FACE MASK DETECTION USING OPENCV

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Abstract: As the "epidemic" spreads, it is creating a global healthcare disaster and disrupting our daily lives. This virus is spread mostly by droplet that erupt from someone in a coronavirus-infected person and pose a threat to others. In public places like airports, marketplaces, railroads, and retail stores, virus propagation is more probable." Wearing a face mask in open areas, as set by the World Health Organization (WHO), "The authority is enforcing restrictions like as having to wear throughout public areas, which is one of the most efficient strategies to prevent being affected with the covid virus." using mouthwash, and maintaining social separation. Using Tensor Flow, Keras, and OpenCV, we provide a method for recognizing face masks on people." "A classification model generated well around individual's face using OpenCV determines is not whether the guy is wearing a bulletproof vest." If the face of a person detects that they would be not wearing a scarf, they should take care. The mask is created using real-time public faces and placed into a Convolutional Neural Network (CNN) as an input. Using OpenCV, Tensor Flow, NumPy, Keras, and MobileNetV2, the dataset is utilized to create a face mask detector. We'll utilize a live video stream, and the output will indicate the accuracy with labels like "Mask" and "No Mask," and then we'll be able to combine it with a database to record the image's features. Our objective is to determine if the person in the appearance broadcasts is trying to imply or not "To inhibit the spread of the covid virus." This study will look at the current literature on perspective analytics and the most popular methods for its implementation.

Keywords: Convolutional Neural Network (CNN), Epidemic, Face mask, OpenCV, NumPy, Tensor Flow.

1. INTRODUCTION

Face recognition system is a mat lab for recognizing features from a photograph, which is utilized in a variety of applications [1]–[3]. Face recognition system is the phenomenon through which humans locate and listen carefully to angles in a residential environment. The goal of our research paper is to find out most effective algorithm to make the application which check that the people has worn a mask or not so that they can take the precautions According with WHO (World Health Organization), the one and only method to avoid the bola virus is to wear a mask. It's becoming bigger every day, and also coming in different waves and different types which are four times dangerous than the epidemic. As a result, there is a greater need for a technology that can identify face masks on individuals. To recognize face masks on humans, the technique employs pattern recognition classifying utilizing OpenCV, Keras, Tensor Flow, and NumPy [4], [5].

- Applications

Facial recognition system is the main topic of this essay. In biometrics, face detection is often employed as part of (or in conjunction with) a facial recognition system. It's also utilized in video surveillance, human-computer interfaces, and managing picture databases. Face detection is used in certain current digital cameras for autofocus. Face detection may also be used to identify places of interest in picture slideshows using the Ken Burns pan-and-scale effect [4]. Smile detection is frequently used in modern products to capture a shot at the right moment.

- *Marketing*

Marketers are becoming more interested in face detection. Any face that goes by may be detected by a camera that is incorporated into a television set up after that, the technique calculates the country, gender, and age of the participants of the face. Following the collection of data, a series of adverts suited to the specified race, country, and generation may be shown.

- *Inferences Based on Emotion*

Face detection may be utilized as part of an emotional inference software solution. People with autism may benefit from emotional inference to better understand the sentiments of others around them.

- *Lip Reading is a skill that allows you to read*

Face detection is crucial in the process of inferring language from visual data. Automated lip reading may be used to assist computers in determining who is communicating, which is useful when security is a concern.

2. LITERATURE REVIEW

Adusumalli et al. in their study illustrated that the pandemic is causing a worldwide healthcare catastrophe. This virus is spread most often by sprays may erupt from either a coronavirus-infected person and pose a threat to other people In public locations, the danger of problems is higher. According with World Health Organization, wearing a face mask in public places is one of the most effective strategies to avoid infection (WHO). The authors presented a technique for detecting face masks on people using facial recognition software. Integral Images and OpenCV in their study. Is not whether the participant is wearing a mask is indicated by a line segment drawn it around individual's face. If a dead person is entered into the system, it recognizes the individual who isn't wearing a surgical mask and simply send to that person. person alerting them to the fact that they are not wearing a mask and advising them to take measures.

Das et al. in their study embellished that epidemic has had a significant influence on our everyday lives, influencing worldwide trade and transportation. Wearing a mask to defend one's face has now become the new standard. Many towns may require consumers to utilize their services while wearing suitable masks in the real world. As a consequence, identifying respirators has become a crucial task in the advancement of global civilisation. Using Tensor Flow, Keras, OpenCV, and Scikit-Learn, and perhaps some basic Machine Learning tools, this study presents a simpler method for achieving this aim. The authors' method effectively detects the object in an image and then assesses whether this is hidden behind a mask. As a reconnaissance job performance, it can also distinguish a head and then a mask in motion. The approach achieves values of up around 95.77 percentage and 94.58 percent on two different datasets, respectively. The authors discovered the best parameter values for the Sequential Probabilistic Neural Control algorithm to correctly recognize the presence of masks without fitting.

