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FACE MASK DETECTION AND HUMANLESS TEMPERATURE SCANING USING RASPBERRY PI WITH UV SANITIZATION

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Abstract— COVID-19 epidemic caused by new coronavirus is continuously spreading. Until now each over India, further than sixteen million people have been infected and the figures are still on the rise. The health care system is going through a severe extremity. Numerous preventative measures have been taken to reduce the spread of the complaint and wearing a mask is one of them. Monitoring manually whether the existent is wearing a face mask rightly and measuring the temperature of each person is a delicate task. Thus, early symptom discovery and proper aseptic norms are essential, especially in places, where people come into arbitrary contact with each other. In this design, we propose a Jeer pi- grounded system that restricts the growth of COVID-19 by Chancing out people who aren't wearing a facial mask and also measuring their temperature. Unlike handheld thermometers that need an individual to take a person's body temperature, our system provides contactless and effective temperature checks using MLX90164 and for the facial mask discovery, an OpenCV subsystem grounded on Raspberry pi single board computer equipped with a camera module is used to allow or deny the entry of a person in structures and event venues. We're using UV blaster for sanitizing bias like mobile, bags, s, etc. The authentication will be transmitted to the existent in the form of an ID, a name, or any other data about that existent.

Keywords: OpenCV (Open Source Computer Vision Library), CNN (Convolutional Neural Network), ML(Machine Learning), tensorflow, haar cascada.

1. INTRODUCTION

During this period, it entered redundant attention due to the spread of nimbus contagion complaint. This is why colorful nations borrow the rule "No entry without masking." Facade discovery is a critical safety problem and Covid-19 forestallment. Masking reduces the threat of the associate of exposure to infected cases out in airfields, hospitals, services and academic areas. The discovery of masks has therefore come a grueling and largely critical issue. Facial recognition is still hastily if not masked Discovery of facades is a crucial safety issue and forestallment of Covid-19. In the medical field, masking lowers the associate's implicit threat of exposure to infected cases, whether or not they show symptoms. Airfields, hospitals, services and academic departments are used in mask discovery. Mask discovery has thus come an extremely important and delicate problem. Still, face recognition with mask is crucial as the birth of carpeted face is incredibly complex compared to conventional face. Facets recognition without masking is simpler. That is similar a vast number of facial characteristics as the measures of the nose, mouth and order within the masked face. In the field of drug, masks lessen the threat of implicit exposures to the nursing associate. That is such a vast number of facial characteristics as the measures of the nose, mouth and order within the masked face. The mask in the medical field reduces the associate's implicit threat of exposure to infected cases whether or not they've symptoms.

1. DEEP Literacy:

Deep literacy approaches are intended to learn scales of characteristics which correspond of lower- position characteristics with advanced scales Bus- literacy features at different abstract situations permit a computer to learn complex functions that collude the input directly to the affair without counting on mortal- designed parcels Large literacy algorithms appear, on several occasions of the input distribution to distinguish good representations. The scale of generalities enables the machine to learn complex generalities through simpler generalities. The chart is depth and consists of several layers if we draw a graph that shows how these delineations have been erected up on each other this is why we call AI deep literacy problem areas. This means that they aren't just a many tables, but pixel data images, textbook recordings or audio recordings. They're indeed tables. Deep literacy makes it possible to learn data representation with colorful degrees of complexity through computer models conforming of several computing subcase models.

