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FACE MASK DETECTION USING OPEN CV

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Abstract – COVID – 19 pandemic caused by novel coronavirus is continuously spreading until now all over the world. The impact of COVID-19 has been fallen on almost all sectors of development. The health care system is going through a crisis. Many precautionary measures have been taken to reduce the spread of this disease wearing a mask is one of them. In this paper we propose a system that can restrict the growth of covid-19 who have not wearing any facial mask in a smart city network where all the public places are monitored with Closed-Circuit-Television (CCTV) cameras. While a person without a mask is detected, the corresponding authority is informed through the city network. A deep learning architecture is trained on a dataset that consists of images of people with and without masks collected from various sources. The trained architecture achieved 98.7% accuracy on distinguishing people with and without facial masks for previously unseen test data.

Key Words: Haar cascade classifier , image pre- processing, face detection , deep learning , masks.

1.INTRODUCTION

The current situation of the world is no better due to the spread of this disease coronavirus. It has made people of all stages to suffer. Owing to this situation wearing a mask is a primary way of controlling the spread of this disease. Hence in order to prevent the spread of this disease face mask detection plays a major role which helps the society. Here the face mask detection refers to the person who is wearing a mask or not and also the location will be also be considered to inform to the concerned authority. The deep learning models used here will also help to identify the facial landmarks.

2. LITERATURE SURVEY

Z-Q. Zhao, P. Zheng, S.-t. Xu proposed a paper regarding the image recognition and processing that data which is used to process the images though the number of pixels in it.

Kumar, A. Kaur, M Kumar proposed a way for processing the images. HOG is used in libraries like open computer vision for detecting the objects required.

Z.Wang, G.Wang, Q. Hong, N.Wang proposed the detection of masked faces where the faces without the masks will not be identified.

D .Chiang proposed a paper which is more suitable for real time object detection that is more efficient and faster. It detects faces and also tells whether it is a masked face or not.

3.REQUIREMENTS

3.1 Hardware Requirements

- **Processor Type:** Intel CoreTM i5
- **Speed:** 2.4 GHZ
- **Ram**: 8 GB RAM
- **Hard Disk**: 80 GB HDD
- **Camera**: Web cam or Usb camera

3.2 SOFTWARE REQUIREMENTS

- **Operating System:** Windows 10
- **Technology:** Python
- **IDE**: Python IDLE
- **Tools**: Anaconda

- **Python Version**: Python 3

4. THE MODEL

There are two methodology's used here in this paper. Haar Cascade Classifier is used for face recognition and Mobilenet V2 deep learning model is used for detection of people wearing a mask.

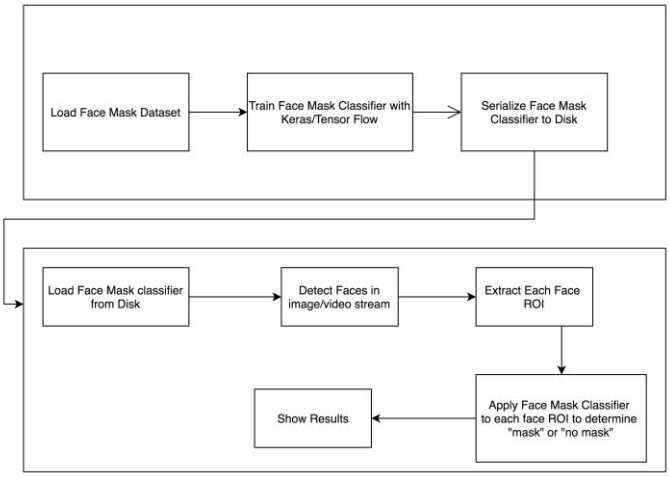

Fig – 4.1: Architecture Diagram

- **Image Preprocessing:**

  The images that is captured through the camera needs to be preprocessed before achieving the next goal. In the next stage the image is then converted into a gray scale image since the RGB image contains many redundant information which will not be helpful in our module. This grayscale image will be of 8 bit for each pixel. These images are then reshaped into (64*64)size to maintain the standard size of the input images and these images are normalized which makes the value of the pixel to be in the range 0 to 1.The normalization makes the algorithm to learn faster and capture most necessary features from the images.

- **Deep Learning Architecture:**

  This deep learning architecture learns the non-linear features among the samples present. This architecture predicts the new samples. The architecture of the learning technique highly depends on the CNN. We have 2 sub modules namely Dataset Collection and Architecture Development.

  - Dataset Collection:

    The data is collected from various sources which will be used for training and testing purposes. Eighty percent of the images were used for training and remaining twenty percent were used for testing purpose.

  - Architecture Development:

    The learning model which is proposed on the basics of CNN is helpful in pattern recognition. The network comprises an input layer, several hidden layers and an output layer . The hidden layers consists of multiple convolutional layers that learn suitable filters for feature extraction .

- **Face Detection:**

  The system takes any real image/video stream from the camera. The OpenCV libraries are used to implement the face detection through the Haar cascade classifier. Haar Cascade classifier is implemented where the features are grouped into the clusters and the classifier will discard the unwanted part from future analysis. Face detection algorithm detects face and further it will also extract the features from it.

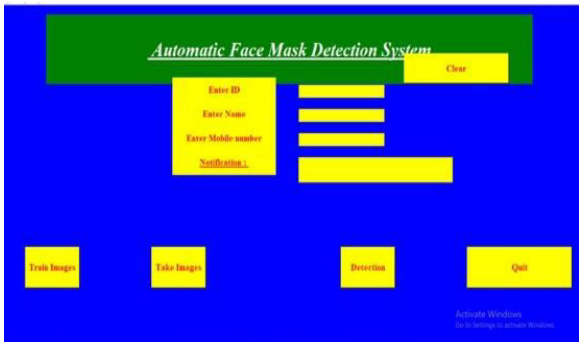

Figure 4.2: GUI of Automated Face Mask Detection

5. CONCLUSIONS

The system identifies the person's face and then the necessary action is to be taken. The system attains an overall efficiency of 89%.

6. FUTURE WORK

In future , the system can be automated using the upcoming technologies.

Abbreviations and Acronyms

CNN: Convolutional Neural Network.

OpenCV: Open Source Computer Vison Library.

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REFERENCES

1. W. H Organization et al., "Coronavirus disease 2019" "(Covid-19)" situation report , 96," 2020.
2. Y. Liu, A.A Gayle, A. Wilder-Smith, J .Rocklov, "The reproductive number of covid -19 is higher compared to sars coronavirus".
3. Y. Fang, Y. Nie, M. Penny, "Transmission dynamics of the covid-19 outbreak and effectiveness of government interventions: A Data Driven Analysis, "Journal of medical virology , vo;.92, no.6,pp.645-669,2020"
4. D. Chiang., "Detect faces and determine people wearing mask, "and "Face detection techniques : a review,", 2020.