



Covid-19 Mask Detection Using Matlab Based Image Processing

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Abstract - As people across the globe are combating the widespread COVID-19 pandemic, it has become essential to develop new technologies to analyse and fight against the disease spread. The most essential protection against coronavirus is to wear Face Mask and as the day surpasses scientists and Doctors have recommended everyone to wear the mask. This paper aims to develop a real time application based on detection or sensing of wearing masks using a webcam. Features considered are detection of nose and mouth in a person image. If either the person's nose or mouth is not covered it intimates by saying "Please wear mask properly", if the person wears a mask his/her nose and mouth is covered properly it intimates by saying "Mask Present". There is also an another case if the person covers his/her nose and mouth using hand it just intimates by saying "remove hand"

Keywords— Mask detector, COVID, webcam, imageprocessing,

I. INTRODUCTION

Droplets generated when a covid-19 sufferer sneezes, coughs, or exhales spread the covid-19 virus from one person to another. Wearing face masks is one of the ways to avoid covid19. Many governments are attempting to educate residents about the importance of wearing masks in public areas, despite the fact that it is now necessary, but the majority of people are disobeying the rule. On the other hand, some governments have implemented equipment that detects people who are not wearing face masks and sends their information to enforcement teams, who would then apprehend them. In this research, we propose a model that detects the public without a facemask and uses that data to identify the individual who is not wearing the mask using a facial detection system, after which the data is connected with a public identity database to collect details about that person.

II. LITERATURE REVIEW

In[1] To distinguish the individuals wearing Face Mask, various identification procedures are available. Veils are prescribed as a straightforward obstruction to protect the respiratory beads from going into the air and onto others, when the individual is found to be wearing the cover hacks, wheezes, talks, or raises their voice.

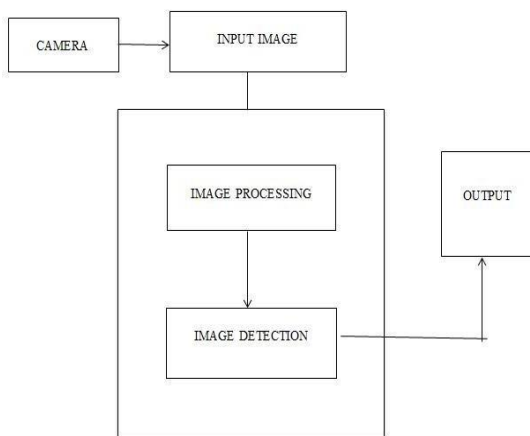
In[2] The model which detects the public without facemask and that data and identifies the person using facial detection system then that data is integrated with public identification database to collect details of that person and fine amount will send to his mobile number and address.

In[3] involves four steps for calculating distance from camera, eye line detection, and facial part detection as well as eye detection. This strategy is unique for the as a result, the problem has resulted in the creation of a method that is simpler in complexity. An examination of the performance of the algorithm on test video sequences provides useful information and new insights into how to improve masked face detection performance.

In[4] Mask-R-CNN with ResNet as the backbone is currently the most used method for real-time mask detection. While this method produces good detection results, it is computationally demanding, and its real-time face mask detection efficiency is not optimal. Our research presents a new strategy to mask detection by replacing Mask-R-CNN with a more efficient model "YOLO" to improve real-time mask detection processing speed without sacrificing accuracy. Furthermore, due of the tiny volume and significant imbalance of the mask detection datasets, we use simple CNAPs, a recent advancement in few-shot visual classification, to improve classification performance.

III. METHODOLOGY

A. Block Diagram:



B. Selection Headings

1. SIFT key points of objects are taken from a collection of reference pictures and saved in a database using the scale invariant feature transform. An item in a new picture is identified by comparing each feature in the new image to this database and discovering possible matching features based on the Euclidean distance between their feature vectors
2. Image Processing: It allows a much wider range of algorithms to be applied to the input image and can avoid problems such as the build-up of noise and distortion during processing.
3. Image detection: It is the process that the image and detects, the objects such as nose and mouth.
4. Webcam: Webcam software enables users to record a video or stream the video on the Internet. As video streaming over the Internet requires much bandwidth, such streams usually use compressed formats. The maximum resolution of a webcam is also lower than most handheld video cameras, as higher resolutions would be reduced during transmission.

The SIFT (Scale-invariant feature transform) method consists of the following steps: SIFT is a technique for recognising and defining local features in photographs.

Locate the important feature points on the face in the image (5 key points, for example, eyes, nose, mouth, and so on), which are used to define the facial posture and alignment.

