

NON CONTACT TEMPERATURE SCREENING SYSTEM

A Synopsis Report

Submitted in partial fulfilment of the requirement for the award of the Degree of Bachelor of Technology in “**Electronics and Communication Engineering**”

Submitted to:

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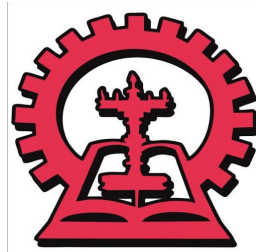
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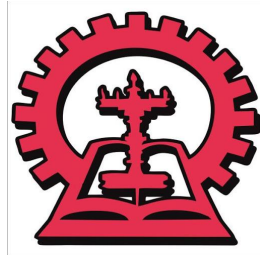
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TECHNOCRATS INSTITUTE OF TECHNOLOGY, BHOPAL
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CERTIFICATE OF APPROVAL

The undersigned certify that they have read and recommended to the Department of Electronics and Communication Engineering for acceptance, a project report entitled “**NON CONTACT TEMPERATURE SCREENING SYSTEM**” submitted by **Bhavya Grewal, Pari Neekhara, Tarun Singh Negi, Govind Patel** in partial fulfilment for the degree of Bachelor of Technology in Electronics & Communication Engineering.

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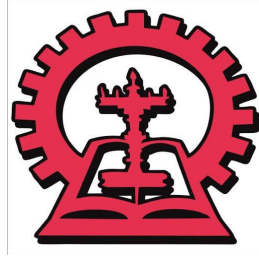
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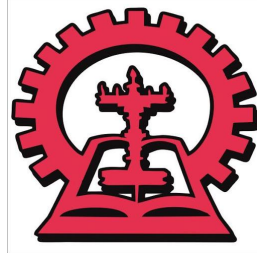


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DECLARATION

We (Bhavya Grewal, Pari Neekhara, Tarun Singh Negi, Govind Patel) students of “**Bachelor of Technology**” in “**Technocrats Institute of Technology, Bhopal (M.P.)**”, session 2017-2021, hereby informed that the work presented in this dissertation entitled “**NON CONTACT TEMPERATURE SCREENING SYSTEM**” is the outcome of our own work, is bonafide and correct to the best of our knowledge and this work has been carried out taking care of Engineering Ethics. The work presented does not infringe any patented work and has not been submitted to any other University or anywhere else for the award of any degree or any professional diploma.

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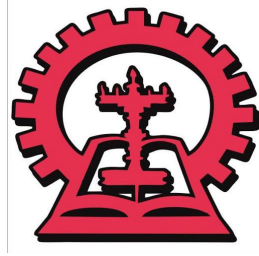
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ABSTRACT

COVID-19 is a serious global infectious disease outbreak. Coronavirus is primarily spread between people during close contact. Less commonly, people may become infected by touching a contaminated surface and then touching their face.

During this, organizations need to follow new guidelines of the government. One of the guidelines is Thermal Screening of workers is compulsory at the entry point. Our project is to build a “**Non-Contact Temperature Screening System**” and the data is recorded in Google Sheets automatically.

CONTENTS

S.NO.	TITLE	PAGE NO.
1	LIST OF FIGURES	6
2	INTRODUCTION	7
3	HARDWARE REQUIREMENT	
3.1	IR THERMOMETER	8
3.2	NODE MCU	8-9
3.3	OLED DISPLAY	9
3.4	OTHERS	10
4	SOFTWARE REQUIREMENT	
4.1	GOOGLE SHEET	11
4.2	ARDUINO IDE	11
5	PROJECT WORKING	12
6	CONCLUSION	15
7	REFERENCE	16

LIST OF FIGURES

Figure No.	Name of Figure	Page No.
1.1	MLX90614 IR Thermometer	8
1.2	NODE MCU	9
1.3	OLED Display	9
1.4	USB Cable	10
1.5	Jumper Wires	10
2.1	Arduino IDE	11
3.1	Block Diagram of Project	13
3.2	Circuit Diagram of Project	14

INTRODUCTION

In early 2020, a new virus began generating headlines all over the world because of the unprecedented speed of its transmission. COVID-19 is a serious global infectious disease outbreak. Coronavirus is primarily spread between people during close contact. Less commonly, people may become infected by touching a contaminated surface and then touching their face.

Strategies in the control of this outbreak are screening, containment (or suppression), and mitigation. Screening is done with a device such as a thermometer to detect the elevated body temperature associated with fevers caused by the infection. As per the Government, Temperature screening is proposed as a prerequisite to enter all site-controlled areas/activities.

