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Real Time Face Mask Detection-A Survey

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***Abstract:** After the breakout of the worldwide pandemic COVID-19, there arises a severe need of protection mechanisms, face mask being the primary one. According to the World Health Organization, the corona virusCOVID-19 pandemic is causing a global health epidemic, and the most successful safety measure is wearing a face mask in public places. Convolutional Neural Networks (CNNs) have developed themselves as a dominant class of image recognition models. The aim of this research is to examine and test machine learning capabilities for detecting and recognize face masks worn by people in any given video or picture or in real time. This project develops a real-time, GUI-based automatic Face detection and recognition system. It can be used as an entry management device by registering an organization's employees or students with their faces, and then recognizing individuals when they approach or leave the premises by recording their photographs with faces.The proposed methodology makes uses of Principal Component Analysis (PCA) and HAAR Cascade Algorithm. Based on the performance and accuracy of our model, the result of the binary classifier will be indicated showing a green rectangle superimposed around the section of the face indicating that the person at the camera is wearing a mask, or a red rectangle indicating that the person on camera is not wearing a mask along with face identification of the person. Face detection and face recognition are very important technologies these days, furthermore we noticed that they got have a variety of uses such as cellphones, army uses, and some high risk information offices. We decided to make a device that detects and recognize the face as a student attendance system and can be a substitute for the regular paper attendance system and finger print attendance system. The main function in our project is going to be done using LabVIEW because, LabVIEW is a very helpful programming tool in regards of facial uses and very helpful in other uses. Our project is based on a main program in LabVIEW that detects and recognize faces with giving scores and parameters, furthermore the subsystems are an Excel sheet that is*

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integrated with the program, and a messaging device that is for either a message for absent students or to the student's parent.

Keywords: Open CV,Haar Cascade,ANN,Convolution,VGG-16,Max-pooling 2D,SQL,Tkinter.

1. INTRODUCTION

Face Recognition is a technique that matches stored models of each human face in a group of people to identify a person based on certain features of that person's face. Face recognition is a natural method of recognizing and authenticating people. Face recognition is an integral part of people's everyday contact and lives. The security and authentication of an individual is critical in every industry or institution. As a result, there is a great deal of interest in automated face recognition using computers or devices for identity verification around the clock and even remotely in today's world. Face recognition has emerged as one of the most difficult and intriguing problems in pattern recognition and image processing. With the aid of such a technology, one can easily detect a person's face by using a dataset of identical matching appearance.The most effective approach for detecting a person's face is to use Python and a Convolutional Neural Network in deep learning. This method is useful in a variety of fields, including the military, defense, schools, colleges, and universities, airlines, banks, online web apps, gaming, and so on. Face masks are now widely used as part of standard virus-prevention measures, especially during the Covid-19 virus outbreak. Many individuals or organizations must be able to distinguish whether or not people are wearing face masks in a given location or time. This data's requirements should be very real-time and automated. The challenging issue which can be mentioned in face detection is inherent diversity in faces such shape,texture, colour, got a beard\moustache and/or glasses and even masks. From the experiments it is clear that the proposed CNN and Python algorithm is very efficient and accurate in determining the facial recognition and detection of individuals.

Literature Review

The face mask detection model is very useful for public places like hospitals, airports, offices where a huge number of people travel from one place to another . In hospitals, we can embed this model in pre-installed CCTV cameras. If the workers of the hospitals are found without mask alarm will ring and the higher authorities of the hospital can take necessary actions against the worker . In airports, the entrance and exit gate of the airport should have this model. The System is prepared to recognize precisely whether an individual is wearing a mask or not . At the point when the calculation recognizes an individual without a mask, caution ought to be produced to alarm the individuals around or the concerned specialists close by, so fundamental activities can be taken against such violators . Not only for Covid19 pandemic, any place and at whatever point facemask is commanded to relieve any air-borne illnesses, passage, what's more, leave access frameworks can be incorporated with such innovation to help in diminishing the spread of infection . The cameras are used to capture images from public places; then these images are feed into a system that identifies if any person without face mask appears in the image. If any person without a face mask is detected

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then this information is sent to the proper authority to take necessary actions .[C.Jagadeeswari, M.Uday Theja,2020]

A system using real time face mask detection using classification for convolutional neural network in VGG-16 model with specific implementation of face recognition ,face mask detection , viola jones, authenticating people . to reduce the spread of corona virus , people often wear mask to protect themselves . This makes face recognition a very difficult task since certain parts of the face are hidden . A primary focus of the researches during the ongoing coronavirus pandemic is to come up to with suggestions to handle this problem through rapid and efficient solution . This software represents a review of various methods and algorithms used for human recognition with face mask. The further work is to improve human face recognation with face mask has various apps in different domains. The various mathedologist diassured in the paper can be based on the particular demands of the application.[Mamata s. Kalas,Walid Hariri,2020]

2. PROPOSED WORK

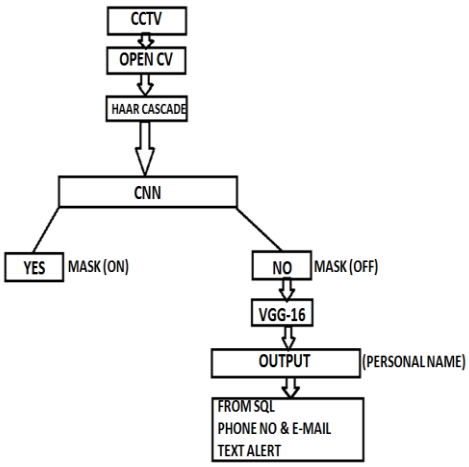
1. Face Detection

For face detection, we use **HAAR Cascade Algorithm**. In this method all black pixels in greyscale images was accumulated. They then deducted from the total number of white boxes. Finally, the outcome is compared to the given threshold, and if the criterion is met, the function considers it a hit.

2. Mask Detection

For Mask Detection, we use a sequential CNN model along with inbuilt Keras Library in Python. The sequential CNN model is trained from dataset of human faces with or without masks on the faces. It forms a logic from the pre-processed images like a human brain, then the model detects the face along with mask using feature extraction and feature selection. After identification of the mask along with face of the person, it forwards to the prediction or identification stage.

4. METHODOLOGY



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5. CONCLUSION

Our Proposed system can Detect, Recognize human face(s) in real-time world and Alert them.Compared to the traditional face detection and recognition system, the face detection and recognition based on CNN model along with the use of python libraries has shorter detection and recognition time and stronger robustness, which can reduce the miss rate and error rate. It can still guarantee a high test rate in a sophisticated atmosphere, and the speed of detection can meet the real time requirement, and achieve good effect. The proposed CNN model shows greater accuracy and prediction for detecting and recognising human faces.The result show us that the current technology for face detection and recognition is compromised and can be replaced with this proposed work. Therefore, the proposed method works very well in the applications of biometrics and surveillance.

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