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IoT& Artificial Intelligence for Mask Detection & Non-Contact Temperature Checkups

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Abstract:
People have been aware of various infectious illnesses on our planet since ancient times. However, as is happening in our society, new diseases from unidentified sources may develop. The hazardous Coronavirus is being disseminated over the world, which causes problems. Additionally, the fact that so many fatalities are being reported every day caused many to fear contracting the Coronavirus. By enacting various rules that the populace must follow, the government aims to reduce the number of infection cases. The most crucial of these rules mandates wearing a face mask when outside and avoiding contact with people if you have any COVID-19 symptoms, such as a high body temperature, and places you under minimum 14-day home quarantine. But some individuals do not follow the two established laws. From this perspective, "Mask Detection & Non-Contact Temperature Checkup Using IoT" was born. This endeavour aims to keep those who break the law under control. The camera functions to find the face mask, gauge its temperature, and then communicate the offender's picture and information to the responsible party. This venture relies heavily on the Internet of things and Artificial Intelligence.

Keywords: *Temperature, Mask Detection, COVID-19,IoT& A.I.*

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I. Introduction

The world economy was put under strain as a result of the lockdown. As a result, the authorities relaxed the lockdown. The WHO has declared that possible speech must be avoided by keeping a safe distance and wearing a mask. After resting, the government requires the most social space and mask-wearing by the people. However, many individuals leave without a face mask, which may contribute to the spread of covid-19.The International Health Organization has said that until vaccinations are developed, masks and social isolation are critical measures for limiting viral spread. As a result, requiring individuals to wear masks in public settings is vital. It is difficult to detect and warn those not wearing face masks in heavily crowded areas. As a result, we are employing image processing algorithms to distinguish between those who are and are not wearing face masks. Images from the camera are captured in real-time and analyzed on the Raspberry Pi embedded development kit. The real-time pictures from the camera are compared to the training dataset to determine whether or not a mask is worn.As the Coronavirus spreads quickly over the world and has resulted in several fatalities and critical cases, it has become tough to manage. In this Project, we're creating a kiosk with a face mask detector and a thermometer. This Project features a camera that can identify a face mask, measure the temperature, and be used in any public space. The sensor detects the passing person's temperature as the gadget reads persons passing by with or without masks, snaps pictures of those who don't, and reports on them. If the temperature is high, a message with the person's photo will be sent to the admin. We will use the OpenCV and TensorFlow code to detect the mask and IR NON-CONTACT TEMPERATURE SENSOR to check the temperature.

II. Literature Review

The unique Coronavirus-caused COVID-19 pandemic has been steadily spreading over the world as of late. Nearly all development sectors have felt the effects of COVID-19, and a crisis is afflicting the healthcare system. Wearing a mask is one of several preventative methods that have been implemented to stop the spread of this illness. In this research, we propose a method that limits the spread of COVID-19 by identifying individuals in an intelligent city network where all public spaces are watched by Closed-Circuit Television (CCTV) cameras and identifying them as not wearing any facial masks. When a person not wearing a mask is specified, the matching.

The city network informs the relevant authorities. A collection of photos of people wearing and not wearing masks that were gathered from multiple sources was used to train a deep learning architecture. The

introduced architecture distinguished between persons wearing facial masks and those wearing none with 98.7% accuracy for never-before-seen test data. Our research might potentially help many nations worldwide by limiting the spread of this contagious disease. [1] The Face Mask Detection Platform uses Artificial Network to determine whether a user is wearing a mask. The software may be linked to any I.P. mask detection camera to identify persons without covers, old or new.Users of the app may also enter names and phone numbers to receive alerts if someone is not hiding behind a mask. The administrator can issue a signal if the camera records an unidentified face. [2]

