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A Review on Temperature and Mask Scanning System

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ABSTRACT: In this project, we will introduce an affordable IoT-based solution aiming to increase COVID-19 indoor safety, covering several relevant aspects:
1) Contactless Temperature Sensing.
2) Mask Detection.
Contactless temperature sensing subsystem relies on Arduino Uno using infrared sensor or thermal camera, while mask detection and social distancing check are performed by leveraging computer vision techniques on camera-equipped computer.

KEYWORDS: COVID-19,Mask Detection, Temperature Detection, Contactless.

I. INTRODUCTION

The first step to detect COVID 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 a lot of disadvantages.

To solve this problem we here 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 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 automated system to prevent the spread of COVID.

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II. LITERATURE REVIEW

"Prevention is better than cure" is one of the effective measures to prevent the spreading of COVID-19 and to protect mankind. Many researchers and doctors are working on medication and vaccination for corona.COVID-19 spreads mostly by droplet infection when people cough or if we touch someone who is ill and then to our face (i.e. rubbing eyes or nose). Ongoing pandemic shows that it is much more contagious and spreads fast. Depending on the infection spreading, we have two cases: Fast and Slow spread.

Fast pandemic will be terrible and will cost many lives. It occurs due to a rapid rate of infection because there are no countermeasures to slow it down. This is because, if the numbers of infected people get too large, healthcare systems become unable to handle it. We will lack resources such as medical staff or equipment like a ventilator.

To avoid the above situation, we need to do what we can to turn this into a slow pandemic. A pandemic can be slowed down only by the right responses, mainly in the early phase. In this phase, everyone who is sick can get treatment and there is no emergency point with flooded hospitals.

In this pandemic, we need to engineer our behaviour as a vaccine. That is, "Not getting infected" and "Not infecting others". The best thing we can do is to wash our hands with soap or a hand sanitizer. The next best thing is social distancing. To avoid getting infected or spreading it, It is essential to wear a face mask while going out from home especially to public places such as markets or hospitals

As Countries around the Globe are Reopening, living with the Novel Coronavirus is becoming the new way of life. But to Stop the Spread of the Virus we need to separate people having the Coronavirus from the Rest. According to the CDC, fever is the leading symptom of the Coronavirus with up to 83% of Symptomatic Patients showing some signs of fever. Many Countries are making Temperature Check-up's and Masks mandatory for Schools, Colleges, Offices, and other Workplaces.

Currently, Temperature check-ups are done manually using Contactless Thermometer. Manual check-ups can be Inefficient, Impractical (in places with a large footfall), and Risky.

To test the real-time scenario, we deployed it on one of the rooms to test how possibly it could be used and the results were pretty affirmative. COVID 19 has made a huge impact on the society, the new restriction has been imposed as in the number of users allowed in a particular room in offices, shops, etc.

To maintain social distancing, along with social distancing regular temperature check at entrances of malls, the office is mandatory. In this project we stimulate a room where such necessary precautions are taken, we make use of a laser diode and receiver to detect the entrance of a person, when the project detect entrance it will check the temperature of the person if the temperature is less than the set temperature the person is allowed entry otherwise the entry is denied. only a pre-determined number of people are allowed in the room.

Temperature sensor: An infrared thermometer is a thermometer which inverts temperature from a portion of the thermal radiation sometimes called black body radiation emitted by the object being measure. Sometimes called laser thermometer as a laser is used to help aim the thermometer or non-contact or temperature gun, to describe the device ability to measure temperature from a distance .By knowing the amount of infrared energy emitted by the object, the permits temperature measurement from distance without contact with the object to be measure. A non- contact infrared sensor thermometer is useful for measuring temperature under circumstance where thermocouple or other probe type sensors cannot be used or do not produce accurate data for a variety of reasons.

IoT based devices in homes and industries are used for controlling all the electrical or electronic devices which are present. Additionally, the saved information of the IoT devices can be controlled from anywhere. The sensor analyzes the graphical representation of the observed data in every user-defined format wherever in the world. In this work, IoT based Arduino is used. Temperature monitoring using Arduino is an exciting and secure process. Furthermore, this flexible system obtains more values in calculating the actuator from the data saved on the internet.

