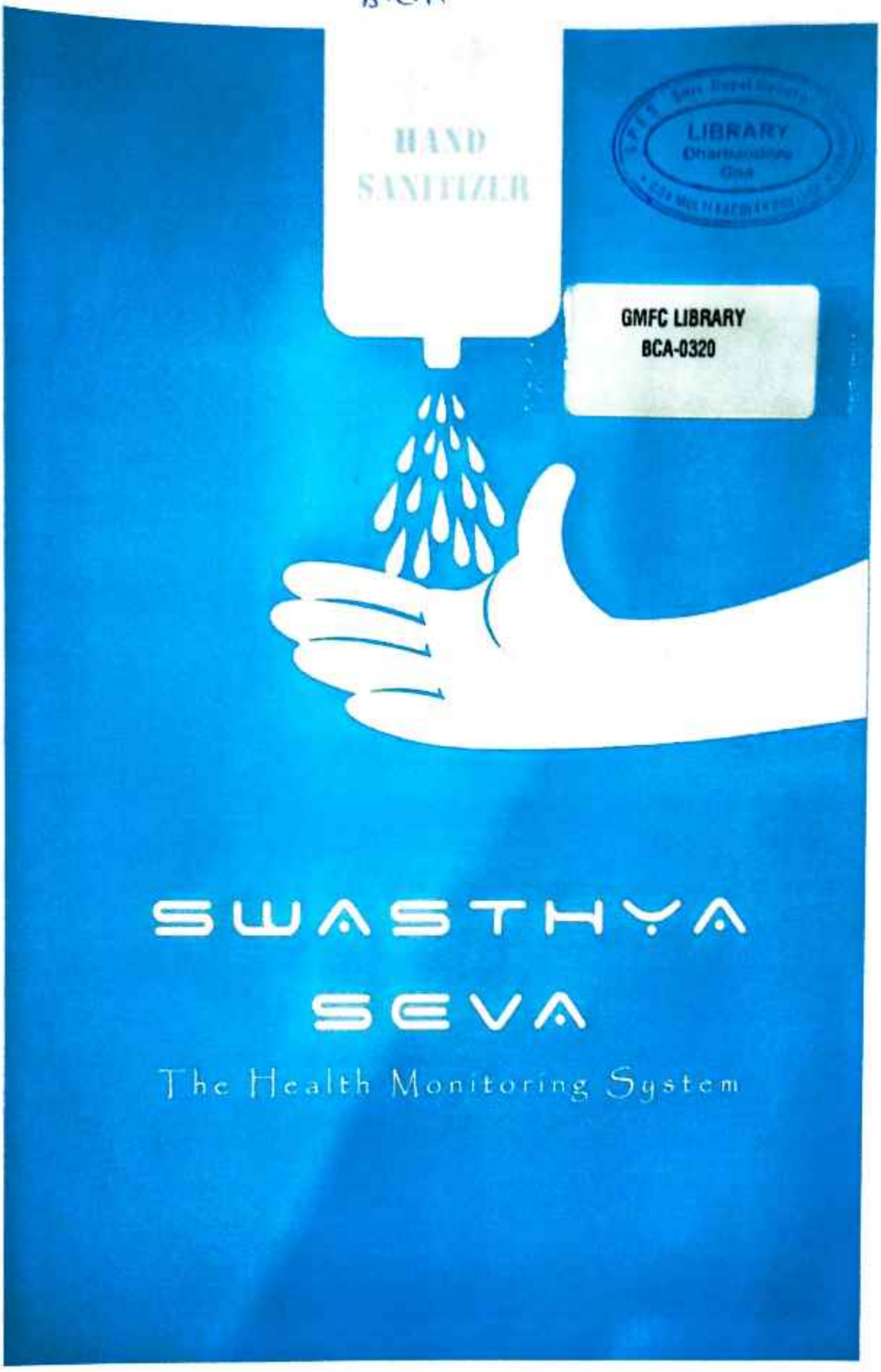
B.C.A



SWASTHYA SEVA

The Health Monitoring System

SWASTHYA SEVA

The Health Monitoring System

A Project Report

Submitted to Goa University

In partial fulfillment of the requirements

For the degree of

Bachelor in Computer Applications (BCA)

By

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Mr. Prathamesh Kolamkar

Mr. Omkar Naik

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Mr. Sanit Velip

Mr. Deeptesh Shet

Ms. Sweta Yadav

Guided By

Ms. Nilaxi Chari

SPES's Shri Gopal Gaonkar Memorial Goa Multi-Faculty College
Affiliated to Goa University

CERTIFICATE

This is to certify that the project on
"SWASTHYA SEVA - The Health Monitoring System"
has been successfully completed and submitted by

Mr. Kenith Bosco

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Mr. Omkar Naik

Ms. Rima Naik

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Ms. Sweta Yadav

Ms. Nilaxi Chari
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External
(Examiner)

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Affiliated to Goa University

DECLARATION BY THE CANDIDATES

We declare that this project report has been prepared by us and to the best of our knowledge; it has not previously formed the basis for the award of any diploma or degree by this or any other university.

Roll No	Name	Goa University Reg. No	Signature
8301	Mr. Kenith Bosco	201801240	
8314	Mr. Prathamesh Kolamkar	201801249	
8322	Mr. Omkar Naik	201801244	
8323	Ms. Rima Naik	201801266	
8333	Mr. Deeptesh Shet	201801231	
8338	Mr. Sanit Velip	201801255	
8340	Ms. Sweta Yadav	201801265	

SPES's Shri Gopal Gaonkar Memorial Goa Multi-Faculty college

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CERTIFICATE BY THE GUIDE

This is to certify that the project report is the record of the whole work done by the candidates themselves under my guidance during the period of study and that to the best of my knowledge; it has not previously formed the basis for the award of any diploma or degree by this on any other university.

Name of college	:	SPES's Goa Multi-Faculty College
Programme	:	Bachelor in Computer Applications (BCA)
Academic Year	:	2020-2021

Ms. Nilaxi Chari
(Project Guide)

ACKNOWLEDGEMENT

It is our immense pleasure to have worked on the project titled "SWASTHYA SEVA - The Health Monitoring System". This project consumed huge amount of work, research and dedication, still implementation would not have been possible if we did not have support of many individuals. Therefore, we would like to extend our sincere gratitude to all of them.

We would like to show our gratitude to our internal guide Ms. Nilaxi Chari for her constant support, motivation, inspiration for this project throughout numerous consultations and for guiding us to make this project a success.

We also extend our sincere gratitude toward our Principal, Dr. Shaikh Mohammad Parvez Al-Usmani, for his wholehearted support in this project.

Nevertheless, we express our sincere gratitude to our teaching and non-teaching staff members and friends for their kind co-operation and encouragement throughout this project.

-The Project Team

PROJECT PROFILE

Project Name	**SWASTHYA SEVA** The Health Monitoring System
Objective	SWASTHYA SEVA -The Health Monitoring System is a project that focuses on precautionary measures of covid 19 during this pandemic.
Platform	Hardware
Front End Tool and Back End	ARDUINO IDE
Hardware requirements	ESP8266 NodeMCU Ultrasonic sensor Relay LCD display LEDs MLX90614 Contact less Temperature sensor 12v Pump
Project duration	1 Year
Internal Guide	Ms. Nilaxi Chari

TABLE OF CONTENTS

1. INTRODUCTION

'Swasthya Seva' is an automatic hand Sanitizer dispenser which dispenses a specific amount of sanitizer on to your hands when placed under a distance measuring sensor (ultrasonic sensor) Here the ultrasonic sensor is used to detect the presence of hand placed under the device (20 cm from the sensor). A MLX90614 Non-Contact IR Temperature Sensor is used to detect the temperature of the user. This sensor works at 5V. A 12V water pump is employed to eject the right amount of liquid at the right time. i.e., when the hands are placed in the 20 cm range. The ESP8266 NodeMCU board controls the pump based on the distance obtained from the ultrasonic sensor. The pump is controlled via microcontroller and connected with the relay. An adapter (5V 1 A DC Output) is used to power the main board. 12V 1A DC output is used to turn the 12V Pump. Our aim is to make fully automated hand sanitizer dispensary system that can be used for personal or business purpose. With such system the user will get to know, body temp through the Display placed above the system, as well as the owner of system will get the information through Wi-Fi medium (android App or web page).

2. EXISTING SYSTEM

Essentially our modules are basically an upgrade/enhancement of already available modules which lack few features. So, we considered our competitors as new/ existing IoT startups.

As we considered the modules already existing, they lack many functionalities due to the unavailability of new technology and resources.

And we also kept in mind that none of these concepts are essentially implemented or put forth across anywhere in Goa.

2.1 Limitations of existing system

- A person has to stand with the thermal screening gun to check temperature of all the people.
- It can do one job at time (sanitizer dispensing/ Temperature check).
- People needs to touch it (Sanitizer Dispenser)
- Required dedicated Human resource
- Manual dispensing.

3. PROPOSED SYSTEM

In this covid-19 pandemic it is very much necessary to maintain hygiene and take care of health. Keeping this in mind, we want to create something that can help to contain the spread of this dreadful virus. Therefore, we have decided to make automatic hand sanitizer dispenser with added features like temperature detector.

Objective

The main objective of this system is to design and implement contact-less smart hand sanitizer dispenser with contact less temperature sensor that includes technology such as ultrasonic sensor, LCD display and Wi-Fi module, relay, based on Microcontroller (ESP8266 NodeMCU).

Scope

- It can be attached to Door (Lock/Unlock) depending on temperature.
- AI Mask Detection.
- Database to store data (Timestamp, picture, Temperature).

Advantages of the proposed system

- Has ability to detect temperature
- System owner can monitor the data locally
- Has Wi-Fi Support
- Has Alert signal

4. FEASIBILITY STUDIES

4.1 Technical Feasibility

The project is technically feasible because the development team have used standard development tools and hardware modules to develop the system, such as, microcontrollers like Arduino UNO 3.0, Ultrasonic sensor, Relay, Wi-Fi module, LCD display, LEDs, MLX90614 Contact less Temperature sensor. They are easily available and affordable.

