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Realtime Face Mask Detection

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ABSTRACT: -

The COVID-19 epidemic has quickly impacted our daily lives by disrupting trade and the movement of the earth. Wearing a protective face mask has become a new daily trend in humanity. In the coming days, more and more public service providers will be asking customers to wear the mask properly to access their services. Therefore, the discovery of a face mask has become an important task of helping the world. This paper introduces a simplified way to achieve this goal using basic machine learning packages such as TensorFlow, Keras, and OpenCV. The proposed method detects the face of your monitoring device's camera properly and detects whether a person is wearing his or her mask. The solution has two different databases to consider, which provide better and more accurate results.

Key-Words: - Covid, ML

Introduction

According to the official World Health Organization (WHO) Situation Report - 205, coronavirus 2019 (COVID-19) has infected more than 20 million people worldwide and caused more than 0.7 million deaths. People with COVID-19 had a number of reported symptoms - ranging from mild appearance to serious illness.

Coronaviruses are a large family of viruses known to cause colds from serious illnesses such as Middle East Respiratory Syndrome (MERS) and Server Acute Respiratory Syndrome (SARS).
The novel coronavirus (COVID-19) was discovered in 2019 in Wuhan, China. This is a new coronavirus that has never been identified in humans. This study provides a common introduction to COVID-19 and emerging respiratory infections and is intended for public health professionals, event managers and staff working for the United Nations, international organizations and NGOs.

Finding a face mask involves finding the surface of the face and finding out whether it has a mask on it or not.
Face mask detection detects a real-time image of a person using a system camera and detects results. Face identification is associated with the division of a particular business group namely Face. It has many applications, such as
social services such as school, colleges and supermarkets, investing in the campuses of various companies. This paper introduces a simplified way to achieve the above goal using basic Machine Learning (ML) packages such as TensorFlow, Keras, and OpenCV.

Problem Formulation

The massive deterioration that has been recognized worldwide as a result of the COVID-19 epidemic has been devastating and has resulted in significant loss of property and health. The epidemic was abrupt and the people and governments could not prepare in advance to reduce the effects of the epidemic. This virus is very lethal and causes many injuries that can be prevented with effective preventive measures.

The use of the mask therefore allows for effective prevention and continuous spread of the virus which can be a key ingredient in stopping infections in their pathways. To ensure that the mask rule is followed there needs to be an automated method that can provide a more accurate and accurate system for obtaining a mask by processing the image and thus the detection of a face mask starts to work here. A person should examine his face with a camera that checks whether he is wearing a mask or not.

Thus the proposed model has the following objectives: -

- Enforcing the right to wear a mask in public places follows the COVID-19 epidemic.
- Effectively provide a working model to obtain an accurate mask.
- Using imaging techniques to detect the presence of facial masks.

● Developing an effective computer-based system that focuses on automatic real-time monitoring of people to find a face mask in public places.

Solution Proposed:-

The app usually solves a problem based on the mask, whether people use their mask in a crowded environment or not. It can be used by various organizations to uphold the principles used by the government during this time of violence.

This app can be used to find people who do not follow the rules and can also be used as a step to take strong action between them. Applying it at the intersection of various sectors of society can help to find people without wearing a mask.

Provides red box output where the mask can be found and provides green box output, if the mask is detected.

Fig.1 shows a diagram of the data flow modelFig.1 shows the Data Flow diagram of the model

