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Thermal Scanning and Mask Detection Entrance

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Abstract: ***"Covid-19", a virus has changed the world with a huge impact in the regular lives of people. People are mostly scared to go outside because of this deadly virus. But there are ways to fight and avoid this virus from affecting us, which is regular sanitization of hands and proper wearing of mask. But these days, people are avoiding these basic safety aids. Because of this virus, many public places have forcibly put to shut as people might get affected. Covid-19 can be fought only if people start to keep safe distance and wear proper mask covering their faces. Covid-19 has several symptoms like high body temperature. So, keeping these factors in mind the prototype has been developed as a system that can detect the body temperature of a person as well as it can check if the person is wearing a mask or not. This work has thermal imaging technique that can detect body temperature without any physical contact and uses image processing to check for mask wearablity. If the person fails to wear a mask or his/her body temperature is above normal, then an alarm is generated, and the photo of the person is sent to the control room with an alert message. The data of both people entering as well as people that are not allowed, are stored in the database with the current date and time.***

Keywords: Mask, Thermal scan, Raspberry Pi, MLX90614, Servo motor, Alarm.

I. INTRODUCTION

Covid-19 has caught many people off guard and its outbreak is increasing day by day. Public places are avoided by most and this has led to downfall of business and many other possibilities in the field of work. During the time of pandemic, wearing a mask is as important as wearing a helmet while riding. The days are not far when everyone would be free from all these but till the day comes, it is needed to keep safe distance and wear mask, sanitize the hands every now and then. Mask can help to fight this pandemic and it should be worn when going out in the open. So, to check if a person entering any public place is safe, it is necessary to check if the person has any of the symptoms and if he/she is wearing a mask or not. So, the thought of an idea is proposed where a gate will be made, and it will check the body temperature with the help of thermal imaging and will also check if the person is wearing a mask or not.

II. METHODOLOGY

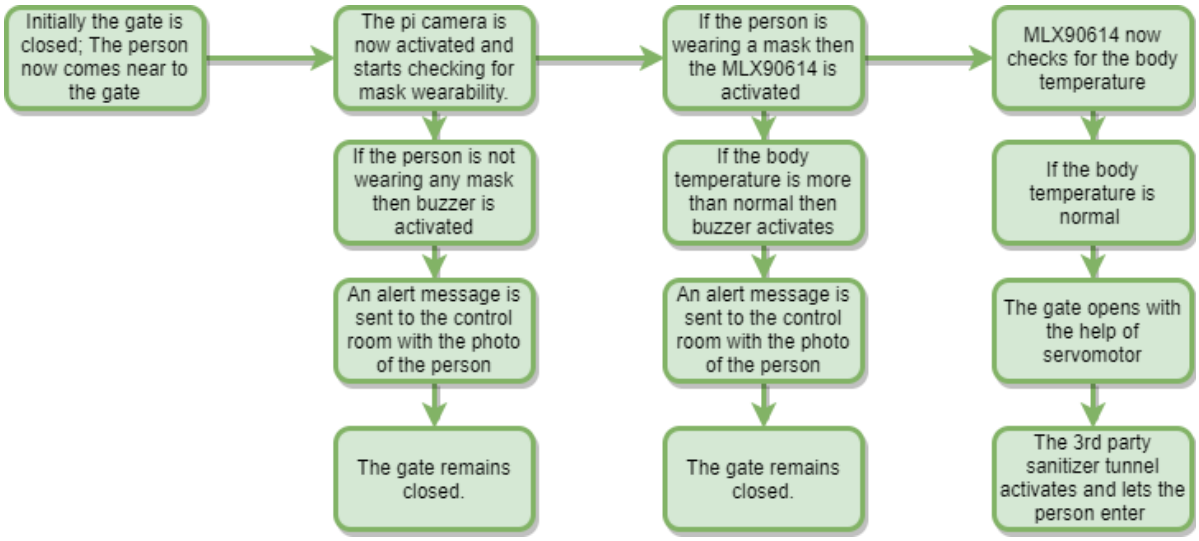


Fig: 1 Workflow of the Thermal scanning and Mask detection

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The system checks if a person entering any premises wearing a mask or not and his/her body temperature is normal or not. The system uses Raspberry pi 4 model as the controller, pi camera to check if the person is wearing a mask or not, MLX90614 thermal sensor to measure body temperature, buzzer to raise an alarm and finally a servo motor to control the gate.

