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REVIEW LIMIT COVID-19 USING FACIAL MASK DETECTION USING BOOSTED CNN IN SMART CITY NETWORK

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Abstract

The Corona virus COVID-19 causes the global health epidemic, while the OPP wears a WHO face mask in public places (WHO). Governments all over the world have implemented programmes to monitor virus transmission in response to the COVID-19 pandemic. According to studies, the initiative has significantly reduced the risk of transmission. AI is a cost-effective and reliable way to create a secure production environment. To detect face mask, a hybrid model using a deeper and conventional machine learning mix is used. OpenCV detects face pictures in real time from live streams using our webcam, mask filter, and disguised video. The data set is used to build a COVID-19 facial mask detector using Python, OpenCV, Flow, and Keras. Our goal is to see whether using a computer view and a video or picture stream for a person wearing a face mask is advantageous.

Keywords*: Covid-19, Facial Mask Detection, BOOSTED CNN.*

INTRODUCTION

COVID-19 has remained a global coronavirus pandemic so far. COVID-19's growth was hampered in almost every way. The medical field was in a state of emergency. The use of a mask is one of the steps taken to prevent the disease from spreading. In this paper, we propose a method for limiting COVID-19 growth in a smart city network that uses CCTV cameras to track all government sites (CCTV). When an individual without a mask is marked, their permanent authority in the city's network grows. A dataset of pictures of individuals from different origins, with or without masks, for the creation of a comprehensive learning architecture. Face masks are becoming more popular in public as a result of the global outbreak of the COVID-19 corona virus. Before Covid-19, people wore masks to shield themselves from the noise. Others are aware of their emotions, but they can keep them hidden by covering their ears. The use of face masks, according to scientists, prevents the transmission of COVID-19. In the twentieth century, COVID19 was the first human influenza virus (Corona Virus). COVID-19 was declared a global pandemic by the World Trade Organization (WTO) in 2020 due to its rapid spread. COVID 19 infected over five million people in 188 countries in less than six months. The virus spreads in cold, crowded areas where people are close together. During the corona virus epidemic, there was a lot of scientific cooperation. In a variety of ways, artificial intelligence (AI), machine learning, and deep learning will aid in the fight against Covid-19. In order to forecast COViD-19, researchers and clinicians can use machine learning as an early warning system for pandemics and vulnerable populations. We must respond to the health needs of emerging technologies such as artificial intelligence, IoT, big data, and machine learning in order to combat and predict new diseases. To increase understanding of infection rates and quickly track and diagnose infections, AI's ability to overcome the Covid19 pandemic has been removed. Wearing a face mask in public is legal in some countries. These laws have been implemented in a wide range of industries, and the number of cases and deaths has increased dramatically. On the other hand,

monitoring large groups of people is an interesting new task. People without a face mask are observed during the monitoring phase.

This machine vision is focused on deep facial recognition model learning. The proposed model can be used with surveillance cameras to avoid COVID-19 transmission and to identify people wearing face masks that do not cover their faces. By using OpenCV, tensor flow, and keras, the model combines deep learning with traditional teaching methods. The functions were extracted using the CNN transmission and then compiled using three traditional algorithms. After that, the functions were compiled. These were compared to the most recent algorithm, which was the most precise and time-consuming in terms of training and detection.

RELATED WORK

Loey M, et al. [1] Comparative findings were presented with the corresponding job at the conclusion of the analysis. The proposed detector was more accurate and reliable than previous research.

M. S. Ejaz et al. [2] The overshadowed problem of face detection was solved using a grounded cascade-neural network (MTCNN). FaceNet, a Google integration model, is used to remove facial features. With the assistance, the assessment feature was completed.

Vector Machine (SVM). Experiments show that when masked faces are recognized, this technique is especially successful. Furthermore, its efficacy was assessed, with promising results observed in the use of unnecessary masks. We conducted a correlative analysis to better understand the situation.

S. Naveen et al. [3] The paper suggests that the face recognize and authenticate the mask's appearance. Facial features are used in the proposed scheme to distinguish local and global masks from true faces. Every part of the face may be used to create the mask's properties, including the eye and nose. Binary local patterns and binary statistical image properties can be used to describe facial texture (BSIF).

I. M. Revina et al [4] Functional vectors are made up of a variety of forms and properties. CNN is capable of conveying a variety of emotions and facial expressions, including disgust, sorrow, smile, and surprise. The proposed solution improves the accuracy of recognition substantially. Any identification criteria will be used in the process.

Zereen A.N et al [5] Many organizations around the world have implemented mask rules for personal protection as a result of the COVID-19 pandemic. Manually verifying whether people access a company's premises wearing masks is challenging and likely inconsistent. Robotic face mask violations have gained no attention so far. For company breaches of face masks, we recommend an automated screening system. Our facial mask sensing system is a two-step, efficient model. The removal and consolidation of face monuments is the first step, followed by a search of the clustered nose.

