iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** III **Month of publication:** March 2021

DOI: https://doi.org/10.22214/ijraset.2021.33476

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue III Mar 2021- Available at www.ijraset.com

Face Mask Detection with Alert System using Artificial Intelligence: Implementation of a Pre-Trained Model in Detection of Masks

Gaurav Kumar D. K. Singh[1], Prof. Pramod Patil[2], Pooja Mahendra Sali[3], Rameshwari Devidas More[4], Mayuri Raju Pawar[5]

[1, 3,4,5]*Students,* [2]*Professor, Computer Engineering, Sandip Institute of Technology and Research Centre, Nashik, India*

Abstract: ***Face mask detection system will be considered as one of the best modalities for biometric info extracting models. Those models are mainly required for ensuring safety and hygiene in a public premises. This research paper has proposed a very fast image pre-processing with the mask in the center over the faces. For this system, we will be using characteristics extraction and CNN Networks made up of neurons which will be used ultimately for classifying the data into labels. Features extracted by neurons in the training phase are used for classification and detection of a masked person from person without mask. This research work will be carried out in three levels: preprocessing the images, cropping the images considering resizing as well and classification of the images. This helps to detect whether the face is having mask or not. A webcam or CCTV camera surveillance will be monitoring all the time and it checks whether the person is wearing a mask, if the person doesn't wear a mask then the system gives a security alert with a instantaneous pop-up on the window along with an email is sent to respective authorities, thus will be helping authorities find out the intruder as early as possible, and impose penalties upon that person.***

Keywords: Mask detection, Artificial Intelligence, Smtp libraries, Video proctoring, Alert system, Cnn networks, Neurons.

I. INTRODUCTION

As we all know how tough times the World have undergone in 2020 due to Covid-19 crisis, and still the second wave of this virus is impacting businesses across all verticals in a negative way such that the whole systems of world have been in complete lockdown for so many months, and in turn this caused people to suffer financially such that many well established businesses had to file for bankruptcy. Now, the only option people have is to live up with precautions like maintaining hygiene, sanitization, temperature checks along-with wearing of masks properly such that spread of diseases could be prevented as well as businesses could run in parallel with these ongoing situations, and a safe environment for businesses like mall, schools could be created by strictly enforcement of Covid-19 regulations, because most of these disease spread through those minute water droplets expelled from person talking without mask and also by sneezing. Thus we get to know from this that how much important alone is the wearing of the mask is. In India specially we have seen that people in large amount do not follow these guidelines of wearing mask properly, thus our proposed system if deployed with existing infrastructure will cause authorities to find those intruders with ease and make them pay huge penalties, so that hygiene could be maintained at public places, and other people will feel free to visit such premises without worrying, and thus this will support economic growth as well.

A. Existing System

In existing systems, you can only monitor people via surveillance systems. In that you are limited to monitoring only. But in addition to monitoring if we add the proposed system designed by us it can be used to detect mask and no-mask in real time without much latency. Thus we will be utilizing same resource for multiple uses, instead of deploying another system for use. Thus we will be effectively utilizing system time and money. Nowadays, as we can notice that every firm and industries are implementing social distancing, sanitation as well as manually checking temperature of persons entering their premises. Thus at-least we can automate the mask check before of the persons, using existing infrastructure. The proposed plan of ours is extremely new for the whole industry and will ease the efforts made by authorities in regulating activities in public premises.

B. Problem Definition

To Develop a real time face mask detection system for detecting person faces in real time consisting face mask or not, and in case mask isn't found, the system will generate an alert on screen along with an email.

C. Purpose

Overall motive of the proposed project is to deploy a real-time face mask detection system based on artificial intelligence having alert system feature.

D. Goals and Objectives

The Goals and Objectives of the given system are as follows:

1) To build a risk free and hygienic environment for public in public places such as shopping malls, schools, etc & spread of viruses such as covid-19.
2) To remove headache of continuous monitoring by a real person, as only that window will generate an alert on which intruder was detected.
3) To add details of location of camera along with the time, and email them to respective authorities for taking action against them.

