac OS X and Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment. A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code.Arduino IDE supports C and C++ languages.The code created on IDE platform generates a Hex file which is then transferred and uploaded on to the controller board. The IDE environment consists two parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Module.

CHAPTER-8

IMPACT OF PROJECT TOWARDS SOCIETY

The only way to fight the virus is to take precautions to avoid the virus spreading, which is possible by contactless movements every day. The current monitoring process has human involvement and is not completely contactless. The sanitizer dispensers used need to be pumped through feet, and an IR thermometer used to check the temperature of the person is done by another person.

Our Hybrid monitoring system overcomes the problem of human involvement and makes sure the individuals are thoroughly monitored before entering the organization so that they are not under the risk of infection as the system is contactless and no human needed to check the temperature and the sanitizing is done automatically without any contact.

Such an ergonomic designed monitoring system improves the disease spread thereby saving large populations from infection or death, which also improves the economy in the long run by providing an appropriate monitoring system for all organizations where the crowd is at the peak amid increasing cycle of lockdown.

CHAPTER-9

IMPACT OF PROJECT TOWARDS ENVIRONMENT

Hybrid monitoring system is extremely non-hazardous to the environment and constitutes the following factors

- It is completely contactless.
- It is an All-in-one monitoring system with sanitising dispenser, temperature sensing and mask detection along with storage in the database.
- It is fast and also accurate monitoring system
- No human intervention and extremely safe to use by all
- It has an additional database to store the day-to-day status of the employees which help in maintaining records.
- Build in mask detection with restricted entry
- On high temperature detection the door will be shut which is

CHAPTER-10

RESULTS

10.1 Hybrid monitoring system:

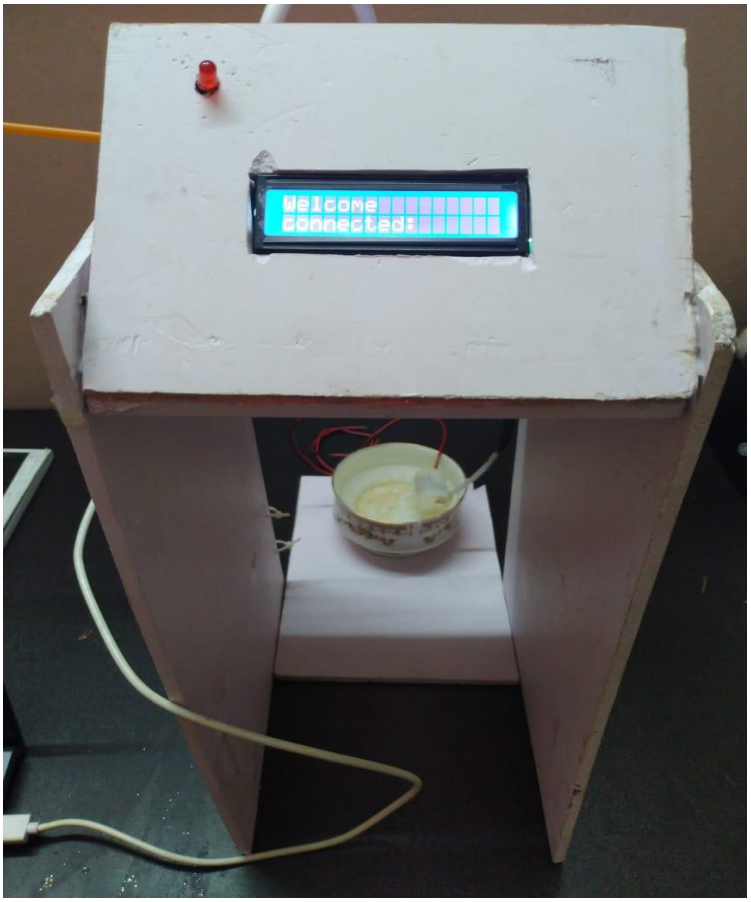


Fig 10.1 Model of hybrid monitoring system

When person enters the organization, their hands will get sanitize by using Automatic Hand Sanitizer which consist of ultrasonic sensor to detects human hand. If the hand is detected then the microcontroller will turn on the dc pump to pump the sanitizer. This is shown in Fig 10.1.