Initially, when a person comes near to the entrance the pi camera will check for the presence of mask. If the person is wearing a mask, then the MLX90614 thermal sensor gets activated and measures the body temperature. If the person's body temperature is normal, then the servo motor rotates its shaft to an angle of 90 degrees and the gate opens letting the person to enter the premises. Now, if any of the two criteria fails then the person is not allowed to enter the premises and the buzzer raises an alarm. An alert message is sent to the control room with the photo of the person failed to enter the premises. Our system maintains a database where all the entries are stored with the photo identification information of the person, i.e., it stores both the images of the person allowed to enter or not allowed to enter with the current date and time in separate folders.

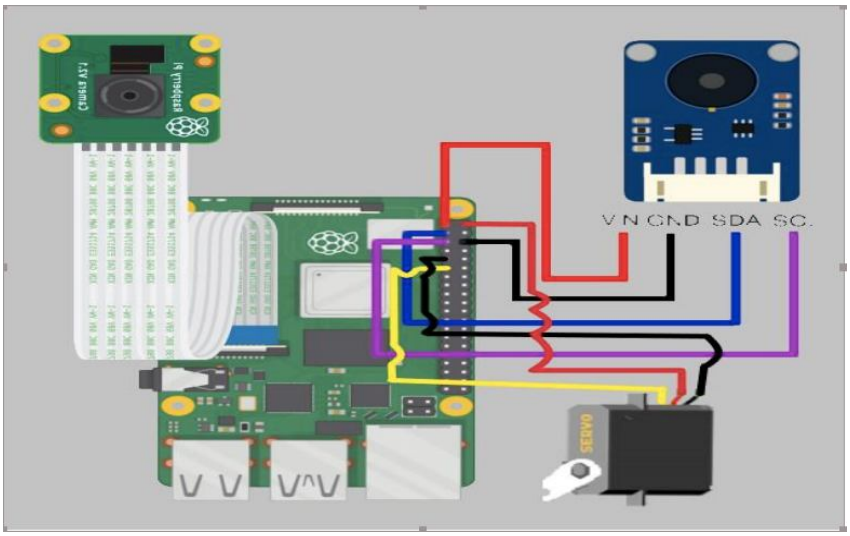


Fig: 2 Connection Diagram of the Thermal scanning and Mask detection

The above diagram conveys the connections done with the components and the microcontroller. The MLX90614 sensor is connected to the 3.3V pin with the VIN of the sensor, the GND (ground) pin of raspberry pi is connected to the GND of the MLX sensor, the SDA (pin3) of raspberry pi is connected to the SDA of MLX sensor and finally the SCL of RSP (pin5) is connected to SCL of MLX sensor. The camera module is connected to the camera module port of the RSP. The Buzzer's positive terminal is connected to the GPIO (pin7) and negative terminal is connected to GND (pin14). The battery's negative terminal is connected to the GND (pin9) and positive is connected to the VCC of the servo motor. The servo motor's input pin is connected to GPIO (pin11) and ground is connected to GND of RSP (pin9).

III.RESULTS AND DISCUSSIONS

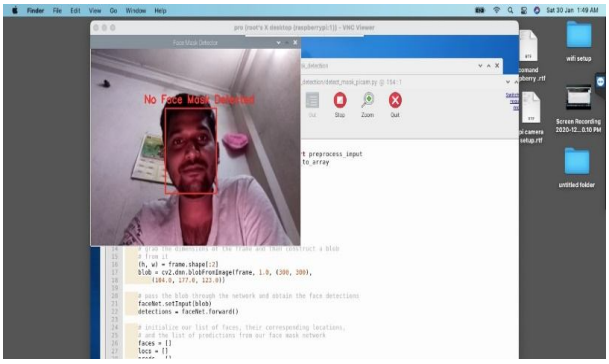


Fig: 3 Snapshot of the detection of mask & body temperature [Failed]