E. Features

1) Detects mask on face.
2) Multiple deployment at the same time.
3) Find intruder of mask rules & alert instantaneous to respective authorities.
4) Doesn't need external graphics to process faces in real-time.

F. Proposed Architecture

Fig – Proposed Architecture

II. METHODOLOGY

In this approach, We will provide a software to client which will be a pre-trained model based on the prefetched data which is basically trained on mask and no-mask images, which in turns generated neural-network based on certain characters of the raw image data which will be deployed on the cameras, along with the CCTV surveillance systems. It detects the mask on the face of the person, whether present or not. In case of detection of mask the system continues to work as it is . But in case, of not detection of mask, the system will generate a instantaneous pop-up on the window screen of the surveillance camera at that very instant and also it will e-mail the respective authorities with the address where the intruder and camera was located with the use of SMTP libraries. The whole process is almost instantaneous without any latency, and respective authorities can check the e-mail received on their respective mail platform for the message consisting of time and address of premises such that authorities can take action against intruder without much delay.

Now, let us discuss some technicalities of the whole s/w:- In the program we are basically using cascade classifier to train the model, in which we first off all take raw indput data on which the model is going to be trained by taking images and converting it into gray scale images of 100*100 px and labelling them as MASK & NO MASK, and then convert these resized images into numpy arrays with each individual pixel data, then generate flattened convolutions from them, then generate two categorical neurons which could get this data split into two categories based on pixel characteristics. The CNN model which we trained now will generate epochs, and best epochs will be considered. After all these processes we will aggregate the program with the SMTP

library to generate email notifications with location details, so as to justify working of the program if person with no-mask is detected. The interface for monitoring and pop-up window generation will be provided by using Tkinter libraries.

A. Software Required

1) Programming language – Python
2) Libraries – OpenCV, Tensorflow, Smtp, Keras, Tkinter

B. Area of Project

Artificial Intelligence, Video- Proctoring, Deep-learning,CNN

C. Advantages

1) Application could be easily deployed on any surveillance camera.
2) Reduce number of mask rule intruders.
3) Tracking via address of premises where intruder was detected.
4) Instant generation of Alert for Respective Authorities via screen pop-up.

