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Face Mask Detection and Classification System Using Deep Learning

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Abstract: COVID-19 pandemic caused by novel corona virus is unendingly spreading up to now everywhere the planet. The impact of COVID-19 has been fallen on the majority sectors of development. The health care system goes through a crisis. several preventative measures are taken to cut back the unfold of this sickness wherever carrying a mask is most significant one in all them. In this paper, we have a tendency to propose a system that restricts the expansion of COVID-19 by looking for people that aren't carrying any facial mask in a very good town network wherever all the general public places area unit monitored with television system (CCTV) cameras.   While someone while not a mask is detected, the corresponding authority is educated through the town network. A deep learning design is trained on a dataset that consists of pictures of individuals with and while not masks collected from numerous sources. The trained design achieved ninety-eight accuracies on characteristic folks with and while not a facial mask for antecedently unseen check knowledge. It's hoped that our study would be a useful gizmo to cut back the unfold of this disease for several countries within the world. A mask detection dataset consists of with mask and while not mask pictures, we have a tendency to area unit planning to use OpenCV to try to period of time face detection from a live stream via our digital camera We will use the dataset to create a COVID-19 mask detector with pc vision exploitation Python, OpenCV, and Tensor Flow and Kera's. Our goal is to spot whether or not the person on image/video stream carrying a mask or not with the assistance of pc vision and deep learning.
Keywords: knowledge visualisation, knowledge Augmentation Preprocessing Image, Classifying Mask and No Mask.

I. INTRODUCTION

The planet Health Organization (WHO) has declared the corona virus sickness 2019 (COVID-19) a deadly disease. a worldwide coordinated effort is required to prevent the more unfold of the virus. A deadly disease is outlined as "occurring over a large geographical region Associate in Nursing poignant an exceptionally high proportion of the population." In 2020, the fast spreading of COVID-19 has forced the planet Health Organization to declare COVID- nineteen as a worldwide pandemic. In 2020, the quick spreading of Covid-19 has forced the World Health Organization to declare Covid-19 as international pandemic. This novel corona virus was named Corona virus sickness 2019 (COVID-19) by World Health Organization in February 2020. The virus is cited as SARS-CoV-2 and also the associated sickness is COVID-19. Corona viruses are a family of viruses that cause ill health such as respiratory diseases or channel diseases. metastasis diseases can range from the respiratory disorder to a lot of severe diseases like Middle East metastasis Syndrome (MERS-CoV) and Severe Acute metastasis Syndrome(SARS-CoV). The virus spreads through shut contact and in huddled and overcrowded areas. The corona virus epidemic has given rise to a unprecedented degree of worldwide scientific cooperation. folks area unit forced by laws to wear face masks publicly in several countries. These rules Associate in Nursing laws were developed as an action to the exponential growth in cases and deaths in several areas.

II. SYSTEM ANALYSIS

A. Existing System

The virus spreads through shut contact and in huddled and overcrowded areas. The corona virus epidemic has given rise to a unprecedented degree of worldwide scientific cooperation.People area unit forced by laws to wear face masks publicly in several countries. These rules Associate in Nursingd laws were developed as an action to the exponential growth in cases and deaths in several areas.

B. Proposed System

The projected system detects whether or not someone carrying mask or not from the image or video streamed. The deep learning algorithms used area unit OpenCV, Tensorflow, and Keras library. The caffemodel is employed to coach the neural network with weights and parameters.

Preprocessing image: For preprocessing the image we have a tendency to like OpenCV's blot From Image perform. This performs the foremost necessary functions particularly mean subtraction and scaling by some issue. Data Augmentation: during this the pictures within the dataset area unit cropped and resized for coaching the model. a lot of pictures area unit enclosed for dataset extension. Detect mask from face: once pictures area unit being preprocessed and increased ensuing step is to create the model generate new prediction, for this the model. Predict is employed and therefore the long run prediction is obtained. ensuing step is to load the trained model exploitation load model that has needed parameters. the pictures area unit being classified with proportion of carrying mask and not carrying. The video input is spilt into frames and also the prediction is completed.

