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AI BASED REALTIME FACE MASK DETECTION

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ABSTRACT

The world has not yet fully Recover from this pandemic and the vaccine that can effectively treat Covid-19 is yet to be discovered. Wearing a face mask will help prevent the spread of infection and prevent the individual from contracting any airborne infectious germs. Done by evaluation of the classification results by analysing real-time streaming from the Camera. Using Face Mask Detection System, one can monitor if the people are wearing masks or not. Here HAARCASACADE algorithm is used for image detection. Collating with other existing algorithms, this classifier produces a high recognition rate even with varying expressions, efficient feature selection and low assortment of false positive features. HAAR feature-based cascade classifier system utilizes only 200 features out of 6000 features to yield a recognition rate of 98-100%. According to this motivation we demand mask detection as a unique and public health service system during the global pandemic COVID-19 epidemic. The model is trained by face mask image and non-face mask image.

KEYWORDS

Face mask detection
Face edges (FMD)
CNN- Convolutional Neural Network

I.INTRODUCTION

Face mask detection is a promising area of applied computer vision. This technique is used to recognize a face or identify a person automatically from given images. In our daily life activities like, in passport checking, smart door, access control, voter

verification, criminal investigation, and many other purposes face recognition is widely used to authenticate a person correctly and automatically. Face recognition has gained much attention as a unique, reliable biometric recognition technology that makesit more popular than any other biometric technique like password, pin, fingerprint, etc. Many of the governments across the world are also interested in the face recognition system to secure public places such as parks, airports, bus stations, and railway stations, etc. Face recognition is one of the wellstudied real-life problems. Excellent progress has been done against face recognition technology.

II.PROPOSED SYSTEM

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 100% accuracy on distinguishing people with and without a facial mask for previously unseen test data While a person without a mask is detected, the corresponding authority is informed through the city network. The algorithm used is HAAR-CASCADE algorithm.

- Can be implemented anywhere
- works on every camera
- Optimized to perform on any condition.

III. MODULES DESCRIPTION

Dataset Collection and Dataset cleaning

Collecting data from various sources from online. These datasets are found from Kaggle and GitHub by Chandrika deb.Using pandas and Jupyter notebook and retrieving the data to the program and clear the unclean data from the set.Plotting graphs to find any correlations from the dataset.

Dataset Training to the model

The Viola-Jones algorithm which is used for objects recognition in an image and HAAR CASCADE algorithm is used for face detection. The use of additional modifications which will increase the speed of the algorithm in a particular image by 2-5 times with the loss of accuracy and completeness of the work by not more than the 3-5%. The training set is the material through which the computer learns how to process information. Machine learning uses algorithms – it mimics the abilities of the human brain to take in diverse inputs and weigh them, in order to produce activations in the brain, in the individual neurons. Artificial

neurons replicate a lot of this process with software – machine learning and neural network programs that provide highly detailed models of how our human thought processes work.

Fitting the model

Fitting refers to adjusting the parameters in the model to improve accuracy. The process involves running an algorithm on data for which the target variable ("labelled" data) is known to produce a machine learning model. Then, the model's outcomes are compared to the real, observed values of the target variable to determine the accuracy. The next step involves adjusting the algorithm's standard parameters in order to reduce the level of error and make the model more accurate when determining the relationship between the features and the target variable. This process is repeated several times until the model finds the optimal parameters to make predictions with substantial accuracy. The scaleinvariant feature transform (SIFT) is a feature detection algorithm in computer vision to detect and describe local features in images. Each cluster of 3 or more features that agree on an object and its pose is then subject to further detailed model verification. Subsequently outliers are discarded, given the accuracy of fit and number of probable false matches.