4.2 Economic Feasibility

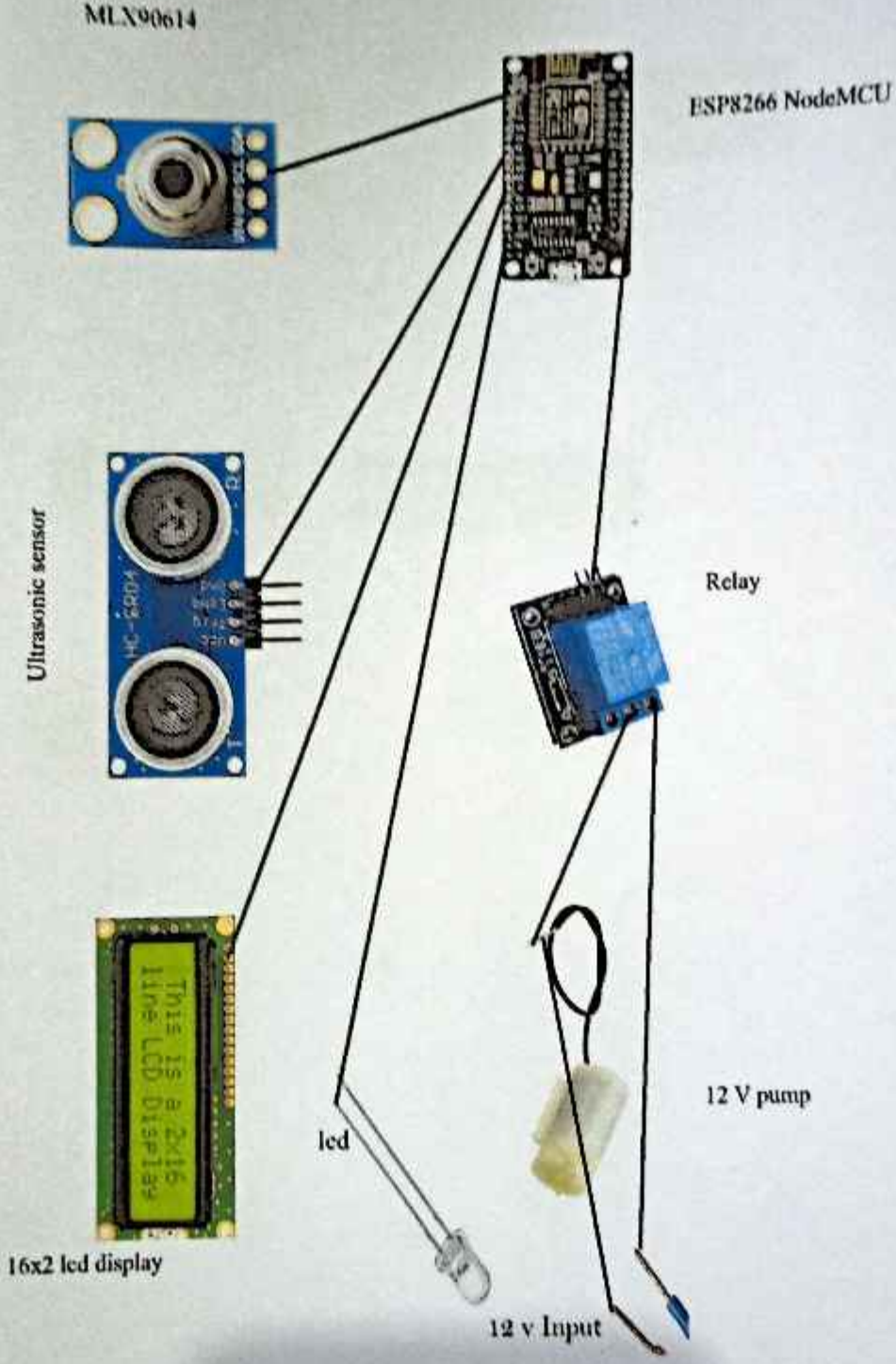
"SWASTHYA SEVA-The Health Monitoring System" project is economically feasible because there is no high-end investment in developing the system. We have used various IoT Microcontrollers and sensors for designing the modules and Arduino IDE for coding the modules. The hardware parts are low cost and easily available hence can be used for small/wide scale projects.

4.3 Operational Feasibility

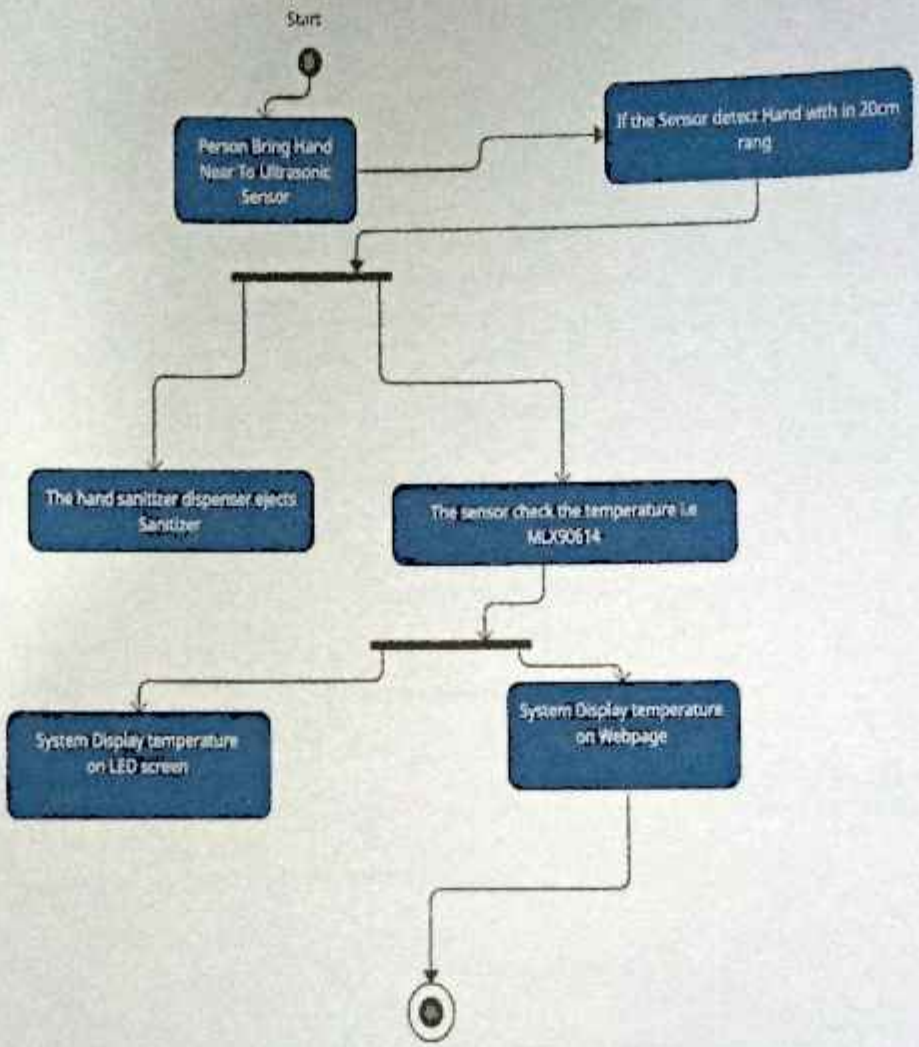
SWASTHYA SEVA-The Health Monitoring System project is operationally feasible because the throughput is high and the response time taken is less. This is possible because we have used standard technologies (hardware) and tools that are easily accessible as they use basic assembly and programming knowledge.