IoT is used for connecting the electronic devices with the internet. The devices may vary from the temperature measuring equipment and vehicles SOS system to other electronic devices such as sensors, software's, and network connectivity facilities, which sanction collecting and exchanging data. The twenty-first century has witnessed a massive paradigm shift to and focusing on global attention onto IoT as a burgeoning discipline with multiple possibilities and diverse opportunities for growth and development

III. PROPOSED SYSTEM

All To solve these problems, we are working on that automates the process of Temperature Check-ups by using Facial Land marking & Contactless IR Temperature Sensor and Mask Detection using Deep Learning Neural Network by using:-

a. Arduino Module
b. IR Temperature Sensor
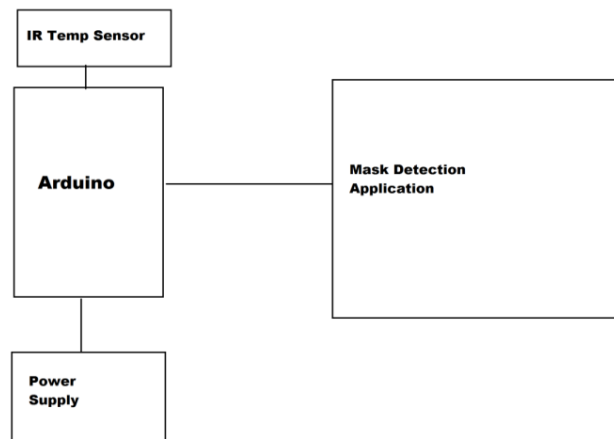c. Power Supply
d. Jumper Cables

Fig.1 A sample design

This system not only detects human temperature but also scans persons wearing face mask or not. When a passer without wearing face mask is approaching to the camera sensor, display shows the body temperature and sounds "ATTENTION, MASK NOT DETECTED" warning to remind the person detected at the same time. Of course the setting of "Wearing mask or not " can be based on officer's preference to make an adjustment. If a potential person is close to fever temperature and exceeds the specific temperature is detected, camera will make a quick response and will sound "WARNING, TEMPERATURE OUT OF RANGE" to inform officer by alarm message.

Moreover, there is another powerful function cooperating with body temperature detection, "Face Recognition with wearing face mask". Through the wide angle of lens, face captured by the camera will be instantly processing face matching with internal database. Whether wearing face mask, camera can still recognize to identify the personnel identities.

A. Modules:-

- Face Detection: - Face detection applications use algorithms and ML to find human faces within larger images, which often incorporate other non-face objects such as landscapes, buildings and other human body parts like feet or hands. Face detection algorithms typically start by searching for human eyes -- one of the easiest features to detect. The algorithm might then attempt to detect eyebrows, the mouth, nose, nostrils and the iris. Once the algorithm concludes that it has found a facial region, it applies additional tests to confirm that it has, in fact, detected a face.

- Mask Detection: - Face Mask Detection uses existing CCTV cameras to look for the faces and detect people without masks. Using an AI network, it can recognize if the person is not wearing a mask.The Face Mask Detection System can be used at office premises to detect if employees are maintaining safety standards at work. It monitors employees without masks and sends them a reminder to wear a mask.

- IR Temperature Sensor: - Thermopile **IR Temperature Sensors** Thermopile **sensors** are designed to measure **temperature** from a distance by detecting an object's **infrared** (**IR**) energy. The higher the **temperature**, the more **IR** energy is emitted. The **thermopile sensing** element, composed of small thermocouples on a silicon chip, absorb the energy and produce an output signal.

IV. CONCLUSION

According to the achieved results, the proposed solution is usable for its purpose under certain performance limitations (such as number of processed frames or measurements per second). Moreover, it relies on both open hardware and free

software, being definite and desirable advantage for such systems. In future, it is planned to experiment with various deep learning and computer vision frameworks for object detection on Computer 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 coronavirus indoors, especially during summer. Finally, the ultimate goal is to integrate the system presented in this paper with our framework for efficient resource planning during pandemic crisis in order to enable efficient security personnel scheduling and mask allocation, together with risk assessment based on statistics about respecting the safety guidelines.

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