10.2 Temperature sensing:

Fig 10.2.1 Detection of abnormal temperature

Fig 10.2.2 Detection of normal temperature

Simultaneously temperature is sensed by using a non-contact temperature module. Both the temperature along with the OTP will be displayed on the LCD screen. This is shown in figure 10.2.1 On detection of normal temperature the data will be saved in a database. If an abnormal temperature is detected only temperature will be displayed on LCD red led glows and alert message is sent to a higher authority. This is shown in figure 10.2.2.

10.3 Android application:

Fig 10.3.1 Home page of application

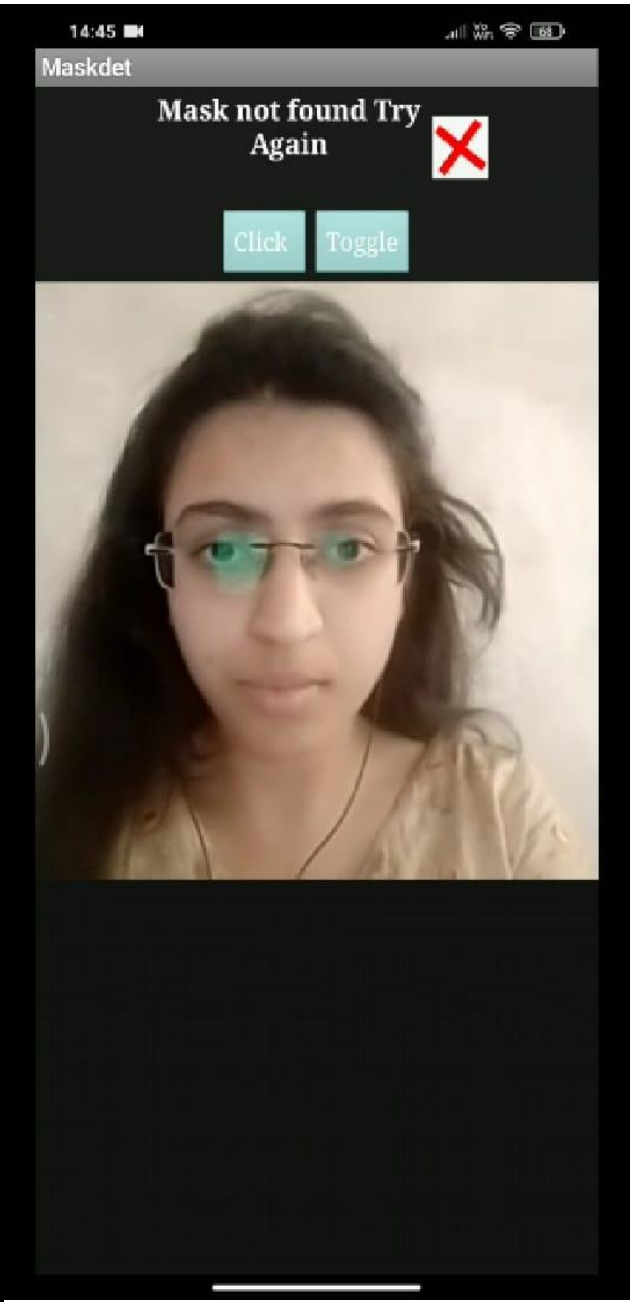


Fig 10.3.2 Mask not recognized

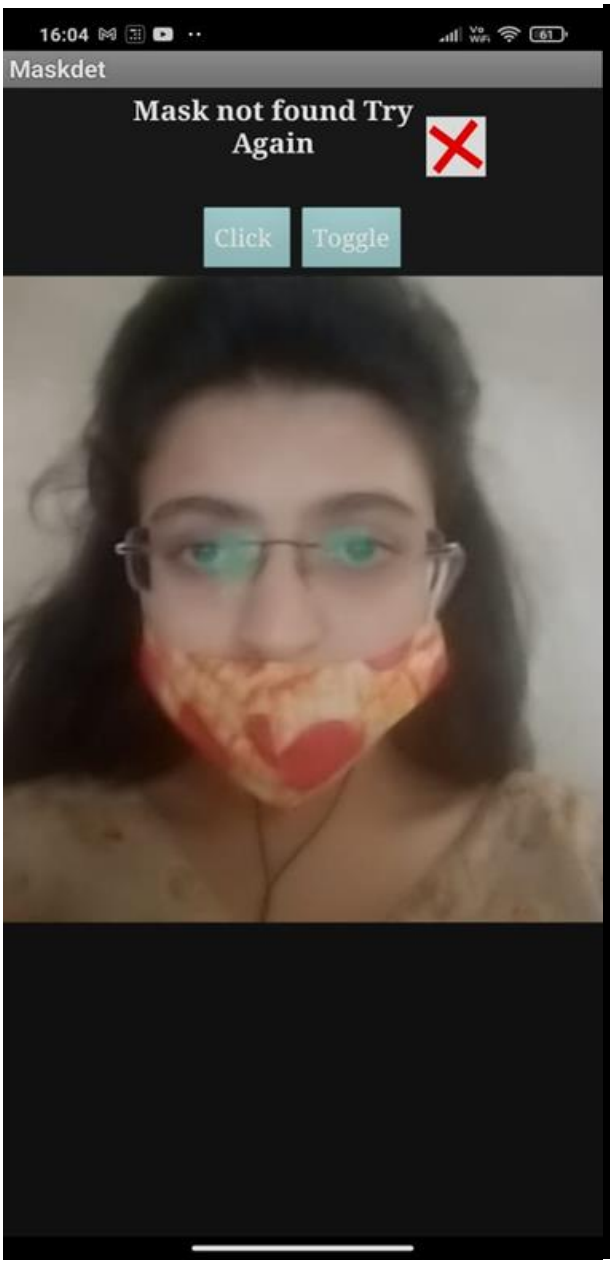


Fig 10.3.3 Mask partially recognized

Fig 10.3.4 Mask recognized

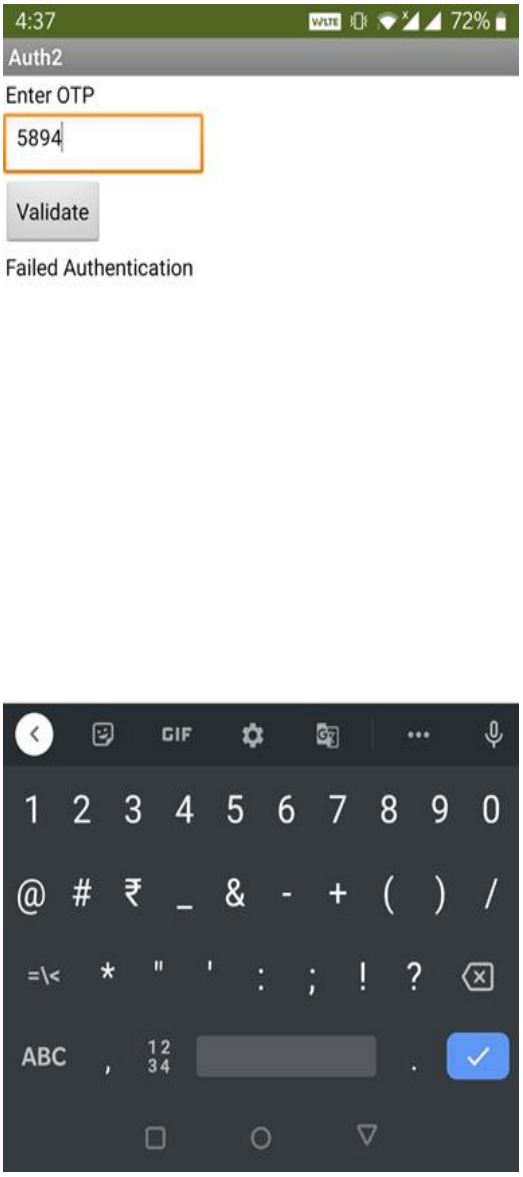
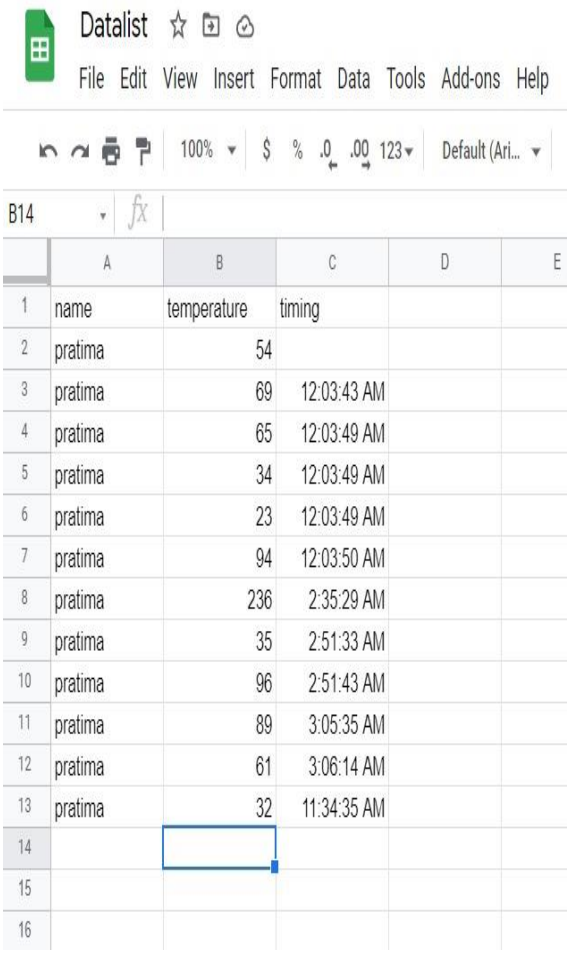