III.   DEVELOPMENT ATMOSPHERER

A. Hardware Requirement

Memory: 8GB

Graphics Card: NVIDIA GeForce GTX970

CPU: Intel Core i5-4590

OS: Windows seven SP

B. Software Requirement

Colab

Google Chrome

IV.   MODULE DESCRIPTION

DATA visualization: In this commencement, allow us to visualize the overall range of pictures within the dataset in these 2 classes. Dataset

A. Data Augmentation

Image knowledge augmentation could be a technique that may be wont to unnaturally expand the dimensions of a coaching dataset by making changed versions of pictures within the dataset. coaching deep learning neural network models on a lot of knowledge may result in additional skillful models, and also the augmentation techniques will produce variations of {the pictures the photographs} that may improve the power of the match models to generalize what they need learned to new images. The Keras deep learning neural network library provides the potential to suit models exploitation image knowledge augmentation via the Image knowledge Generator class..

B. Preprocessing Image

The aim of pre-processing is Associate in Nursing improvement of the image knowledge that suppresses unwanted distortions or enhances some image options necessary for more process.

C. Construction Of Model

The construction of convolution network is troublesome therefore as an alternative we have a tendency to pre-train the ConvNet on a awfully massive dataset exploitation Transfer Learning. the 2 structure of transfer learning area unit Fine-tuning the convent and creating it a set feature extractor.

- Fine-tuning the convNet: Instead of random data formatting, we have a tendency to initialize the network with a pre-trained network, just like the one trained on the image dataset. the rest of the preparation is as traditional.
- ConvNet as a set feature extractor: We freeze the weights for the complete network aside from the ultimate absolutely connected layer. This last absolutely connected layer is replaced by a brand new one with random weights and solely this layer is trained.

D. Pre-Training The CNN Model

once elevating the model the perform train_model and visualize_model area unit wont to train and find the output.

The model embody the subsequent steps

* iterating over the info

* creating the parameter gradient zero

* forward and trailing history with loss proportion

* Backward and improvement.

The on top of steps administered exploitation the loss.backward( ) and optimizer.step( ) functions and also the time go on is additionally generated.

E. Detect Mask From Face

once pictures area unit being preprocessed and increased ensuing step is to create the model generate new prediction, for this the model.predict is employed and therefore the long run prediction is obtained. ensuing step is to load the trained model exploitation load_model that has needed parameters. the pictures area unit being classified with proportion of carrying mask and not carrying. The video input is spilt into frames and also the prediction is completed.

F. Classifying Mask And No Mask

The perform visualize_model with 2 sub perform plt.ioff( ) and plt.show( ) can categorise the mask and no mask with that our faces area unit displayed with a caption on top of the face.

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The model embody the subsequent steps

- Iterating over the info
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- Forward and trailing history with loss proportion
- Backward and improvement.

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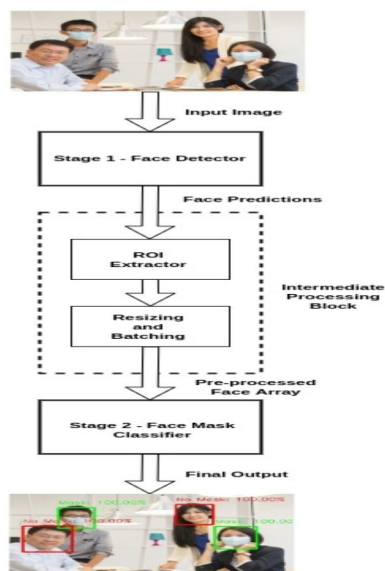
V. SYSTEM ARCHITECTURE

Fig: System architecture

VI. CONCLUSION

To alleviate the unfold of COVID-19 pandemic, few measures area unit taken that embody carrying mask. As technology makes our life ease therefore we've got build a mask detector and classifier which may probably assist public health care. The design used is MobileNetV2 that act as a elementary strength. The MobileNetV2 design is most well-liked over different architectures because it makes the model installation on the embedded systems easier. The Transfer learning is employed for fine standardization the convolution network and so as to extract the options, it adopts weight of the total network except the ultimate absolutely connected layer.