5. IMPLEMENTATION

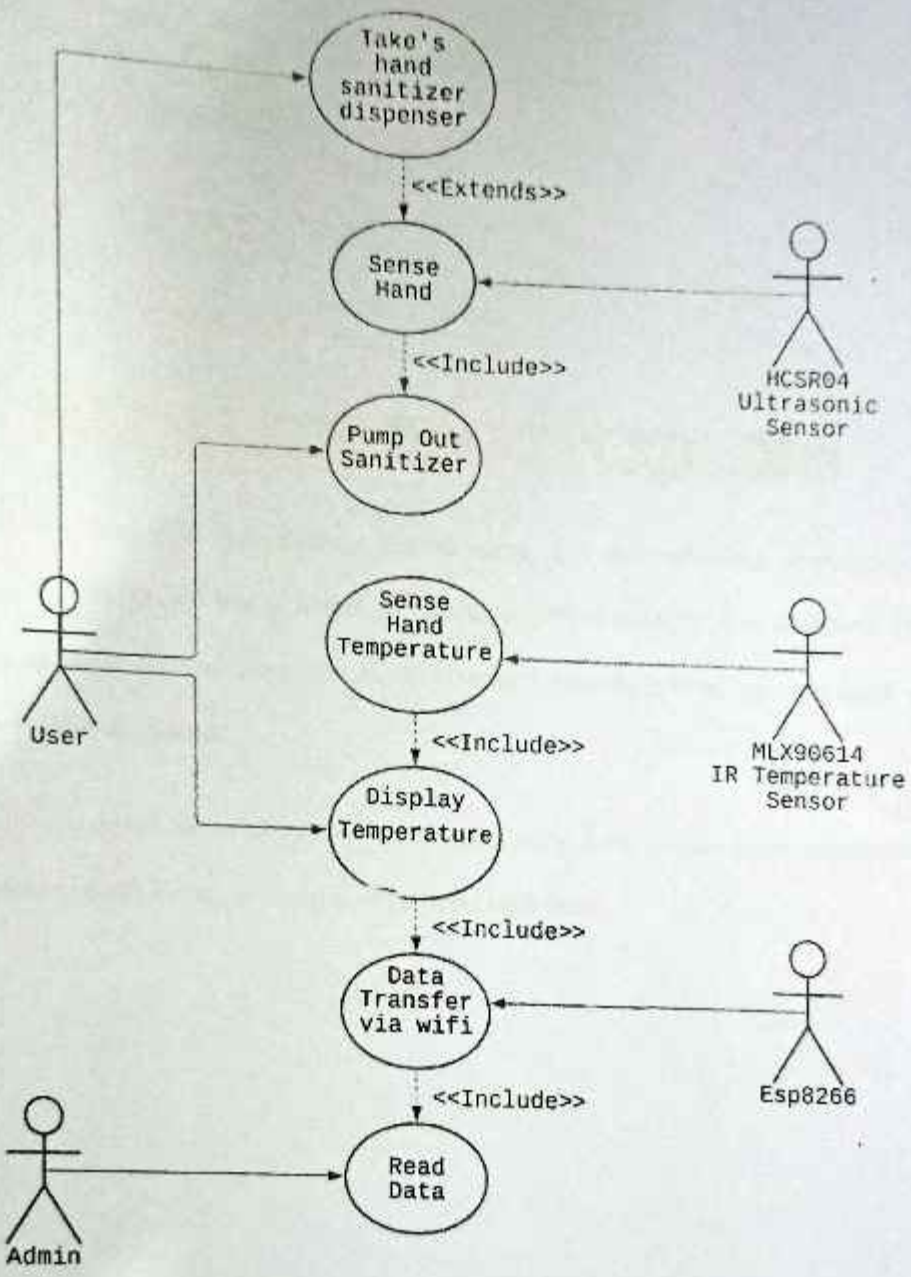
5.1 Circuit Diagram



6. ACTIVITY DIAGRAM

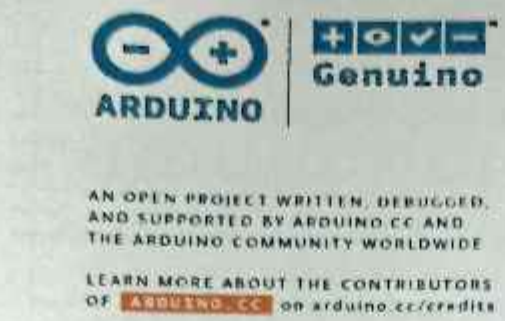


7. USE CASE DIAGRAM



8. BACK-END & FRONT-END TOOLS

Arduino IDE



The Arduino Integrated Development Environment 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 program to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards.

It contains text editor for writing codes. It connects to the Arduino board and other hardware components to upload programs and communicate with them.

C++

C++ is a cross platform language that can be used to create high-performance applications. C++ was developed by Bjarne Stroustrup at Bell labs in 1979, as an extension to the C language. C++ gives programmers a high level of control over system resources and memory. C++ is one of the world's most popular programming languages. C++ can be found in today's operating system, graphical user interfaces, and embedded systems. This is an object-oriented programming language which gives a clear structure to programs and allows code to be reused lowering development costs.

Lucid charts

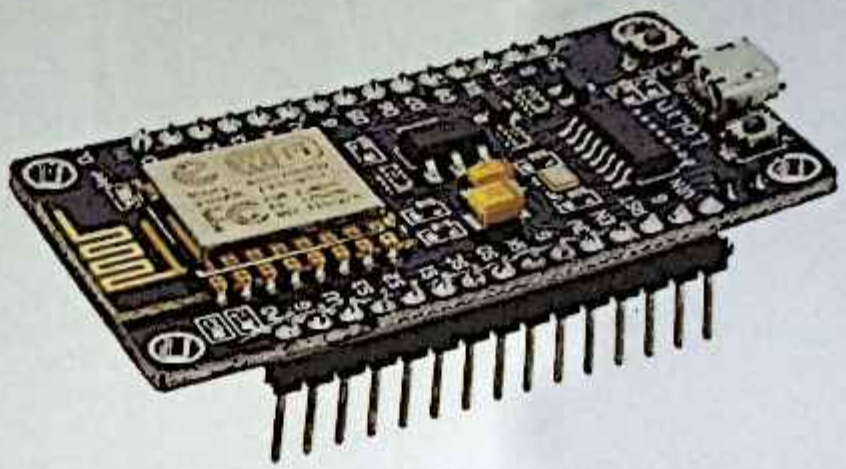
Lucid chart helps users sketch and share professional flowchart diagrams, providing designs for anything from brainstorming to project management. Lucid chart is supported in all modern web browsers like Google Chrome, Firefox, Safari, Microsoft Edge and Internet Explorer 8+.

Microsoft Office Word

Microsoft Word helps users to create a e-document on the desktop. It can also create the diagrams, can upload pictures from the desktop. Microsoft Word is supported in all platforms like wind\ows7+ and Mac OS. It is also supported by the mobile OS like Android and IOS.

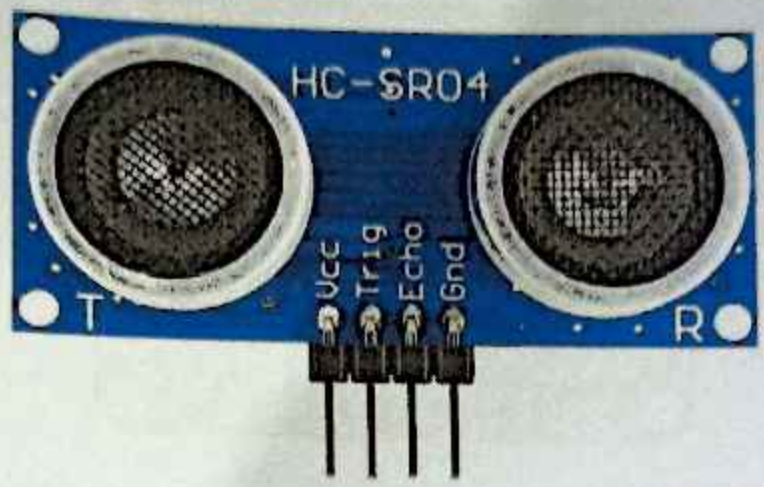
9. HARDWARE COMPONENTS

ESP8266 NodeMCU



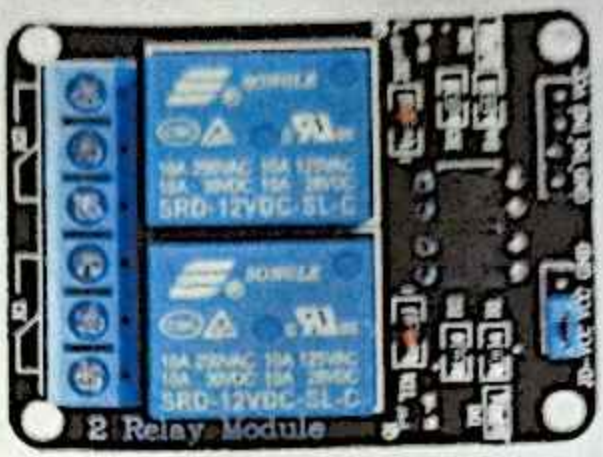
NodeMCU is a low-cost open source IoT platform. It initially included firmware which runs on the ESP8266 Wi-Fi SoC from expressive Systems, and hardware which was based on the ESP-12 module. Later, support for the ESP32 32-bit MCU was added.

Ultrasonic Sensor



An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e., the sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

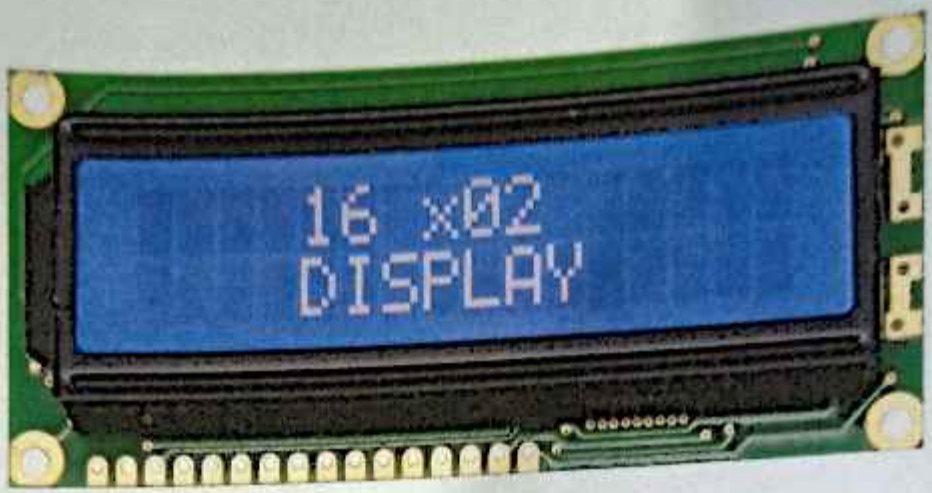
Relay



A relay is an electrically operated switch. It consists of a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations thereof.

Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal repeaters: they refresh the signal coming in from one circuit by transmitting it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

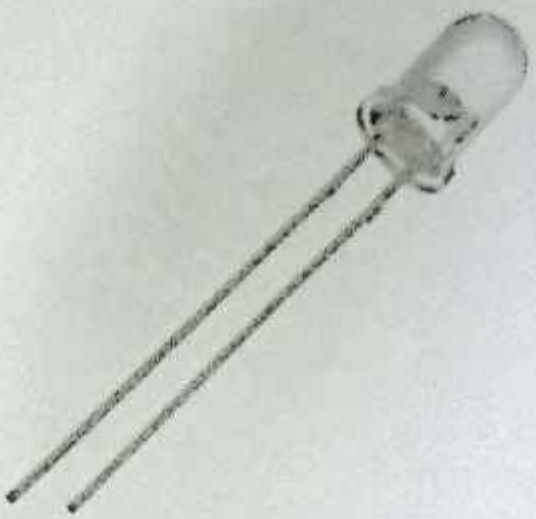
LCD 16x2 I2C



LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels.

LCDs were a big leap in terms of the technology they replaced, which include light-emitting diode (LED) and gas-plasma displays. LCDs allowed displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. Where an LED emits light, the liquid crystals in an LCD produces an image using a backlight.

