

A man with dark hair is wearing a white surgical-style face mask. He is wearing a dark grey hooded jacket over a white t-shirt. The background is a blurred city street. Overlaid on the image are green L-shaped corner brackets forming a rectangular box around the face and mask. To the right of the top-right corner of this box, the text 'Mask - 99.79%' is written in green. On the left side of the image, the text 'AI Internship Project' is written in a black, monospaced font. On the right side, 'Face Mask Detection' is written in the same font. At the bottom center, the authors' names 'by Cristian Teodorescu & Atharva Tripathi' are listed in a white, monospaced font.

AI Internship
Project

Mask - 99.79%

Face Mask
Detection

by Cristian Teodorescu & Atharva Tripathi

Project Description

Problem statement: What is the problem?

The problem is that the majority of the people now don't take virus outbreaks seriously and don't follow the strict protocols so this is the reason why we are creating this machine.

Pitch: Why should people buy or listen to the idea?

Tired of people not wearing a mask and increasing the spread of viruses? Well don't think about it again since we have created the Face Mask Detector!

Benefit: How will this benefit the AI community?

This will benefit the AI community a lot since people can use it for experimental reasons and can also be used for research. Another reason why it is useful and beneficial is because it is compatible with all devices, although it takes a few lines of code to set up, if you pre-make it, you're all good to go!

Tools & Technology Used

1. Python : The code is entirely written with python.
2. Google Colab : It is an online/open-source editor for python and many other programming languages.
3. Keras : Keras is an open-source software library that provides a Python interface for artificial neural networks. Keras acts as an interface for the Tensorflow library.
4. TensorFlow : TensorFlow is an open-source library developed by Google primarily for deep learning and machine learning applications.
5. Haar Cascade : Haar cascade is an algorithm that can detect objects in images regardless of their size. In our case, we trained the algorithm to detect masks on people's faces.

Data & Data Description

- There are two separate folders in the dataset:

- One for images with mask:

- This contains 1,915 images

- One for images without masks:

- This contains 1,918 images

The age of the people in these images vary anywhere from 10 to 70.

- Why is age important:

- It is important because someone at the age of 50 has a different facial structure than someone at age 12. This variety ensures that our model will be more accurate.

Methodology

Steps

1. **Importing Dependencies** : For this we imported tensorflow, keras, opencv, and numpy.

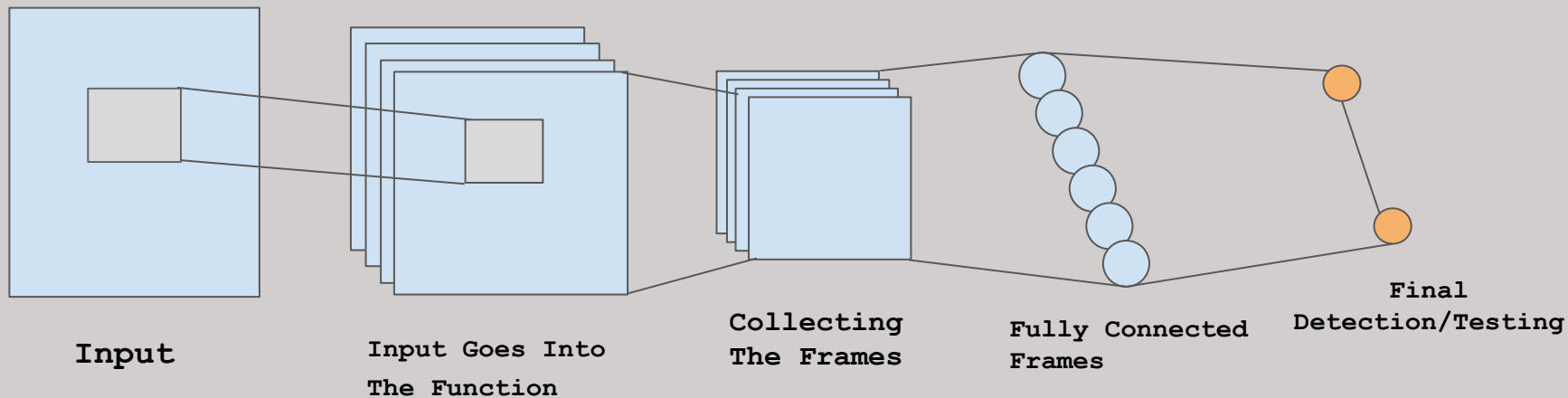
2. **Loading the model** : We first need to clone this github repo : https://github.com/misbah4064/face_mask_detection.git. We used this as a reference since it contains "haarcascade_frontalface_alt2.xml". The github repo also contains "mask_recog.h5", (the model that we used). Then we load the model.

3. **Making The Function** : We started by defining our function: `def mask_detector(frame):`. "frame", in this case, is the image that we are giving the function. After this, we converted the image color to grayscale. Then, we framed the faces of the people in the images.

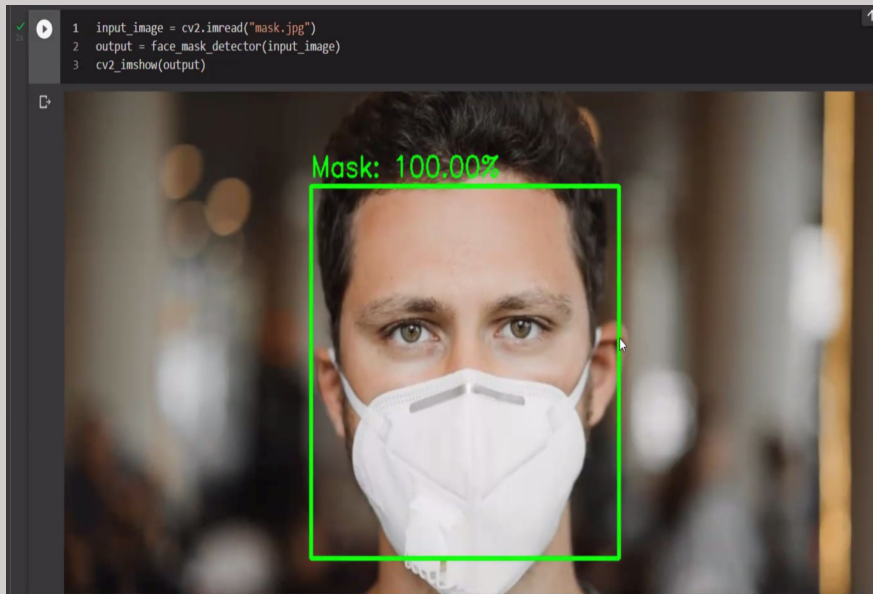
4. **Labeling The Images/Frames** : In this step, we will be labeling the frames. If the frame is green, the label will display "Mask". If the frame is red, the label will display "No Mask".

Running The Code: To run the code, all we have to do is to give an input and call the function. Then we press run and we are done.

Model Process



Results



Drawbacks & Areas of Development

As you could see from the results, the second image does not have a frame. The model sometimes does not detect the mask due to the poor/low quality of the image. As a part of our future work, we would like to make our mask detector real time.

A background image showing three surgeons in blue scrubs, masks, and hairnets, focused on a surgical procedure. The image is semi-transparent, allowing text to be overlaid.

Future Work

For future work, we would like to pitch our face mask detector to the medical industry. It is extremely important for surgeons to be wearing masks because if the bacteria from the surgeons breath gets into the patient, they could end up with an infection and then that might lead to death. That is why masks are very important in the medical field.