Review Paper On Face Mask Detection In Covid 19 Using Machine Learning Technique

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Abstract- *The corona virus COVID-19 pandemic is inflicting a worldwide fitness disaster so the powerful safety techniques is sporting a face masks in public regions consistent with the World Health Organization (WHO). The COVID-19 pandemic forced governments across the global to impose lockdowns to prevent virus transmissions. Reports indicate that sporting facemasks even as at paintings honestly reduces the chance of transmission. A green and monetary method of the usage of AI to create safe surroundings in a production setup. A hybrid version the usage of deep and classical device getting to know for face masks detection may be presented. A face masks detection dataset is composed of with masks and without masks images, we're going to use caffe model to do real-time face detection from a stay circulation via our webcam. We will use the dataset to construct a COVID-19 face masks detector with laptop imaginative and prescient the usage of Python.*

Keywords- Deep Learning, Computer Vision, Object Detection, OpenCV, Images, Videos, Caffe model.

I. INTRODUCTION

The trend of carrying face mask in public is growing because of the COVID- 19 corona virus epidemic all around the world. Before Covid-19, People used to put on mask to defend their fitness from air pollution. While different humans are self-conscious approximately their looks, they conceal their feelings from the public through hiding their faces. Scientists proofed that carrying face mask works on impeding COVID-19 transmission. COVID19 (called corona virus) is the ultra-modern epidemic virus that hit the human fitness withinside the remaining century. In 2020, the rapid spreading of COVID-19 has compelled the World Health Organization to claim COVID- 19 as a international pandemic. More than 5 million instances had been inflamed through COVID-19 in much less than 6 months throughout 188 countries. The virus spreads via near touch and in crowded and overcrowded areas. The corona virus epidemic has given upward push to an extraordinary diploma of global medical cooperation. Artificial Intelligence (AI) primarily based totally on Machine getting to know and Deep Learning can assist to combat Covid-19 in lots of ways. Machine getting to know lets in researchers and clinicians compare vast portions of facts to forecast the distribution of COVID- 19, to function an early caution mechanism for potential pandemics, and to categories prone populations. The provision of healthcare wishes investment for emerging generation which includes synthetic intelligence, IoT, huge facts and gadget getting to know to address and expect new diseases. In order to higher apprehend contamination prices and to hint and speedy locate infections, the AI's strength is being exploited to deal with the Covid-19 pandemic. People are compelled through legal guidelines to put on face mask in public in lots of countries. These regulations and legal guidelines had been evolved as an motion to the exponential growth in instances and deaths in lots of areas. However, the technique of tracking massive businesses of humans is turning into more difficult. The tracking technique includes the detection of everyone who isn't carrying a face mask. Here we introduce a masks face detection version thatis primarily based totally on pc imaginative and prescient and deep getting to know. The proposed version may be incorporated with surveillance cameras to obstruct the COVID-19 transmission through permitting the detection of humans who're carrying mask now no longer carrying face mask. The version is integration among deep getting to know and classical gadget getting to know techniques.

A. MACHINE LEARNING

Machine learning (ML) is the study of computer algorithms that improve automatically through experience. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so.

Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop conventional algorithms to perform the needed tasks. Machine learning is closely related to computational statistics, which focuses on making predictions using computers. The study of mathematical optimization delivers methods, theory and application domains to the field of machine learning. Data mining is a related field of study, focusing on exploratory data analysis through unsupervised learning.In its

application across business problems, machine learning is also referred to as predictive analytics.

B. DEEP LEARNING

Deep learning methods aim at learning feature hierarchies with features from higher levels of the hierarchy formed by the composition of lower level features. Automatically learning features at multiple levels of abstraction allow a system to learn complex functions mapping the input to the output directly from data, without depending completely on human-crafted features. Deep learning algorithms seek to exploit the unknown structure in the input distribution in order to discover good representations, often at multiple levels, with higher-level learned features defined in terms of lower-level features.

The hierarchy of concepts allows the computer to learn complicated concepts by building them out of simpler ones. If we draw a graph showing how these concepts are built on top of each other, the graph is deep, with many layers. For this reason, we call this approach to AI deep learning. Deep learning excels on problem domains where the inputs (and even output) are analog. Meaning, they are not a few quantities in a tabular format but instead are images of pixel data, documents of text data or files of audio data. Deep learning allows computational models that are composed of multiple processing layers to learn representations of data with multiple levels of abstraction

C. OpenCV

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. Being a BSD-licensed product, OpenCV makes it easy for businesses to utilize and modify the code.