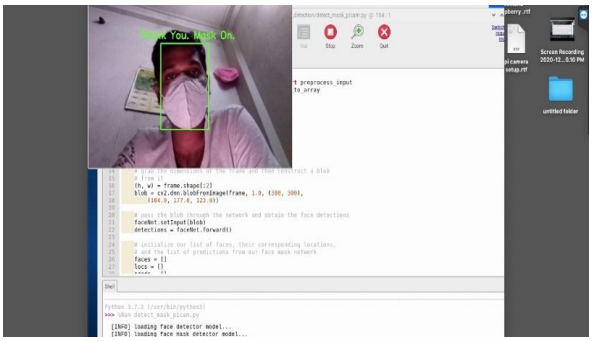


Fig: 4 Snapshot of the detection of mask & body temperature [Passed]

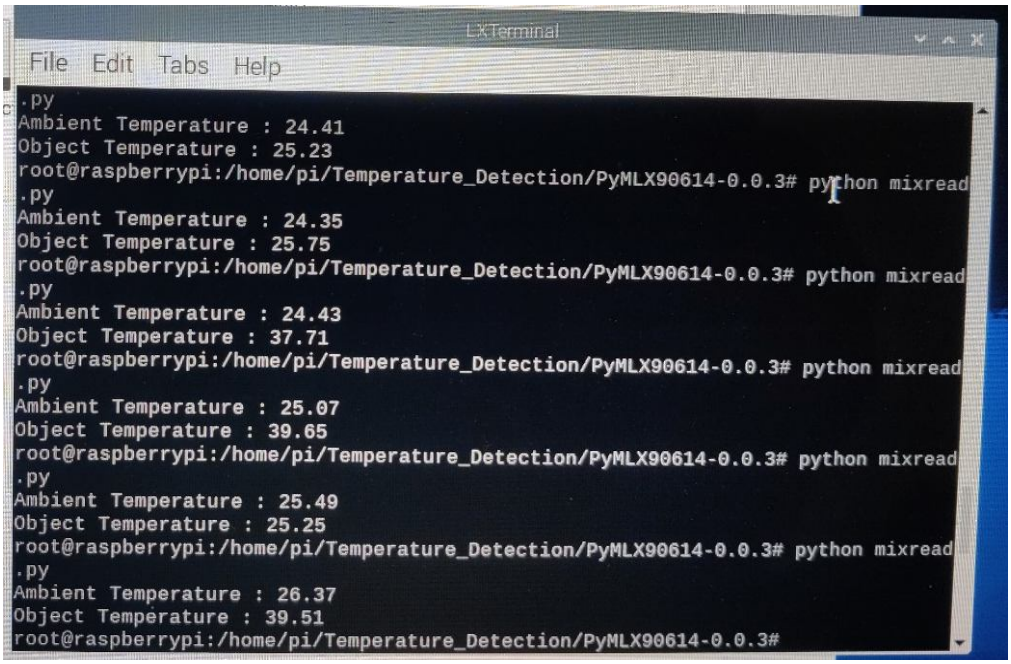


Fig: 5 Snapshot of the programming output

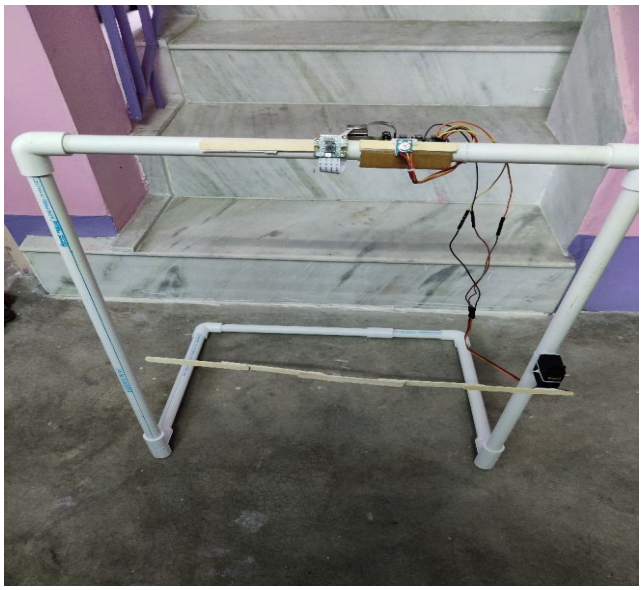


Fig: 6 Snapshots of the Prototype

In the above figure, some images of the developed prototype are shown. The prototype is developed in such a way that it can be implemented on any entrance of the big premises with lots of public gathering.

