Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 19535- 19540
Received 05 March 2021; Accepted 01 April 2021.

Face Mask Detection Using Python

Divyanshu Fauzdar[1], Saurabh Aditya[2], Ankit Raj[3]

[1]Department of Computer Science and Engineering Galgotias University, Greater Noida, India
fauzdardivyanshu@gmail.com
[2]Department of Computer Science and Engineering Galgotias University, Greater Noida, India Saurabhaditya9@gmail.com
[3]Department of Computer Science and Engineering Galgotias University, Greater Noida, India rajankit2121@gmail.com

ABSTRACT
Currently, the whole world is facing the COVID19 epidemic. The virus grows unparalleled. If you would like to be safe and build a security community then we will wear a facemask. Therefore, we have a tendency to try to create a model that can determine whether a person has a facemask or not. Face detection has changed as a normal return on image and Laptop viewing process. New square rules have been developed using the exploitation of framing algorithms as appropriate. These decision-making bodies have made it easy to extract even the details of an item. We have a tendency to aim for a binary split face style that will find any facial gift within the framework despite its alignment. We have a tendency to give a back gift with the right face masks from any size less image. Starting with an RGB image of any size, this method uses predefined Weights for VGG16 design. The processed model is trained and tested on the Face-Mask-12k-Images-Dataset. To enhance the proposed model, we used image augmentation technique on train and test dataset. The accuracy of the proposed model is 99.05% during training and 100% during testing.

Keywords: VGG16, FCN, Face-Mask-12k-Images-Dataset

Literature Reviews/Comparative study:

Rapid advancements within the fields of Science and Technology have diode U.S.A. to a stage wherever we have a tendency to square measure capable of achieving feats that appeared unbelievable some decades past. Technologies in fields like Machine Learning and AI have created our lives easier and supply solutions to many complicated issues in varied areas. trendy pc Vision algorithms square measure approaching human-level performance in beholding tasks. From image classification to video analytics, pc Vision has proved to be a revolutionary facet of contemporary technology. Ina world battling against the Novel Coronavirus illness (COVID-19) pandemic, technology has been a lifesaver. With the help of technology, 'work from home' has substituted our traditional work routines and has become a vicinity of our daily lives. However, for a few sectors, it's not possible to adapt to the present new norm. because the pandemic slowly settles and such sectors become desirous to resume in-person work, people square measure still skeptical of obtaining back to the workplace. sixty fifth of staff square measure currently anxious regarding returning to the workplace (Woods,2020). Multiple studies have shown that the utilization of face masks reduces the chance of infectious agent transmission moreover as provides a way of protection (Howard et al., 2020; Verma et al.,2020). However, it's unfeasible to manually enforce such a policy on giant premises and track any violations. pc Vision provides a far better various to the present. employing a combination of image classification, object detection, object following, and video analysis, we have a tendency to developed a sturdy system that may sight the presence and absence of face masks in pictures moreover as videos. Here, we have a tendency to propose a two-stage CNN design, wherever the primary stage detects human faces, whereas the second stage uses a light-weight image categoryifier to classify the faces detected within the initial stage as either 'Mask' or 'No Mask' faces and attracts bounding boxes around them beside the detected class name. This algorithmic rule was more extended to videos moreover. The detected faces square measure then half-track between frames mistreatment associate degree object following algorithmic rule, that makes the detections sturdy to the noise because of motion blur. this technique will then be integrated with a picture or video capturing

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 19535- 19540
Received 05 March 2021; Accepted 01 April 2021.
device sort of a CCTV camera, to trace safety violations, promote the utilization of face masks, and guarantee a secure operating setting.

Problem Formulation

- COVID-19 is related to Associate in Nursing unprecedented catastrophe that ends up in a large style of injuries and safety considerations.
- During this epidemic, it's necessary to wear a mask and it's terribly dangerous if an individual doesn't wear a mask.
- Forestall bank robberies.
- During this context of Covid-19 news, there aren't any applications to induce a mask that saves the realm that's in dire want of transportation implies that densely inhabited areas, residential regions, major makers and separate businesses produce some security.
- The system is commonly simply employed by any camera or hardware like investigating cameras.
- There's no have to be compelled to be forced to put in any hardware as a result of the system is sometimes connected to the aspect of your existing tv solely.
-

Required Tools:

1. Keras
2. TensorFlow
3. NumPy
4. CNN
5. VGG16
6. OpenCV
7. Matplotlib
8. Scikit-learn

Feasibility Analysis:

