Real Time Face-Mask Detection System

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UNDER THE SUPERVISION OF-DR MEDHAVI MALIK

Abstract

The COVID-19 pandemic has disrupted international trade and flows, and wearing a protective face mask has become the norm. In the future, many utility providers may require their customers to wear face masks to use their services. Therefore, the quest for facial recognition has become an important task to help the world. This article provides a simple way to do this using some machine learning packages like TensorFlow, Keras, OpenCV, and Scikit-Learn. The proposed method can identify human faces from images and then tell if there is a mask on it. As an observer, it can also capture the faces and masks of people in motion. We use the Sequential convolutional neural network model to search for the best parameters to accurately detect masks without any problems.

Keywords: deep learning, computer vision, OpenCV, TensorFlow, Keras.

INTRODUCTION

The COVID-19 pandemic caused by the COVID19 virus has affected more than 20 million people worldwide and killed more than 700,000 people, according to the World Health Organization situation - 205. COVID19 patients have reported symptoms ranging from mild to severe, including respiratory problems such as shortness of breath or shortness of breath. The COVID19 virus can have serious consequences for older people with lung disease, as they are considered to be at higher risk. Wearing a mask is important to prevent respiratory illnesses such as COVID-19.

Facial recognition models have been developed using features near edges, lines, and centers. These techniques are successful with grayscale images and require a low budget. However, deep learning techniques have been more successful in recent years. The proposed method in this research uses deep learning techniques to accurately detect masks on human faces.

LITERATURE SURVEY

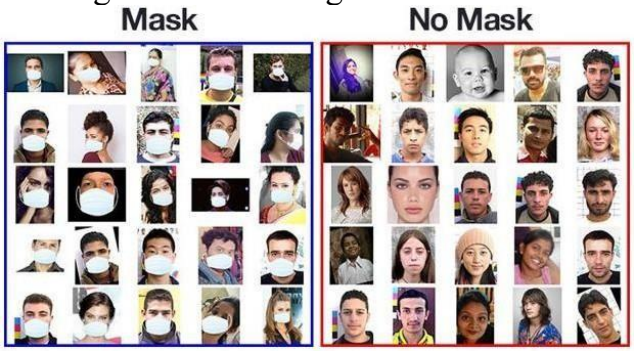
Previous research has proposed various techniques to detect objects, including facial recognition. AdaBoost is a regression-based classifier that fits a regression function to the original dataset, although some misclassified objects are modified during backpropagation to improve the result. The Viola Jones Detector provides a real-time product model that can be used to identify various product distributions. Harr-like features are like folds and are used to determine if something is up in an image. However, these techniques may not be accurate in some cases, such as when the image brightness changes or when the image is rotated.

Convolutional networks are often used to solve classification problems. Malathi, J's research mainly focuses on the detection of fake images. Patelet et al. developed a model to determine iron ore grade by extracting properties from mineral materials. Satapathy, Sandeep Kumar and colleagues developed a model for controlling arrest warrants, and Pathaket has developed several biometric authentication systems that work well in low light conditions.

WORKING

This research uses machine learning algorithm and MobileNetv2[5] image classification to recognize facial expressions.
MobileNetV2 is a performance and efficiency-enhancing technology based on Google's Convolutional Neural Network (CNN).

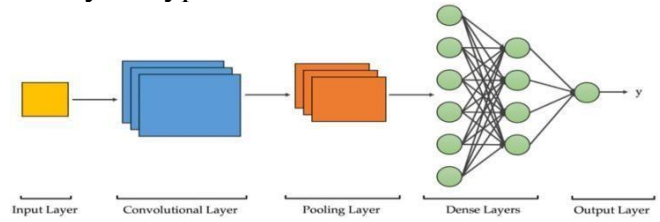
Data Collection
Data collection is the first step in creating a face mask template. This database collects information about people who wear and do not wear masks. The model will distinguish between wearing and not wearing a mask.



Pre-processing

The first step happens before the training and test data. Preprocessing consists of four steps: downscaling the image, converting the image to an array, preprocessing the input with MobileNetV2, and one-time encoding of the text. Image scaling is an important first step in computer vision because of the effectiveness of training models. The model gives better results if the image is smaller.

The next step is to create a sequence from all the images in the dataset.
The image is converted to an array for the loop function to call it. These images will then be used to advance strategies using MobileNetV2. The last step at this stage is encoding the text, as many machine learning algorithms cannot work directly on typed data.



Building the Model

The next step is to construct the model. Building of the training image generator for augmentation, the basic model with MobileNetV2, adding model parameters, compiling the model, training the model, and storing the model for future prediction are the six processes in generating the model.

Implementing the model

The model used in the photo. Read the video frame by frame, then use the face detection algorithm. If a face is found, the program moves to the next level. It looks like there are faces to repeat with MobileNetV2, including before strategy and exporting to an array.

The next step is to approximate the input data as a registered pattern.
Use the design to guess the finished image. In addition, whether the person is wearing a mask will be labeled in the video frames and the percentage will be estimated.

Result and Discussion

The model was trained, validated and tested on a dataset of 1915 masked and 1918 unmasked images. The system achieves a high accuracy of 99.77%, showing that this best-in-class performance reduces the amount of errors.

MaxPooling[6] is one of the main reasons for this step. It also reduces the number of examples to learn while adding a simple interpretation of the variable to the internal representation.
The system can identify some unseen faces with high accuracy by face, hair or hands. It measures the degree of obstruction in four areas: nose, mouth, chin, and eyes to distinguish between mask and face closure with hands. Therefore, a mask that covers the entire face (including the nose and chin) is only considered "masked" by the standard.

CONCLUSION AND FUTURE SCOPE

The system achieved a reasonable level of accuracy using simple machine learning tools and simple methods. It can be used for many purposes.

Due to the Covid-19 situation, wearing a face mask will be mandatory in the future. Many government agencies will require their customers to wear masks to use their services. The method used will have a positive impact on public health.
After that, it will continue to be checked whether the person is wearing the mask correctly.

The model needs to be further developed to determine if the mask is infected, eg mask, N95 mask.

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