Nieto-Rodríguez A., et al [6] This paper explores how to decide whether or not a medical mask is needed in the workplace. The key goal is to provide as few false positive face detections as possible without mask detections, so that only medical personnel without surgical masks are warned.

Liu SQ., et al [7] Extensive testing shows that the feature not only outperforms current rPPG-based approaches in a 3d-mask attack, but also allows for realistic camera motion in low-light environments.

Jignesh Chowdary G et al [8] The rapid spread of the coronavirus has resulted in a global health outbreak (COVID-19). The World Health Organization has created a set of recommendations to help prevent the spread of coronavirus (WHO) COVID-19 is the most effective preventive measure, according to the WHO, in public spaces and crowded areas.

PROPOSED METHODOLOGY

Since they resemble a masked man, the hand-wrapped faces are difficult to identify using the current method. If you drive in a car without a face mask, the machine would recognize you. In a similarly densely populated city, a person's face is a problem. In this scenario, our approach to recognizing people who don't wear a mask will cause the same issue. With passion to produce the best results, the critical city has a variety of cameras to track the town and identify breakers. Since information from the violator is transmitted via SMS, the system will crash if there is a network issue. The proposed system detects a face mask and tests a person's constant power if they are not wearing it. The Authority must then deploy its personnel in order to discover various activities. This manual scenario is automatically simplified and executed by robot systems and drones. Breaches are seen face-up on the LED panel in order to record a different specimen and to recollect those that do not wear a warning mask. The alarm signal is being disrupted all over the place. The idea is to use a face mask to recognize people in a pictorial or video stream using OpenCV, Tensor Flow, Keras, PyTorch, machine visioning, and deep learning algorithms.

APPROACH

1.Train Deep learning model (MobileNetV2)

2. Live video feeds and photographs are used to operate the mask detector. Flow diagram Higher hierarchical functions are used in profound learning methods to learn the hierarchy of properties based on the composition of lower-level characteristics. Without being fully human-dependent, a system may learn automatic learning features that allow it to map the input to the output in different terms directly from the data. To find a good representation, deep study algorithms use the unknown structure in the input.

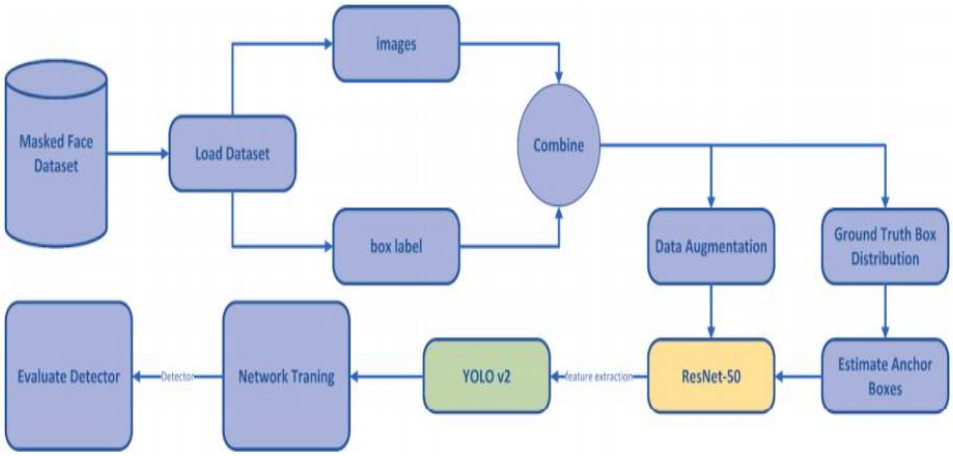

Figure 1: Working of face detection approach

The majority of the images have been improved using OpenCV source information. Previously, the images had been labelled as "masks" or "no masks." The images on display were of various sizes and resolutions, taken from various sources or computer resolutions (cameras). The

computer can learn complex concepts from simple ones thanks to the hierarchy of concepts. The position of these significances are depicted in the diagram. The popularity of AI deep learning has risen as a result of this. Data fields that are related (and even outputs). There are a few pixel results, text records, or audio data files on the other hand. Deep learning is the best way to understand multi-layer data representation in a computer model. The term "deep learning" refers to a condensed version of the learning process.

