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# TEMPERATURE MONITORING AND AUTOMATIC DOOR OPENING SYSTEM USING ARDUINO UNO

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## Abstract

Severe Acute Respiratory Syndrome coronavirus 2 (SARS-CoV-2) is a fast-spreading infectious disease that is presently inflicting a healthcare crisis across the globe. The lethal corona virus founded in Wuhan, China in December 2019. The symptoms for covid 19 are rise in body temperature, cough, tiredness, loss of taste or smell, sore throat, headache and shortness of breath. The fast-spreading deadly disease covid-19 which is difficult to identify its spread. the effective vaccination is still going on around the world.

There are some existing strategies to minimal the spread of COVID 19 virus which is based upon monitoring the temperature using the sensors and spray the sanitizer on their hands. The proposed system consists of temperature sensor, IR sensor, RFID reader, buzzer, laptop / personal computer with web camera. A person entering is sensed for monitoring the temperature, face mask is detection is also included and then the sanitizer is provided by sensing the hand of the person. If the temperature of the person is below 37.6 degree, below the acceptance limit, then mask detection perform takes place by using matrix lab, then sanitizer is sprayed and then door will open automatically. Otherwise, the door will not open and the buzzer is alarmed. With these precautionary measurements, people can be capable to survive this pandemic situation.

**KEYWORD: Temperature, Mask detection, Sanitizer, Door open, Mat Lab**

## 1. INTRODUCTION

SARS-CoV-2 is a air borne disease that is presently affecting people in and around the world. The lethal corona virus founded in Wuhan, China in December 2019. COVID-19 is an threatening disease which keeps evolving in different variants like alpha, delta, omicron, delmicron and so on, which leads to many deaths. This disease affects not only a certain country but also the entire world. The remedial measures for infected persons is to maintain oxygen level with medications. A person with covid-19 can experience a wide range of symptoms like rise in temperature, cough, tiredness, loss of flavor or smell, sore throat, headache and difficult to breath or shortness of breath. The rapid spreading virus have an effects on day - to - day human life and and the economic stability of a country. The fast-spreading deadly disease covid 19 is difficult to identify its spread, and its effective vaccination is still going. The infection caused by covid-19 is dreadful which causes many death but many people are surviving against that virus with the help of medications. Affected patients of covid-19 are required to be in isolation, in order to contain the spread the proper screening, and covid PCR (Polymerase Chain Reaction) test should be

performed frequently. Since it is an air borne disease a masks can play a vital role to prevent the spread from one people to other. Not only a masks but also maintain a proper social distancing to reduce the spread and also wash the hands frequently. Due to its many variants the spreading rate of the person differ from each other, so taking precautionary measures are important, in order to survive this pandemic situation.

## 2. LITERATURE SURVEY

M. Kristo, M. Icasic - Kos (2019) proposed that the fame of surveillance systems increased in order to get better security systems specifically in bad lighting conditions / at night. To get better recognition of a person the security system is programmed to collect as many details as possible. Thermal face recognition methods are compared in this paper to emphasizing their strengths and weaknesses. “Then, the trends in the development of surveillance and the security systems will be outlined such as fusion of visible and then the thermal images and use of convolutional neural networks”.[1]

Piyush Devikar (2017) proposed that to eliminate the chances of a person to fake his / her identity, face liveness and disguise detection system are used. By using high-end silicone masks and prosthetics, the face recognition systems available in the market failed to detect the fake faces. And these systems failed to find the difference between a physical photograph and a real face, so these are the vulnerabilities present in the system. To overcome the glaring problems that are present in almost all face recognition systems, a simple approach is presented by this paper.[6]

## 3. PROPOSED SYSTEM

The proposed system consists of temperature sensor, Radio Frequency Identification (RFID) reader, personal computer / laptop, buzzer, sanitizer and the pump / DC motor. The proposed system has five stages.

- Tag based entry
- Temperature monitoring
- Face mask detection
- Sanitizer
- Automatic door opening system

MATLAB (matrix laboratory) is abstract numeric environment and programming language of the fourth generation developed by math works, MATLAB allow matrix manipulation, algorithm execution, user interface development, function and data visualization and coupling with applications that are written in other languages, which includes Fortran, C, C++, and Java.