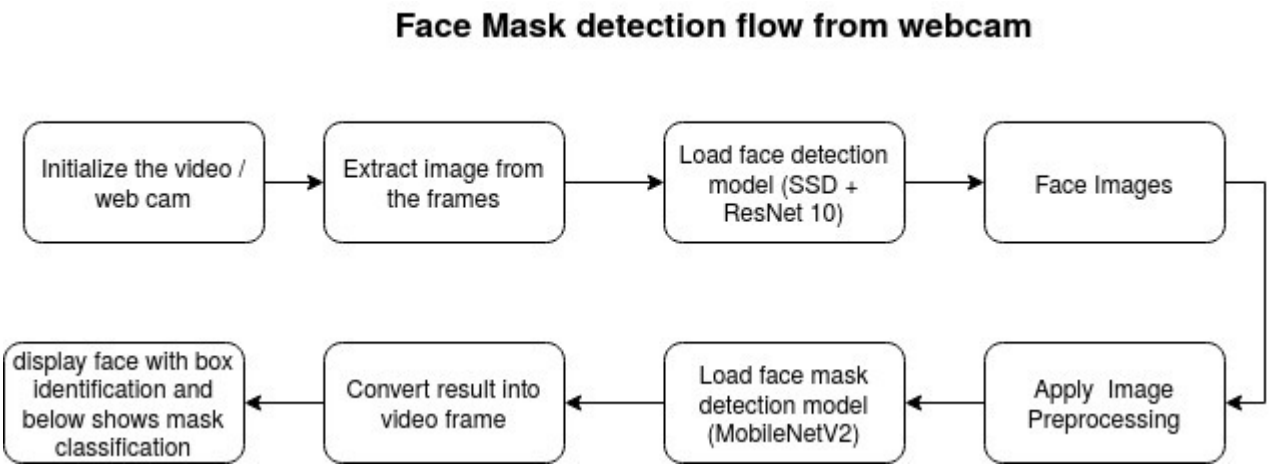

Figure 1 Data flow diagram

Fig.2 show the different phases of the model and training.

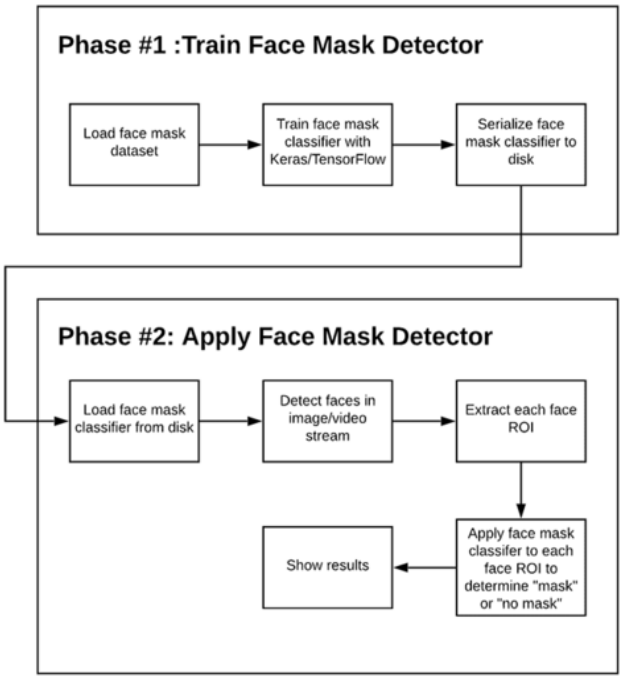

Figure 2 Phases of the model

Fig.3 show the use case diagram from user as well as from software end.

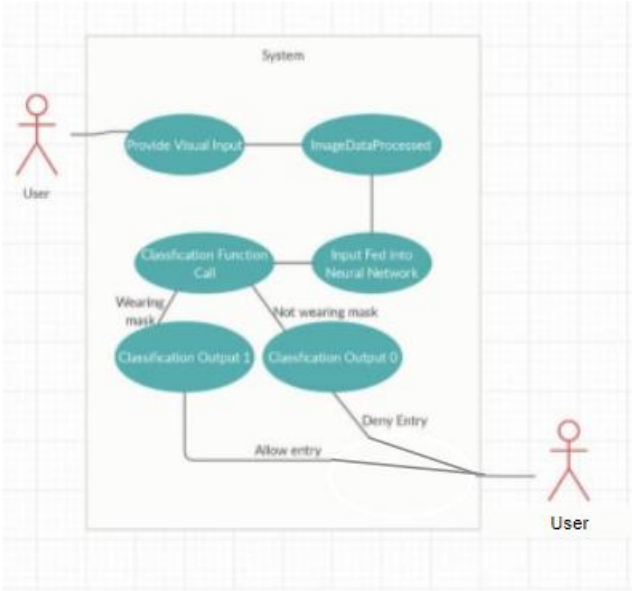

Figure 3 Use Case diagram

Literature Review

On the way to find the face, the face is found in a picture that has a few features in it. According to, facial recognition research requires attention to speech, facial monitoring, and posture measurement. Given the picture alone, the challenge is to see the face in the picture. Face detection is a difficult task because the face changes size, shape, color, etc. and does not change. It becomes a difficult task of blurring an image blocked by something other than the camera, and so on. Authors who think that the discovery of a blurred face come with two major challenges: 1) the unavailability of large databases containing both the covered face and the uncovered face.2) the removal of the face from the covered area. Using a locally linear embedding (LLE) algorithm and dictionaries trained in a large pool of covered face, compact land surface, a few lost expressions can be corrected and the height of facial expressions can be significantly reduced. According to a report reported on, convolutional neural network (CNNs) in computer vision comes with a strong barrier to image size. A common practice is to rearrange images before uploading them to the network to bypass the block.

