AUTOMATED ANALYSIS OF FACE MASK & BODY TEMPERATURE DETECTION

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ABSTRACT

The COVID-19 epidemic has prompted governments throughout the world to block the transfer of viruses. This caused all economic activities to shut down and output in factories were suspended in most industries. While production needs to be resumed in emergency, the security of the work force at the facility needs to be increased even more. Reports show that keeping social distance and using face masks at work decreases the chance of transmission significantly. Research investigations suggest that 91% and 68% of N95 operating masks are efficient in stopping viral transmission. Using these masks efficiently disrupts airborne viruses, which prevents them from reaching the respiratory system of a human being and is cost-effective in reducing deaths and breathing problems. However, facing masks have usually been decreased in the public because of insufficient usage of facemasks in preventing the transmission of illness. A smart system to control if a face mask is present and the temperature should be below 97°F (36.1°C) to 99°F (37.2°C) is needed. It is important to create this system. This project exhibits how the face mask and temperature detection analysis is automated, without human involvement. We created an algorithm to identify people from a live video stream. We also offer an infrared sensor that can measure the temperature from a distance of 3-6 inches for temperature detection. Prevention of the pandemic begins right here in a new contemporary and technical method.

This work uses profound teaching approaches to build a classifier to train itself from the pictures of a person with a face mask and a person without a face mask. The CNRs offer us with the method to derive the characteristics from the provided data. The software utilized is OpenCV library, a Python programming language tensor flow. The software is implemented by a controlled Raspberry Pi controller. Raspberry Pi is utilized on this system to provide mobility to our system (smartly known as the credit card computer). The camera is interfaced with one of Raspberry Pi's existing camera ports. These hardware components are economical, compact in size and have adequate computing strength for applications. Our research outlines how to use AI/ML to build a safe environment in this pandemic crisis in an effective and financial manner. Our technique is demonstrated with a modern-day deeper learning blends and a traditional likely projective for a strong face mask and temperature detection system.

1. INTRODUCTION

1.1 Introduction

The COVID-19 corona virus epidemic has been

affecting everyone worldwide. It paralyzed the worldwide economic progress of the nation. Corona virus 2019 (COVID-19) is a new respiratory illness due to the corona virus 2 or SARS-CoV2 acute breathing syndrome. By 10 June 2020, almost 8 million sick individuals were infected with the virus, and half a million perished. For combating the virus, the World Health Organization (WHO) establishes enforced procedures such as obligatory face mask wear, rigorous social distance control in public spaces and regular hand washing or hand sanitizing by disinfectants. Studies have found that it is necessary to use facemasks to inhibit viral propagation. Research investigations suggest that 91% and 68% of N95 operating masks are efficient in stopping viral transmission. The use of these masks successfully disturbs airborne viruses, preventing these diseases from reaching the respiratory system of humans, and is a cost-effective means of mitigating deaths and breathing disorders. However, facing masks have usually been decreased in the public because of insufficient usage of facemasks in preventing the transmission of illness. Automatic detection for face masking should be developed to give personal protection and prevent the local pandemic.

This work applies in-depth learning approaches to build a classifiers to gather photos of a person wearing a facial mask rather than a database and distinguish between these facing wearing and non-face wearing classes. A rigorous technique for the extraction of functions from unprocessed data was presented by the artificial neural network. This paper proposes the development of the Face Masking Classifier by a coevolutionary neural network and the influence on prediction accuracy of the number of the coevolutionary neural layer. This project is carried out on a Raspberry Pi utilizing the programming language OpenCV, TensorFlow and Python.

One of the symptoms of the new COVID-19 is likewise high temperature. We have created an application to assess the temperature of the human body through the palm or front of the patient. The model with a threshold of 97oF (36.1oC) to 99oF (37.2oC) is defined. Our research presents an efficient and cost-effective method of applying AI/ML to build a safe production environment. With a blend of current profound study and classical projective geometry, we illustrate our method to building a robust facemask and algorithm for temperature detection.