MATLAB is intended primarily for optional toolbox, offering symbolic computing capabilities, numerical programming, using the symbolic MuPAD computer. A further kit, Simulink software provides Model-Based Design for dynamic and systems built in and multi-domain interactive simulation. MATLAB had about a millions of users in 2004 across the industry and to the academy. MATLAB users comprise of

different backgrounds such as economics, science and engineering. MATLAB is widely used in research institution, academic and in industrial enterprises also.

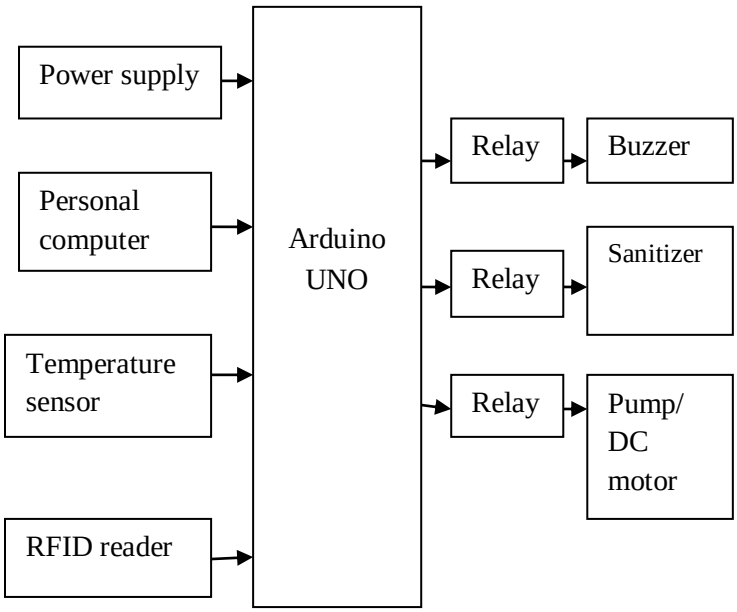


Figure 1. Block Diagram

Radio Frequency Identification (RFID) mainly uses the electromagnetic fields to identify and tracks the tags which is attached to the objects. An RFID system consists of a radio receiver and transmitter and a tiny transponder. The RFID reader is a network – connected device that can be transportable or permanently connected. It uses radio waves to transmit indicators that set off the tag, as soon as activated, the tag sends a wave lower back to the antenna, wherein it's far translated into statistics. The RFID tags are available in three forms, they are Passive Reader Active Tag (PRAT), Active Reader Passive Tag (ARPT), and Active Reader Active Tag (ARAT). The RFID tags may be of either active, passive or battery-assisted passive form.

The temperature sensor used in this project is Thermistors. These thermistors are semiconductor devices. The thermistor sensor is used to measure temperature. The word thermistors is derived from the words "resistor" and "thermal". The electrical resistance found in thermistors are directly proportional to the temperature. As an instance, devices such toasters, heaters, and light bulbs operate on the principle of thermistors. These sensors are very accurate in result. These sensors are very easy to work and cost-effective also. The types of thermistors are PTC (Positive Temperature Coefficient) and NTC (Negative temperature coefficient).

An audio signalling device like a buzzer or beeper may be of either mechanical, electromechanical or piezoelectric form. The function of the buzzer is to convert the signal from audio to sound. Buzzers can generates different sounds like music, siren, bell and alarm which is based on the various designs. Buzzers

are powered through the DC voltage and these are used in timers, printers, alarms, alarm devices, computer etc. Buzzer is in different forms which are magnetic, mechanical, electromagnetic, electro mechanical and piezoelectric.

A DC (Direct Current) motor is used to transform direct current electrical energy into mechanical energy. DC motors have some mechanism which undergo internally may be of either electronic or electromechanical. DC motors are used in variety of applications some of them are conveyors and turntables. It is also used in dynamic braking and reversing application. There are two key components in DC motors, they are a stator and an armature. The four types of the DC motors are compound DC motors, shunt, series and permanent magnet DC motors.

**Applications**

- Used in firms.
- Used in hospitals.
- Also used in most of the public places.
- Control the spreading of virus infection from one person to other.