OpenCV is a computer vision programme. OpenCV is a computer vision and machine learning library that is free and open source. OpenCV is a show library for computers. OpenCV was created to provide a common computer vision infrastructure and to help users implement user machine sensing more quickly. As a BSD-licensed software, OpenCV makes it simple for businesses to use and modify the code. The library contains over 2500 optimized algorithms, including various machine views, state-of-the-art, and computer algorithms. Face detection and recognition, human behavior identification, movement system tracking, and the modelling of 3D point clouds on stereo cameras all use both algorithms. You can also use several images to create a panoramic view of the entire scene. With over 18 million downloads, OpenCV has a user base of about 47,000 people. Companies, academic organizations, and government agencies use the library as well. In addition to the traditional library-owned businesses, OpenCV is used widely by other companies such as Google (Google), Yahoo, Microsoft, Intel, IBM, Sony, Honda, and Toyota. Street photography, Israeli video surveillance intrusion detection, Chinese mining machinery tracks, Willow Garage robotics and pickup assistance, European pool incident, sculptures in Spain and New York, waste travel scans, and positive labels are just some of the applications. Turkey and New York City are the locations of the labels. When the MMX and SSE instructions are available, OpenCV heavily relies on real-time vision. The CUDA and OpenCL interfaces have been significantly extended. More than 500 algorithms have been written or supported by ten times the number of individuals. OpenCV's C++ template interface makes it easy to integrate STL containers. TensorFlow is a flow-free database that solves a variety of problems. It's also a symbolic math book that's used in neural network applications. TensorFlow is Google's second-generation research and development programme. TensorFlow 1.0.0 was released on February 11th, and it now supports multiple CPUs and GPUs during a single computer reference function (with optional CUDA and SYCL extensions for general-purpose computing on graphics processing units). Tensor Flux will be supported on 64-bit Linux, MacOS, Windows, and mobile device platforms such as Android and iOS. Workplaces should be welcoming and spread across various platforms in server clusters, handheld devices, and cutting devices thanks to the modular architecture (CPUs, GPUs, TPUs). A multi-dimensional tensor array, also known as a "tensor flow," perforates neural network operations. According to Jeff Dean, only five GitHub repositories were posted at the Google I/O conference in June 2016. TensorFlow is a programme that allows you to create tensor Unlike other frameworks, TensorFlow was created for RankBrain and the fun DeepDream project for R&D and Deep Learning development systems like Theano. This architecture can be run on hundreds of large distributed systems as well as a single GPU and handheld computer. Keras is a human-centered API rather than a device API. It provides reliable, easy-to-understand APIs, reduces the number of user actions needed for common tasks, and sends out timely, accurate error messages. The cognitive load is reduced by using best practices such as comprehensive guides and implementation guidance. It includes layers, goals, activation, and optimizers, as well as other common neural network building blocks. The source code is available on GitHub, as are community support forums. Keras is a small Python library for deep learning that can be used

with Theano or Tensor Flow. The aim was to make incorporating deep learning models into research and development as easy and fast as possible. With Python 2.7 or 3.5, this can be used for GPU or CPU frames. It's available for purchase under the agreed-upon MIT license.

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

- Modularity: A model is a series or a single graph. An in-depth learning model concerns all discrete components which can be arbitrarily connected.
- Minimalism: In order to obtain a result, the library has no frills and maximizes readability.
- Extensibility: New components are intended for the researchers to test and explore new concepts deliberately simple to incorporate and use in this context.
- Python: For custom file formats, there are no special model files. All is written in Python. Keras is designed for being lightweight and scalable to enable the description of profound learning models easily and to run on a backend of Theano or TensorFlow. PyTorch is a Torch based open-source study library. It was developed for applications such as machine view and speech processing by the Facebook AI Research Laboratory (FAIR). The software is free and open source with a BSD license upgrade. Although the Python interface is polished further, the C++ interface is still the primary focus of PyTorch's growth. Calculation of tensors with high acceleration using graphical devices like NumPy (GPU).
- Deep neural networks built on an artificial differentiation system based on tape For storing and using homogenous rectangular multi-dimensional arrays, PyTorch describes a class called the Tensor (torch.tender). PyTorch Tensors have NumPy Arrays identical, but can also be used with CUDA supported on an Nvidia GPU. PyTorch supports various subtypes of tensors.

CONCLUSION

With the addition of new mask detectors, we can now provide a wider range of data on patterns and trends. MobileNet is the foundation for both high and low calculation instances. The structure has a one-of-a-kind design. To develop stable tasks that have been trained on different data from similar tasks, such as facial recognition, we increase the transmission ability. To determine whether people wore face masks or not, we used OpenCV, tensor flow, keras, pytorch, and CNN. Models were tested in real time using video streams and photographs. The model's accuracy was reached, and the optimization process proceeded. We can construct a highly accurate description by changing the hyper parameters. As an example of application, this model can be used to analyze the edges. Furthermore, the proposed approach produces cutting-edge outcomes using a variety of public faces. We can tell if someone is wearing a mask until they do, which is extremely beneficial to society.

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