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

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Abstract— Coronavirus pandemic brought about by novel Covid is ceaselessly spreading up to this point everywhere in the world. The effect of COVID-19 has been fallen on practically all areas of advancement. The medical services are going through an emergency. Numerous prudent steps have been taken to diminish the spread of this sickness where wearing a mask is one of them. In this project we have used ML, Open CV and Tensor Flow to recognize face masks. This Model can be utilized for security purposes since it is very resource efficient to deploy. In this approach Mobile net V2 architecture is used which has BN layer and is very lightweight and we have embedded this model with Raspberry pi to perform real-time mask detection, where, structure of SSD is used and backbone network is lite. These datasets can be used by other researchers for further advanced models such as those of face recognition, facial landmarks, and facial part detection process.

Keywords:

1. INTRODUCTION

Everyone has been affected by the COVID-19 coronavirus epidemic on a global scale. It crippled the profitable growth of the entire nation around the world. Coronavirus complaint 2019 (COVID-19) is an arising respiratory complaint caused by severe acute respiratory pattern coronavirus 2 or SARS-CoV2. As of June 10, 2020, the contagion reached nearly eight million infected cases and half a million failed from the contagion. To combat the transmission of the contagion (4), there are executed protocols set by the World Health Organization (WHO) like mandatory wearing of face masks, observing strict social distancing in public places, and washing of hands or sanitizing hands with detergents constantly. There are studies conducted that wearing a facemask is important to help the spread of the contagion. Research studies show the effectiveness of N95 and surgical masks in precluding contagion transmission are 91 and 68 independently. Wearing these masks will effectively disrupt airborne contagions so that similar infections can't reach a mortal being's respiratory system and it's an affordable way to alleviate losses and respiratory infection diseases. Nonetheless, the efficacity of facemasks in precluding complaint transmission in the public has generally been lessened due to shy facemask use. It's essential to develop an automatic discovery for wearing facemask which will give individual protection and help the original epidemic.

Raspberry Pi is designed as a Chip System (SoC) where the critical circuits such as the Central Processing Unit (CPU), the Graphics Processing Unit (GPU), input, and output are carried by a single circuit board. The GPIO pins provide an essential element to help enable the RPi to be accessible to hardware programming for controlling electronic circuits and data processing on input/output devices. Add a power adapter, keyboard, mouse, and monitor that works on the Raspberry Pi in compliance with the HDMI connector. New models are available to interact via Wi-Fi to the internet. The RPi can be run using the Raspbian operating system. It has a pre-installed Python programming language.

2. BLOCK DIAGRAM:

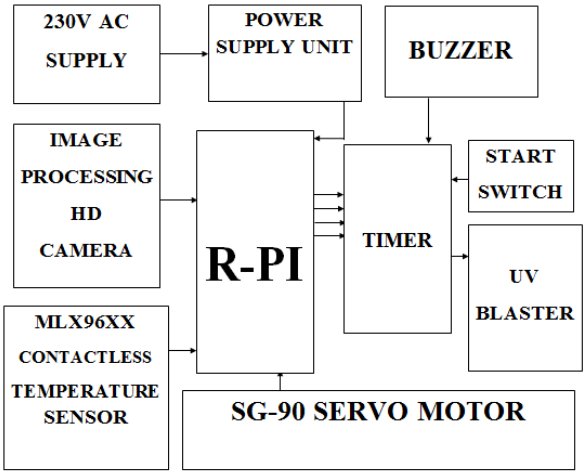

Fig.1: Block diagram of overall project

3. HARDWARE

i. Raspberry pi

Fig.2: Raspberry Pi

The Raspberry Pi is a low cost, credit- card sized computer that entrapments into a computer examiner or Television, and uses a standard keyboard and mouse. It's an able little device that enables people of all periods to explore computing and to learn how to program in languages like Scratch and Python.

ii. Web camera

Fig.3: Web camera

A webcam is a videotape camera that feeds or streams an image or videotape in real time to or through a computer network, similar as the Internet. Webcams are generally small cameras that sit on a office, attach to a stoner's examiner, or are erected into the tackle.

iii. Buzzer

The buzzer may be a sounding device which will convert audio signals into sound signals.. It's extensively utilized in admonitions, computers, printers, and other electronic products as sound bias. It's substantially divided into piezoelectric buzzer and electromagnetic buzzer, represented by the letter"H" or "HA"in the circuit.

Fig.4: Buzzer

iv. UV Blaster

UVC LED lights are an easy way to sanitize Bacteria and Contagions without the use of chemicals Stir Detector makes sanitizing easy. Contains the same proven technology croakers use to sanitize tools. Flexible setup lets you sanitize small

objects (tools, portmanteau, keys, and mask), groceries, auto innards, divisions and small apartments

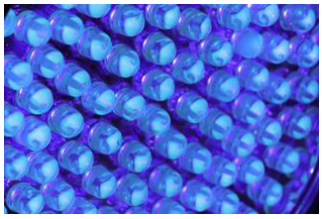

Fig.5: UV Blaster

4. METHODOLOGY

In machine literacy, Convolutional Neural Networks (CNN or ConvNet) are complex feed forward neural networks. CNNs are used for image bracket and recognition because of its high delicacy. It was proposed by computer scientist Yann LeCun in the late 90s, when he was inspired from the mortal visual perception of feting effects. The CNN follows a hierarchical model which works on erecting a network, like a channel, and eventually gives out a completely- connected subcaste where all the neurons are connected to each other and the affair is reused.

A. Image Acquisition

The first step of the real-time facemask recognition system is image accession. High-quality images of the person posing with facemask wearing and not wearing the facemask are attained through digital cameras, cellphones, cameras, or scanners.

