



IOT TEMPERATURE AND MASK ENTRY SYSTEM

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ABSTRACT

In the present scenario due to Covid-19, the need for temperature detection and face mask detection are now in high demand for Railway Entrance, Airport Entrance, Office Entrance, Museums and Parks, Other Public Places and enterprises to ensure safety. These steps are now done in a manual way by which the person may get in contact with the other person while checking temperature and mask might not be accurate. To mitigate the problem, this research work introduces an affordable IOT-based solution aiming to increase Covid-19 entrance safety, covering several aspects: Contactless temperature sensing and Mask detection. Contactless temperature subsystem relies on Raspberry Pi using temperature sensor, while mask detection performed by leveraging computer vision techniques on camera-equipped Raspberry Pi. Any person without temperature check and mask scan will not be provided entry. Only person having the conditions satisfied by the system is instantly allowed inside, else the buzzer will alert the security about the situation, if any violation of the condition is found. From the simulation results, it is clearly observed that the proposed method has high accuracy compared to the existing methods. Thus the system provides 100% automated system to prevent the spread of the Covid-19.

KEY WORDS: Covid-19, Contactless temperature sensing, Mask Detection, Raspberry pi

1. INTRODUCTION

Since the last days of the previous year, the occurrence of novel infectious flu-a like respiratory disease Covid-19 caused by SARS-Cov-2 virus (also known as corona virus) has affected almost every aspect of people's lives globally. Common symptoms of corona virus disease include fever, tiredness, sore throat, nasal congestion, loss of taste and smell. In most cases, it is transmitted directly (person to person) through respiratory droplets, but also indirectly via surfaces. Therefore, the usage of face masks and sanitizers has shown positive results when it comes to disease spread reduction. The first step to detect Covid-19 is by scanning for fever. Also, we need to monitor every person for a mask. We have temperature checking systems for every entrance for scanning but manual temperature scanning has lots of

disadvantages and also the personnel are not well trained on using temperature scanner devices. There may be the human error that can occur while reading the values. Many a times people are not barred from entry even after they are diagnosed with higher temperature readings and also, they will allow them to enter the building even if they have no masks. The scanning is skipped by the personnel if supervisors are not watching. Manual scanning system is not suitable for large crowds.

To solve this problem, we are going to propose a fully automated temperature scanner and entry provider system. It is a multipurpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to restrict the entry if

the personnel are diagnosed with high temperature or if the personnel is identified with no mask is detected with the help of the scanner. No person will be provided entry without temperature and mask scan. Only the person who satisfies both the conditions correctly they will be provided with the entry instantly to go inside. The system uses temperature sensor and camera connected with a raspberry pi system to control the entire operation. The camera is used to scan for mask and temperature sensor for forehead temperature. The raspberry processes the sensor inputs and decides whether the person is to be allowed. In this case the system operates a motor to open the barrier allowing the person to enter the premises. If a person is flagged by system for high temperature or no Mask the system glows the red light and bars the person from entry. Also, the face and temperature of person is transmitted over IOT to server for authorities to take action and test the person for COVID.