Nagrath et al. in their study embellished that since the beginning of the epidemic, huge strides have been made in the fields of image processing algorithms for the identification of creams. A variety of approaches and strategies have been used to create image retrieval models. Pattern recognition, Tensor Flow, Keras, and OpenCV are suggested in this study, and the authors conducted a study to identify face masks. This notion might be employed for safety concerns since it is relatively resource efficient to implement. The SSDMNV2 technique employs Single Shot Multibox Information gathering as an identification process and MobilenetV2 as a classification model platform, both of which are very light and may be utilized to perform legitimate mask detection on hardware platforms (such as the NVIDIA Jetson Nano and Raspberry Pi). The accuracy score for this investigation was 0.9264, and the F1 score was 0.93. Other researchers will be able to utilize the dataset in this article, which was collected from the respondents from a variety of sources, to construct more complex model facial recognition. photos, upgraded data, and countenance component classification.

Research Questions:

- How deep learning is helping the system?
- How OpenCV is helping in image processing?
- How dataset is configuring the system process?

3. METHODOLOGY

3.1.Design:

It's made up of a collection of datasets that come in two flavors: with or without a face mask. In our suggested system, we use the CNN algorithm. Dataset collection: "The dataset was acquired via the Kaggle Repository," with some photos from Google included in for "training and testing data following its analysis." Dataset Extraction: Using mobileNetV2, Keras, and Tensor Flow, we can extract picture characteristics from the acquired dataset (Python library). To train a model to identify face masks, do the following: Faces were obtained using the normal OpenCV module, and then a Keras model was trained to recognize face mask in the frame of a live video stream using OpenCV.

3.2.Sample And Instruments:

Detecting the person: A model was trained to detect the people in the live video stream that whether the people have worn a mask or not and then it will create a bounding box after detecting the face. Showing Accuracy for face masks: After taking input from the video stream, it will try to match in the dataset and then it will display the bounding box with the accuracy of wearing mask or not wearing a mask. Figure 1 shows the training model of the system.

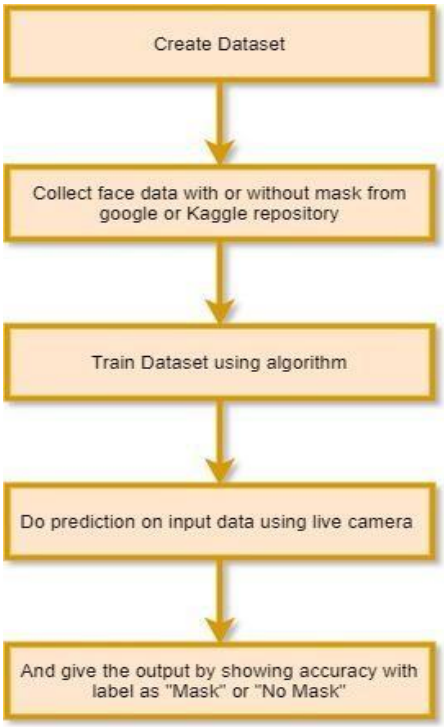

Figure 1: Illustrated the Flowchart for Training Model

3.3.Data Collection:

Different types of data are gathered from various locations throughout the system, allowing the model to get accurate knowledge about the system. It begins with the image face model, then moves on to set input data, recognizes the face input in the model that is being used in the process, and collects the data, and finally, the final image processing system enters the picture, printing the image that the model is attempting to take data off the system. Figure 2 shows the input model of the system that is used in the processing part of the system.

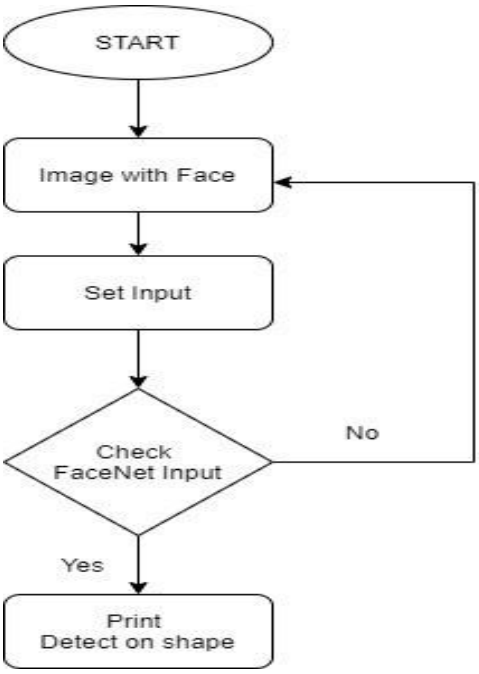

Figure 2: Illustrated the Input Model

3.4.Data Analysis

Working of Input Model: It starts and take the input of image with face and check face Net input and forward and prints the detection shape.