In the mean, several systems are developed for COVID19 in sensible town networks. BlueDot methodology was initially accustomed to mark the cluster of bizarre unwellness respiratory illness respiratory disorder in the metropolis that finally detected the disease as a virus. It additionally predicts that the virus would unfold from Wuhan to Bangkok, Taipei, Singapore, capital of Japan and city. HealthMap service supported San Francisco, noticed the patients with a cough that is that the initial sign of COVID19, victimisation computing (AI) and large information. A study on victimisation facemask to limit the expansion of COVID19 is very important and here we've got done the study. The study indicated that the masks that area unit adequately work, effectively interrupt the unfold of droplets expelled once coughing or instinctive reflex. Masks that aren't dead fitted, additionally capable of retentive mobile particles and viruses. Allam and Jones planned a framework on sensible town networks specializing in however information sharing ought to be performed throughout the occurrence of COVID19. The planned system mentioned the prospects of Urban Health information concerning the protection problems with the economy and national security. within the system, the info is collected from varied points of the town victimisation sensors, trackers, and from laboratories. A mask detective work model named Retinal mask combining with a cross-category object removal rule is planned by JiangTetTal. The developed model includes one stage detector consisting feature pyramid network that ends up in slightly higher

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 19535- 19540
Received 05 March 2021; Accepted 01 April 2021.
exactitude and recalls than the baseline result. For reducing the shortage of datasets, they need applied transfer learning, a widely known deep learning technique. GuptaTetTal. planned a model to enforce the social distance victimisation sensible town and Intelligent installation (ITS) throughout the COVID19 pandemic. Their model delineates the deploying sensors in numerous places of the town to watch the time period movement of objects and offered a knowledge-sharing platform. an understandable contribution of a sensible town in dominant the unfold of coronavirus in the Republic of Korea is explained by Won Sonn and Lee. A time area geographer sped up the contact chase within the town as well as patient movement, purchase history, mobile phone usages, and mobile phone location. Real-time watching has been administrated on CCTV cameras within the hallways of residential buildings. SinghTetTal. place their specialise in however IoT will fight against COVID19. The developed system emphasizes interconnected devices or operations to trace the patients in conjunction with cautious cases. Sophisticated cluster victimisation interconnected devices is made to spot the clusters considerably. a motivating pandemic management model, while not imprisoned in an exceedingly sensible town, has been printed by SonnTetTal. The patients are interviewed and their past movement has been monitored. they need to be claimed that some patients tried to hide concerning their past quality however time period chase system found the precise data. JaiswalTetTal. planned the way to attenuate the chance throughout COVID19. Their planned model used the position of technology to trace infected individuals. Drones and golem technologies are applied as medical personnel for providing adequate services to infected individuals. the event of sensible cities beneath COVID19 and the dominant pandemic in China has been reviewed by WangTetTal. the continual provision of essential materials and contactless supply distribution of systems to society created the thanks to cut back the unfold of coronavirus. ITS and time period map reflection strategies are accustomed to block the movement of vehicles throughout the pandemic. additionally, driverless vehicles are accustomed monitor the situations across the town.

Work Plan:

It is evident from the dataset description that their area unit a restricted range of samples because of the govt. norms regarding the protection and privacy of the people. Whereas deep learning models struggle to find out in presence of a restricted range of samples. Hence, over-sampling is often the key to handle the challenge of restricted knowledge accessibility. Thereby the planned methodology is split into 2 phases. The first part deals with over-sampling with image augmentation of the coaching knowledge whereas the second part deals with the detection of mask victimisation transfer learning of InceptionV3. Image enlargement can be a common way to increase the size of a training database by effectively converting images within the database. during this analysis, the training images are enlarged with eight different functions mainly cutting, contrast, ping horizontal, rotation, zoom, shading. The generated data is redeemed at 224 x 224 pixels and reborn in a single greyscale channel image.

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 19535- 19540
Received 05 March 2021; Accepted 01 April 2021.

Fig. 1: Masked and Without masked images

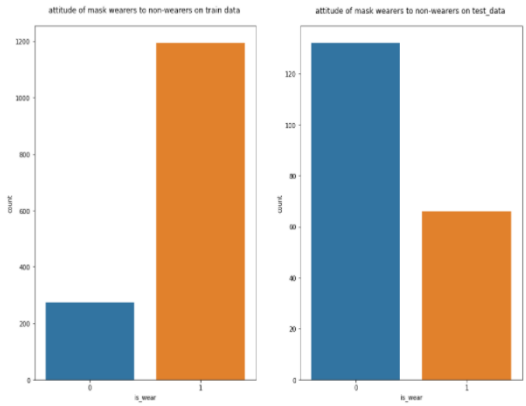


Fig 2: Count plot of masked and without masked images

Deep networks used for image integration is a result of its higher performance than other algorithms. but training a deep neural network is expensive because it requires high process power and other resources, and it is long. in order to build a network train that is faster and more expensive, learning with in-depth transfers based on learning has emerged. Transfer study permissions that transmit the neural network's trained data in accordance with the para-metric weights in the new model. The transfer of learning enhances the performance of the new model even if it is trained in a small database. There is a square measuring many previously trained models such as InceptionV3, MobileNet, MobileNetV2, VGG16, ResNet50, etc. With this paper, a learning-based approach is developed using the pre-trained VGG16 model to distinguish non-facial people. With this function, the final layer of VGG16 is removed and optimized by adding three layers to the network. The three-dimensional layers add a square measuring 5 x 5 of the pooling layer, the ending attending layer, followed by a dense layer of 256 ReLU neurons and an exit scale of 0.5, and a decisive determining layer - 2 neurons and sigmoid function are supported to distinguish whether a person is wearing a mask or not. The VGG16 model is trained for 10 epochs each time with 46 steps. A schematic diagram of the planned route is shown in Fig. 3. The structure of the planned model is shown in Fig. 4.