LEDS



A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

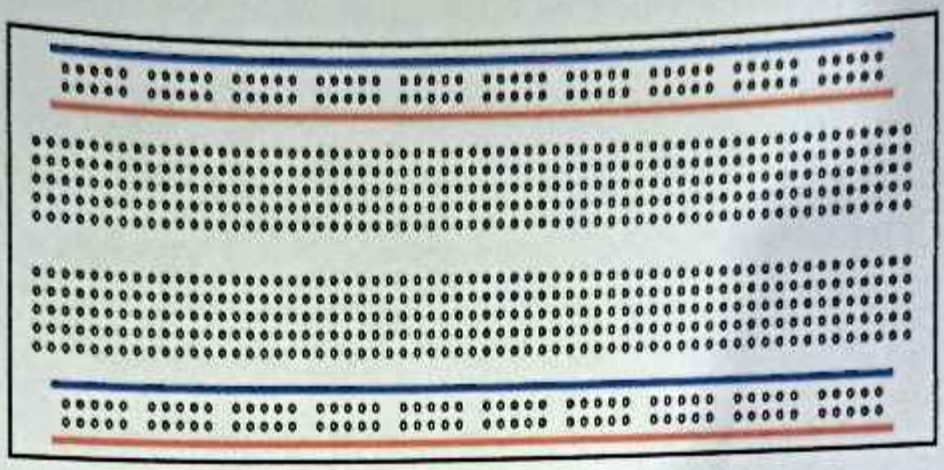
Appearing as practical electronic components in 1962, the earliest LEDs emitted low-intensity infrared (IR) light. Infrared LEDs are used in remote-control circuits, such as those used with a wide variety of consumer electronics. The first visible-light LEDs were of low intensity and limited to red. Modern LEDs are available across the visible, ultraviolet (UV), and infrared wavelengths, with high light output.

MLX90614

The MLX90614 is a Contactless Infrared (IR) Digital Temperature Sensor that can be used to measure the temperature of a particular object ranging from -70° C to 382.2°C. The sensor uses IR rays to measure the temperature of the object without any physical contact and communicates to the microcontroller using the I2C protocol.

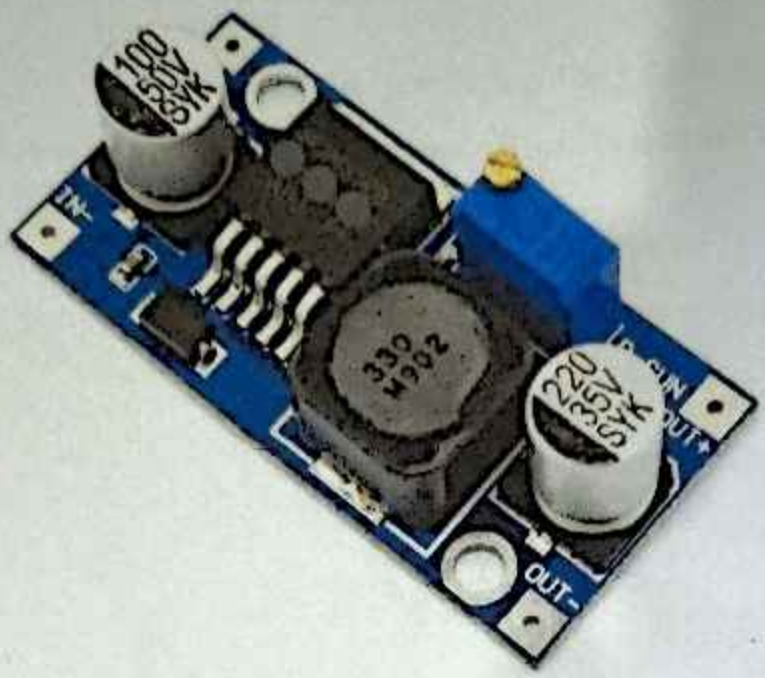
The key feature of MLX90614 is that it is a contactless IR temperature sensor with high accuracy. So, it can be used in industries to measure the temperature of moving objects like a rotating motor shaft. Due to its high accuracy and precision, it is also used in a wide range of commercial, health care, and household applications like room temperature monitoring, body temperature measurement, etc.

Breadboard



A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate.

CN6009 Boost Converter



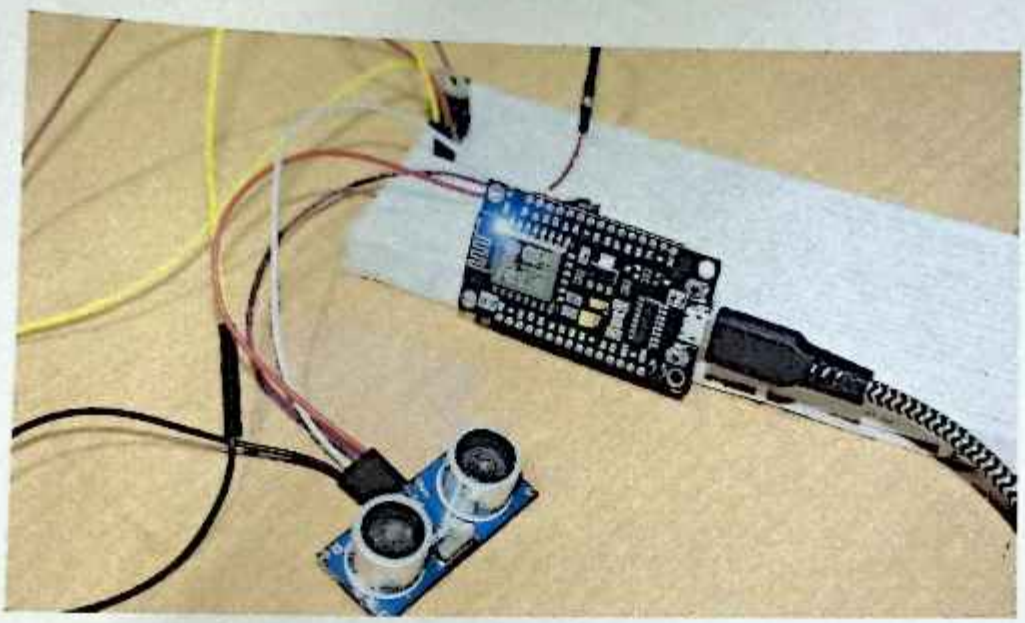
The XL6009 is a high-performance step-up (BOOST) module with 4A switching current. The module uses the second generation of high frequency switching technology XL6009E1 as the core chip, performance far beyond the first generation of technology LM2577. XL6009 step-up module cost lower, more excellent performance, LM2577 module is about to be eliminated.

10. VALIDATION TEST REPORT

Unit Testing

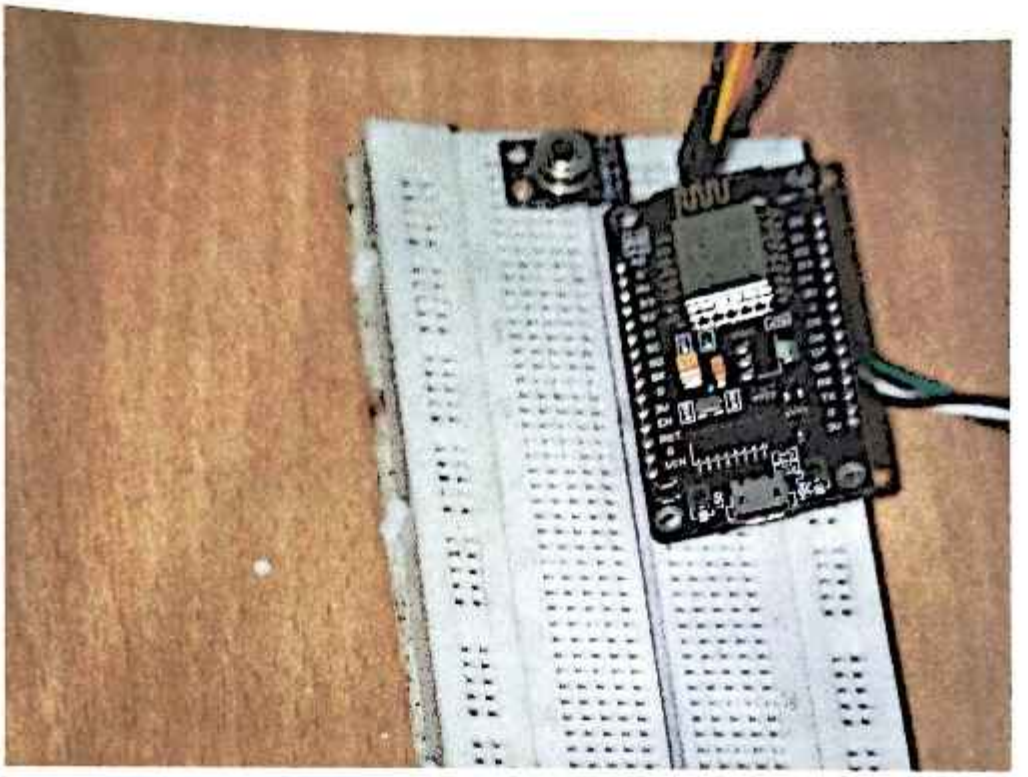
When Only Ultrasonic Sensor connected

This sensor is used to identify distance (Centimeters). Then we check if the distance from the sensor is under 20 cm, if yes, then next process will start else again back to initial position.