The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of- the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc. OpenCV has more than 47 thousand people of user community and estimated number of downloads exceeding 18 million. The library is used extensively in companies, research groups and by governmental bodies.Along with well- established companies like Google, Yahoo, Microsoft, Intel, IBM, Sony, Honda, Toyota that employ the library.

D. TensorFlow

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks. It is used for both research and production at Google, TensorFlow is Google Brain's second-generation system. Version 1.0.0 was released on February 11, While the reference implementation runs on single devices, TensorFlow can run on multiple CPUs and GPUs (with optional CUDA and SYCL extensions for general-purpose computing on graphics processing units).

Tensor Flow is available on 64-bit Linux, macOS, Windows, and mobile computing platforms including Android and iOS. Its flexible architecture allows for the easy deployment of computation across a variety of platforms (CPUs, GPUs, TPUs), and from desktops to clusters of servers to mobile and edge devices.

The name Tensor Flow derives from the operations that such neural networks perform on multidimensional data arrays, which are referred to as tensors. During the Google I/O Conference in June 2016, Jeff Dean stated that 1,500 repositories on GitHub mentioned TensorFlow, of which only 5 were from Google.Unlike other numerical libraries intended for use in Deep Learning like Theano, TensorFlow was designed for use both in research and development and in production systems, not least RankBrain in Google search and the fun DeepDream project.It can run on single CPU systems, GPUs as well as mobile devices and large scale distributed systems of hundreds of machines.

E. KERAS

Keras is an API designed for human beings, not machines. Keras follows best practices for reducing cognitive load: it offers consistent & simple APIs, it minimizes the number of user actions required for common use cases, and it provides clear & actionable error messages. It also has extensive documentation and developer guides. Keras contains numerous implementations of commonly used neural-network building blocks such as layers, objectives, activation functions, optimizers, and a host of tools to make working

with image and text data easier to simplify the coding necessary for writing deep neural network code. The code is hosted on GitHub, and community support forums include the GitHub issues page, and a Slack channel. Keras is a minimalist Python library for deep learning that can run on top of Their no or Tensor Flow. It was developed to make implementing deep learning models as fast and easy as possible for research and development. It runs on Python 2.7 or 3.5 and can seamlessly execute on GPUs and CPUs given the underlying frameworks. It is released under the permissive MT license.

Keras was developed and maintained by François Chollet, a Google engineer using four guiding principles:

- **Modularity:** A model can be understood as a sequence or a graph alone. All the concerns of a deep learning model are discrete components that can be combined in arbitrary ways.
- **Minimalism:** The library provides just enough to achieve an outcome, no frills and maximizing readability.
- **Extensibility:** New components are intentionally easy to add and use within the framework, intended for researchers to trial and explore new ideas.
- **Python:** No separate model files with custom file formats. Everything is native Python. Keras is designed for minimalism and modularity allowing you to very quickly define deep learning models and run them on top of a Theano or Tensor Flow backend.

II. LITERATURE SURVEY

In the yr 2018, Suma S L [1] applied a actual time face popularity set of rules the use of Linear Binary Pattern Histogram (LBPH) and Viola Jones set of rules. This technique includes com fusion and popularity. is achieved the use of Viola Jones set of rules is implemented is for Face detection, characteristic extraction is achieved via way of means of LBPH approach and Euclidean Distance Classifier is used for face popularity. These paintings have popularity charge of approximately "85%-95%". These paintings can be similarly amended to choose in all situations such as brightness, in case of twins, beard and carrying goggles.

In the yr 2017, Li Cuimei [2] applied a human face detection set of rules the use of 3 vulnerable classifiers including Haar cascade classifier. Skin hue histogram, Eye detection and Mouth detection are the 3 classifiers followed via way of means of this technique. This yields sufficiently excessive detection. The proposed technique generates a function prediction value (PPV) to approximately 78.18% - 98.01%. This may be amended to locate human faces handiest of more than one races and decrease the put off for detecting and spotting diverse faces among distinct photos of humans with variant in mild and historical past situations.

In the yr 2017, Souhail Guennouni [4] put into effect a face detection device via way of means of collating with Haar cascade classifiers and part orientation matching. Edge orientation matching set of rules and Haar-like characteristic choice blended cascade classifiers are the 2 strategies used on this device. This set of rules produces a higher matching however the detection pace is relatively less.

