

An IoT Based Health Monitoring System for Early Identification of COVID-19 in Public Places

RAHUL U¹, PAVAN VADDE², Y. SAI VARDHAN³, ANANDHAKRISHNAN R⁴, ROGITH VIJAY PV⁵, SREEHARI KN⁶, ANU CHALIL⁷

^{1, 2, 3, 4, 5} Student, Department of Electronics and Communication Engineering Amrita University

^{6, 7} Professor, Department of Electronics and Communication Engineering Amrita University

Abstract— Covid-19 has now become a turnover in each and everyone's life. It has totally changed the work culture and routine of all the people. Hanging out has become a risk and we do not know from where and how this virus travels. The only solution for preventing ourselves is to isolate ourselves from all the possible physical interactions. In a highly populated country like India, it is very difficult to avoid interactions with people. Where ever we go we find a lot of people. All shopping complexes check our temperature before letting us in. But when there is a huge crowd we may not find enough time to check everyone and collect their details for future references. The main issue here is if a person is suspected to be affected by the virus later, we may not find his or her details to cross check all the people who were in contact with them. Bigger shops and shopping complexes where people visit a lot need a proper system to monitor the customers and collect their details for future references. Our proposed system uses Internet of Things (IoT) to overcome this burden. Our framework uses health monitoring sensors which collect the basic and wanted details of our health, cross checks with the normal person's usual monitored values, collects the data and allows the person inside the complex only if he or she seems to be normal. Even if that person gets affected by covid in future, the details could be easily traced and the people who were in contact with that person during shopping could be cross checked for safety purposes. The collected data will help us to do so. The sensors calculate parameters like body temperature, respiratory rate, blood oxygen saturation which pave a way for primary suspicion of covid 19. Those calculated values will be compared and checked with a normal human range and the person will be allowed in according to the result of his or her system. This proposal will be very useful in bigger cities where larger people crowd a lot. This virus has bigger chances of spreading in cities as the population density there is very high. At the same time it is in our hands to control the spread by properly identifying people with symptoms and making them isolated and not allowing them to meet anyone further. This system helps us to classify the conditions of people, store the data and hence reduce the risk of spread.

I. INTRODUCTION

To prevent the spread of COVID-19 we are using Alcohol based Hand sanitizer, We Maintain a safe Distance from anyone who is Coughing or Sneezing, wearing a mask and Staying Home if we are Feeling Unwell. The common symptoms which are easily identifiable of COVID-19 are fever dry cough, and tiredness. Other symptoms that are very prevalent are loss of taste or smell, sore throat, heart disease, Respiratory issues. The most visible symptom of COVID-19 is fever. Since the outbreak of virus, thermal screening using infrared thermometers are done to get to know the person who is infected by the virus among a huge crowd. This method is still not preferred because it is not reliable and very difficult to coordinate in situations where there is a huge crowd. Sometimes it is not even possible to check it properly in public places as it might take a lot of time and people have no patience to wait.

- Objective of Our Project

This prevention still lacking because it spends a lot of time to check the body temperature from every person and the most importance is the close contact of the infected person might lead to spreading it to the person who do the screening process or from the one in charge of screening to the checked people. We propose a system, which reads the temperature and controls the door open /close regarding to the persons temperature. When the person shows their RFID card, RFID reader reads the card and we additionally measure the body temperature of person with a non-contact infrared thermometer. If the temperature is higher than the threshold (one of the symptoms of COVID19), access is blocked. In addition, all data go to the website and will be monitored by the respective management.

II. TECHNOLOGY USED

i. NODEMCU

NodeMCU is an economic as well as an open source platform mainly used for the purpose of internet of things. "NodeMCU" comprises of two words the "node" as well as the "MCU". The word "MCU" stands for micro-controller. Framework board plans are accessible in the NodeMCU. A ESP8266 wireless fidelity empowered chip is present in the NodeMCU board. Based on the TCP/IP protocol the ESP8266 functions. We have used NodeMCU with Arduino IDE as the development environment.

ii. ARDUINO UNO

Arduino Uno is evolved on Arduino.cc and established on the microcontroller known as Microchip ATmega328P. "UNO" refers to one. The ATmega328 empowered in the board is already programmed. Without the help of an extrinsic programmer, the latest code can be transmitted into it. UNO works on the basis of STK500 protocol.

The board comprises of analog as well as digital input-output pins. The board consists of a total of 6 analog input-output pins and 14 digital input-output pins. With the help of Arduino IDE through a USB cable of type B, these pins are capable of programmable.

iii. RFID READER AND INFRARED THERMOMETER

RFID reader is the integral part of RFID system to perform its functions. RFID readers are also named as RFID interrogators. These are gadgets uses radio waves that are transmitted and received so as to communicate with the RFID tags. This innovation is alike bar codes. It is to be noted that the RFID tag need not be examined directly to a reader. The RFID tag must be within the specified reach of the RFID reader. Infrared thermometers are also named as non-contact thermometers. The function of this thermometer is to compute the temperatures from a gap so as to ensure the threat of spreading of virus. The gadget comprises of a lens which pivots the radiation to a indicator, where the radiant power is transformed to a electrical signal. This electrical signal is in turn exhibited in the

temperature units. It is very good alternative for probe type as well as thermocouple.

iv. POWER SUPPLY CIRCUIT

We will be having 230V AC power supply in our homes, we only require 5V DC to run the arduino UNO, to do so first the supply is let into stepdown transformer which will make the 230V AC to 12V AC, after that it is passed to the rectifier which will convert that 12V AC into a 5V DC, rectifier has 3 pins where the 1st pin will have the 12V AC input, the 3rd pin will have the 5V DC output and the center pin is grounded.

III. WORKING

We are using arduino uno as the main microprocessor. It has 14 digital pins numbered from 0 to 13 and 6 analog pins numbered from A0 to A5. Serial data line (SDA) is connected to A4 of the arduino and Serial Clock (SCL) is connected to A5 of the arduino. 0th pin of the arduino is the Rx pin. RFID's Tx pin is connected to the Rx of arduino. Arduino has only one Tx, but the data has to go to the wifi module as well as the GSM module. We use relay to shift the transmission. Relay has coil1 coil2 common normally close and normally open terminals. Common will go and touch accordingly. normally open is set for the IoT and normally close is set for GSM module. GSM module needs AT commands (attention) to get initialized. 4 Relays are used in this system, 2 relays for motor, 1 for valve and 1 for GSM and wifi module. For the IoT part, data is transmitted from arduino to node MCU, from Node MCU to cayennecloud and from there to our mobile application.

IV. WORK DONE



All the required components were bought, it was assembled properly then the required source code for was done in the Arduino IDE by installing all the required libraries. Then a soldering kit was bought and with help of some professionals we soldered the whole circuit and it was temporarily pinned in a board.

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Now as we show the RFID card, the name will be displayed and the temp will be sensed. If normal the valve starts and stops and then the door opens and closes. The valve here sucks the sanitizer from one end and releases it in the other end. Arduino uno has a different variant with wifi module in it, but we have used node mcu for wifi module

CONCLUSION

Thus we have referred research papers from various authors and have drawn an idea of the situations that we could face while doing this project. We have also learnt different conditions on which we may have to work and the references that we did, made the related concepts in a better frame of understanding

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