VII. FUTURE IMPROVEMENT

More than fifty countries round the world have recently initiated carrying face masks mandatory. folks have to be compelled to cowl their faces publicly, supermarkets, public transports, offices, and stores. Retail corporations usually use software system to count the amount of individuals coming into their stores. they will conjointly wish to live impressions on digital displays and promotional screens. we have a tendency to area unit reaching to improve our mask Detection tool Associate in Nursing unleash it as an ASCII text file project. Our software system will be equated to any existing USB, IP cameras, and CCTV cameras to notice folks while not a mask

REFERENCES

[1] B. QIN and D. Li, characteristic facemask-wearing condition exploitation image super-resolution with classification network to stop COVID-19, May 2020, doi: 10.21203/rs.3.rs-28668/v1.

[2] S.A.Hussain, A.S.A.A.Balushi, a true time face feeling classification and recognition exploitation deep learning model, J. Phys.: Conf. Ser. 1432 (2020) 012087, doi: 10.1088/1742- 6596/1432/1/012087.

[3] A. Nieto-Rodríguez, M. Mucientes, V.M. BreaSystem for medical mask detection within the operating theater through facial attributes Pattern Recogn. Image Anal. Cham (2015), pp. 138- 145, 10.1007/978-3-319-19390-8_16.

[4] M.S. Ejaz, M.R. Islam, M. Sifatullah, A. Sarker .Implementation of principal element analysis on cloaked and non-masked face recognition 2019 first International Conference on Advances in Science, Engineering and AI Technology (ICASERT) (2019), pp. 15, 10.1109/ICASERT.2019.8934543.

[5] Sultana, F. A. Sufian, and P. Dutta. "A review of object detection models supported convolutional neural network." arXiv preprint arXiv:1905.01614 (2019).

[6] MobileNets: economical Convolutional Neural Networks for Mobile Vision Applications - Apostle G. Howard, Menglong Zhu, Bo Chen, Dmitry Kalenichenko, Weijun Wang, Tobias Weyand, Marco Andreetto, Hartwig Adam.

[7] Image Classification exploitation Convolutional Neural Networks DeepikaJaswal, Sowmya.V, K.P.Soman

[8] SSDMNV2: a true time DNN-based mask detection system exploitation single shot multibox detector and MobileNetV2, PreetiNagrath, Rachna Jain, Agam Madan, Rohan Arora, PiyushKataria,and Jude Hemanth.

[9] https://www.irjet.net/archives/V7/i8/IRJET-V7I8530.pdf COVID-19 Fame Mask Detection with Deep Learning and pc Vision, Vinitha, Velantina.

[10] membrane mask Detector, Mingjie Jiang, Xinqi Fan, Hong Yan.

[11] A completely unique Approach To notice mask to regulate Covid19 exploitation Deep Learning, T Subhamastan Rao1 , S Anjali Devi2 , P Dileep3 , M Sitha Ram4.

[12] Real Time Multi-Scale Facial Mask Detection and Classification exploitation Deep Transfer Learning Techniques, Ssvr Kumar Addagarla1, G Kayla Chakravarthi2, P Anitha3.

[13] Face Mask Detector exploitation Machine Learning and Image process, Amrit Kumar Bhadani1, Anurag Sinha2.

[14] A Deep Learning primarily based helpful System to Classify COVID-19 mask for Human Safety with YOLOv3. Author:Md. RafiuzzamanBhuiyan, SharunAkterKhushbu, Md. Sanzidul Islam.

[15] https://github.com/kairess/maskdetection/blob/master/image.ipynb

[16] https://github.com/mahfujur1/Face-mask-Classification-PyTorch

[17] https://towardsdatascience.com/a-comprehensive-guide-to-convolutional-neural-networks-the-eli5-way-3bd2b1164a53

[18] http://adilmoujahid.com/posts/2016/06/introduction-deep-learning-python-caffe/

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