2. Methodology

BLOCK DIAGRAM

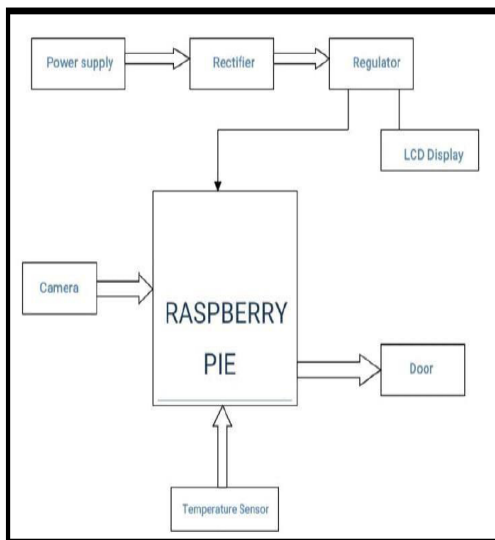


FIG 2.1 BLOCK DIAGRAM

2.1 PROPOSED SYSTEM

To solve this problem we here propose a fully automated temperature scanner and entry provider system. It is a multi purpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected. Any person will not be provided entry without temperature and mask scan. Only person having both conditions is instantly allowed inside. The system uses temperature sensor and camera connected with a raspberry pi system to control the entire operation. The camera is used to scan for mask and temperature sensor for forehead temperature. The raspberry processes the sensor inputs and decides whether the person is to be allowed. In this case the system operates a motor to open the barrier allowing the person to enter the premises. If a person is flagged by system for high temperature or no Mask the system glows the red light and bars the person from entry. Also the face and temperature of person is transmitted over IOT to server for authorities to take action and test the person for COVID.

Thus the system provides a 100% automated system to prevent the spread of COVID.

ADVANTAGES:

- Fully automated monitoring of compliance with facemask and body temperature requirements.
- Reliable detection within seconds.
- Saves staff resources.
- Avoids potential hygiene and data privacy risks.
- Touch screen with self-explanatory audio/video interaction for guiding users through the entire scanning process.

DISADVANTAGES:

- If the sensors are not working then there is a problem with the detection.
- Accurate temperature measurements are hindered by differing reflections from the surfaces

3D WORKING VIEWS:

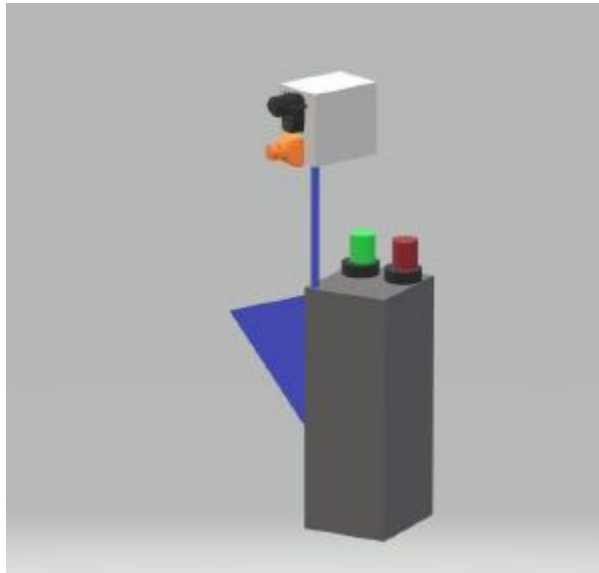


FIG 2.2 3D WORKING VIEWS

WORKING:

In the present scenario due to Covid-19, the need for temperature detection and face mask detection are now in high demand for Railway Entrance, Airport Entrance, Office Entrance, Museums and Parks, Other Public Places and enterprises to ensure safety. These steps are now done in a manual way by which the person may get in contact with the other person while checking temperature and mask might not be accurate. The working of the IOT Temperature and Mask Scan Entry System is used to scan a person who are entering in to the location which is to be healthy environment. These project is mainly deals with temperature of the body and face mask recognition. In this we use raspberry pi its has an data base that used to recognize faces of a person with mask or with-out mask and temperature sensor measures the temperature of the body. IR sensor is also used to detect the person which is available in front of the system. As the person is in front of camera detect the face with mask and it sends the signal to raspberry pi, and allows the person inside after checking the body temperature. The person with having both face mask and average temperature will allows them in side and it displays access granted. If person with no mask and average temperature or the person with mask and high temperature or person with no mask and high temperature will not allow inside and it displays access denied.

Applications:

- Railway station entrance
- Airport entrances
- Government office

- Public places

3. PROBLEM STATEMENT:

To solve this problem we here propose a fully automated temperature scanner and entry provider system. It is a multi purpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected.