Fig 10.3.5 Entering OTP

Fig 10.3.6 Displaying temperature and time



Datalist

File Edit View Insert Format Data Tools Add-ons Help

100% $ % .0 .00 123 Default (Ari...

B14

	A	B	C	D	E
1	name	temperature	timing		
2	pratima	54			
3	pratima	69	12:03:43 AM		
4	pratima	65	12:03:49 AM		
5	pratima	34	12:03:49 AM		
6	pratima	23	12:03:49 AM		
7	pratima	94	12:03:50 AM		
8	pratima	236	2:35:29 AM		
9	pratima	35	2:51:33 AM		
10	pratima	96	2:51:43 AM		
11	pratima	89	3:05:35 AM		
12	pratima	61	3:06:14 AM		
13	pratima	32	11:34:35 AM		
14					
15					
16					

Fig 10.3.7 Storing data in database

For mask detection user has to click a selfie using an application. After the picture is clicked and mask is successfully recognized, the user has to enter the OTP which was displayed on the LCD as shown in Fig 10.3.4 and Fig 10.3.5. If mask is not recognized or partially recognized the user as click the picture again till it gets recognized as shown Fig 10.3.2 and Fig 10.3.3. Once the OTP is validated the temperature along with user details and time gets updated to the database. This is shown in Fig 10.3.7. Once the all process is successfully completed the door open and close after certain delay. If high temperature is detected the OTP will not be displayed for further process and door remains close.

CHAPTER-11

FUTURE SCOPE

As a future scope, GSM module can be used to alert the organization if a person tries to enter without following procedures or try to forcefully open the door. Also, a notification could be sent to an organization in-case of low-level sanitizer, after a threshold limit is detected.

CHAPTER-12

CONCLUSION

The proposed work is a significant attempt to reduce the spread of covid 19 infection. As said prevention is better than cure, an automatic hand sanitizer and temperature sensing device is built along with features like mask detection and database is provided. This reduces the risk subjected to a human and also helps in reducing the spread of the deadly disease. This system can be used at the entrance of any organization like Schools, colleges, Private institution, Banks and so on. It can also be implemented at the entrance of shopping malls and hospitals where the crowd is maximum and human monitoring is difficult. We can also use at the entrance of metro stations, railway stations, airports and also in public transportation.

PAPER PUBLICATION DETAILS

I. LITERATURE SURVEY PAPER:

- We have published our literature survey paper in **IARJSET Journal (International Advanced Research Journal in Science, Engineering and Technology)**Vol. 7, Issue 12, December 2020
  DOI 10.17148/IARJSET.2020.71213

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Literature review on "Hybrid temperature sensing and monitoring system with built-in sanitizer"

Navin Kumar H.G, Navya S, Pratima Agnihotri, Pratima V Kashyap, P.N Sudha

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eISSN: 2319-1163 | pISSN: 2321-7308

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RUBRICS for Evaluation of Project work

Review-1 : Total Marks 15			
Design Readiness (Component procurement, Project plan & set up of environment)	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Component procurement, Project plan & set up of environment is done as required	Component procurement, Project plan & set up of environment is done partially	Component procurement, Project plan & set up of environment is poorly done
	8 to 10 marks	**5 to 7 marks**	**0 to 4 marks**
Comparison with similar work	**Evaluation criteria**		
	Good	**Average**	**Poor**
5 marks	Comparison of the work is good against similar work	Comparison of the work is average against similar work	Comparison of the work is poor against similar work
	4 to 5 marks	**3 marks**	**0 to 2 marks**