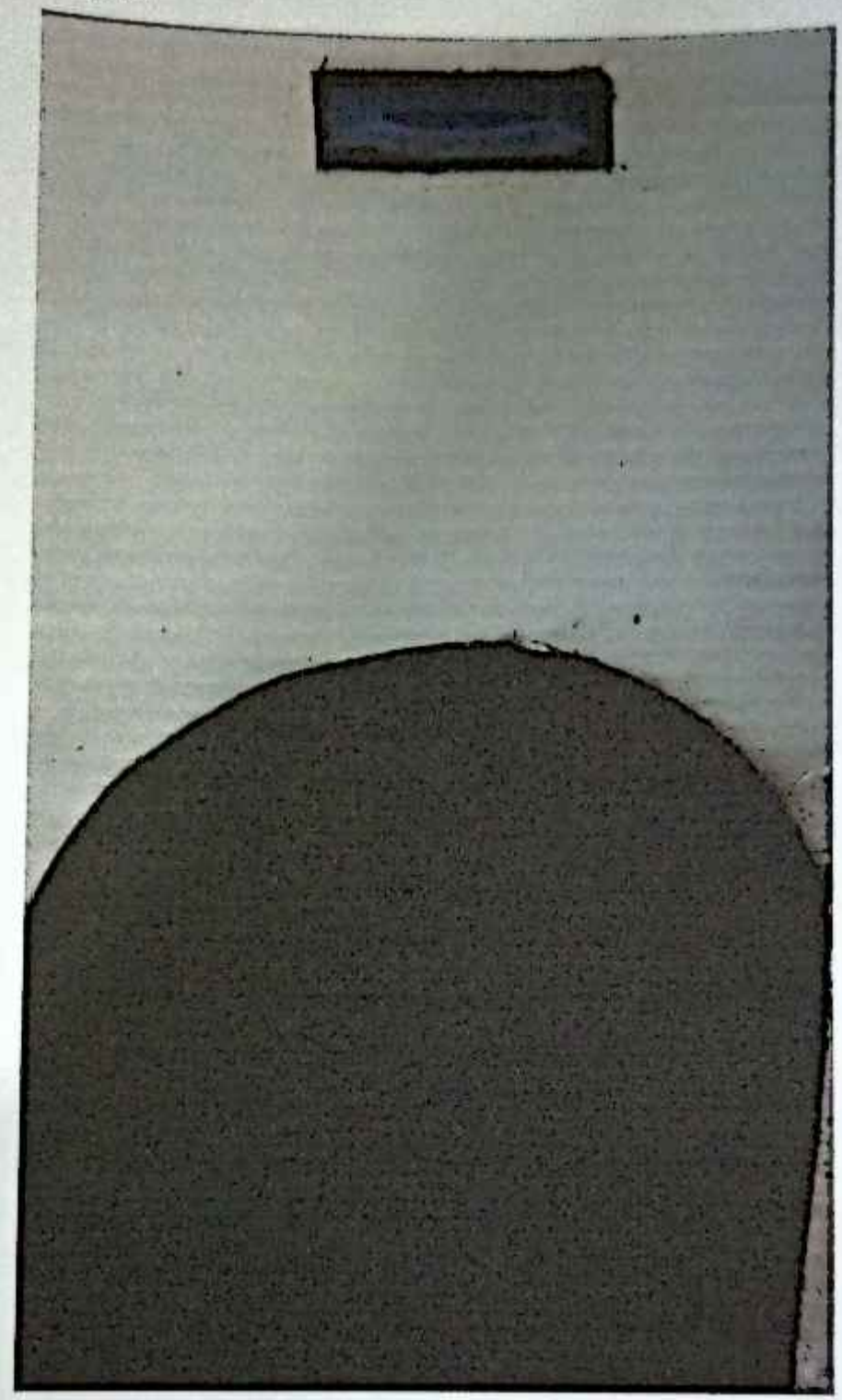


When Only MLX90614 (Temperature) Sensor Connected

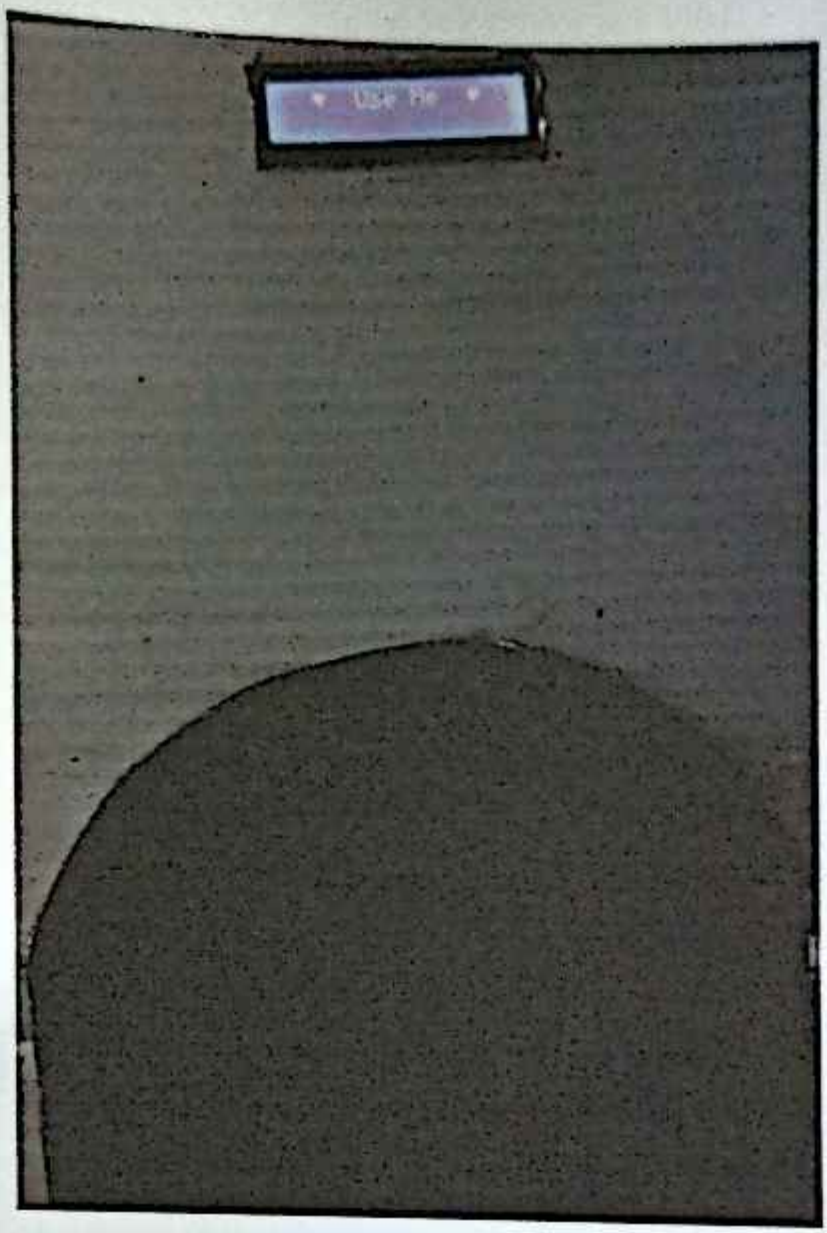
This sensor takes temperature of the system user & pass it with the microcontroller, through the code we made, this data is being transferred over TCP/IP protocol. The data which the sensor sends, reaches to the system owner in real-time.