Any person will not be provided entry without temperature and mask scan. Only person having both conditions is instantly allowed inside. The system uses temperature sensor and camera connected with a raspberry pi system to control the entire operation.

The camera is used to scan for mask and temperature sensor for forehead temperature. The raspberry processes the sensor inputs and decides weather the person is to be allowed. In this case the system operates a motor to open the barrier allowing the person to enter the premises. If a person is flagged by system for high temperature or no Mask the system glows the red light and bars the person from entry. Also the face and temperature of person is transmitted over IOT to server for authorities to take action and test the person for covid. Thus the system provides a 100% automated system to prevent the spread of COVID.

4. Results:



FIG 4.2.1 FINAL REPORT

When a person with mask and below the temperature of 35 will be accessed and open's the door otherwise the door will not be opened.

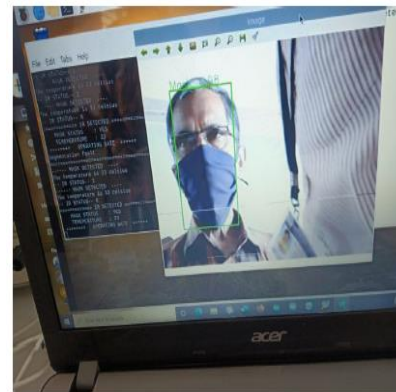


FIG 4.2.2 A PERSON WITH MASK



FIG 4.2.3 OUTPUT DISPLAY

A person with no mask and temperature is very high then the system will not opened the door.

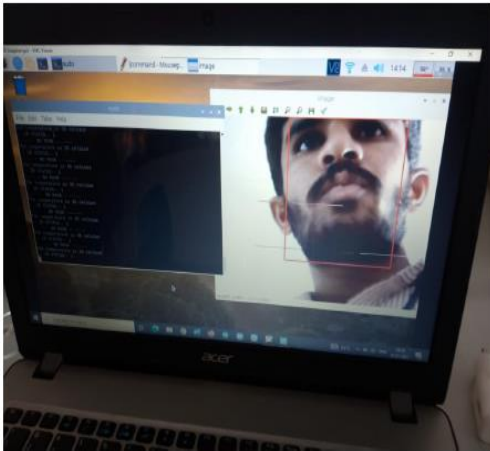


FIG 4.2.5 A PERSON WITH OUT MASK



FIG 4.2.6 OUTPUT DISPLAY AND
ACCESS DENIED

5. CONCLUSION AND FUTURE SCOPE

The main purpose of this project is to automate the manual work of the covid-19 protocols of checking the temperature and ensure if people wear mask or not. By this system the spread of the covid-19 virus can be controlled and the accuracy of the

temperature checking increases than when it is manually done. The authority of certain management need not worry about the health and care concern of employees or students. Also lack of attention of the personal who checks the conditions can be resolved by this system. Further in future the accuracy of the mask detection can be increased and there is also scope for further development in our project to a great extent. A number of features can be added to this system in future like for security systems and any other outbreak preventing systems. By reporting the information to the government sectors, they can track prevent the spreading. By using these applications, the people can feel more secure and prevent the human generation from getting affected from the life-threatening situations.

5.2 FUTURE SCOPE:

In future, it is planned to experiment with various deep learning and computer vision frameworks for object detection on Raspberry Pi in order to achieve higher frame rate. Moreover, we would like to extend this solution with environment sensing mechanisms for adaptive building air conditioning and ventilation airborne protection in order to reduce the spread of corona virus indoors [4, 8, 24], especially during summer. Furthermore, we will consider the implementation of mechanisms for transparent face shield detection. Finally, the ultimate goal is to integrate the system presented in this paper with our framework for efficient resource planning during pandemic crisis [25] in order to enable efficient security personnel scheduling and mask allocation, together with risk



assessment based on statistics about respecting the safety guidelines and air quality.

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