D. Limitations

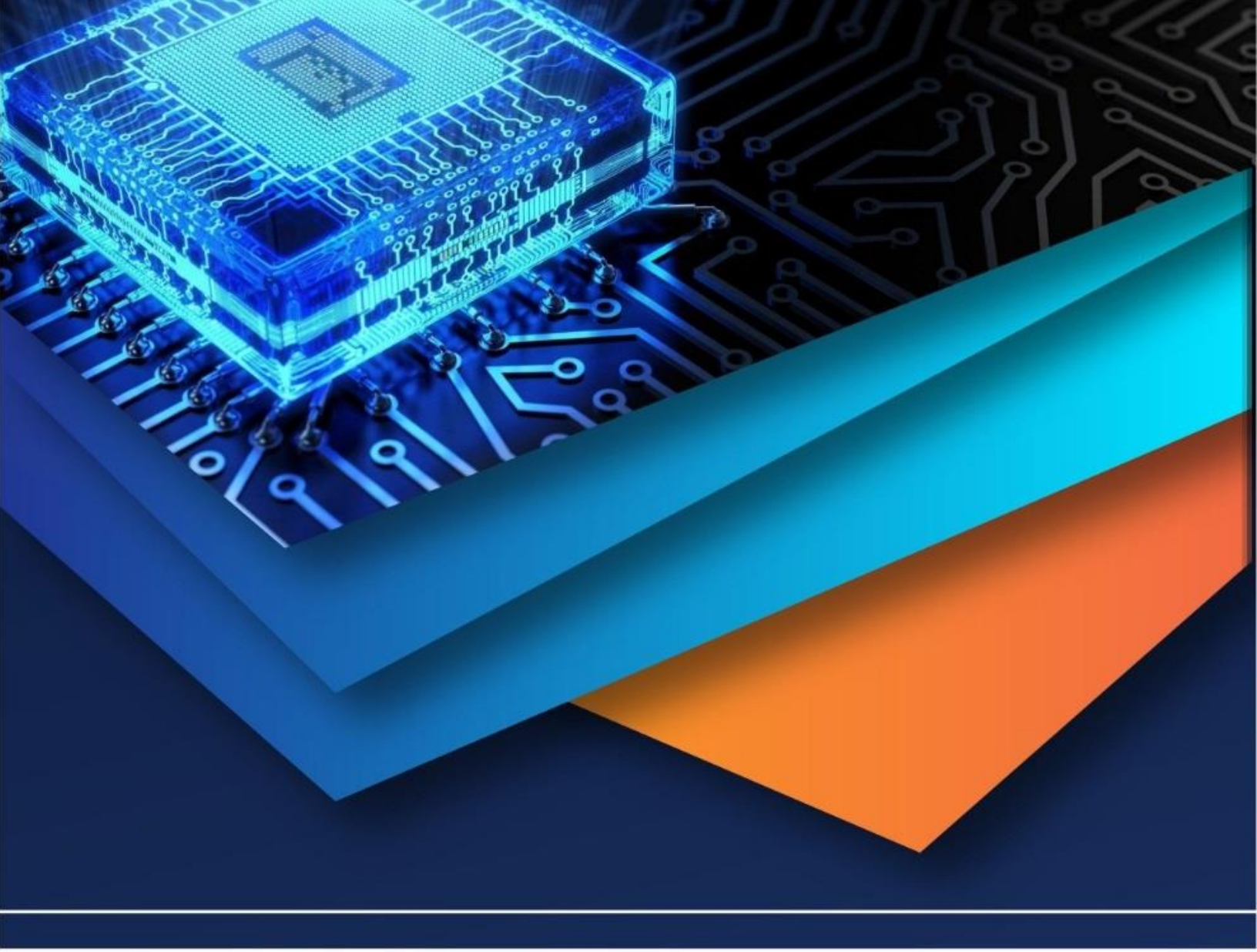
1) For taking action authorities have to manually send their person to fine the intruder.
2) The system currently needs at-least integrated graphics support.
3) System security depends on surveillance system.

III. CONCLUSION

The proposed system can detect mask on person's face while being in premises or entering in premises, thus detecting mask present or not. In case of not detection of mask, the system will generate instant alert along with an email to respective security maintaining authorities of the premises. So that the person found to be breaking the Covid-19 rules, must get fined or any liable action could be taken against the intruder. Thereby reducing spread of such diseases to a large extent because sanitization alone cannot help that much. Also, this system when deployed with the surveillance camera can detect and address authorities without any time-delay, thereby reducing risk of transfer. We can add many more features like if the person instead of wearing mask is using his hands to cover his half-face, instead of a proper mask. These functions will be discussed separately in later research.

REFERENCES

[1] P. Pattanasethanon and C. Savithi, "Human Face Detection and Recognition using Web-Cam", *Journal of Computer Science*, vol. 8, no. 9, Year: 2020 | Conference Paper | Publisher: IEEE
[2] T. Schenkel, O. Ringhage and N. Branding, "A COMPARATIVE STUDY OF FACIAL RECOGNITION TECHNIQUES With focus on low computational power", Year: 2019 | Conference Paper | Publisher: IEEE
[3] Research on Image Matching Detection Based on Machine Vision Yihong Wang 2019 IEEE 19th International Conference on Communication Technology (ICCT) Year: 2019 | Conference Paper | Publisher: IEEE
[4] L. Wang and A. A. Siddique, "Facial recognition system using LBPH face recognizer for anti-theft and surveillance application based on drone technology", Year: 2020 | Conference Paper | Publisher: IEEE
[5] P. Gupta, N. Saxena, M. Sharma and J. Tripathi, "Deep Neural Network for Human Face Recognition", Year: 2020 | Conference Paper | Publisher: IEEE
[6] Advances in Face Detection and Facial Image Analysis, Cham: Springer International Publishing, Year: 2016 | Conference Paper | Publisher: IEEE



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY