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Automatic Face Mask Detection and Temperature Scan Entry System

R.Lavanya[1], Y.Akhila[2], V.Tejasri[3],P.Navya[4], G.Veena Deekshit[5], M.Thanmai[6]
[1]Assistant Professor, [2 3 4 5 6]UG Students
Department of ECE,
Bapatla Women's Engineering College, Bapatla, Andhra Pradesh,522101

Abstract:
As we have seen from ending of 2019 a scary Disease COVID-19 that had attacked many people It is an easy spread communicable disease so to overcome This virus. we need to maintain social distance so that spread of virus will be reduced. We have seen everywhere checking up the health conditions and allowing inside to respective areas. To check these conditions a person should be there to monitor so instead of that we can use this. it automatically works without man source.

Keywords: *Covid 19, Raspberry pi, face mask detection, Temperature detection , camera*

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I. Introduction :

Corona virus disease-19 (COVID-19) is a contagious disease caused by virus. Many people have affected to this disease world widely. This is caused by infected people who revolves around healthy people without wearing the mask. The virus is spread by the droplets coming out from the mouth while functioning the mouth like talking ,eating ,singing . For this spreading we need to cover the mouth by a mask and one more symptom to easy identification of covid is temperature because the foremost symptom is fever so based on that we have considered temperature detection also . If the person is wearing a mask and maintaining social distance the chances will less to be infected while the person has suspected people in surroundings

II. Background :

As we have seen that COVID-19 has affected the people world widely by easy spreading of virus WHO is also in research of find the medicine for the virus somehow they created vaccine but that also doesn't stop the presenting of virus . Later on they thought that virus is a communicable disease so that can be reduced by the safety measures that WHO has stated that social distancing should be there between person to person whether they are effected or not, next was a mask that covers the nose, mouth these are the parts from where the virus can be easily flow through and a sanitizer that prevents the people not to spread the virus with the hands . This is the way to stop spreading the virus

Components:

Raspberry Pi : This is a single-board computer, the board consist of a 1.2GHz 64-bit quad-core ARM processor and an 802. 11n wireless LAN, Bluetooth 4.1, and Bluetooth low energy. It consist of 1GB of RAM, 4 USB ports, and full HDMI support. It has a powerful feature of Raspberry Pi is the row of GPIO (it means general purpose input/output) pins along the extreme right edge of the board, it consist of a 40 pin GPIO . It is a standard interface for connecting a single board computer or microprocessor to other devices is through GPIO pins.

IR Sensor : The IR sensor is a device which detects IR radiation falling on it, an infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. It can measure the heat of an object as well as detects the motion as well as the presence of an object due to intervention or interruption. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor, there are numerous types of IR sensors that are build and can be built depending on the application.

Temperature Sensor : The sensor is used to measure the temperature of a particular object ranging from -70^0 C to 382.2^0C. The sensor uses IR rays to measure the temperature of the object without any physical contact and communication to the microcontroller using the 12C protocol.

Servo motor : It is a type of motor that can rotate with great precision. In general this type of motor consist of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motor to rotate with great precision. If the motor is powered by a DC power supply, it is called DC servo motor

and if the motor is powered by a AC power supply, it is called AC servo motor. Motor is used for rotating the sliding door.

Piezo Buzzer : The piezoelectric buzzer uses the piezoelectric effect of the piezoelectric ceramics and uses the pulse current to drive the vibration of the metal plate to generate sound. The sound is issued in the system for indication.

Existing Methodology :

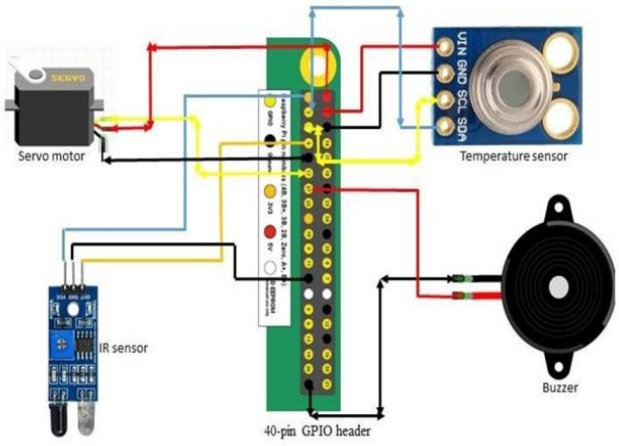
As some systems are there to prevent people from virus but those are also not much affected like this system. They used to do thermal screening before allowing the person to some particular area due to the virus and also used to check that the person is wearing mask or not and these are observed by the respected guard in the surroundings.

III. Methodology :

The procedure is introduced by using Raspberry pi that is connected by sensors. By the virus every place is being under with some conditions like everyone must wear a mask, should have a normal body temperature that is checked out by thermal screening in order to apply these condition we should need a person to monitor. In some cases the person may also be effected by the virus, in order to overcome this system is introduced.

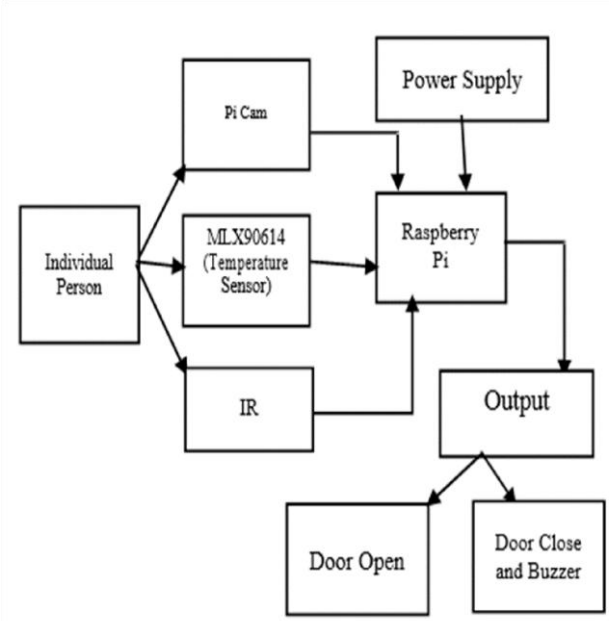
This system is used in crowded areas like airports, railway and bus stations, hospitals, shopping malls and some other public places. This system is considered with three conditions foremost is when the person is coming near to the system should place hand near the a sensors so that IR sensor will be activated and temperature will be checked out as these sensors are side by side constructed and the face of the person should be near to the pi camera its captures the face of the person and finds that the person is having a mask or not and last the sliding door will be functioned when these two conditions are been satisfied by the person then the system works

First condition is the person's temperature is checked if temperature is satisfied by the normal temperature that is displayed on the lcd that is constructed in the system and then coming to the mask which is necessary it is captured by the camera that if not having the buzzer is makes sound and the sliding door will not allow the person. Second condition is when the person is not having a satisfied temperature but wearing a mask then also the buzzer makes sound and the sliding door will not be opened. Last condition is the temperature should be normal and the mask should be properly placed then buzzer doesn't make sounds and the sliding door will be opened so the person is permitted to go inside the particular area where the system is placed



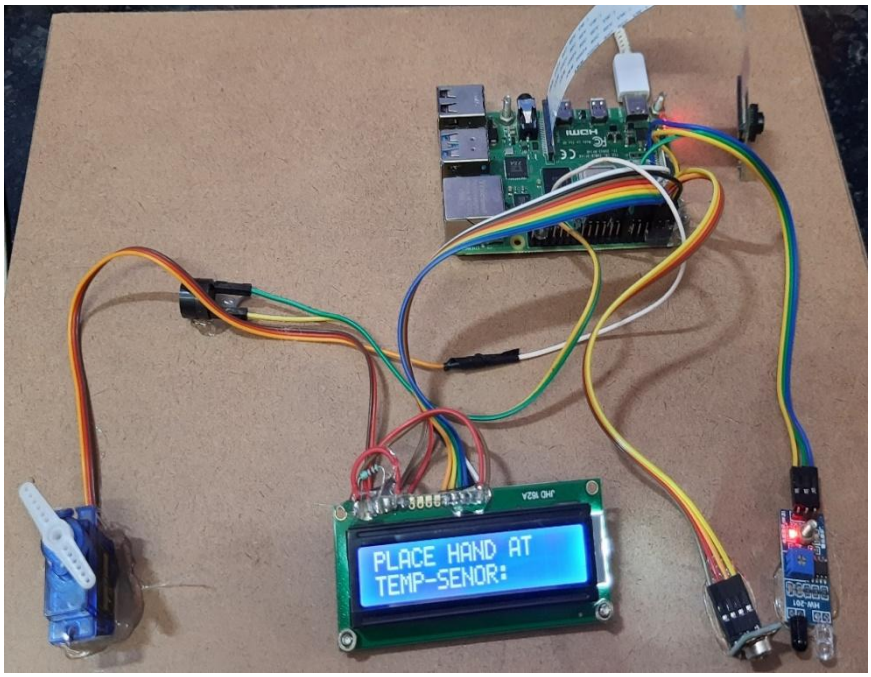
In the above figure we can see that these are main components used in the system , the GPIO header has the connected with both the sensors and the buzzer ,servo motor and one of the main component was raspberry pi camera.

In this paper the input is taken as the person and the response is taken from three active components pi cam, IR sensor and temperature sensor. The inputs from these three are connected to the raspberry pi. The power supply is also given to the raspberry pi which plays the main key role in the paper. Power supply can be given from any monitoring system like laptop or computer. The program injected to the system gives the output based on the input considered.



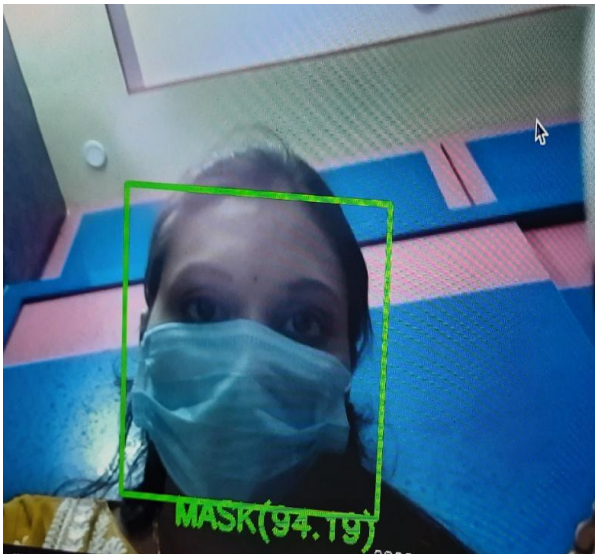
Finally the output is executed by two conditions one the sliding door gets opened and the sliding door will not be opened.

Connections:

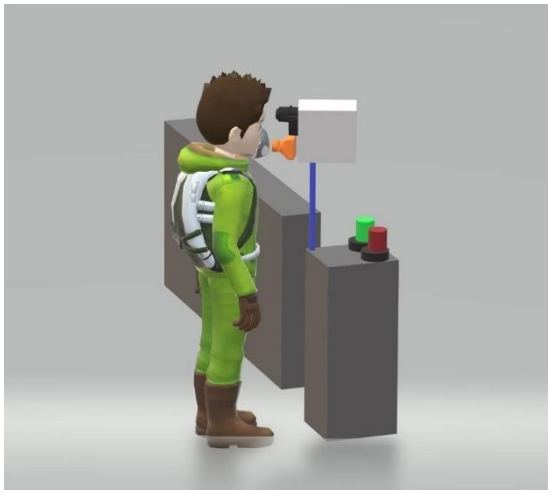


IV. Observation :

The images of the people shows the output of the pi camera the image shows the red indication by the boundary on the face means the person is not wearing the mask and the second image shows the green indication by the boundary on the face means the person is wearing the mask.



After the pi cam detection of mask the sliding door shows the final output that the person is satisfying the condition that are used in the system or not and that can be observed below that sliding door is closed and opened.



V. Conclusion:

For this reason we have designed this paper to stop the spreading of virus in public sectors which has high efficiency to split the droplets of virus without any safety measures then thiscauses to the high increase of cases and soon after the dead rate due to COVID-19. Thus prevention will be there rather than going through the disease.

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