- *Working of Face size model:*

After the input the model will create 3 list like faces, locs and preds then the for loop will be started and check the range of face detection shape if the shape is not detected the model will start again and if detected then go to the if condition and checks the confidence is > 0.5 if yes then it will append the face with the position x-axis and y-axis. Then it will check len (faces) > 0 then set the path, load face detector model and start video stream. The start process work flow in the system then the check box locs ,prediction then the mask flow comes into play ,after that put that text work flow work is major consent in the c=system the set front system work in the system the work in the major concern. Figure 3 discloses the face size model of the system that is taking input from the user and Figure 4 shows the details checking model of the input system.

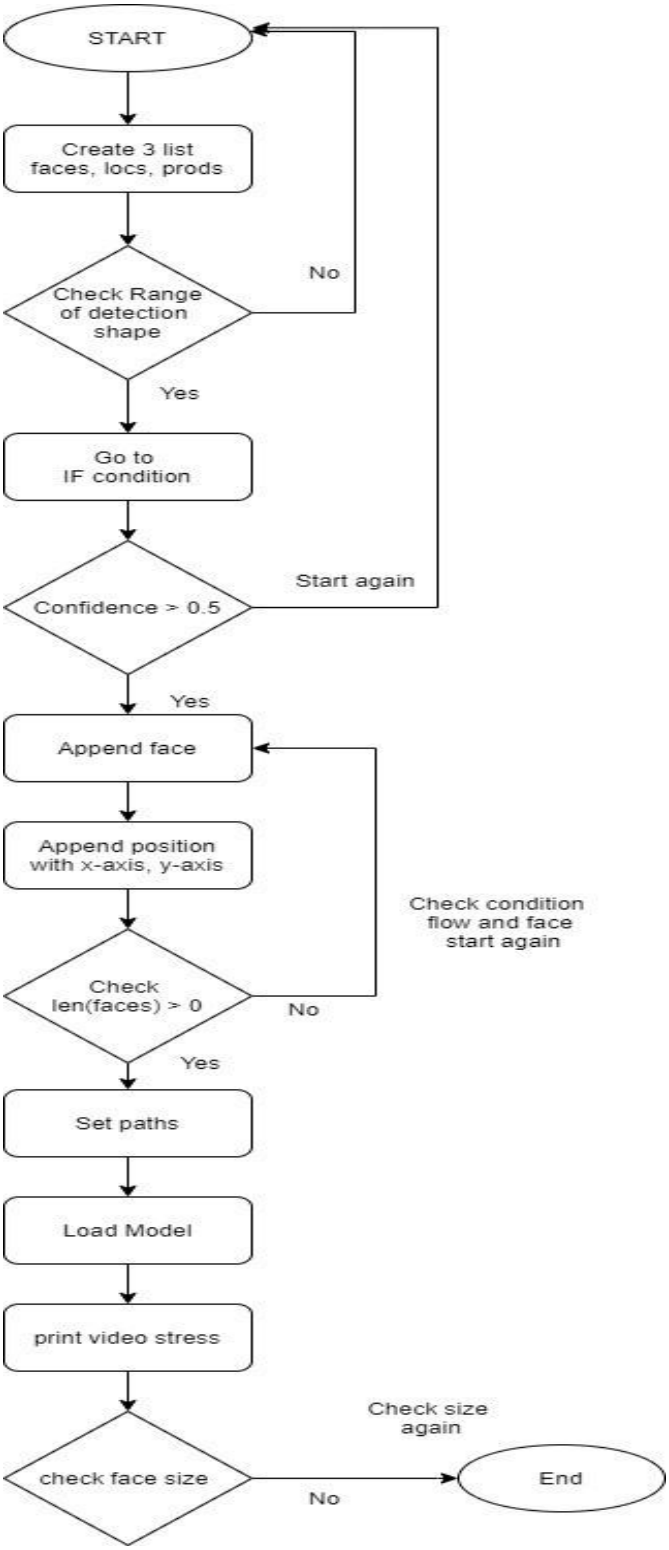

Figure 3: Illustrated the Flowchart of Face Size Model

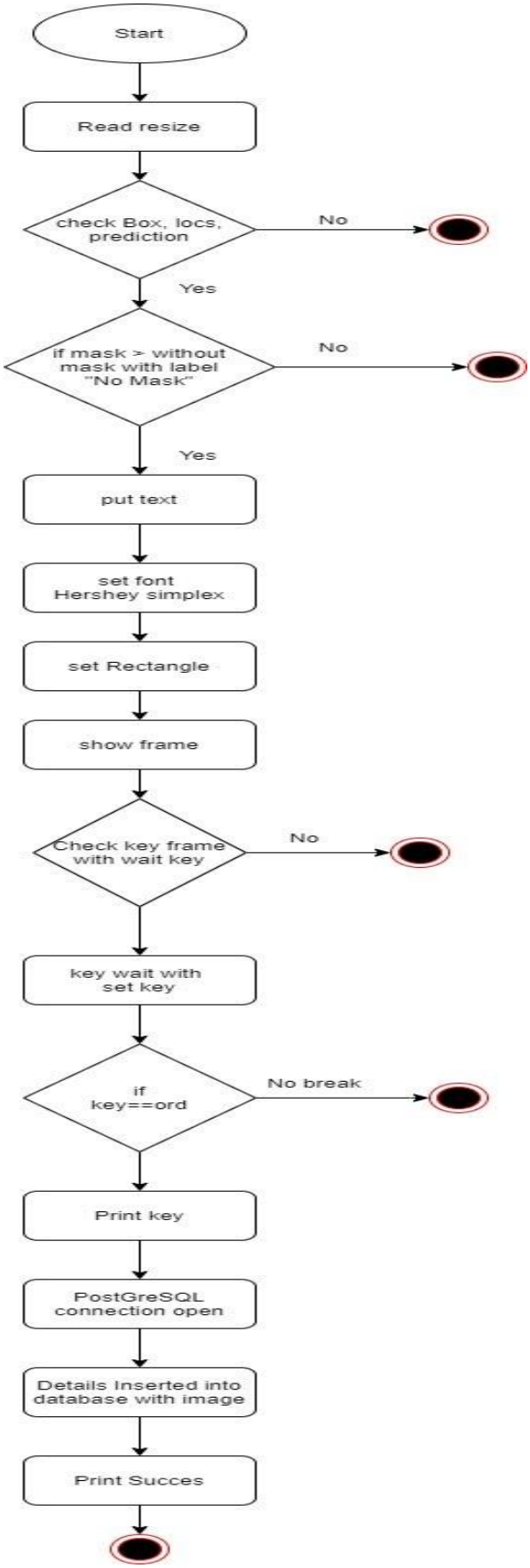

Figure 4: Illustrated the Flowchart of Details Checking Model

4. DISCUSSION

4.1.Working of Details checking model:

After face size is detected in the frame then while loop will read and check the Box, locs, prediction, if predicted then it will the label “Mask” for image with mask and “No Mask” for image with no mask. And then this model

will put the text using cv2 and sets the Hershey Simplex font then set the rectangle and show frame using show method and check the key frame with wait Key and if we press key then it will open the PostgreSQL connection and insert images with details and print success.

A fingerprint recognition system is a software system that compares a human face from a digital photograph or direction of the movement to a set of training data. It locates and measures face traits from just a given picture, and it is often used to validate individuals through Email verification solutions.