IV. CONCLUSIONS

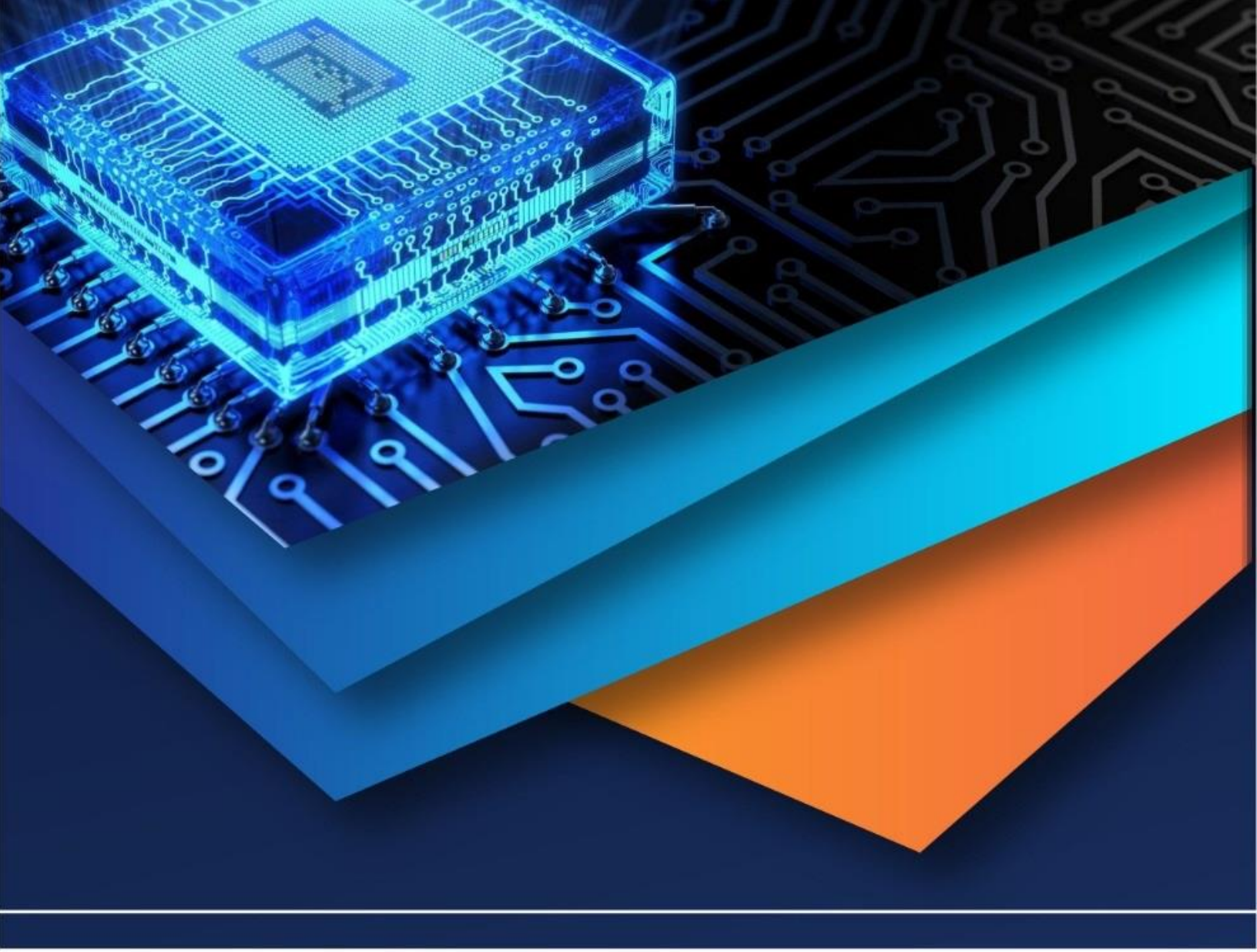
The project speaks for itself and its importance. So, after all the possible outcomes and prototype testing, it is concluded that the prototype is able to do its job flawlessly and there are no major issues as of now. It is cheap, effective, and easy to maintain. The prototype can make a change in lives of the ordinary people if used in a right way and effectively.

V. ACKNOWLEDGMENT

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