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RUBRICS for Evaluation of Project work

Review-2 : Total Marks 40			
Partial Demo	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Partial demonstration of project work is satisfactory	Partial demonstration of project work is average	Partial demonstration of project work is poor
	8 to 10 marks	**5 to 7 marks**	**0 to 4 marks**
Tool learning	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Tool learning is satisfactory	Tool learning is partially satisfactory	Tool learning is poor
	8 to 10 marks	**5 to 7 marks**	**0 to 4 marks**
Project Report draft	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	The contents of the Draft project report is good	The contents of the Draft project report is average	Draft project report is poorly written.
	8 to 10 marks	**5 to 7 marks**	**0 to 4 marks**
Consistency Team work	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Demonstration of consistency in work progress and team work if good.	Demonstration of consistency in work progress and team work if average.	Demonstration of consistency in work progress and team work if poor.
	8 to 10 marks	**5 to 7 marks**	**0 to 4 marks**

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RUBRICS for Evaluation of Project work

Review-3 : Total Marks 45			
Functional demo	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Functional demonstration of project work is satisfactory	Functional demonstration of project work is average	Functional demonstration of project work is poor
	8 to 10 marks	**5 yo 7 marks**	**0 to 4 marks**
Results vs Requirements Further work	**Evaluation criteria**		
	Good	**Average**	**Poor**
5 marks	Results vs requirements of the project is satisfactory	Results vs requirements of the project is partially satisfactory	Results vs requirements of the project is poor
	4 to 5 marks	**3 marks**	**0 to 2 marks**
UGC approved State level or above	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	The work is published in UGC Journal + one in state level or above	Both papers are published in statel level or above	Only one paper is published
	6+4 marks	**4 +4 marks**	**4 to 6 marks other wise 0 marks**
Final Project report	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Project report is complete and correct in all respects	Project report is complete and correct partially.	Project report's completeness and correctness is poor
	8 to 10 marks	**5 to 7 marks**	**0 to 4 marks**
Presentation & PPT quality	**Evaluation criteria**		
	Good	**Average**	**Poor**
10 marks	Presentation and PPT quality is good	Presentation and PPT quality is average	Presentation and PPT quality is poor
	8 to 10 marks	**5 yo 7 marks**	**0 to 4 marks**

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K.S. INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG.

8th SEMESTER PROJECT REVIEW - 1

2020-21

Project Group No	8
Project Title	Hybrid temperature sensing and monitoring system with built in sanitizer
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO1(10)	CO3(5)	Total (15)
			Design Readiness (Component procurement, Project plan & set up of environment)(10)	Comparison with similar work(5)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	5	15
2	1KS17EC063	NAVYA.S	10	5	15
3	1KS17EC071	PRATIMA.P.AGNIHOTRI	10	5	15
4	1KS17EC072	PRATIMA V KASHYAP	10	5	15

Evaluator Name **Mr.Sunil Kumar.G**

Project Coordinators **Dr. B Sudarshan**
Mrs. Pooja.S

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K.S. INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG.

8th SEMESTER PROJECT REVIEW - 1

2020-21

Project Group No	8
Project Title	Hybrid temperature sensing and monitoring system with built in sanitizer
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO1(10)	CO3(5)	Total (15)
			Design Readiness (Component procurement, Project plan & set up of environment)(10)	Comparison with similar work(5)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	5	15
2	1KS17EC063	NAVYA.S	10	5	15
3	1KS17EC071	PRATIMA.P.AGNIHOTRI	10	5	15
4	1KS17EC072	PRATIMA V KASHYAP	10	5	15

Evaluator Name **Mrs.Sangeetha.V**

Project Coordinators **Dr. B Sudarshan**
Mrs. Pooja.S

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K.S. INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG.