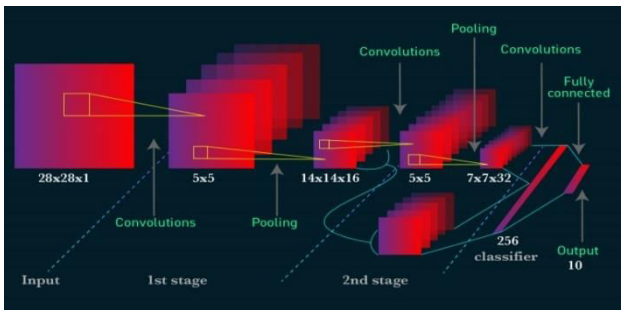

Fig.6: Convolutional Neural Networks

B. Annotated Dataset Collection

A Knowledge- grounded dataset is created by proper labeling of the captured images with unique classes.

C. Image Processing

The attained images that will be engaged in a preprocessing step is further enhanced specifically for image features during processing. The segmentation process divides the images into several parts and employed in the birth of facemask covered areas in the person's face from the background.

D. Feature-Extraction

This section involves the evolutionary layers that gain image features from the resize images and is also joined after each complication with the ReLU. Max and average pooling of the point birth decreases the size. Eventually, both the convolutional and the pooling layers act as cleansers to induce those image characteristics.

E. Classification

The final step is to classify images, to train deep literacy. Models along with the labeled images to be trained on how to fete and classify images according to learned visual patterns. The authors used open-source perpetration via the Tensor Flow module, using Python and Open CV including the VGG-16 CNN model. Three criteria were used to measure the model's performance delicacy, training time, and learning error. In the conduct of trials, the input parameters were set inversely to 224 according to its input image range and height, batch size during training is set to 64 images and 100 duplications are set to the number of ages.

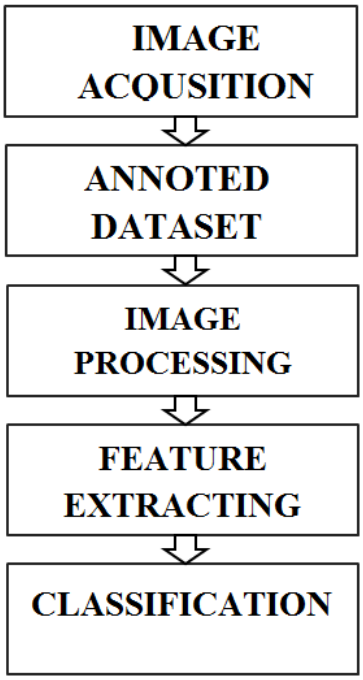

Fig.7: Flowchart

The trained CNN model was transferred to the Raspberry Pi to test its performance in detecting people wearing a facemask or not wearing it. After the trial was accomplished, the trained model along with other operations. Programs were transferred to the storehouse device of Raspberry.

5. RESULT

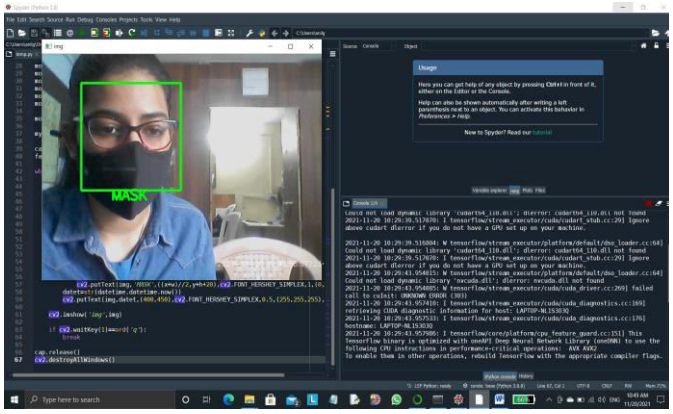

Fig.8: with mask

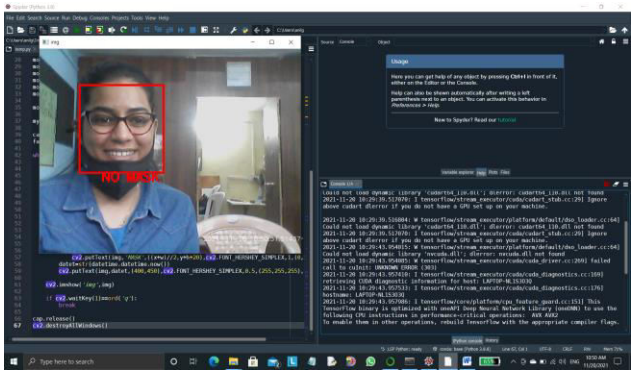

Fig.9: No with mask

6. CONCLUSION

This paper manuscript presented a study on real-time facemask recognition with an alarm system through deep learning techniques by way of Convolutional Neural Networks. This process gives a precise and speedily results for facemask detection. The test results show a distinguished accuracy rate in detecting persons wearing a facemask and not wearing a facemask. The trained model was able to perform its undertaking using the VGG-16 CNN model achieving a 96% result for performance accuracy. Moreover, the study presents a useful tool in fighting the spread of the COVID-19 virus by detecting a person who wears a facemask or not and setting an alarm if the person is not wearing a facemask. UVC radiation may be a known disinfectant for air, water, and nonporous surfaces. UVC radiation has effectively been used for many years to scale back the spread of bacteria, like tuberculosis.

The integration of several models of CNNs and compare each model with the highest performance accuracy during training to increase the performance in detecting and recognizing people wearing facemasks is suggested. Also, the researchers recommend a different optimizer, enhanced parameter settings, fine-tuning and using adaptive transfer learning models.

7. REFERENCE

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