Implementing Model

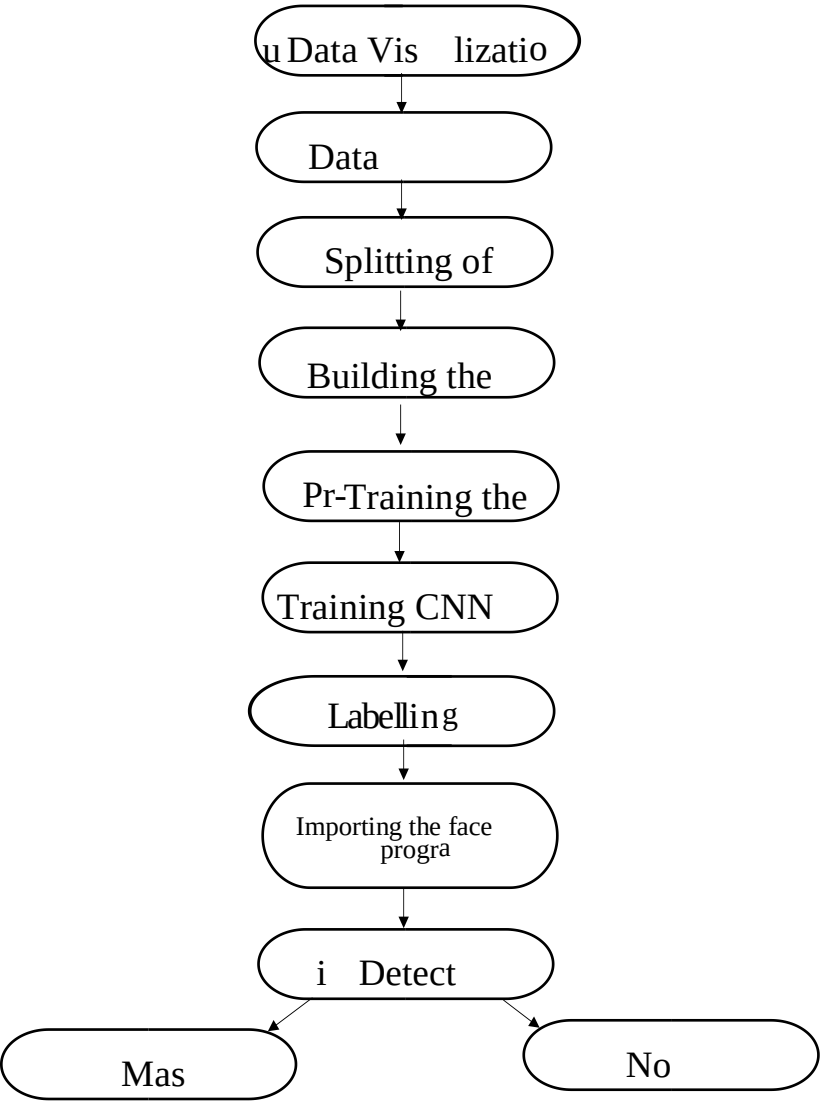
Model implementation results in selected, with equal consideration of the economic and environmental system aspects, the desalination resource is selected as the primary water supply resource serving at "charging" the water storage tank and satisfying the demand. On the other side the energy demand is primary met by wind and only in the case of deficit there is larger diesel penetration (than the 30% of initial operation condition).

The histogram of oriented gradients (HOG) is a feature descriptor used in computer vision and image processing for the purpose of object-detection. The technique counts occurrences of gradient orientation in localized portions of an image. Then the program is executed as of detect mask video.py which runs real-time video and produces face mask detection.

Dataset Link

https://github.com/prajnasb/observations/tree/master/experiements/

IV.SYSTEM ARCHITECTURE



considered to most critical stage in achieving a successful new system giving the user confidence that the new system will work and be effective.

V.SYSTEM TESTING AND IMPLEMENTATION

Implementation is the stage in the project theoretical design is turned into a working system. The most critical stage is achieving a successful system and giving the confidence of on the new system. It involves the implementation design of methods to the changes over methods.

