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Face Mask Detection using Opencv Python

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Abstract - The end of 2019 witnessed the outbreak of Coronavirus Disease 2019 (COVID-19), which has continued to be the cause of plight for millions of lives and businesses even in 2020. As the world recovers from the pandemic and plans to return to a state of normalcy, there is a wave of anxiety among all individuals, especially those who intend to resume in-person activity. Studies have proved that wearing a face mask significantly reduces the risk of viral transmission as well as provides a sense of protection. However, it is not feasible to manually track the implementation of this policy. In this paper we are going to use OpenCV to do real time facemask detection from a live stream via our webcam. Our system consists of a dual-stage Convolutional Neural Network (CNN) architecture capable of detecting masked and unmasked faces and can be integrated with pre trained models

***Key Words*: Python, Opencv, Webcam, Sublimetext Software**

1. INTRODUCTION

The trend of wearing face masks in public is rising due to the COVID- 19 coronavirus epidemic all over the world. Before Covid-19, People used to wear masks to protect their health from air pollution. While other people are self conscious about their looks, they hide their emotions from the public by hiding their faces. Scientists proofed that wearing face masks works on impeding COVID-19transmission. COVID19 (known as corona virus) is the latest epidemic virus that hit the human health in the last century. In 2020, the rapid spreading of COVID-19has forced the World Health Organization to declare COVID- 19 as a global pandemic. More than five million cases were infected by COVID-19 in less than 6months across 188 countries. The virus spreads through close contact and in crowded and overcrowded areas. The corona virus epidemic has given rise to an extraordinary degree of worldwide scientific cooperation. Artificial Intelligence (AI) based on Machine learning and Deep Learning can help to fight Covid-19 in many ways.

2. PROBLEM STATEMENT AND OBJECTIVES

In this thesis, we consider a problem of detecting masks from camera. In this new era where we experiencing a pandemic and people are advised to wear masks, some people are not used to it and are avoiding to wear masks and also it requires more labours in malls, banks, offices to check the person is wearing mask or not and also it takes more time and extra human effort is required for that we propose a new technology. The main objective of this project is to develop a face mask detection by using Opencv Python · In this we propose a multi-scale facial mask real time detection and Classification for the hospital industry, crowd surveillance in the streets and malls are more useful in this COVID-19 pandemic situation.It helps us to spread the awareness among people using face mask properly. To prevent people from COVID – 19 and this can be achieved by effective deep learning algorithm

3. PROPOSED SYSTEM

The proposed framework centers around how to recognized the individual on picture/video transfer wearing a face mask with the assistance of PC vision and profound learning calculation by utilizing the OpenCV, Tensorflow, Keras. Our primary focus is to make a system work in crowded places.

4. BLOCK DIAGRAM

5. WORKING OF THE PROPOSE SYSTEM

OPENCV

Opencv (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was worked to give a typical foundation to PC vision applications and to quicken the utilization of machine discernment in business items. The library has in excess of 2500 streamlined calculations, which incorporates an extensive arrangement of both works of art and cutting edge PC vision and AI calculations. These calculations can be utilized to distinguish and perceive faces, recognize objects, group human activities in recordings, track camera developments, track moving articles, separate 3D models of items, produce 3D point mists from sound system cameras,

line pictures together to create a high-goal picture of a whole scene, find comparable pictures from a picture data set, eliminate red eyes from pictures taken utilizing streak, follow eye developments, perceive view and build up markers to overlay it with enlarged reality, and so on.

TENSORFLOW

It is a free and open-source programming library for dataflow and differentiable programming across a degree of assignments. It is a representative mathematical library and

is likewise utilized for AI applications, for example, neural organizations. It is utilized for both examination and creation at Google, TensorFlow is Google Brain's second-age framework. Keras is an API intended for people, not machines. Keras follows best practices for decreasing intellectual burden: it offers steady and straightforward APIs, it limits the number of client activities needed for basic use cases, and it gives clear and significant mistake Messages.