Here's a great challenge for you to find the face from the photo correctly and indicate if you have a mask on it or not. In order to perform surveillance tasks, the proposed route should also see a face and a moving mask.
Face detection is defined as a process with many applications such as face tracking, position measurement or compression. Face detection is a two-stage problem where we have to decide whether or not a face is in the picture. This approach can be seen as a simplified face recognition problem.

AdaBoost: Adaboost is an algorithm for building a strong classifier as a combination of lines. Adaboost, short for Adaptive Boosting, is a machine learning algorithm. The meta-algorithm can also be used in conjunction with other learning algorithms to improve its performance. Adaboost adapts to the situation in the sense that subsequent classified dividers are modified to suit those conditions that were incorrectly set by previous dividers. Adaboost produces and calls for a new weak separator for each cycle series. For a collection of training photos. This method can be used for both face detection and facial areas. In this way, a standard face (like the front one) can be used. The advantages of this method are that it is very easy to use the algorithm, and it is easy to specify the areas of the face such as the nose, eyes, mouth, etc. based on the contact values.

Methodology

The proposed method consists of a cascade section and a pre-trained CNN consisting of two 2D layers connected to dense neurons. The algorithm for getting a face mask is as follows: Finding a face mask
A. Data Processing
Pre-data processing involves converting data from a specific format to an easy-to-use, desirable and highly logical format. It can be in any form like tables, pictures, videos, graphs, etc. This structured information is consistent with the information model or structure and captures relationships between different organizations. The proposed method deals with image and video data using OpenCV.

We use the function cv2.cvtColor (input_image, flag) to change the color space. Here the flag determines the type of conversion. In this case, the flag cv2.COLOR_BGR2GRAY is used for gray conversion.
Deep CNNs require an image that incorporates static size. We therefore need a standard default size of all images in the database. Using cv2.resize () the gray scale image is resized to 100 x 100.
Image reshaping
The input time for image capture is a three-dimensional tensor, where each channel has a unique pixel. All images must be the same size as the 3D feature tensor. However, no images are traditionally integrated or their tensors are compatible. Most CNNs can only accept well-executed images. This creates few problems with data collection and model usage. However, resetting the input images before adding them to the network can help bypassing this restriction.
Images are usually made to change the pixel width between 0 and 1. They are then converted to dimensional 4 using data = np.reshape (data, (data.shape [0], img_size, img_size, 1)) where 1 shows a gray image. As such, the last layer of the neural network has 2 effects - with a mask and without a mask that is categorized, the data is converted to category labels.

Result Discussions

The model produces the result based on image processing, image processing occurs on the basis of a given database. Each data set contains two types of data, with mask images and no mask images. Using the camera face is recorded and the appropriate result is achieved. If the person wearing the mask gives you a green box with an outgoing mask, and if the mask is not presented then it shows a red box with an outgoing mask.

Conclusion

In this epidemic situation, where the whole world dreams of returning to normalcy, the program will play an effective role in monitoring the use of masks in the workplace. With the development of this system, we can see the mask on a person's face and allow his or her entry into the workplace. The program also contributes to public health care, as it helps to keep the environment healthy. This system can be used effectively in public places with integrated application systems at airports, train stations, offices, schools and public places to ensure that public safety guidelines are followed.

- Active photography.
- Effective data set training with CNN.
- Successful masking of face mask.
- Maintain an alert attitude.

In addition, the project can also be used on mobile devices that can be stored as the future scope of the project. As soon as the project works the camera will work, it will monitor whether a person wears a mask or not on the basis of an algorithm as long as it will scan the face and produce the result. If the mask is present it will display a green box with an existing message mask otherwise the box will be red with the message mask missing.

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