Our project is to build a No Contact Temperature Screening System in which temperature can be measured and displayed without being closer and without contact with anyone.

Body temperature can be measured in a number of ways. Traditionally, body temperature has been measured using contact thermometers that are placed on the forehead or in the mouth. Thermal screening is a process of detecting the amount of radiation emitted that allows a person's temperature to be taken with no contact with the person. The thermal scanner can be used to take a person's temperature from a greater distance than other non-contact thermometers.

No Contact Temperature Screening System can be a system in which the temperature of the person can be screened with no physical contact with anyone, displays the temperature & allows the person to enter if the temperature is less than threshold temperature and that data is recorded in Google Sheets automatically.

HARDWARE REQUIREMENTS

1.1 MLX90614 IR THERMOMETER

The MLX90614 is an IR thermometer for non-contact temperature measurements. The MLX90614 consists of two devices embedded as a single sensor, one device acts as a sensing unit and the other device acts as a processing unit. The sensing unit is an Infrared Thermopile Detector called MLX81101 which senses the temperature and the processing unit is a Single Conditioning ASSP called MLX90302 which converts the signal from the sensor to digital value and communicates using I2C protocol.

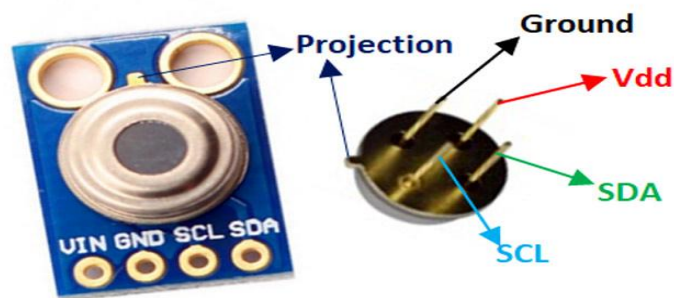


Fig 1.1 MLX90614 IR Thermometer

1.2 NODE MCU

NodeMCU is a low-cost open-source IoT platform. It initially included firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems and hardware that was based on the ESP-12 module. Later, support for the ESP32 32-bit MCU was added.

- Memory : 128 KB
- CPU : ESP8266(LX106)
- Storage : 4MB
- Power : USB

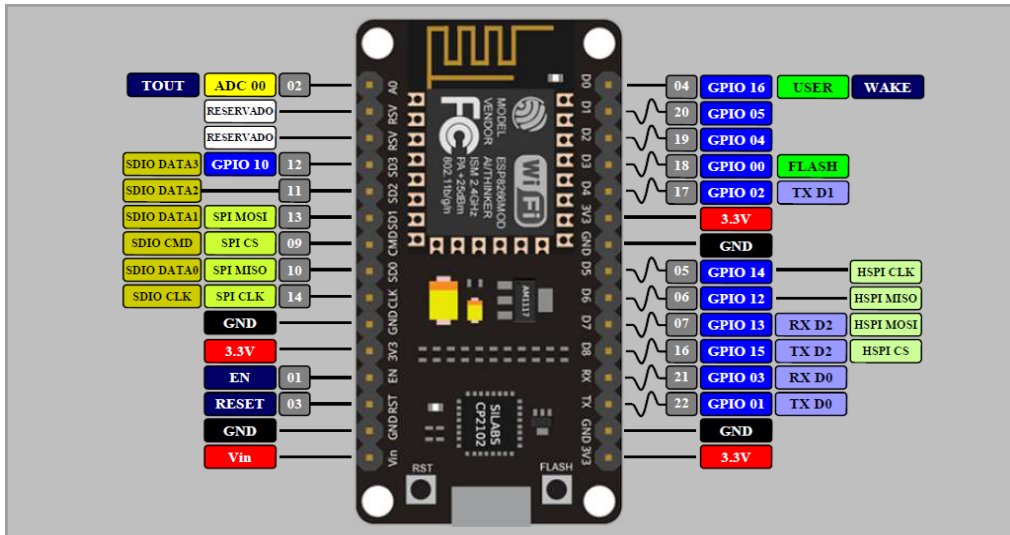


Fig 1.2 NODE MCU

1.3 OLED Display

Oled or Organic light-emitting diode is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compound i.e. polyaniline and polyfluorene (millions of small LED lights) that emits light in response to an electric current. OLEDs are used to create digital displays in devices such as television screens, computer monitors, portable systems such as mobile phones, hand-held game consoles and PDAs.



Fig 1.3 OLED Display

1.4 USB Cables

Short for universal serial bus, USB is a plug and play interface that allows a computer to communicate with peripheral and other devices. USB may also be used to send power to certain devices.