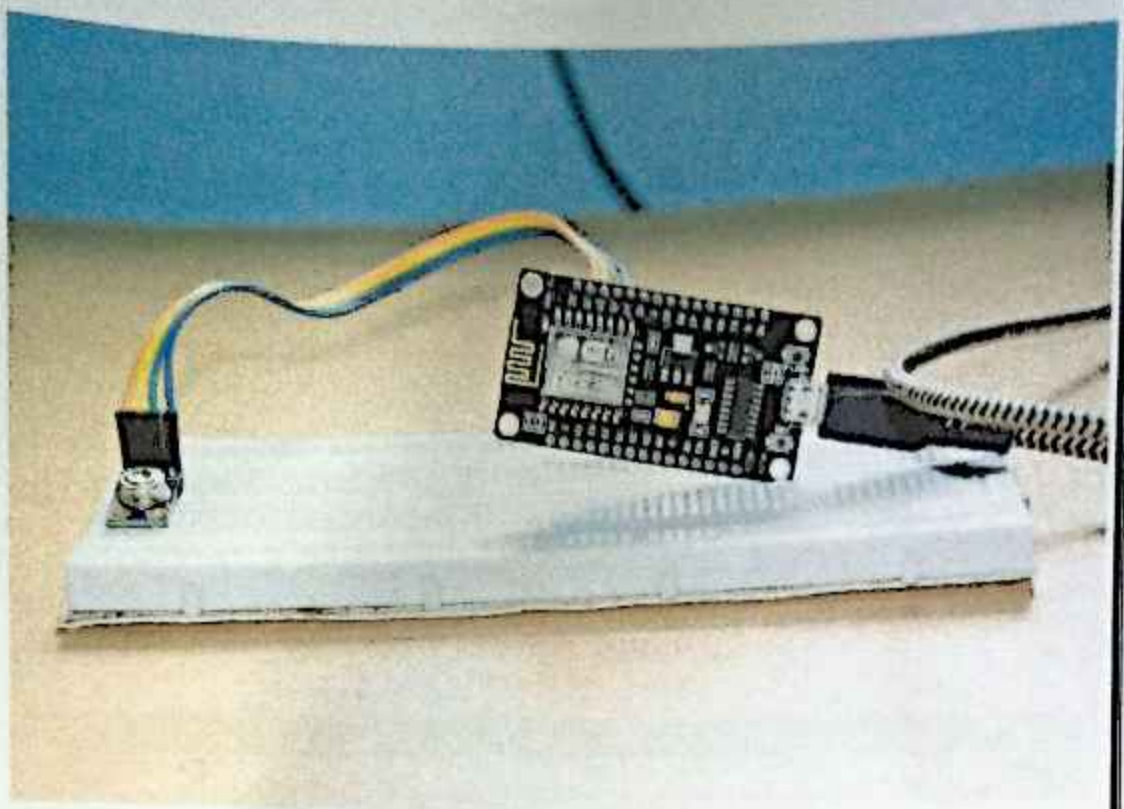
When device is off



When Device is On

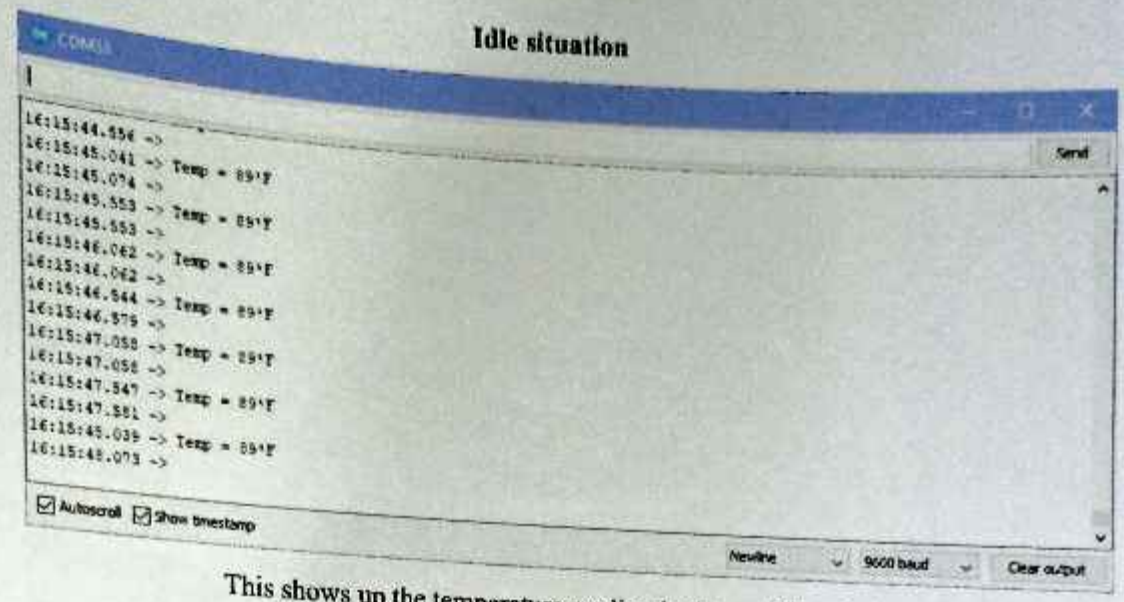


Testing of MLX 90613 with Node MCU 8266



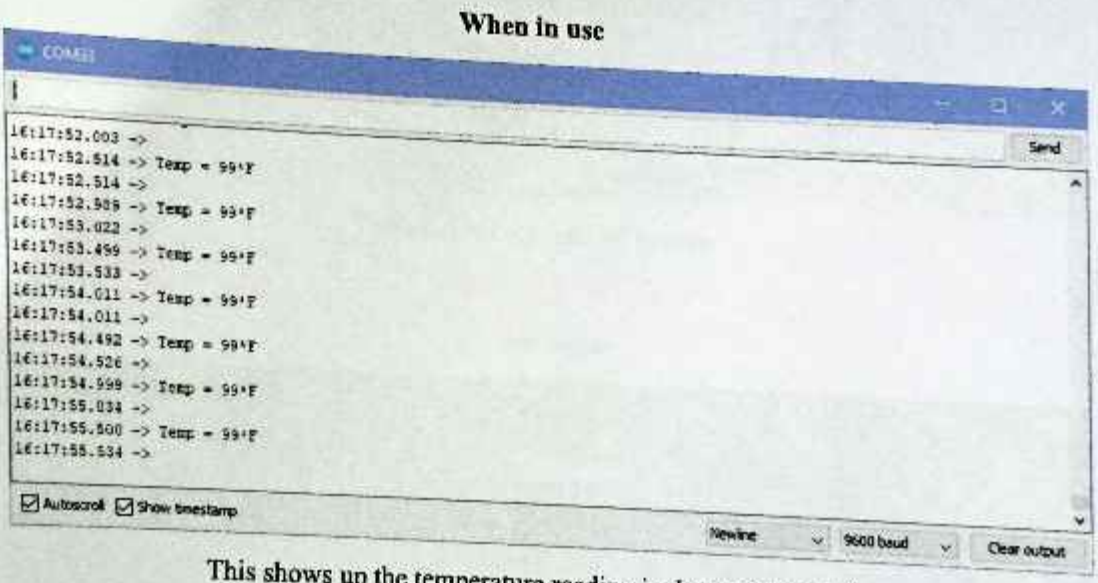
Temperature sensor with microcontroller when turn off.

Idle situation



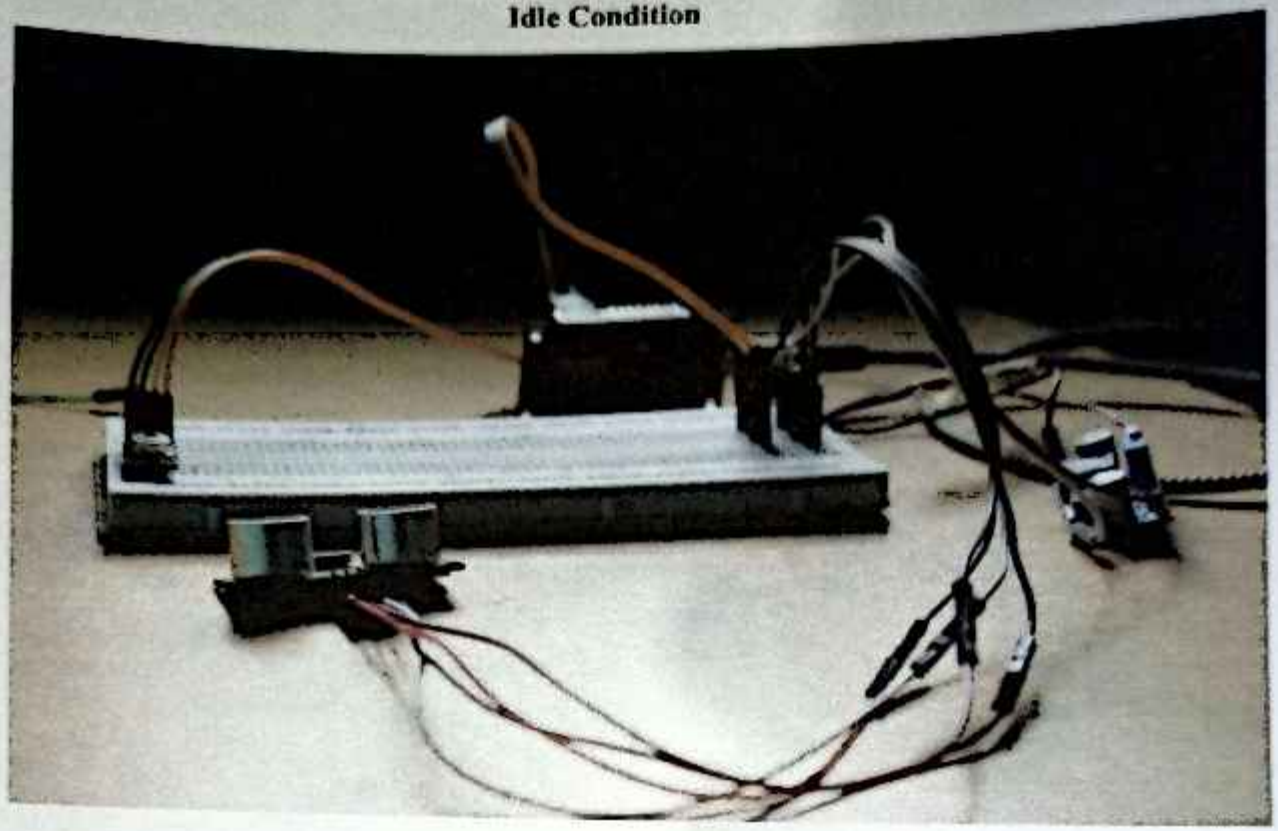
This shows up the temperature reading in degree Fahrenheit

When in use



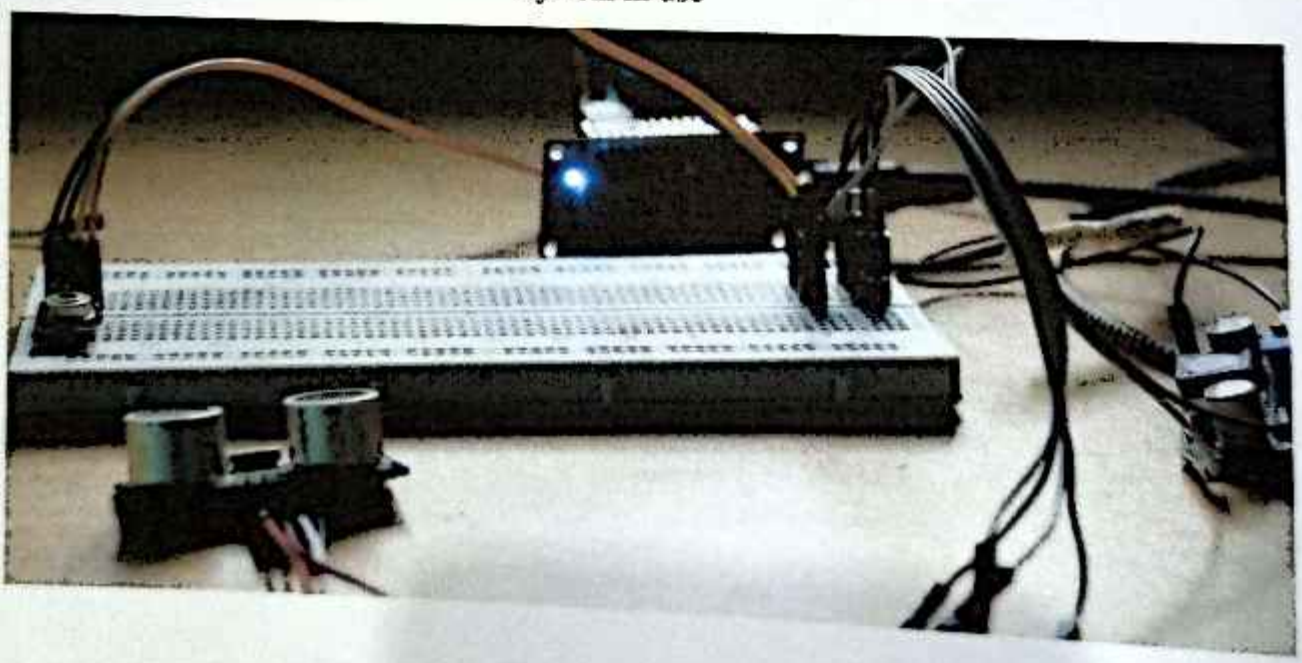
This shows up the temperature reading in degree Fahrenheit