In the yr 2015, Jiwen Lu [5] the use of getting to know CBFD proposed a face popularity device. The face representation and popularity is applied thru Compact Binary Face Descriptor (CBFD) characteristic getting to know technique even as coupled CBFD is accomplished for heterogeneous face matching via way of means of minimizing the modality hole of characteristic level. Collating with different Binary Codes Learning strategies, CBFD extracts compact and discriminative characteristic, consequently produces a higher popularity charge of approximately 93.80% is obtained. In this painting, characteristic is discovered handiest from one unmarried layer. This device can reap higher overall performance via way of means of Learning Hierarchal functions in deep networks.

In the authors developed a face mask wearing condition identification method. They were ready to classify three categories of face mask-wearing. The categories are face mask-wearing, incorrect face mask-wearing and no face mask-wearing. Saber et al [12], have applied the principal component analysis on masked and unmasked face recognition to acknowledge the person. Also, PCA was utilized in 1[3]. The author proposed a way that's used for removing glasses from human frontal faces. In [14], the authors used the YOLOv3 algorithm for face detection. YOLOv3 uses Darknet-53 because the backbone. Nizam et al [15] proposed a completely unique GAN-based network, which will automatically remove mask covering the face area and regenerate the image by building the missing hole. In [16], the authors presented a system for detecting the presence or absence of a compulsory medical mask within the OR. The general is to attenuate the false positive face detection as possible without missing mask detection so as to trigger alarms just for medical staff who don't wear a surgical mask.Shaik et al used deep learning real-time face emotion classification and recognition. They used VGG-16 to classify seven countenance. Under the present Covid-19 lock-in time, this technique is effective in preventing spread in may use

cases. Here are some use cases which will benefit from system.

Face Mask Detector Single Shot Detector structure is used for the item detection purpose. In this machine face masks detector may be deployed in lots of regions like purchasing malls, airports and different heavy site visitors locations to screen the general public and to keep away from the unfold of the sickness through checking who's following fundamental guidelines and who's now no longer. It takes immoderate time for statistics loading in Google Colab Notebook. It did now no longer permit the get admission to of webcam which posed a hurdle in checking out photos and video stream. We have modeled a facemask detector the usage of Deep studying. We are processed a machine computationally green the usage of MobileNetV2 which makes it less difficult to Extract the statistics sets. We use CNN structure for higher performance. We can restoration it in any sort of cameras. Face detection strategies: a review, Artificial Human beings have now no longer awesome capacity to pick out extraordinary faces than machines, so automated face detection machine performs an critical function in face reputation, head- pose estimation etc. It has a few troubles like face occlusion, and on uniform illumination. We use Neural Network to hit upon face withinside the Live video stream. Tensor waft is likewise used on this machine. In present they use Adaboost algorithm, we're the usage of mob internet CNN Architecture version in our proposed machine. We will triumph over a lot of these troubles on this paper . Multi-Stage CNN Architecture for Face Mask Detection This machine includes a dual-stage (CNN)structure able to detecting masked and unmasked faces and may be incorporated with pre-hooked up CCTV cameras. This will assist music protection violations, sell using face mask and make certain a secure operating environment. Datasets had been accrued from public area together with a few statistics scraped from the internet. They use best pretrained datasets for detection. We can use any cameras to hit upon faces. It could be very beneficial for society and for peoples to save you them from virus transmission. Here we use stay video detection the usage of open cv (python library).

Real time face masks reputation with alarm machine the usage of deep studying This manner offers a specific and swiftly effects for facemask detection. Raspberry pi primarily based totally actual time face masks reputation that captures the facial photograph. This machine makes use of the architectural functions of VGG-sixteen as the inspiration community for face reputation. Deep studying strategies are implemented to assemble a classifier so one can gather photograph of someone carrying a face masks and no mask. Our proposed examine are makes use of the architectural features of CNN as the inspiration community for face detection. It indicates accuracy in detecting individual carrying a face masks and now no longer carrying a face mask. This examine presence a beneficial device in combating the unfold of covid 19 virus.

III. CONCLUSION

Deep learning-based face mask detection has been a research hotspot in recent years. This project starts on generic face mask detection which provide base architectures for other related tasks. With the help of this the three other common tasks, namely object detection, face detection and pedestrian detection, can be accomplished. Authors accomplished this by combing two things: Object detection with deep learning and OpenCV and Efficient, threaded video streams with OpenCV. The camera sensor noise and lightening condition can change the result as it can create problem in recognizing the object. The end result will be a deep learning-based object detector system which will detect whether the person wear the mask or not.

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