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ARTIFICIAL INTELLIGENCE-FACE MASK DETECTION AND DATA ANALYTICS USING RELATED HEALTH CARE DATA

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Abstract— Face masks are now an essential part of our everyday life as the country begins the many stages of reopening in order to keep safe. It will be necessary to wear a mask in order to communicate with others or do business. Therefore, this application makes use of a camera to determine if a person is wearing a mask. we have used dataset, Machine learning and deep Learning, mobilenetv2, OPEN CV, PYTHON, KERAS and TENSOR FLOW. By using Transfer learning, we have to do real time detection. To analyze the project, we need to figure out Introduce YOLO algorithms to detect the images. YOLO stands for you only look once, by using computer vision to detect images. This work on mainly used in Traffic Signals, Hospitals, Airports, public places etc. By figure out this pandemic we need statistical analytical report on covid 19. To visualize the graph, we use data visualization in which health industries are felt problem with covid and presenting dashboards. To achieve that thing we use python libraries, power bi and tableau.

Keywords—YOLO, ML and DL, CNN, CV, mobilenetv2, packages, SGD, KERAS, DL, Tensor flow, train, test, HAAR cascade

I. INTRODUCTION

People used to wear a mask to safeguard themselves from air pollution before to Covid-19. According to research, using a face mask can help stop the spread of COVID-19. Due to its rapid growth, the World Health Organization named COVID-19 a global virus in 2020. In dense and congested areas, the virus spreads among nearby persons. In order to prevent virus, we use mask. Unfortunately, many people do not strictly follow these instructions, that is going to accelerate the development of this incurable disease. The solution has the potential to locate people who aren't wearing a mask and notify the authorities. Face mask detection is a technique for figuring out if a person is wearing a mask. Transfer learning approaches are frequently used in healthcare applications because they enable scientists to examine and assess vast amounts of data.

Unfortunately, many do not strictly follow these rules. Deep learning algorithms have played a crucial role in object detection. These concepts and architecture could be employed to find masks on a face. In this work, we present a face mask detection model that integrates deep convolutional neural network and machine learning. The proposed approach can be linked with computer or laptop cameras to identify those wearing masks and those who aren't. The model

was created using open cv, tensor flow, and keras together with deep and conventional machine learning techniques. To determine the most appropriate method that produces the maximum accuracy, we have developed a comparison between three machine learning algorithms.

People are encouraged to wear masks and keep a distance of at least one metre between each other in order to decrease the potential of infection. Deep learning has drawn increased interest in object detection and has been used to recognise people and create a tool that can tell whether someone is wearing a mask or not. By examining the real-time stream from the camera, the categorization result can be evaluated. A trained model is necessary for deep learning projects. The module has been trained using this actual dataset to prepare a number of actions. People are recommended to wear masks and keep a distance of at least one metre between each other in order to lessen the chance of infection.

II. LITERATURE SURVEY

SNO	Name of the author	Published year	Description of that work
1	chhaya gupta	2020	He showed the modules that trained by using deep learning algorithms. They got 98% accuracy on their model.
2	Mukul Shende	2020	He did work on image processing techniques and get the results with good accuracy while training the data.
3	Anurag Sinha	2020	Sinha showed their model using machine learning techniques by using CNN algorithms

III. EXISTING SYSTEM

In order to extract that module and carry out the implantation on detecting the faces, this face mask detection has already been researched at numerous universities. This project is being worked on by a large number of data scientists during the pandemic. nearly all health care This System is crucial for security-related purposes.

Multi-task cascaded convolutional neural networks have been used to solve the challenge of face detection (MTCNN). The google face net embedding model is used to extract the facial features. In order to determine whether a person is wearing a mask or not, this system can be trained on data sets for both individuals.

The following are some drawbacks of the current system:

- While we are handling the training process for this model, our systems do not support it.

- Running the model requires a significant investment in computation units.
- Transfer learning can occasionally result in some frameworks not being supported by free versions.
- Due to some packages or libraries not being up to standard, real-time live detection and recognition are not possible in the free editions.
- Just to demonstrate a simulation model in our work.

IV. PROPOSED SYSTEM

In order to determine if you are wearing a face mask for protection, we choose to develop a very straightforward Convolutional Neural Network (CNN) model using TensorFlow, the Keras library, and OpenCV. The following provides a description of every facet of our work.

4.1 Deep learning architecture:

From the supplied examples, the deep learning architecture learns a variety of significant nonlinear properties. Then, using the learnt architecture, previously unobserved samples are predicted.