**Advantages**

- It is used to be utilized in a large number of environments.
- The whole system is fully autonomous.
- It is fully wireless technology.
- It is simple and easy to implement.
- It gives more accuracy.

## 4. PROCEDURAL FLOW

In this figure 2 shows that procedural flow, at the entry point the person shows the RFID tag. If the temperature of the person is below 37.6 degree, the next procedure follows. Otherwise, the next step is not proceeded and the buzzer is alarmed. After temperature monitoring the person, face mask detection performs takes place. The face mask detection performs by image processing technique by using MATLAB. If the person wears the face mask the next procedure step follows. Otherwise, the next step is not proceeded and the buzzer is alarmed. After mask detection the sanitizer is sprayed then, the door will open automatically.

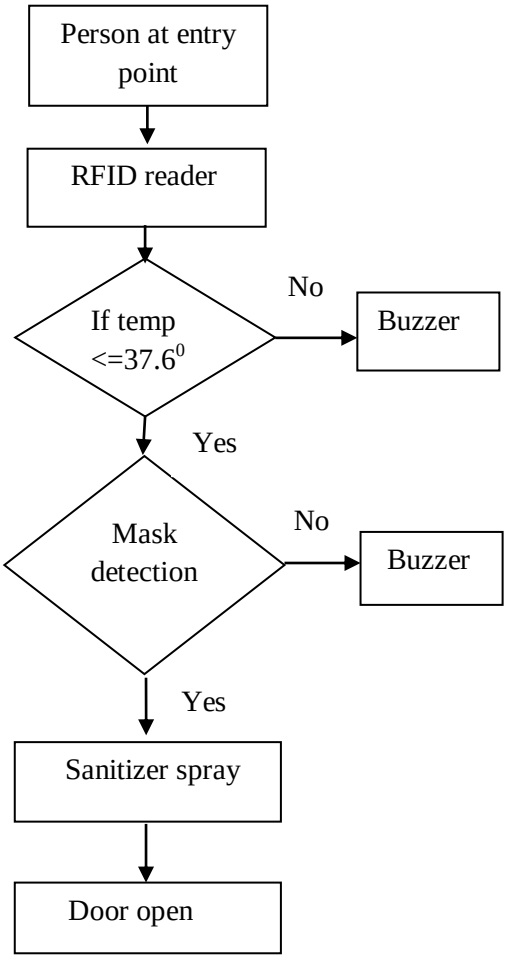


Figure 2. Flowchart

## 7. RESULTS

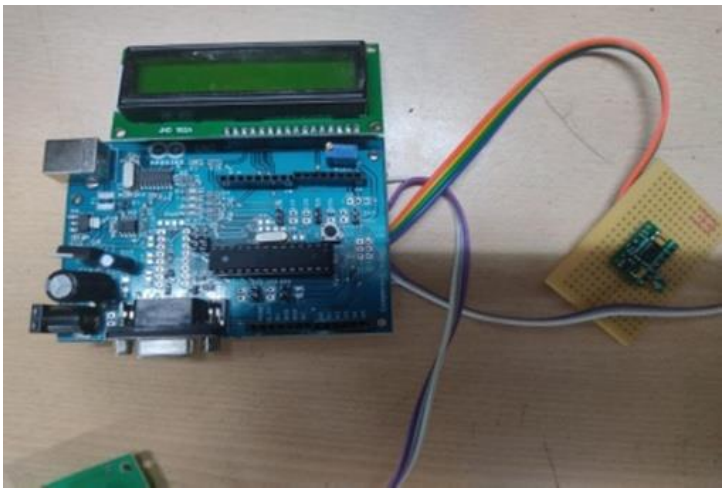

Figure 3. Hardware module

Figure 3 shows that hardware module of the project "Temperature Monitoring and Face Mask Detection Using MATLAB". In software the face mask detection performs take place using MATLAB by the technique named as image processing.

## 8. CONCLUSION

The process that is done by the embedded system ensures the safety measure of the people in the world. By the help of monitoring system people can secure them without any fear. The detection and monitoring based networks highly enlightened by the embedded systems. This research can be further extended by linking it to the IoT (Internet of Things) to store the details in the cloud for future analysis. This project provides an extra layer of safety from covid-19 infection by automatic decision made through the designed embedded system.

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