By putting a snapshot in front of the camera, a traditional facial recognition system may be fooled. With the help of photographs, we are able to avoid

Algorithm:

- Ensure: camera enabled for the deployed application, frontally facing the camera.
- 1: Procedure LIVE VIDEO ANALYSIS (videostream)
- 2: basis principle
- 3: for (each frame) do
- 4: if (detected face) then
- 5: if (Not detected nose and mouth) then
- 6: display("Mask Present")
- 7: else
- 8: display("Please wear mask properly")
- 9: end if
- 10: else

- 11: if (“Either nose or mouth detected”) then
- 12: display(“Wear mask properly”)
- 13: display(“Please remove your hand”)
- 14: end if
- 15: end for
- 16: end procedure

c. MATLAB Software:

MATLAB is a programming platform which is specially designed to analysis, design system and products to obtain a required output mostly object oriented program such as C, C++, java is used as programming code.

It is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Script is a file that contains multiple sequential lines of MATLAB commands and function calls

F. Features of MATLAB:

Provides an interactive environment for iterative exploration, design and problem solving and vast library of mathematical functions for linear algebra, statistics, Fourier analysis, filtering, optimization, numerical integration and solving ordinary differential equations.

MATLAB's programming interface gives development tools for improving code quality maintainability and maximizing performance. It provides tools for building applications with custom graphical interfaces.

It has a rich library of mathematical functions for linear algebra, statistics, Fourier analysis, filtering, optimization, numerical integration, and solving ordinary differential equations, as well as an interactive environment for iterative exploration, design, and problem solving.

IV. RESULTS AND DISCUSSION

1. If the programme detects a person's nose and mouth, the output result will be "Please wear mask"

Fig1. Output 1 – Please wear Mask

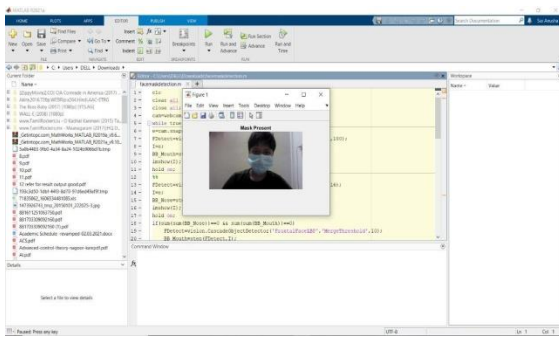


Fig2.Output 2- Improper wear of Mask- Nose Not covered

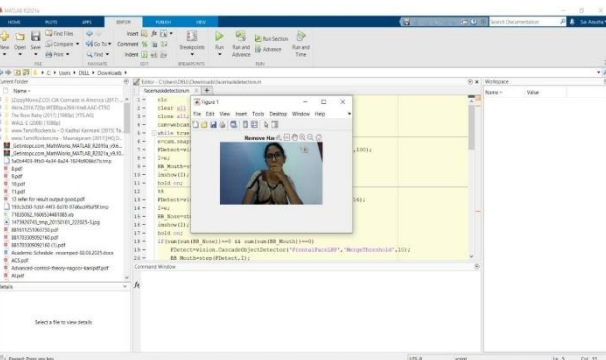
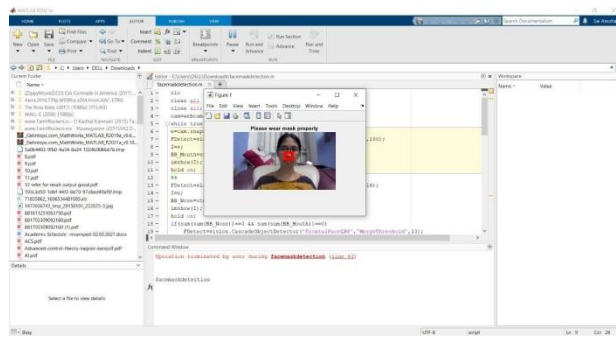


Fig 3. Output 3-Mask Not Present- Hand covered



Person with mask: if the software doesn't identifies person's nose and mouth then the output result will be "mask Present"

Fig 4. Output 4-Mask Present Person 1

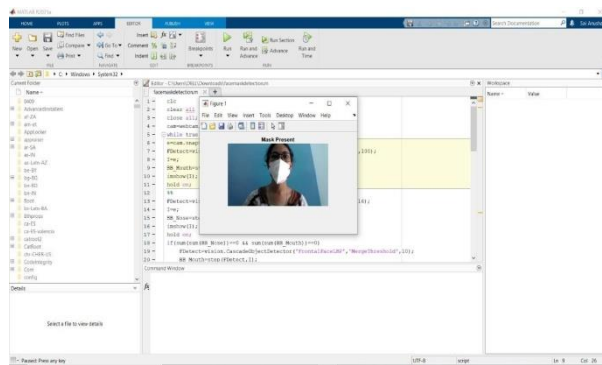


Fig 5. Output 5- Mask Present Person 2



Fig 6- Output 6- Mask detected Properly

Fig 7- Output 7-Hand Present in Mask

v. CONCLUSION

In this paper image processing based algorithm is developed for Mask detection to combat COVID-19. This can be developed into a prototype with open source software and the product can be used in places like airport which is an important place to check the standard operating procedures for effective fight against Covid19. If the person wears a mask properly then the output will be displayed as "MASK PRESENT", otherwise the output will be "PLEASE WEAR MASK".

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