4.2Image Processing:

HAAR Cascade Classifier will recognise the input from the videocam. Before moving on to the next phase, the webcam's acquired photos needed to be processed. The image is converted into a grayscale image during the pre-processing stage since the RGB colour image has so much extra information that is not required for face mask detection. Then, in order to retain the uniformity of the input photos for the architecture, we downsized the photographs to be (150x150) in size. The images are then normalised, and following normalisation, a pixel's value falls between 0 and 1. The learning system learned more quickly and more quickly by capturing the relevant information from the photos after normalisation.

4.3 Dataset Collection:

We gathered photos for the purpose of training our deep learning architecture. CNN is a key component of the learning method's architecture. To train and test the model, data from the source is collected. Dataset solely includes pictures of faces. There are approximately 1,315 pictures in it, 658 of which show people with masks on their faces and 657 of which don't. 80% of each class's photos are used for training, and the remaining 20% are used for assessment. Some of the photos from two distinct classes are displayed in Figure. 4.1. E. Development of Architecture The CNN-based learning approach is particularly effective in identifying patterns in images. Neural networks require access to both classes' worth of data. An input layer is included in the network.

The architecture contains three pairs of convolution layers each followed by one max pooling layer.

The convolution layer contains 100 kernels of window size 3x3. Max pooling layer of window size 2x2. This layer will

be aggregating the results from the previous convolution layer and will be picking the max value in that 2x2 window. It decreases the spatial size of the representation and thereby reduces the number of parameters.
As a result, the computation is simplified for the network. The output of the convolution layers will be flattened and will be converted into a 1-D array. Then there is one dropout layer and two dense layers. The dropout layer prevents the network from overfitting by dropping out units. The dense layer comprises a series of neurons each of them learn nonlinear features.

The output layer is followed by multiple hidden layers. There are several convolutional layers in the hidden layers. Multiple dense neural networks employ the features that CNN has retrieved for categorization. Three pairs of convolution layers, each followed by a max pooling layer, make up the architecture.100 3x3 window-size kernels make up the convolution layer, and a 2x2 window-size kernel makes up the maximum pooling layer. Using this layer assemble the outcomes of the preceding convolution layer and select the maximum value inside that 2x2 window. By shrinking the representation's spatial dimensions, it also cuts down on the number of parameters.

The computation is thereby made simpler for the network. A 1-D array will be created by flattening and converting the convolution layers' output. After that, there are two dense layers and one dropout layer. By dropping out units, the dropout layer prevents overfitting in the network. A group of neurons that are all capable of learning nonlineasr characteristics make up the dense layer.

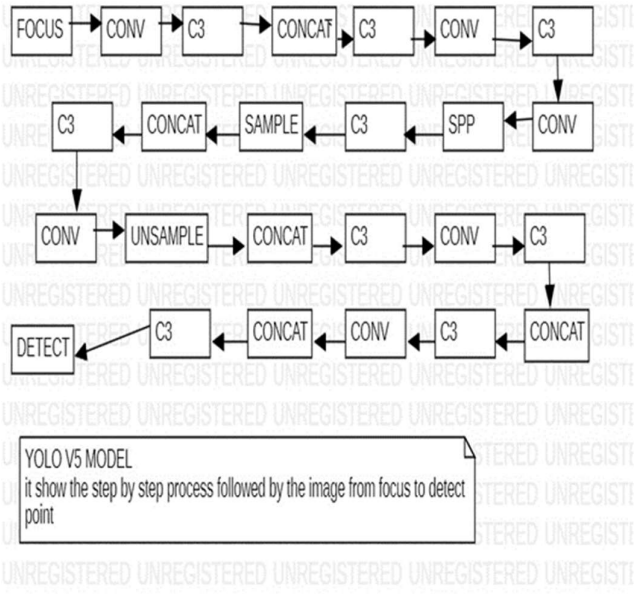

Figure 4.1. summary view of yolov5

4.4 Data visualization:

Here, we employ a variety of methods for data analysis, including the following:
Let's look at the aforementioned things in more detail:
By using SQL, we must extract the data by passing various queries to address the problem statements. Every time we present some problem statements on some data, the dataset is based on information collected from Kaggle or git hub sources. use the Java or MySQL servers to resolve those specific claims in response to those queries as just data analyst.

Python requires that we use its libraries in order to display and visualize the analysis. Data cleansing and data pre-processing are:

- BY USING PYTHON
- BY USING POWER BI
- BY USING JAVA

Let's look at the aforementioned things in more detail:
In order to address the problem mentioned, we must use SQL to retrieve the data by passing some queries. Every time we present a problem statement on some data, we based on dataset by collecting from Kaggle or git hub sources. How to use the JDBC or MySQL servers to resolve those specific statements in response to those requests as a data analyst
Python requires the usage of matplotlib in order to view and present the analysis. Data cleansing and data pre-processing are need to be carried out in order to achieve that. We need to use the NUMPY, Matplotlib, and seaborn libraries to visualize the data.