Fig 1.4 USB Cable



Fig 1.5 Jumper Wires

SOFTWARE REQUIREMENTS

2.1 Google Sheets

Google Sheets is an online spreadsheet application that lets you create and format spreadsheets and work with other people.



We use Google Sheets as an IoT cloud to log the data generated by a temperature sensor. Here we will use ESP8266 NodeMCU to send Temperature data from sensors to the google sheets over the internet.

2.2 Arduino IDE

The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards.

It is basically used to write the program for the controller and later upload it to the controller for the desired functioning.



Fig 2.1 Arduino IDE

WORKING

The Non-contact temperature screening module will be installed at the entry point in the organisation. The person will have to stop at the gate for a maximum of 1 or 2 seconds. The thermosensor (MLX90614, IR Thermometer) will scan the person for his/her thermal temperatures.

The MLX90614 consists of two devices embedded as a single sensor, one device acts as a sensing unit and the other device acts as a processing unit. The sensing unit will scan the person's Temperature through Infrared Thermopile Detector called MLX81101. Then this analog data will be converted to digital output by the module's processing unit i.e Single Conditioning ASSP called MLX90302 which converts the signal from the sensor to digital value and communicates using I2C protocol. This digital output will be sent as an input to NodeMCU for further processing.

The NodeMCU will analyse the input based on the program uploaded to it through Arduino IDE. Here we have written the program functions in such a way that the received signal will send to an OLED display connected to NodeMCU and the function will also trigger Application Programming Interface (API, which is a software intermediary that allows two applications to talk to each other) to add the data in Google Sheets.

After that, the NodeMCU will send the data to the OLED display for displaying the temperature to the respective person, and as ESP8266 (low-cost Wi-Fi chip) inbuilt in NodeMCU with TCP/IP protocol, NodeMCU can trigger the API with data over the Internet to add the data in Google Sheets for recording purposes.

The data recorded in the sheets can be used in the future for analysis, like when a particular person was not well, or when there were more cases in the organisation and many more as per the needs of the organization.