8th SEMESTER PROJECT REVIEW - 1

2020-21

Project Group No	8
Project Title	Hybrid temperature sensing and monitoring system with built in sanitizer
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO1(10)	CO3(5)	Total (15)
			Design Readiness (Component procurement, Project plan & set up of environment)(10)	Comparison with similar work(5)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	5	15
2	1KS17EC063	NAVYA.S	10	5	15
3	1KS17EC071	PRATIMA.P.AGNIHOTRI	10	5	15
4	1KS17EC072	PRATIMA V KASHYAP	10	5	15

Evaluator Name **Dr.P.N.Sudha**

Project Coordinators **Dr. B Sudarshan**
Mrs. Pooja.S

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K.S. INSTITUTE OF TECHNOLOGY
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG.
8th SEMESTER PROJECT REVIEW - 2
2020-21

Project Group No	3
Project Title	Hybrid temeperature sensing and monitoring system with built in sanitizer
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO2 (10)	CO3 (10)	CO4 (10)	CO5 (10)	Total (40)
			Partial Demo (10)	Tool learning (10)	Project Report draft(10)	Consistency Team work (10)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	10	10	10	40
2	1KS17EC063	NAVYA.S	10	9	10	10	39
3	1KS17EC071	PRATIMA.P.AGNIHOTRI	10	10	10	10	40
4	1KS17EC072	PRATIMA V KASHYAP	10	10	10	10	40

Evaluator Name **Dr.Sudha.P.N**

Project Coordinators **Dr. B Sudarshan**
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8th SEMESTER PROJECT REVIEW - 2

2020-21

Project Group No	3
Project Title	Hybrid temeperature sensing and monitoring system with built in sanitizer
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO2 (10)	CO3 (10)	CO4 (10)	CO5 (10)	Total (40)
			Partial Demo (10)	Tool learning (10)	Project Report draft(10)	Consistency Team work (10)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	10	10	10	40
2	1KS17EC063	NAVYA.S	10	10	10	10	40
3	1KS17EC071	PRATIMA.P.AGNIHOTRI	10	10	10	10	40
4	1KS17EC072	PRATIMA V KASHYAP	10	10	10	10	40

Evaluator Name **Mrs.Sangeetha.V**

Project Coordinators **Dr. B Sudarshan**
Mrs. Pooja.S

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG.
8th SEMESTER PROJECT REVIEW - 2
2020-21

Project Group No	3
Project Title	Hybrid temeperature sensing and monitoring system with built in sanitizer
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO2 (10)	CO3 (10)	CO4 (10)	CO5 (10)	Total (40)
			Partial Demo (10)	Tool learning (10)	Project Report draft(10)	Consistency Team work (10)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	10	10	10	40
2	1KS17EC063	NAVYA.S	10	10	10	10	40
3	1KS17EC071	PRATIMA.P.AGNIHOTRI	10	10	10	10	40
4	1KS17EC072	PRATIMA V KASHYAP	10	10	10	10	40

Evaluator Name **Dr.Sudharshan.B**

Project Coordinators **Dr. B Sudarshan**
Mrs. Pooja.S

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8th SEMESTER PROJECT REVIEW - 3
2020-21

Project Group No	3
Project Title	Hybrid Temperature sensing and monitoring system with built in sanitiser
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO2(10)	CO3(5)	CO4(10)	CO4(10)	CO5(10)	Total (45)
			Functional demo10)	Results vs Requirements Further work (5)	UGC approved (6) State level or above (4)	Final Project report(10)	Presentation (5) PPT quality (5)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	5	10	10	10	45
2	1KS17EC063	NAVYA.S	10	5	10	10	10	45
3	1KS17EC071	PRATHIMA.P.AGNIHOTRI	10	5	10	10	10	45
4	1KS18EC072	PRATHIMA.V.KASHYAP	10.	5	10	10	10	45

Evaluator Nan **Dr.Sudha.P.N**

Project Coord **Dr. B Sudarshan**
Mrs. Pooja.S

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8th SEMESTER PROJECT REVIEW - 3

2020-21

Project Group No	3
Project Title	Hybrid Temperature sensing and monitoring system with built in sanitiser
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO2(10)	CO3(5)	CO4(10)	CO4(10)	CO5(10)	Total (45)
			Functional demo10)	Results vs Requirements Further work (5)	UGC approved (6) State level or above (4)	Final Project report(10)	Presentation (5) PPT quality (5)	
1	1KS17EC062	NAVIN KUMAR.H.G	10	5	10	10	10	45
2	1KS17EC063	NAVYA.S	10	5	10	10	10	45
3	1KS17EC071	PRATHIMA.P.AGNIHOTRI	10	5	10	10	10	45
4	1KS18EC072	PRATHIMA.V.KASHYAP	10	5	10	10	10	45