4.5 STATISTICS:

Statistics play a significant part in data transformation for end users when it comes to visualization. We need to use sample data to get this all data in order to support that conclusion. The majority of data scientists always spend more time and money pre-processing data. A solid grasp of statistics is necessary for this. When processing any type of data, a few standard procedures must be followed. numerous statistical tests to determine the significance of features.

• Determining the connections between features to rule out the potential of duplicate features.
• Formatting the features in the necessary manner.
• Scaling and normalising the data. Identification of the distribution and type of data are also part of this process.
• Taking the data and applying the necessary corrections to it for further processing.
• Choose the appropriate mathematical strategy or model after analysing the data.
• The outcomes are validated using the various accuracy assessment scales after they have been collected

Figure 4.2 data analytics using covid date using python analytics

V.RESULTS

In order to develop vaccinations, we need demonstrate business stakeholders and a power bi tool. The power BI developers and data scientists would calculate the data scaling, features, and every other part to deliver the detailed report to the government authorities, hospitals, and laboratories to produce the vaccines that help lower the deceases.

This scale is ranging from weak to weak, day by day, and the detail report on COVID 19 throughout the globe or country by country can give an astonishing glimpse of people's daily progress on this scale. The visual dashboard for COVID 19 must be demonstrated from this analytical view.

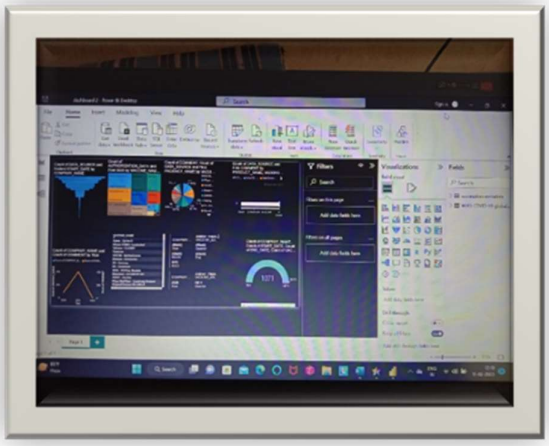

Figure 5.1 power bi analysis

Following model training in yolov5, the obtained result is:

The 7400 photos with both masked and unmasked faces that make up the dataset used in this research study are depicted in figure 1. Compared to many other neural networks used for face detection, the model's accuracy after 50 epochs is 95%, which is a significant improvement.

The report also includes a graphic illustration of Training Loss, Validation Loss, and Training Loss. Training and accuracy Accuracy that are important for making better validation selections and are displayed in figures 5.2and 5.3 below. The output from the
live streaming video that was analyzed by this model is shown in figure 8 below. The model is able to analyzed the videos that are being streamed in real-time and is capable of identifying those who are wearing masks and those who are not.

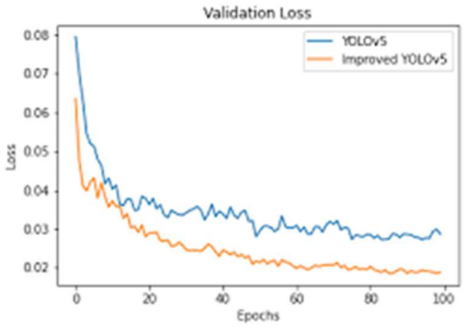

Fig 5.3 The output of the training data

V.CONCLUSION

As a result, after the task is finished, we use computer vision techniques to perform real-time live detection and display the live result. We must use the HAAR CASCADE xml file to improve the outcome in order to find the whole code file.

In this COVID-19 pandemic, wearing a mask is absolutely necessary, thus the Corona Mask offers a real-time safety measure for people by recognising whether they are doing so. The neural network's accuracy on the picture dataset is 95%; however, by employing the Mobile Net neural network as the foundational model, accuracy can be further improved. This concept can be used by multiple government organisations in congested regions including markets, airports, train stations, and other public venues to guarantee that individuals abide by the safety measures.

Future versions of this model might include an alarm or buzzer, and IoT could be developed with deep learning CNN that would beep whenever a person was seen without a mask. If this strategy is implemented properly, it will help to ensure that people are safe.

Fig 5.2 output of the work

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In the current state of the world, it will take a tremendous amount of engineering expertise to make the next big opportunity happen, but we are keeping our eyes open for it. I dedicate my project to the management, all of the faculties, my college friends, and the full staff of Dr.

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