1.2 PROBLEM DEFINITION

The COVID-19 epidemic pushed governments throughout the world to lock down viruses. This led to the closure of all economic activities and therefore the production in production facilities in most industries was stopped. Although production must be resumed urgently, the safety of the employees at the facility must be made even more necessary. Reports show that keeping social distance and using face masks at work decreases the chance of transmission significantly. Research investigations suggest that 91% and 68% of N95 operating masks are efficient in stopping viral transmission. Using these masks efficiently disrupts airborne viruses, which prevents them from reaching the respiratory system of a human being and is cost-effective in reducing deaths and breathing problems because of these facts, governments have taken numerous safeguards to reduce the spread of the disease, such as compulsory indoor mask wear, social distancing, quarantine, self-isolation and restriction on

citizens' movements in and out, often with a ban and withdrawal of massive public events and events. While the pandemic at several periods appeared weaker, most safety precautions continue to be enforced owing to instability. From corporate to social, athletic and entertainment relationships, corona virus. There is a greater risk that a person might carry the disease and become a local host to the fatal virus when his body temperature is manually monitored and when the temperature exceeds the specified threshold.

2. LITERATURE SURVEY

Case 1:

It proposes a system that restricts the growth of COVID-19 by identifying individuals who don't wear face masks on a smart urban network, where all public places are monitored by Closed Circuit Television (CCTV) cameras. In the IEEE International Conference 2020, IOT and Electronics and Mechatronics (IEMTRONICS). The appropriate authorities are alerted via the city network while a person without a mask is spotted.

This project does not have the temperature monitoring module. And Raspberry pi is not implemented. IEEE International Conference on IOT, Electronics and Mechatronics (IEMTRONICS) is an unportable project, and lacks the speech output functionality.

Case 2: This project offers a method that produces precise masks for segmentation from any image of arbitrary size. The technique utilizes the VGG predefined training weights - 16 Architecture for extracting features, starting with an RGB picture of any size. Training is carried out through Fully Convolute Networks to partition the face of the picture semantically.

For training, Gradient Descent is employed while Binomial Cross Entropy is used as a loss feature. In addition, the FCN output picture is processed in order to eliminate the unexpected noise and prevent any erroneous forecasts and to set a bounding box around the faces.

There is no temperature monitoring module for this project and there is also no real-time mask detection, i.e. from a video source. The project works not with video source but with pictures.

Case 3:

In the next portion of our study we have achieved that those who wear face masks or not are taught in face masks and non-facial mask imagery. This article was published by 2020 11th International Conference on Computing, Communications and Technology Networking (CCITC). Under experimental conditions, real time video data were detected, located and recognized.

Compared to the other two projects this project is provided with the temperature monitoring module, but lacks the real-time face and face mask detection module. Only pictures and not video sources are covered under the project. It's also not portable since no micro controller like raspberry pi is used. Furthermore, this project has no speech output. For examining whether people wear masks or not, physical contact is essential.

• Manual temperature screening can promote airborne air virus transmission, therefore facilitating Covid-19 diffusion. . It is a time-consuming to use portable IR sensors to detect each worker's temperature.

3. OVERVIEW OF THE SYSTEM

3.1 Existing system

In our best understanding, contact and respiratory droplets are the main cause of the virus. Airborne transmission may occur under certain circumstances. "Sure that you and the people around you are following proper respiratory hygiene," WHO advises us. This implies that when you cough or sneeze, you cover your mouth and nose with your elbow or tissue bent. Then remove the fabric and wash your hands promptly. Why? Spreading viral droplets. You protect those around you from viruses such as cold, flu and COVID-19 by practicing proper respiratory hygiene.

The current system consists, according to the study, of manual analyses of persons like:

• The body temperature is checked using an infrared thermometer at malls, restaurants and other leisure venues.

• Employees in different sections of a certain organization monitor whether or not a person wears a mask. •

3.2 Proposed System

Given the COVID-19 setting, we have focused our attention on creating characteristics that decrease the likelihood of viral transmission. Research showed that the maintenance and use of face masks were effective ways to reduce this risk and social distance between colleagues is important to prevent spread of virus. The key approach in this project is to automate the situation in which the employees are verified manually. Also in the model layer of the solution is the face mask monitoring module. Once a worker who does not wear a mask is recognized, a warning is triggered again. This module takes single frames and is considered to be static pictures. The pictures are processed in two steps: Face and Classification. The photographs are processed. In this project, the other module detects a person's temperature. If the temperature of a person is greater than usual, alert the individual to becoming a host of the virus.

The proposed approach is the most effective technique to overcome the present system.

• Temperature sensor without contact. Prevents the situation of the airborne.