2. OpenCV:

Open access machine vision and instruction operations library (Open Source Computer Vision Library). OpenCV has been developed for a popular computer vision structure and for rapid-fire use in consumer products of machine perception. As a BSD- certified software, OpenCV encourages the use and revision of the law by enterprises. The library has further than integrated algorithms that include both traditional and advanced computer vision and machine literacy algorithms. These algorithms can serve for detecting and recognizing images, for relating objects, classifying mortal exertion in images, for tracking camera movements, for tracking moving

objects, for rooting objects'3D models, to produce stereo camera- grounded 3D point shadows, to induce film land in high resolution of the entire scene. OpenCV has over stoner group members and is estimated to have over 18 million downloads. In businesses, consulting associations and government agencies, the library is extensively used. In addition to being library- employed companies similar as Google, Yahoo, Microsoft, Intel, IBM, Sony, Honda, Toyota, several startups are now working with OpenCV, similar as Applied Minds, Video Surf, and Zester. OpenCV use includes the ensuing areas gathering road views, detecting intrusions into Israel's camera surveillance, covering China's mining machines, allowing robots to maneuver and gather particulars at Willow Garage, detecting pool drownings in Europe, running in Spain and New-York interactive art, covering debris runways in Turkey, checking pro markers in the field of business. It supports Linux, Windows, Mac OS and Android, and has Java, Python, C and MATLAB interfaces. The OpenCV uses MMX and SSE instructions where available, substantially in real time vision operations. Right now there are laboriously erected a completely-fledged CUDA and OpenCV interfaces. There are further than 500 algorithms and about ten times the number of algorithm functions. OpenCV is native to C and contains an interface template with STL holders which work seamlessly.

3. tensorFlow: Tensor Flow is an open source free data inflow software library and a differentiable programming library that can cover a number of tasks. It's a emblematic calculation library that's also used by apps like neural networks. tensor Flow is Google Brain's alternate- generation frame, for analysis and development on Google. On February 11, interpretation1.0.0 was released, tensor Flow can operate on several CPUs and GPUs (with voluntary CUDA and SYCL extensions on graphical units for general purpose computing), while the Reference Code is running on individual computers. tensor Flow is usable on 64- bit Linux, MacOS, Windows and handheld bias, similar as iOS and Android. Its modular armature facilitates the fast deployment of calculating systems from desktops and garçon clusters to handheld and edge computers, on a range of platforms (CPUs, GPUs and TPUs).[1]. The term Tensor Flow derives from exertion in multidimensional data arrays known as tensors conducted by neural networks. On a Google I/ O conference in June 2016, Jeff Dean reported on TensorFlow, which included only five Google depositories, to GitHub depositories. Unlike other numerical libraries planned to be used in the field of deep literacy similar As Theano, TensorFlow was designed for use in exploration and development as well as in manufacturing systems. It can run on a single CPU, GPU and mobile bias, and on hundreds of large-scale distributed systems

4. Keras: Keras is an API for people, not robots. Keras is compatible with introductory APIs, minimizes the and operative error dispatches and uses stylish practises to reduce cognizant cargo. It also contains detailed accoutrements and inventor attendants. Included in Keras are multitudinous executions of extensively- used neural network structure blocks similar as layers, targets, activation functions, optimizers and several styles for easy law jotting using image and textbook can be used on top of Thaana or Tensor Flow. It was designed to allow exploration and development to borrow profound models as snappily as fluently as possible. It's available onPython2.7 or3.5 and can run easily with the underpinning frames on GPUs and CP Druggies. It's published in the MIT permit.

5. Haar Cascada

For object detection haar cascade classifier are one of the effect way.It was proposed by Michael jones and Paul Viola. It is used in Boosted cascade for rapid object detection of simplest features so this machine learning approach are used to train these classifier with lot s positive and negatives images. The images which the classifier identifies are positive images and all the other images which it could not detect are negative images. We use this haar like features for human face detection which are divided into three formations. The edge feature is the first format, line is the second format and the last is four-rectangle feature. This haar like principle provides fast computation using the integral. So this haar cascade specific features of a face can be identified using this algorithm. Using this detection the image can be converted into a window 24X24 pixels. Initially lot of positive images and negative images are given as a data set to train this classifier.