Similar systems were initially created as a kind of software system in the 1960s. Since its inception, machine learning algorithms have been employed on smartphones and in other types of technology, such as robots. Because they analyse a person's physiological features, automated machine learning algorithms are categorised as biometrics. Biometrics are less successful as sensor authentication than detection and fingerprint recognition, yet they are widely utilized due to their seamless nature. Object recognition systems have been employed in highly evolved interfaces, camera footage, and automatic photo routing.

Facial recognition technology is currently used by governments and business entities all over the world. Their effectiveness varies, and many have been terminated in the past owing to inefficiency. Imaging systems have also caused criticism, with worries that they violate residents' privacy, often produce incorrect identifications, perpetuate gender stereotypes and systemic racism, and fail to maintain vital medical features. As a consequence of these claims, face recognition technology has been outlawed in a number of sites throughout the United States. In response to mounting societal concerns, Meta declared that it will shut down Facebook's biometric identification, erasing the profile datasets of over half billion users. This could be one of the most important breakthroughs in the tradition of facial recognition technology.

5. CONCLUSION

In this proposed research we have made only algorithm using OpenCV, Tensor Flow, and NumPy with the database to store the images of without mask so that when there is a need of any person’s image of without mask then it will be available but it will be implemented in future using PostgreSQL database.

As we can see increase in the epidemic virus and with the new variants also it is necessary to wear a mask for everyone’s precautions. So, to check the application is greatly needed to check to see whether the individual is wearing a mask. In future we can add the database which stores the data and can be retrieve whenever needed. And can be used in traffic surveillance, hospitals, and companies etc. to check the database whenever required.

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