On August 18, 2020, Taipei, Taiwan IBASE Technology Inc. (TPEx: 8050), a top supplier of embedded computers and digital signage systems, is happy to announce the release of the VINO2100, an intelligent face mask and body temperature measurement system powered by Intel® OpenVINO-based iVINO A.I. recognition software. The ongoing COVID-19 pandemic provides numerous persons with real-time automatic face mask identification and precise body temperature measurement. [3]

Nearly immediately after the COVID-19 outbreak began, the public started to shame those who did not use face masks. China's provinces and municipalities began requiring wearing masks in public in February. Soon after, news accounts of locals and police reprimanding the disobedient appeared; this practice is now widespread worldwide. We realized how crucial it is to use a mask to stop the COVID-19 virus, SARS-CoV-2, from spreading. But we wanted to create a computer program that could analyze photographs and determine whether individuals are wearing masks rather than relying on the general population to keep an eye on one another.

Mask requirements exist in 34 states and the District of Columbia for outdoor and interior public areas. However, compliance varies based on various circumstances, including personal politics and an individual's financial ability to acquire masks. Even if they can afford to follow the mandates, people who defy the directives generally get away with it. Only a few reports—from Nevada, Louisiana, and Indiana—indicate that law enforcement intervened to arrest people inside private establishments without masks. Noncompliance might result in others in the workplace becoming sick for organizations that have workers returning to indoor facilities. Ultimately, it might be a huge cost for a company if there is an epidemic because someone was asymptomatic and neglected to act.

Deborah Raji, a fellow at New York University's A.I. Now Institute, believes that face data is as valuable as fingerprint data. Those who have reservations about face recognition worry whether mask recognition software has a place in today's society, no matter how well-intentioned. Mask recognition software, according to developers, avoids privacy concerns since the algorithms do not truly identify persons. Such software is trained on two sets of images: one to teach the algorithm how to recognize a face ("face detection") and another to figure out how to recognize a mask on a face ("mask recognition") ("mask recognition"). Companies that have created mask recognition software indicate that they hope to apply this technology in various ways to benefit the public.

Objectives:

- To Ensure That People May Live Safely.
- Decreasing The Prevalence Of Viruses And Illnesses.
- Decrease Mortality

Solution for solving the problem:

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 Checkups and Masks mandatory for Schools, Colleges, Offices, and other Workplaces. Currently, Temperature Check-ups are done manually using Contactless Thermometer. Manual Checkups can be Inefficient, Impractical (in places with a large footfall), and Risky. To solve these problems, we are designing a Kiosk that automates the process of Temperature Checkup by using Facial Land marking & Contactless I.R. Temperature Sensor and Mask Detection using a Deep Learning Neural Network.

This Kiosk is not limited to Schools, Colleges, Offices, and other Workplaces but can also be used in High-Risk Areas like Hospitals. This Device can also be used at Train Stations, Bus Stops, Airports, etc.Our approach for this Project is to build an efficient Setup process such that anybody without any Prior Experience in Computer Vision or Deep Learning can use this. This will be a fully functioning and ready-to-use Project. We are making this Project highly customizable by adding code files for every stand-alone part and the full version. Using Amazon AWS Credit, we can train our Deep Learning Model for Mask Detection with Good Compute Power using AWS EC2 Instance.

Innovation significance

- Determine the percentage of persons who do not wear the mask.
- To take a quick and easy temperature reading.
- It is an early warning system for those at risk of dying due to high temperatures and virus infection.
- To lower the number of deaths among those who have a high fever but are unaware of it.

Face Cover Recognition Algorithm

Step 1: Launch the software.
Step 2: The input picture is fed.
Step 3: Load mask training weights from the disk.
Step 4: The object identification algorithm detects people wearing and not wearing face masks.
Step 5: Following detection, the resultant image and the number of people
Step 6: The ratio of with and without face masks is computed.
Step 7: The LED and buzzer attached to the Raspberry Pi will be based on the status output.
Step 8: Save the resulting image
Step 8: Print.