The implementation process begins with the exploratory data analysis, data cleaning, preprocessing, data partition, and evaluation implementation of the system. According to this plan the activities are the plans, resources and how to test activities. Implementation is the stage of the project into the working system various data for and external sources algorithms are SVM algorithm and . To support image processing, high performance computing platforms are required. In other situation, privacy concerns, noise, and errors can be introduced into the data produce altereddata copies.

Fig. 5.1 System

The coding step a design representation into a programming languages realization. Thus, it can be

Integration Testing

Data can be lost across an interface, one module can have an adverse effect on the other sub function, when combined, may not produce the desired major function. Integrated testing is systematic testing that can be done with sample data. The need for the integrated test is to find the overall system performance. There are two types of integration testing. They are:

- Top-down integration testing.
- Bottom-up integration testing.

White Box Testing

White Box testing is a test case design method uses the control structure of the procedural desig drive cases. Using the white box testing methods derived test cases that guarantee that all indepen paths within a module have been exercised at once.

Black Box Testing

- Black box testing is done to find incorrect or missing function
- Interface error ● Errors in external database access
- Performance errors.
- Initialization and termination errors

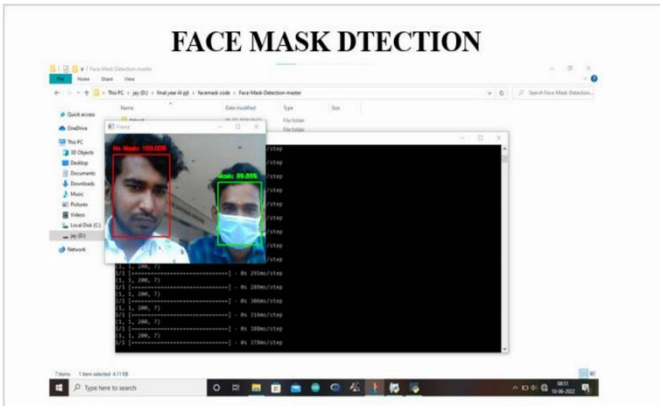
In 'functional testing', is performed to validate an application conforms to its specifications of correctly performs all its required functions. So this testing is also called 'black box testing'. It tests the external behaviour of the system. Here the engineered product can be tested knowing the specified function that a product has been designed to perform, tests can be conducted to demonstrate that each function is fully operational.

Validation Testing

After the culmination of black box testing, software is completed assembly as a package, interfacing errors have been uncovered and corrected and final series of software validation tests begin validation testing can be defined as many, but a single definition is that validation succeeds when the software functions in a manner that can be reasonably expected by the customer

VI.WORKING

Fig:3 With & Without Mask – Output



VII. Conclusion

Fig: 1 sample images

Fig: 2 Running Of Model

As the technology are blooming with emerging trends the availability so we have novel face mask detector which can possibly contribute to public healthcare. The architecture consists of Mobile Net as the backbone it can be used for high and low computation scenarios. In order to extract more robust features, we utilize transfer learning to adopt weights from a similar task face detection, which is trained on a very large dataset. We used OpenCV, tensor flow, and NN to detect whether people were wearing face masks or not. The models were tested with images and real-time video streams. The accuracy of the model is achieved and, the optimization of the model is a continuous process and we are building a highly accurate solution by tuning the hyper parameters. This specific model could be used as a use case for edge analytics. Furthermore, the proposed method achieves state-of-the-art results on a public face mask dataset. By the development of

face mask-detection we can detect if the person is wearing a face mask and allow their entry would be of great help to the society

VIII. Future Work

Future Enhancement is completely depended on the smart network system, as by deploying face mask program as a module in the system the COVID-19 will be reduced, these enhancements may contain of finding a person identity using project in future, where attaching the mask virtually in their government identification card which will produce lower accuracy but in future the algorithms can help them to produce a great accuracy and dynamic programs to find an individual even with mask. The quality of the mask can also be found, and must be able to differentiate cloth and mask.

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