Idle Condition

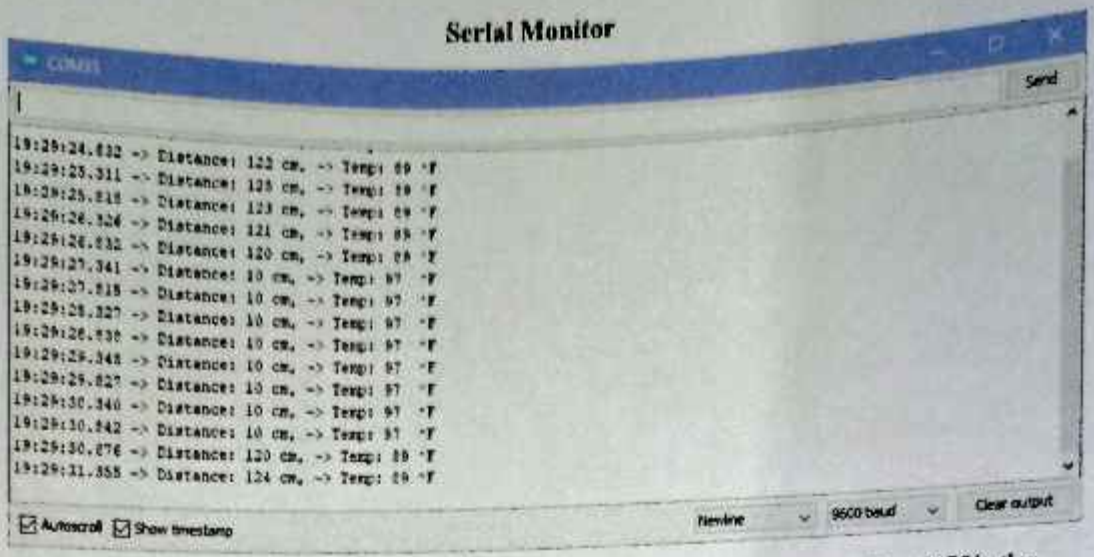


This picture is of turn off system

System in use



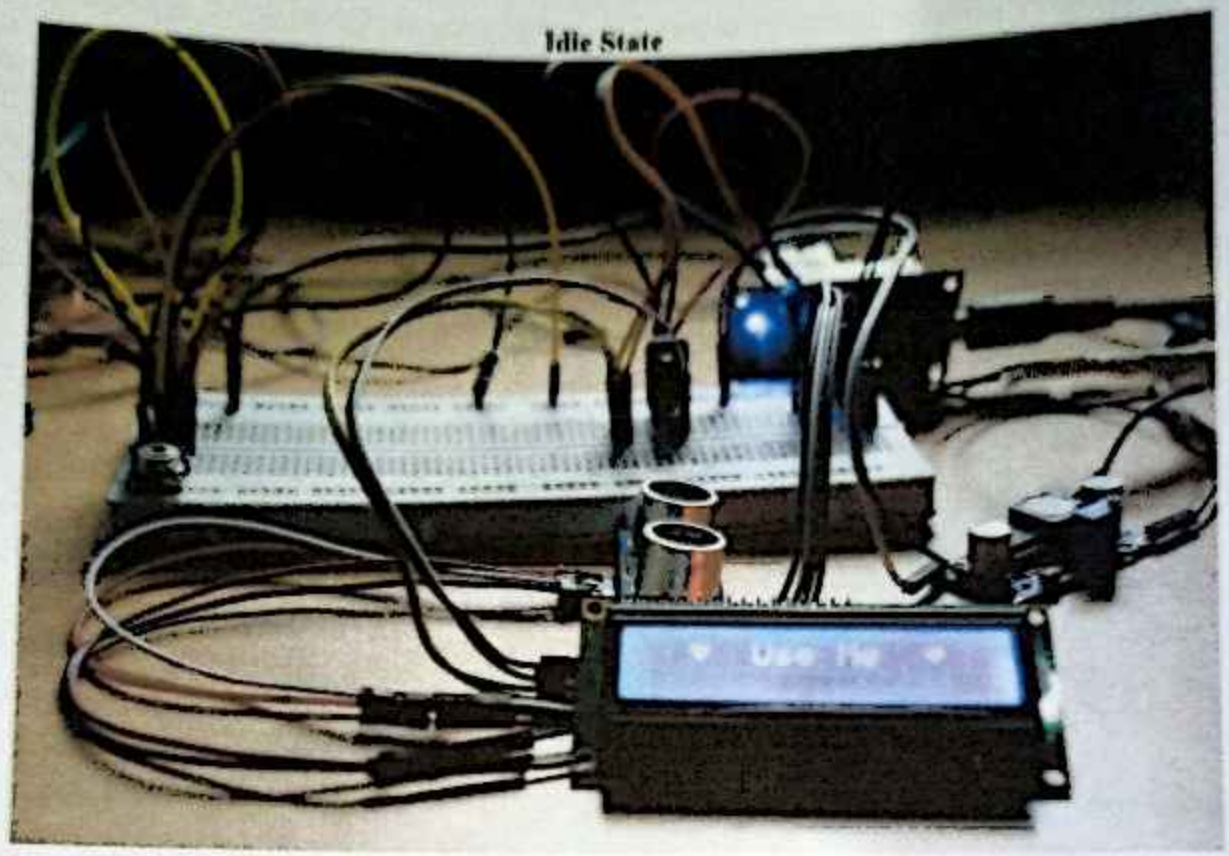
Serial Monitor



Reading that serial monitor shows at 9600 baud. 89f is ambient temperature where 97f is the object temperature.

Connecting LCD Display(16x2)

Idle State

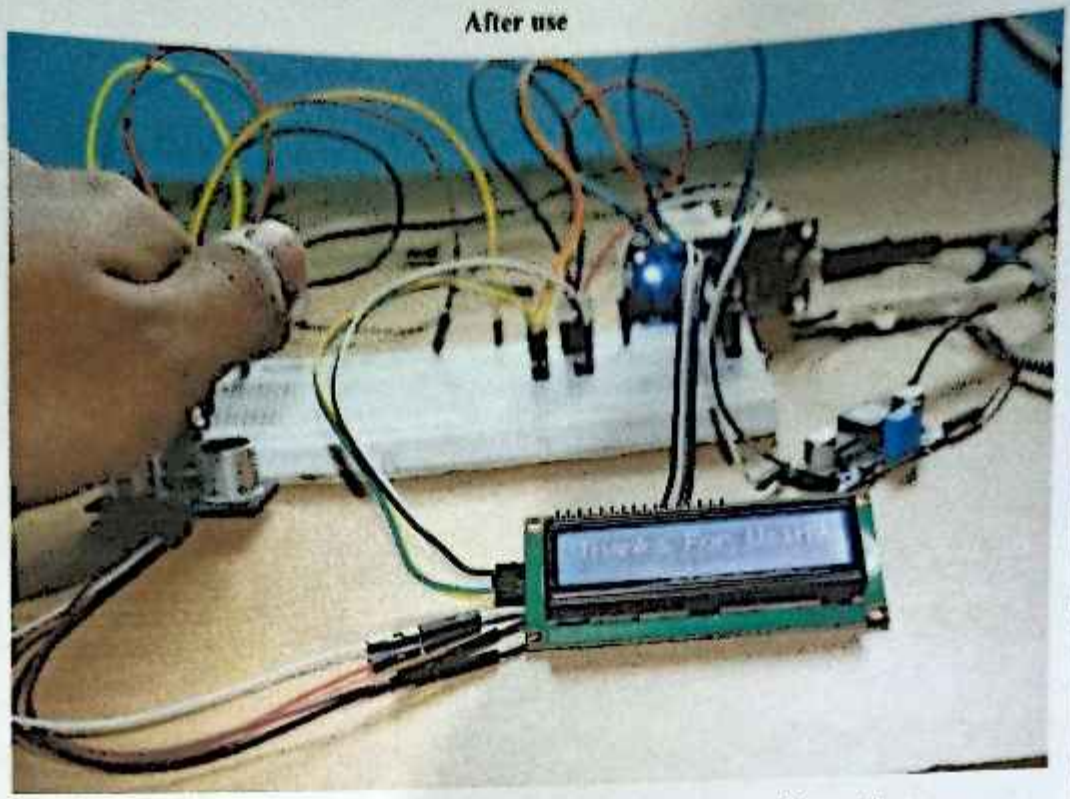


This demonstrates how our display guides user.

When in use

During this state, our pump will pulls the sanitizer towards the spray nozzle. During this process, only required sanitized is sprays.

