FACE MASK DETECTION

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Abstract – In this paper, a proposal of a face mask detection. The proposed project will be using the basic Machine Learning packages like TensorFlow, Keras and OpenCV. The proposed method detects the face from the model accurately and then identifiy if a person has a mask or not. The collected image data contains 2000 images each for people wearing and not wearing a face mask.

Keywords –python, face mask detection, face recognition, COVID-191

I.INTRODUCTION

As the Coronavirus outbreak continues, most of the people in the world are suffering badly due to this pandemic. Every day thousands of people are getting infected globally because of the lack of disciple of people. The World Health Organization Coronavirus (COVID-19) [4] situation report as of February 10 2021, there are over 3.1 million new cases reported last week, 41% of cases reported from National Capital Region (NCR), CALABARZON (17.5%), Central Visayas (6%), and Central Luzon (6.68%).[5] Largest increase in new cases from NCR. Coronavirus disease 19 or COVID-19 is a respiratory illness that caused severe pneumonia in an infected person and acquiring this disease is through person-to-person direct contact with generated respiratory droplets, droplets of saliva or discharge from the nose when the infected person coughs or sneezes or through breathing in the virus if you are within the range of an infected person. You can also acquire this virus by touching a contaminated surface and then entering the virus in your mouth, nose, or eyes Elderly persons, persons with a poor immune system, and those with underlying health complications like heart failure, diabetes, severe respiratory disease, and cancer are vulnerable in this type of illness .[4]

Advancements in the field of deep learning, particularly convolutional neural networks (CNNs), have already shown remarkable success in the classification of images . The key idea behind the CNNs is to create an artificial model, like a visualization area of the human brain [2]. The biggest advantage of CNNs is that one can extract more important characteristics over the whole image, instead of just handcrafted attributes [1]. Researchers introduced different deep networks based on CNN, and these networks achieved the state of results in computer vision classification, segmentation, object detection, and localization. In this research study, deep learning techniques are applied to construct a classifier to collect images of a person wearing a face mask and not wearing from the database.

II. SIGNAL PROCESSING

Signal processing is the processing of signals by means of hardwired or programmable devices, the signals being regarded as continuous or discrete and being approximated by analog or digital devices accordingly. Filtering and image processing are examples of signal processing

III. DIGITAL IMAGE SIGNAL PROCESSING

Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image.

IV. FACE MASK DETECTION

Face mask detection models have been created using several algorithms and techniques. The proposed approach in this paper uses deep learning, TensorFlow, Keras, and OpenCV to detect face masks. This model can be used for safety purposes since it is very resource efficient to deploy.

V. FACE RECOGNITION

A face detection system determines the presence, location, scale, and (possibly) orientation of any face present in a still image or video frame. This system is designed to detect the presence of faces regardless of attributes such as gender, age, and facial hair. a face detection system may predict that an image region is a face at a confidence score of 90%, and another image region is a face at a confidence score of 60%. The region with the higher confidence score should be more 4 likely to contain a face. If a face detection system does not properly detect a face, or provides a low confidence prediction of an actual face, this is known as a missed detection or false negative. [3]

VI. METHODOLOGY

The process used for this project are, facemask and no-facemask dataset collection, dimensions of the frame for face detection, and the live webcam to display the face in a digital screen.

A. With Face Mask and Without Face Mask Dataset

The collection of images used for training and testing, the model was collected from the website kaggel. Containing 2000 images each for people with face mask and without face mask. All images were formatted in a JPEG formatting.

B. Deep Learning

Deep learning is essentially a combination of artificial intelligence and machine learning. Inspired by brain neurons, this has proven greater flexibility and builds more accurate models compared to machine learning. Deep learning has applications in many fields like image

classification, speech recognition, computer vision, natural language processing.

C. Face Recognition

Using Face recognition we can identify or verify the identity of an individual using their face. Face recognition systems can be used to identify people in photos, video, or in real-time. Law enforcement may also use mobile devices to identify people during police stops. Face recognition systems use computer algorithms to pick out specific, distinctive details about a person's face. These details, such as distance between the eyes or shape of the chin, are then converted into a mathematical representation and compared to data on other faces collected in a face recognition database

D. Live Webcam

This project utilizes OpenCV Library to make a Real-Time Face Detection using your webcam as a primary camera.

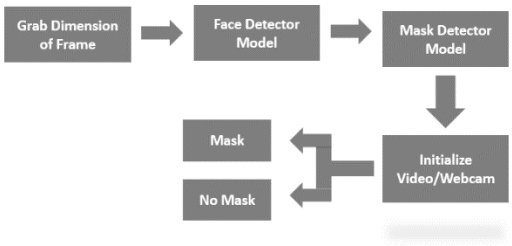

fig 1. The flow chart of face mask detection

VII. RESULTS

The results of face mask recognition model with confidence level are shows bellow with different types and colors of face mask.

Fig.2 Wearing surgical mask

As shown in fig.2 ,it detects surgical mask and will display "Mask" with 99% accuracy.

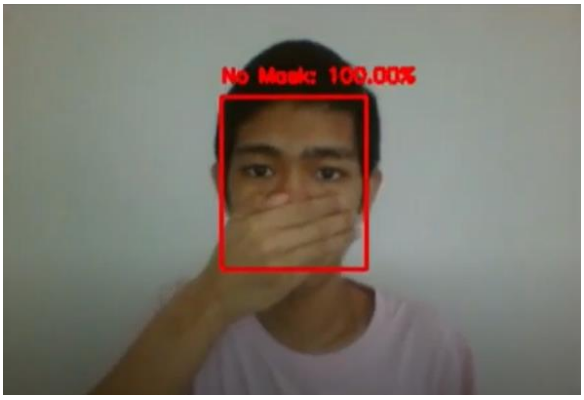

Fig.3 Covering face using hand

As show in fig 3, even when covering the lower part of the face using a hand it will display "No Mask" with 99% accuracy.

Fig.4 Wearing black face mask

As shown in fig.4 ,wearing black face mask has an accuracy of 80-90% of detecting that a person has a face mask

Fig.5 Wearing blue face mask

As shown in fig.5 ,it detects blue face mask and will display "Mask" with 99% accuracy

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