6. Convolutional layer

It always comes first. It receives the image (a matrix of pixel values). Assume that the input matrix's reaction starts at the top left of the image. The software then chooses the smaller matrix there, which is referred to as a filter. The filter then generates convolution that moves over the input image. The filter's job is to multiply the original pixel values by its value. All of these multiplications are added together, yielding a single number. The filter moves because it only reads the image in the upper left corner. Additionally, one unit on the right performs a similar operation. A matrix is created after

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2. LITERATURE REVIEW

This chapter is set out to provide the overall analysis of various research approaches deployed and several options and achievements attained by different writers on our specified field of study and applications. The content here will take account of concepts of various researchers that have already made extensive research on the tools and applications with their collective efforts which has backed to the growth of technology.

The evaluated masked face detection algorithm on the masked face testing achieves very satisfactory performance. This chapter is set out to provide the overall analysis of various research approaches deployed and several options and achievements attained by different writers on our specified field of study and applications. The content here will take account of concepts of various researchers that have already made extensive research on the tools and applications with their collective efforts which has backed to the growth of technology.

J. Barabas et al proposed a system for automated testing of temperature and hygienic standards. An algorithm is used for mask detection utilizing both neural networks (NN) and feature vector description based on a histogram of oriented gradients (HOG) approach. The device is trained with several image sets, and these are stored in Caffe framework format and processed in the OpenCV Deep Neural Network module. Proper temperature is measured using the MLX90614 infrared thermometer. Raspberry Pi processor is the core of the whole system which enables real-time processing of all image and sensor data. Sammy et al suggested a deep learning approach to detect facemask and social distance. The image data sets are stored in JPEG format.

Classification of images is done using open-source software using python and OpenCV. A CNN model is created using Tensor flow and Keras module along with the VGG-16 network model. The system is also designed to give the count of people violating the physical distancing. Arjya Das et al introduced a technique to identify hybrid facial masks using basic machine learning packages. The expected system acts as the surveillance task performer which detects mask even in motion. Values of parameters are optimized using the Sequential CNN model to detect the presence of facemasks accurately without over-fitting.

The incorporated ML packages include Tensor Flow, Keras, OpenCV are used for reshaping, compile the overall model along with resizing and color conversion of data images. Suresh K et al . This paper approaches a simplified way to achieve facemask detection. The mask is extracted and fed as an input into a convolutional neural network. The real time automated detection has been done by Mobile Net and OpenCV. The datasets are divided into categories that provide an advantage to improve variants. Apart from this the paper also suggested that this model can be further integrated for Temperature Screening. Anirudh Lodh et al designed a system that is used for face recognition and person identification.

A face mask detecting model named Retina Face Mask combining with a cross- class object removal algorithm is proposed by Jiang et al. The developed model includes one stage detector consisting feature pyramid network that results in slightly higher precision and recall than the baseline result. For reducing the shortage of datasets, they have applied transfer learning, a well-known deep learning technique.

Coronavirus epidemic brought about by new Covid is ceaselessly spreading up to this point everyplace in the world. The effect of COVID-19 has been fallen on virtually all areas of advancement. The medical services are going through an exigency. Multitudinous prudent way have been taken to dwindle the spread of this sickness were wearing a mask is one of them. In this design, we've used ML, OpenCV, and TensorFlow to fete face masks. This model can be employed for security purposes since it's veritably resource-effective to emplace. In this approach MobilenetV2 armature is used which has a BN subcaste and is very featherlight and we've bedded this model with Jeer pi to perform real- time mask discovery, where, structure of SSD is used and the backbone network is lite. The datasets used for this CNN grounded face mask discovery are prepared by Prajna Bhandary and AIZOOTech which are available on Github. These datasets can be used by other experimenters for farther advanced models similar as those of face recognition, facial milestones, and facial part discovery process.

CONCLUSION

This review is proposed to support monitoring for the face mask detection is trained on CNN model and we use OpenCV, Tensor Flow and python to detect whether person is wearing a mask or not. The model was tested with real time video as well as images and a promising accuracy is achieved and the optimization of the model is continuous process.

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