BLOCK DIAGRAM OF PROJECT

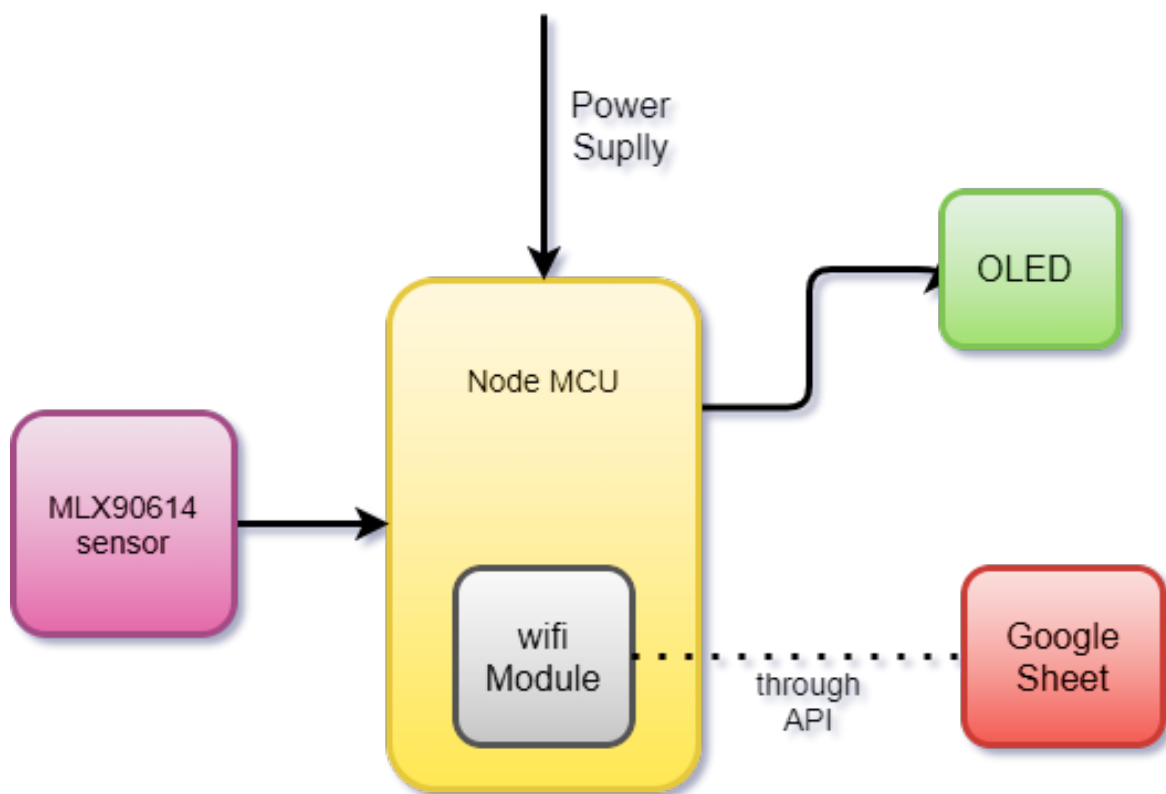


Fig 3.1 Block Diagram

CIRCUIT DIAGRAM OF PROJECT

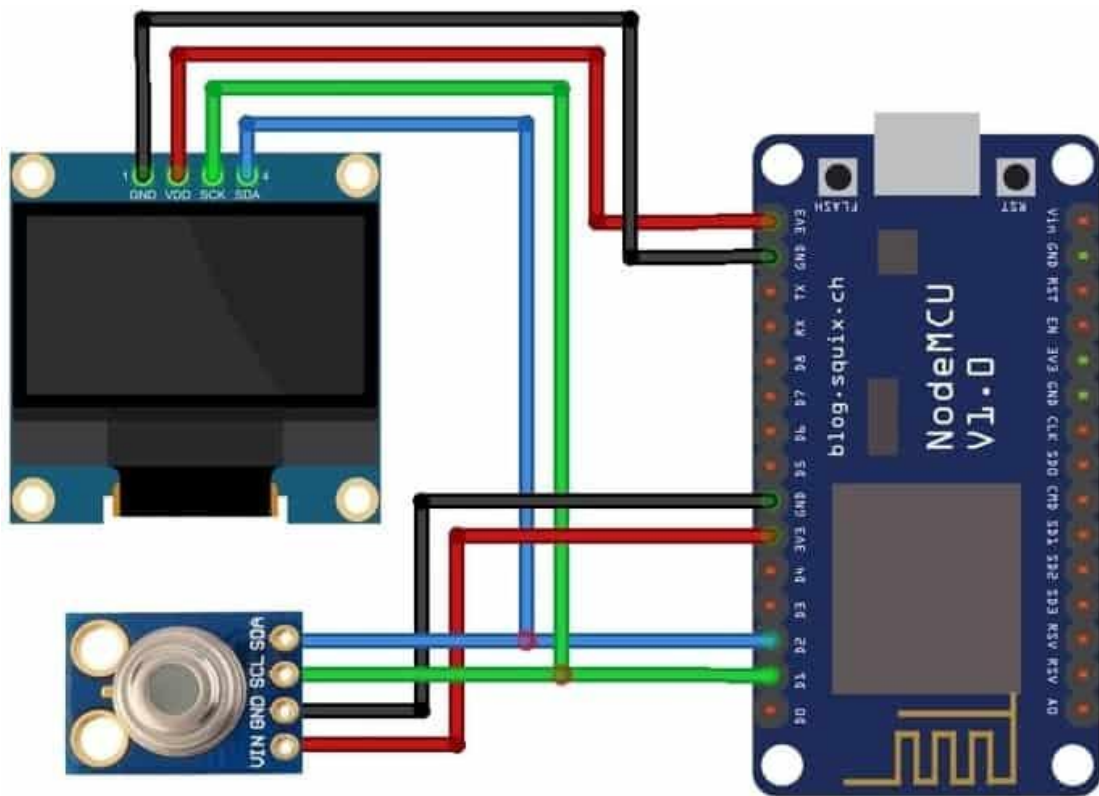


Fig 3.2 Circuit Diagram

CONCLUSION

We can conclude that with the use of this device we can help to reduce the increasing number of corona cases. With the use of this device the guards or the officials at the entry points of the organizations will be safe and will be more than willing to work in these hard situations to ensure smooth functioning of the organizations without contributing more numbers to society.

Non-Contact Temperature Screening System can be used with RFID attendance system, Automatic door system by changing some Arduino functions and by making some connections.

REFERENCES

- **Arduino IDE** (<https://www.arduino.cc/en/Guide/Environment> & <https://support.arduino.cc/hc/en-us>)
- **Google Sheet**
(https://support.google.com/docs/topic/9054603?hl=en&ref_topic=1382883)
- **Node MCU** (<https://nodemcu.readthedocs.io/en/release/>)
- **MLX 90614**
(<https://components101.com/sensors/melexis-mlx90614-contact-less-ir-temperature-sensor>)
- **Wikipedia** (<https://www.wikipedia.org>)