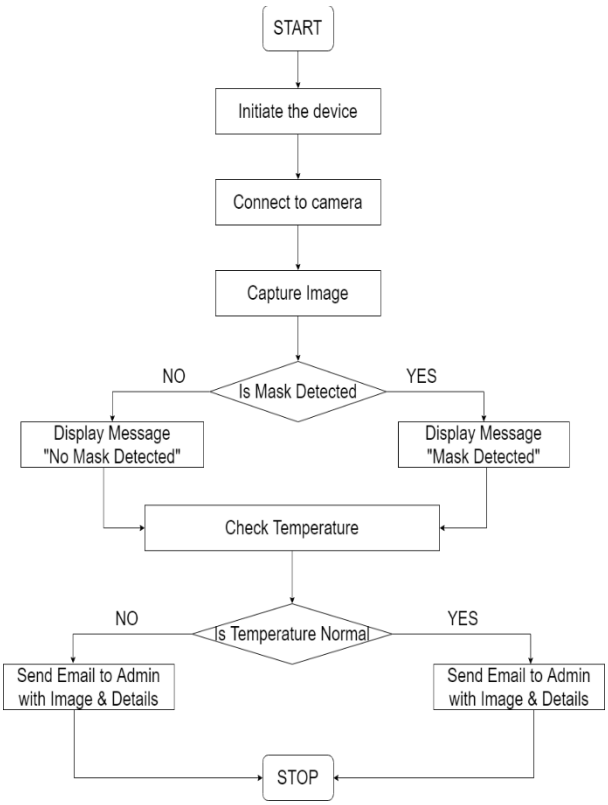
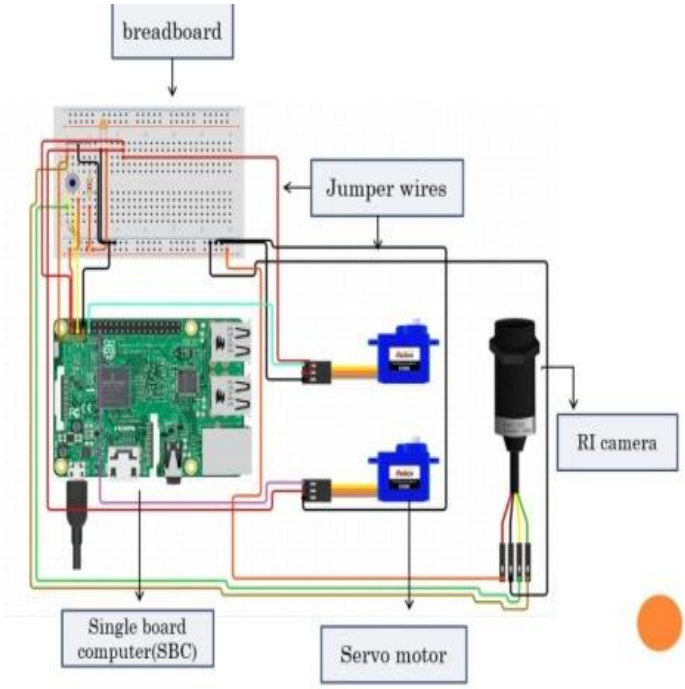


Fig: Flow Chart

Circuit Diagram



III. Conclusion

We utilized detect face masks in this study. The individuals with and without face masks who worked efficiently and used IOT to send an alert message to authorities It'spicture performance is excellent, and our detection findings were likewise outstanding. That is pretty good. This detection may also be applied to video streams, camera feeds, and inputs. Higher-end Raspberry Pi models provide more excellent performance and speed. A RAM variation of 4 G.B. or 8 G.B. can be employed to accomplish the detection. Algorithm. The Project's future development will include a person's identity and issue an alert message to the individual's mobile phone who was not wearing a face mask.Future research will entail increasing the accuracy of these processes, combining different characteristics to improve performance, and creating a mobile app with a user-friendly interface for monitoring. Consequently, authorities will be able to take rapid action following pandemic safety guidelines.

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