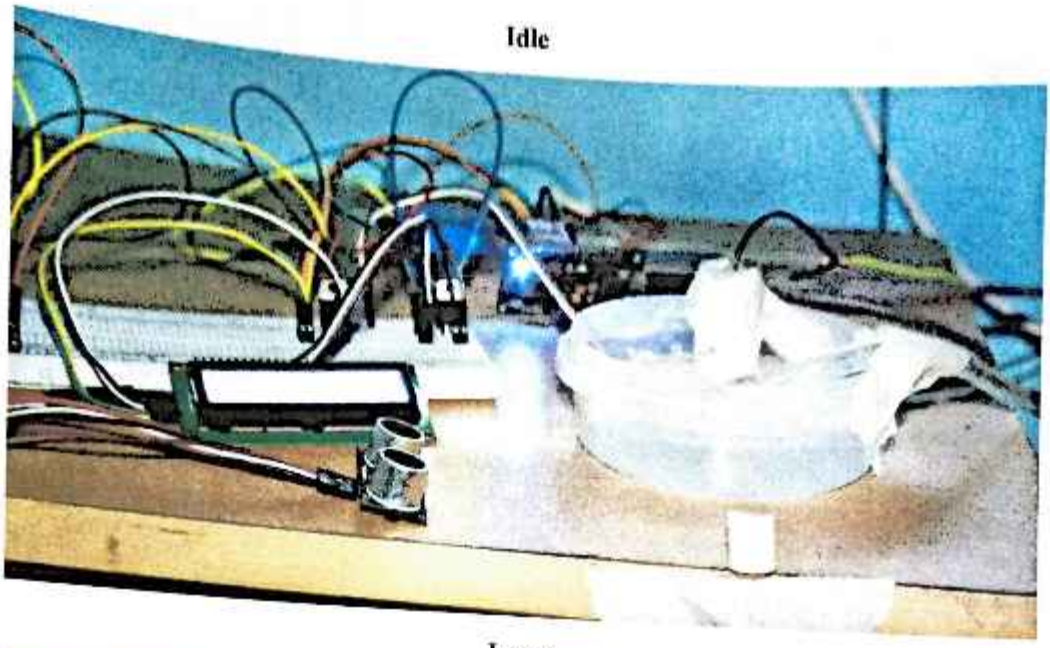
After use



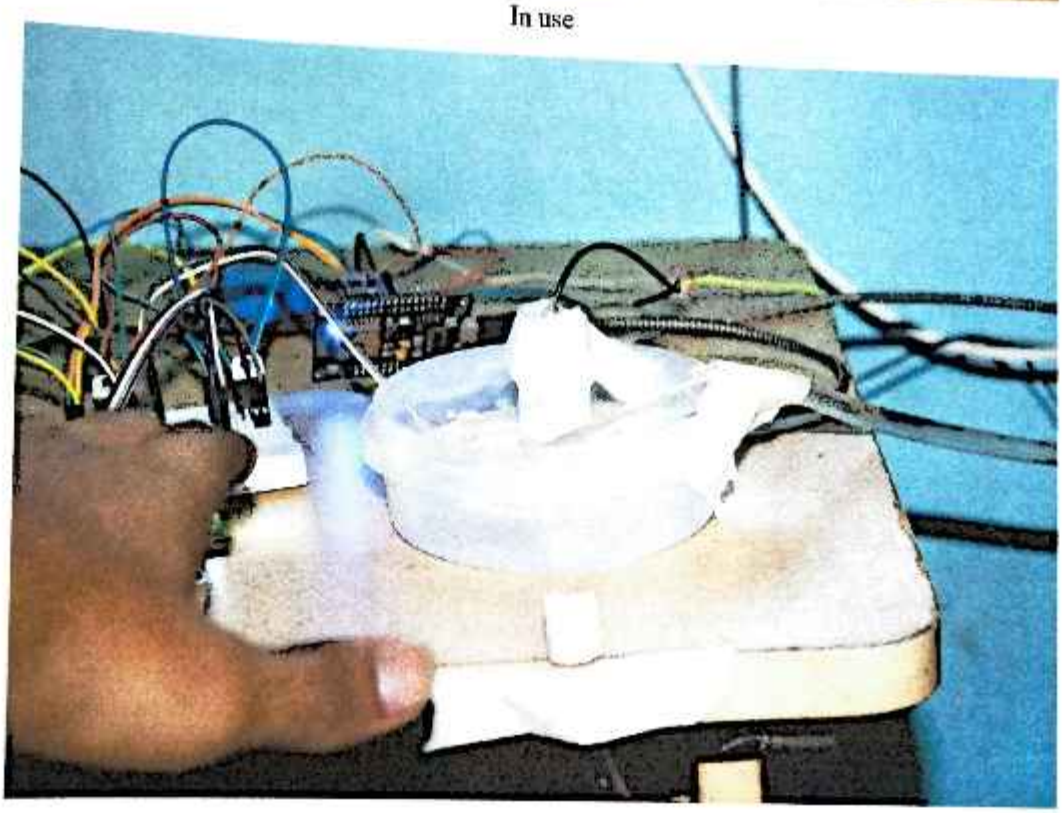
During this state, our sanitization process ends and it tells user with greetings.

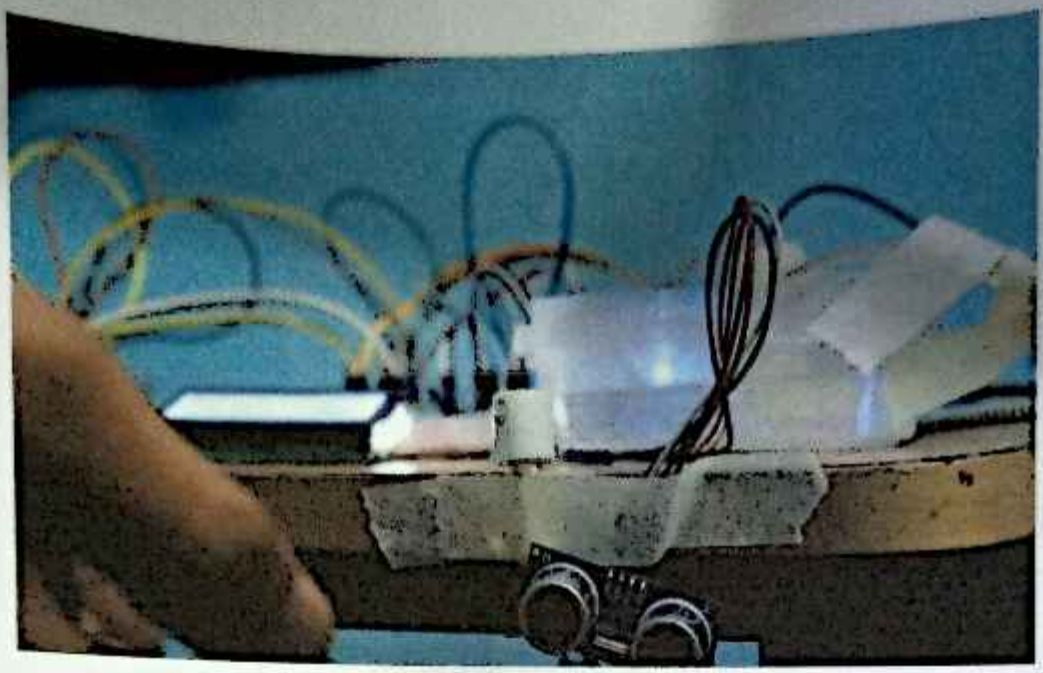
Adding Pump to system

Idle



In use

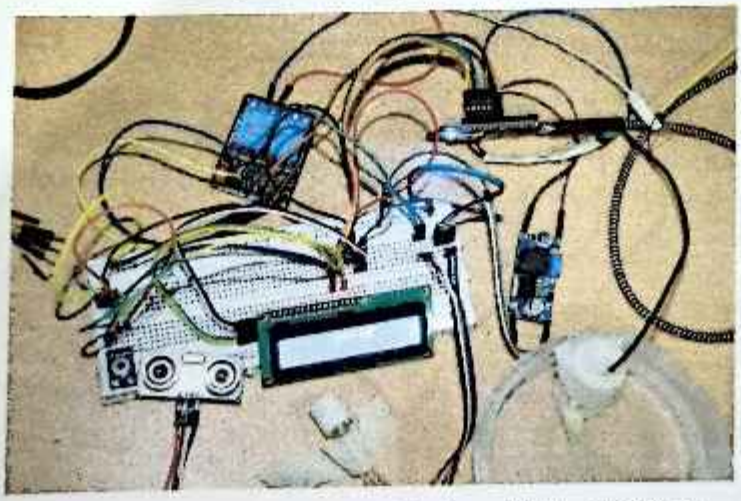




This is the prefect picture that shows the sanitizer spray. It activates when the user is near to the ultrasonic sensor.

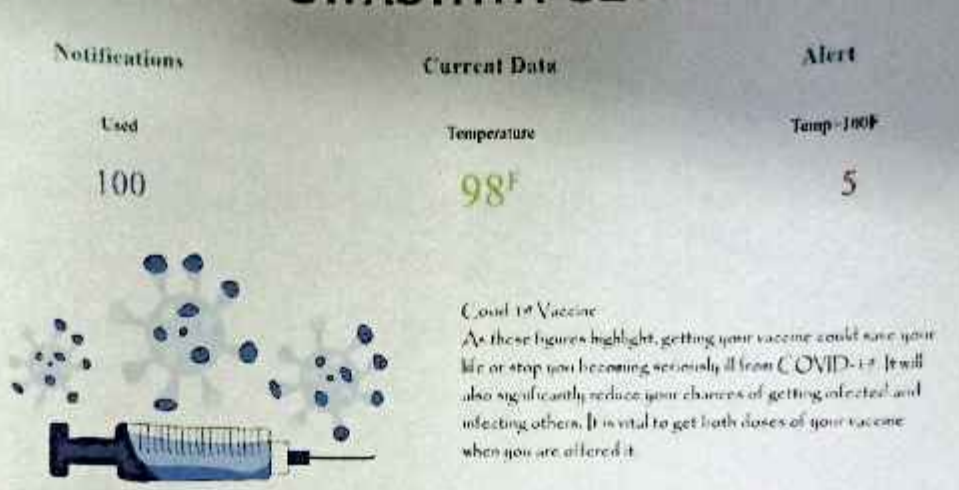
11. SYSTEM INTEGRATION TEST REPORT

Our system is working as we expected.



This shows that the integration of mxl90614, lcd display with i2c (16x2), 12v pump, step-up boost, nodemcu esp8266, ultrasonic sensor, relay, diode and voltage regulator.

Web Interface



This is to show that web interface is working as expected. And it has been hosted on nodemcu ESP8266 itself.

12. USER MANUAL

Automatic hand sanitizer machine

1. Move your hand towards machine to sanitize your hand.
2. Besides the sanitization there is temperature sensers to check the temperature of the body.
3. Use the directions properly given on the display.
4. If someone's temperature is above 100F then they can't enter.

13. FUTURE ENHANCEMENT

1. The project can be upgraded by adding Voice Recognition to the system to enable the voice command control for efficient usage (Lock/Unlock Entrance).
2. The user may also control the system through their smartphones.
3. Additional features and advanced sensors for betterment of human life.
4. Face Detection technology can be used to record facial expression of the user.
5. Large display to show the results.

14. CONCLUSION

Hand sanitizer usually operate by squirting sanitizer liquid when one presses a pump with one's hand. Some hand sanitizer on the market are automatically pumped. However, sanitizer container and pump devices are designed to be compatible only between product produced by the same manufacturer.

To address this problem, we have designed an automatic hand sanitizer system. With the proposed device, it is possible to avoid many people coming into contact with the pump handle, thus preventing fomite viral transmission and making the use of hand sanitizer much more convenient these system squirts a certain amount of hand sanitizer at all times. Making it easy to manage refills.

Automatic hand sanitizer also includes temperature sensor which can take temperature directly when we take hand near automatic hand sanitizer by which we can know about the user is having any fever symptoms.

The automatic hand sanitizer is contactless hand disinfection in public places and virus infection prevention.

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- https://www.instructables.com/
- https://lastminuteengineers.com/
- https://www.teachmemicro.com/