Fig. 3: Schematic diagram of the planned route

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 19535- 19540
Received 05 March 2021; Accepted 01 April 2021.

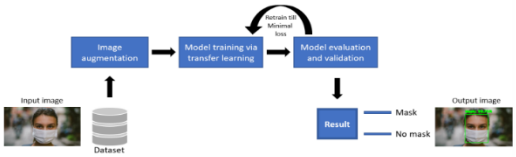
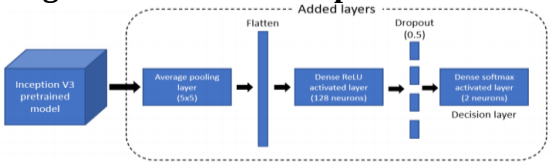


Fig. 4: Structure of the planned model



The idea of this analysis is to improve the automated approach. Officials of the united states watch their voters carry masks in public places. As a result, an automated system was developed that used VGG16 transmission learning to distinguish non-facial characters. with a few random samples, the model release shows a binding box around the face where it is unconscious and the red colour indicates that the person is wearing a mask and not carrying a mask separately and a measure of arrogance, as shown in Fig. 5.

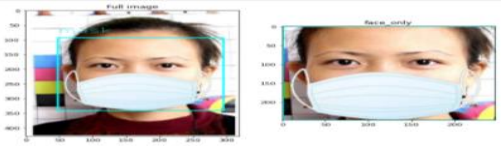


Fig. 5(A): Prediction of wearing mask

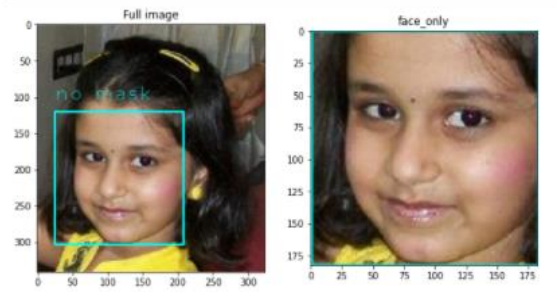


Fig. 5(B): Prediction of wearing no mask

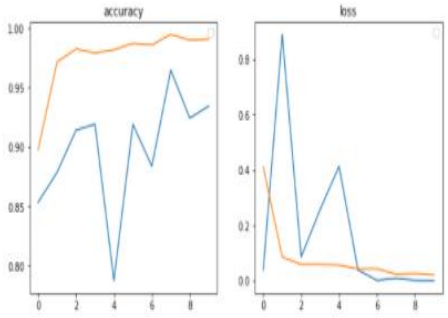


Fig. 6: Comparison of accuracy and loss of the proposed model during training and testing

Annals of R.S.C.B., ISSN:1583-6258, Vol. 25, Issue 4, 2021, Pages. 19535- 19540
Received 05 March 2021; Accepted 01 April 2021.

Conclusion

The motivation for the paper comes from non-compliant people who are forced to stop the spread of coronavirus. The program contains the composition of finding a face mask in which an in-depth learning algorithm is used to find a face mask. To train the model, the labelled image data was used when the images were masked faces and without a mask. The proposed system receives a face mask with 99.05% accuracy. The decision of the severance network is referred to by the corresponding authorities. The plan proposed in this paper will serve as an important tool to strictly enforce the use of face masks in public places.

References

1. Dataset, https://www.kaggle.com/ashishjangra27/face-mask-12k-images-dataset
2. https://covid19.who.int/
3. QIN, B., LI, D.: Identifying facemask-wearing condition using image super resolution with classification network to prevent covid-19 (2020)
4. Jeong-Seon Park, You Hwa Oh, Sang Chul Ahn, Seong-Whan Lee: Glasses removal from facial image using recursive error compensation. IEEE Transactions on Pattern Analysis and Machine Intelligence 27(5), 805–811 (2005)
5. Feng, S., Shen, C., Xia, N., Song, W., Fan, M., Cowling, B.J.: Rational use of face masks in the covid-19 pandemic. The Lancet Respiratory Medicine 8(5), 434–436 (2020)
6. Howard, A.G., Zhu, M., Chen, B., Kalenichenko, D., Wang, W., Weyand, T., Andreetto, M., Adam, H.: Mobilenets: Efficient convolutional neural networks for mobile vision applications. CoRR abs/1704.04861 (2017), http://arxiv.org/ abs/1704.04861