Evaluator Nan **Mr.Sunil Kumar.G**

Project Coord **Dr. B Sudarshan**
Mrs. Pooja.S

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGG.
8th SEMESTER PROJECT REVIEW - 3
2020-21

Project Group No	3
Project Title	Hybrid Temperature sensing and monitoring system with built in sanitiser
Guide Name	Dr.P.N.Sudha

Sl No	USN	Student Name	CO2(10) Functional demo10)	CO3(5) Results vs Requirements Further work (5)	CO4(10) UGC approved (6) State level or above (4)	CO4(10) Final Project report(10)	CO5(10) Presentation (5) PPT quality (5)	Total (45)
1	1KS17EC062	NAVIN KUMAR.H.G	10	5	10	10	10	45
2	1KS17EC063	NAVYA.S	10	5	10	10	10	45
3	1KS17EC071	PRATHIMA.P.AGNIHOTRI	10	5	10	10	9	44
4	1KS18EC072	PRATHIMA.V.KASHYAP	10	5	10	10	9	44

Evaluator Nan **Mrs.Sangeetha.V**

Project Coord **Dr. B Sudarshan**
Mrs. Pooja.S

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Branch : EC Scheme : 2017 Semester : 8

Sl NO.	USN	17EC81	17EC82	17EC833	17EC835	17EC84	17ECP85	17ECS86	STUDENT SIGNATURE
1	1KS16EC001	34	26	27	-	35	70	80	
2	1KS16EC038	35	34	36	-	47	91	94	
3	1KS16EC068	33	28	-	20	35	84	91	
4	1KS16EC086	34	38	-	32	45	85	91	
5	1KS16EC113	35	26	33	-	35	90	93	
6	1KS17EC001	35	37	-	30	48	98	94	
7	1KS17EC002	36	34	-	31	48	94	99	
8	1KS17EC003	39	38	-	29	47	88	98	
9	1KS17EC004	38	38	37	-	46	100	94	
10	1KS17EC005	38	38	37	-	47	90	93	
11	1KS17EC006	39	39	37	-	46	99	93	
12	1KS17EC007	38	40	38	-	46	96	93	
13	1KS17EC008	39	39	36	-	48	98	98	
14	1KS17EC009	39	39	-	36	47	94	98	
15	1KS17EC010	37	37	38	-	47	93	98	
16	1KS17EC011	33	33	37	-	47	84	94	
17	1KS17EC012	37	40	37	-	47	95	98	
18	1KS17EC013	37	39	37	-	47	89	98	
19	1KS17EC014	39	39	-	30	48	96	99	
20	1KS17EC015	38	40	37	-	49	100	99	
21	1KS17EC016	38	35	38	-	47	90	93	
22	1KS17EC017	37	39	-	30	40	89	93	
23	1KS17EC018	37	38	37	-	46	91	91	
24	1KS17EC019	39	33	-	24	48	89	93	
25	1KS17EC020	39	39	37	-	46	93	93	
26	1KS17EC021	37	38	-	32	46	93	93	
27	1KS17EC022	37	35	-	31	46	96	93	
28	1KS17EC023	37	35	37	-	46	91	93	
29	1KS17EC024	36	39	36	-	46	90	93	
30	1KS17EC025	36	35	37	-	47	95	95	
31	1KS17EC026	36	34	37	-	47	85	93	
32	1KS17EC027	37	38	38	-	47	96	93	
33	1KS17EC028	38	40	37	-	46	86	93	
34	1KS17EC029	39	39	-	32	48	99	92	
35	1KS17EC030	37	37	37	-	47	89	93	