• Masks automatically detected. Manual screening prevention.

4. RESULTS

Fig. 4.1: Advanced IP Scanner

Fig. 4.2: VNC Viewer

Fig. 4.3: Front View

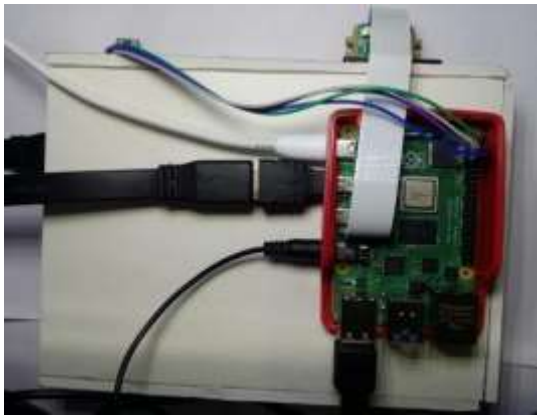

Fig. 4.4: Back View

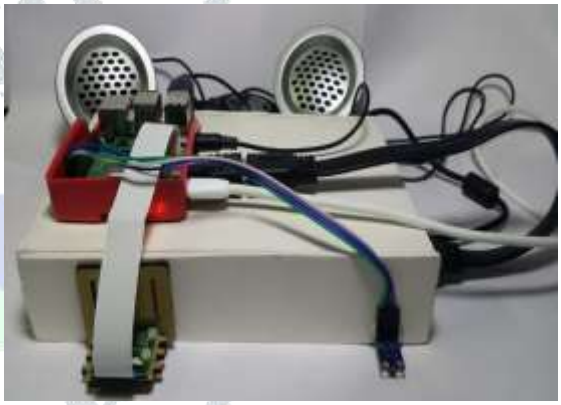

Fig. 4.5: Lateral View

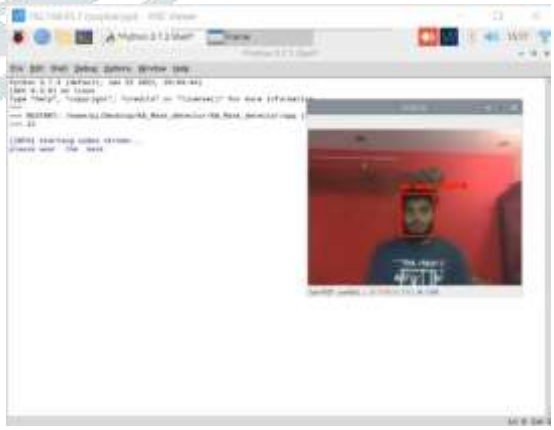

Fig. 4.6: No mask detected

Fig. 4.7: Mask and Body Temperature detected

5. CONCLUSION

A system is built to automatically identify whether the person is wearing a face mask or not and checking the body temperature which is a preventive step of COVID-19. The effort has been motivated by those who break the regulations required to halt the spread of corona virus. The system has a mask-detection architecture in which the mask on the face is detected with a deep learning algorithm. In addition to the Temperature Monitoring module with the IR temperature sensor, the project comprises the functionality not found in the prior literature. It also includes a speech output function that is again an advantage to individuals with vision impairment.

This project is carried out with Raspberry pi, which is also known as a credit card size computer in order to accomplish the portability feature. The project requires a good lightning condition that is even more dependable and precise, so that other sensors described above may be further improved.

6. FUTURE ENHANCEMENT

In addition to these new characteristics, few negatives can be addressed by the future impact of the project. In future, few additional features, including two main modules, will be included into the present project. One is to add an intelligent lock to the project, which will operate if the mask is detected and the temperature is below the threshold limit, then the user can enter any premises and the door is automatically unlocked. And if any of the detection is wrong, the door stays locked.

A sanitizer sprayer through the entrance, which sprinkles the sanitizer spray when a human goes through the door may definitely be added to the other new feature. The existing method may also be supplemented by another module for the physical distancing which measures the distance of two individuals according to the WHO guidelines.

By adding: The present project can be further reliable:

- An improved light source for low light facial detection.
- An ultrasonic sensor to determine if

your hand is close to the IR sensor.

- A camera for a night vision in low light to detect the face and facing.

A more reliable facial scan iris scanner.

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