CNN

The Convolutional Neural Networks (CNNs) are category of Neural Networks that have proven effective in areas such as image recognition and classification. CNN have been successful in identifying animals, face masks, objects and track signs apart from powering vision in robots and self-driving cars.

6. CONFIGURATION OF THE SYSTEM

· Input image (100, 100, 3) for coloured image.

· Input image (100, 100, 1) for grayscale image.

· Convolutional layer (filter size)

· ReLU layer (to get featured map output)

· Pooling and flattening to reduce the dimension of featured map output

· Fully connected layer

· To predict the accuracy how perfectly if the person is wearing mask or not in percentage

MOBILENETV2

MobileNetV2 builds upon the ideas from MobileNetV1, using depth wise separable convolution as efficient building blocks. In any case, V2 acquaints two new highlights with the design:

1. Linear bottlenecks between the layers, and

2. Shortcut connections between the bottlenecks. 3. Typical MobilenetV2 architecture has as many Layers, The weights of each layer in the model are predefined based on the ImageNet dataset. The loads show the cushioning, steps, portion size, input channels, and yield channels. MobileNetV2 was picked as a calculation to construct a model that could be sent on a cell phone. A tweaked completely associated layer which contains four consecutive layers on top of the MobileNetV2 model was created. The layers are

1. Average Pooling layer with 7×7 weights

2. Linear layer with relu activation function

3. Dropout Layer

4. Straight layer with Softmax initiation work with the aftereffect of 2 qualities. The last layer softmax work gives the aftereffect of two probabilities every one addresses the characterization of "cover" or "not veil".

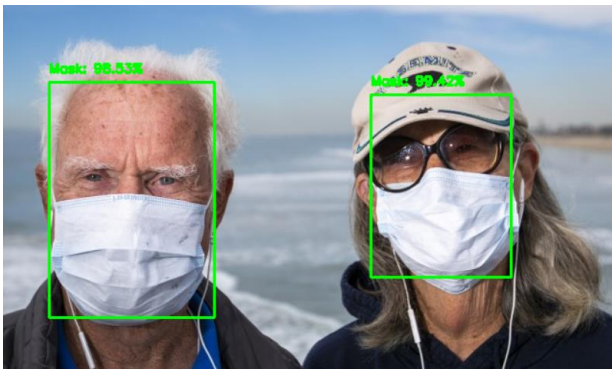
7. FUTURE SCOPE

In future, the development of the project may be done in many ways, where we replace the alarm or opening and closing of the door to indicate the person wearing a mask or not and the stage 1 model can be replaced with an improved model in the future that would give better accuracy.

8. RESULT

From that I predict the images of with mask and without mask images in that prompt I am just typing python detect mask images form that we get an output.

```
C:\Users\sowmi\Desktop\code>python detect_mask_image.py --image images/pic2.jpg
[INFO] loading face detector model...
[INFO] loading face mask detector model...
2020-12-19 00:20:15.154938: I tensorflow/core/platform/cpu_feature_guard.cc:142] This TensorFlow binary is optimized wit
h oneAPI Deep Neural Network Library (oneDNN)to use the following CPU instructions in performance-critical operations:
AVX2
To enable them in other operations, rebuild TensorFlow with the appropriate compiler flags.
2020-12-19 00:20:15.161325: I tensorflow/compiler/xla/service/service.cc:168] XLA service 0x230f7ae7a20 initialized for
platform Host (this does not guarantee that XLA will be used). Devices:
2020-12-19 00:20:15.161400: I tensorflow/compiler/xla/service/service.cc:176]   StreamExecutor device (0): Host, Default
 Version
[INFO] computing face detections...
```



9. CONCLUSION

In future, the development of the project may be done in many ways, where we replace the alarm or opening and closing of the door to indicate the person wearing a mask or not and the stage 1 model can be replaced with an improved model in the future that would give better accuracy.

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