Sl NO.	USN	17EC81	17EC82	17EC833	17EC835	17EC84	17ECP85	17ECS86	STUDENT SIGNATURE
36	1KS17EC031	36	36	-	23	47	88	94	
37	1KS17EC032	38	37	-	34	47	90	92	
38	1KS17EC033	37	37	37	-	46	80	91	
39	1KS17EC035	39	40	-	35	47	99	99	
40	1KS17EC036	37	39	-	32	47	99	98	
41	1KS17EC038	36	32	37	-	39	85	92	
42	1KS17EC039	36	35	37	-	47	88	93	
43	1KS17EC040	36	38	-	36	47	94	98	
44	1KS17EC041	37	31	-	29	48	98	94	
45	1KS17EC042	35	39	-	27	46	89	92	
46	1KS17EC043	40	37	-	33	47	88	93	
47	1KS17EC044	39	36	-	27	47	93	94	
48	1KS17EC045	40	40	-	37	48	96	98	
49	1KS17EC046	37	31	-	30	40	78	91	
50	1KS17EC047	39	39	37	-	46	100	91	
51	1KS17EC048	35	35	-	26	47	88	98	
52	1KS17EC049	35	35	-	30	46	88	93	
53	1KS17EC050	40	40	-	38	49	96	98	
54	1KS17EC051	38	40	-	38	47	94	93	
55	1KS17EC052	36	36	-	25	46	85	93	
56	1KS17EC053	34	38	37	-	46	85	93	
57	1KS17EC054	35	26	37	-	45	79	91	
58	1KS17EC055	36	35	36	-	46	79	94	
59	1KS17EC056	36	36	-	23	48	80	93	
60	1KS17EC057	37	37	-	34	49	100	98	
61	1KS17EC058	37	37	36	-	47	94	91	
62	1KS17EC059	36	38	-	34	48	92	94	
63	1KS17EC060	34	30	34	-	46	75	91	
64	1KS17EC061	28	28	28	-	46	75	94	
65	1KS17EC062	37	38	-	30	47	100	93	
66	1KS17EC063	37	39	-	31	49	100	93	
67	1KS17EC064	37	38	36	-	48	80	93	
68	1KS17EC065	36	38	36	-	48	80	93	
69	1KS17EC066	37	37	-	30	48	89	91	
70	1KS17EC067	37	39	-	34	49	100	98	
71	1KS17EC068	38	40	38	-	49	92	94	
72	1KS17EC069	36	39	37	-	46	80	98	
73	1KS17EC070	36	36	36	-	46	75	98	
74	1KS17EC071	38	36	37	-	49	100	98	
75	1KS17EC072	37	37	-	31	49	100	98	
76	1KS17EC073	37	35	-	27	47	84	98	
77	1KS17EC074	36	25	34	-	35	98	80	

Sl NO.	USN	17EC81	17EC82	17EC833	17EC835	17EC84	17ECP85	17ECS86	STUDENT SIGNATURE
78	1KS17EC075	38	39	38	-	49	100	94	
79	1KS17EC076	37	40	-	29	49	96	94	
80	1KS17EC077	26	24	34	-	35	70	80	
81	1KS17EC078	37	37	36	-	47	91	93	
82	1KS17EC079	37	37	-	25	47	100	93	
83	1KS17EC080	37	38	36	-	49	90	92	
84	1KS17EC082	37	33	35	-	48	86	98	
85	1KS17EC084	37	40	-	33	49	99	91	
86	1KS17EC085	38	40	38	-	49	100	98	
87	1KS17EC086	36	36	-	33	48	99	98	
88	1KS17EC087	35	37	36	-	47	73	92	
89	1KS17EC088	37	39	-	31	49	89	98	
90	1KS17EC089	36	38	-	33	47	89	93	
91	1KS17EC090	36	37	-	32	48	88	93	
92	1KS17EC092	38	38	-	37	49	96	98	
93	1KS17EC093	38	39	36	-	49	96	93	
94	1KS17EC094	37	37	-	30	47	81	93	
95	1KS17EC095	36	38	-	24	47	99	93	
96	1KS17EC096	37	38	-	33	48	94	93	
97	1KS17EC097	37	39	-	33	48	80	92	
98	1KS17EC098	36	36	-	26	47	75	93	
99	1KS17EC099	37	39	-	32	48	90	93	
100	1KS17EC100	37	39	-	33	49	90	98	
101	1KS17EC101	38	39	-	28	49	87	94	
102	1KS17EC102	38	40	38	-	49	87	94	
103	1KS17EC103	37	35	-	32	48	99	98	
104	1KS17EC104	37	40	-	31	49	100	98	
105	1KS17EC105	37	39	-	32	49	100	93	
106	1KS18EC403	36	37	36	-	46	71	93	
107	1KS18EC406	36	33	36	-	46	97	93	
108	1KS18EC408	36	37	36	-	46	70	93	
--x--	Faculty Signature								----XXXXXXX----

* - values are either optional subjects or the faculty has not yet entered the marks

30/7/2021

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