Deep Learning Project

Title : Face Mask Detection System Using Deep Learning

welcome everyone to my project

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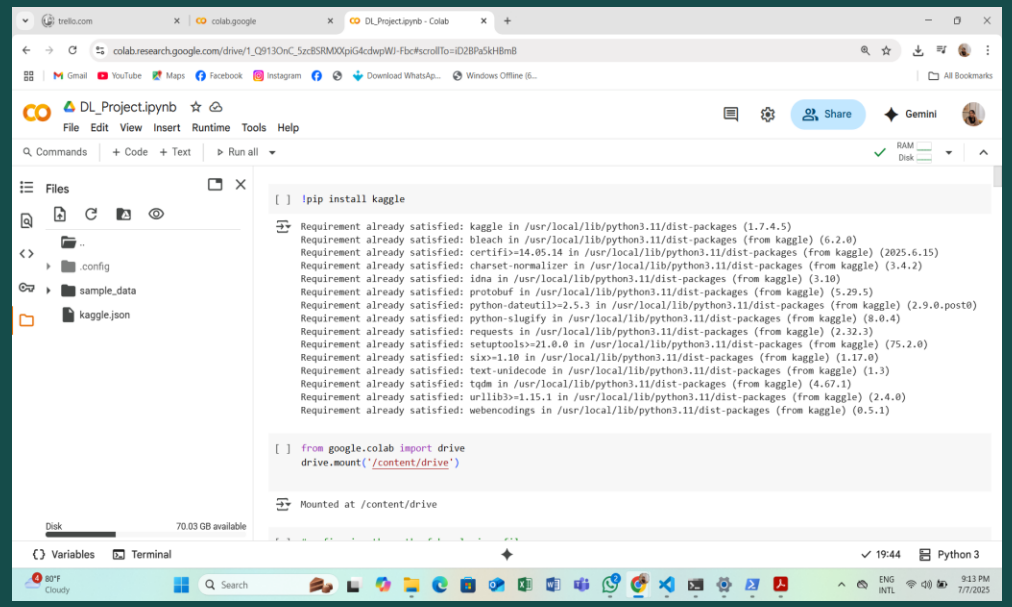
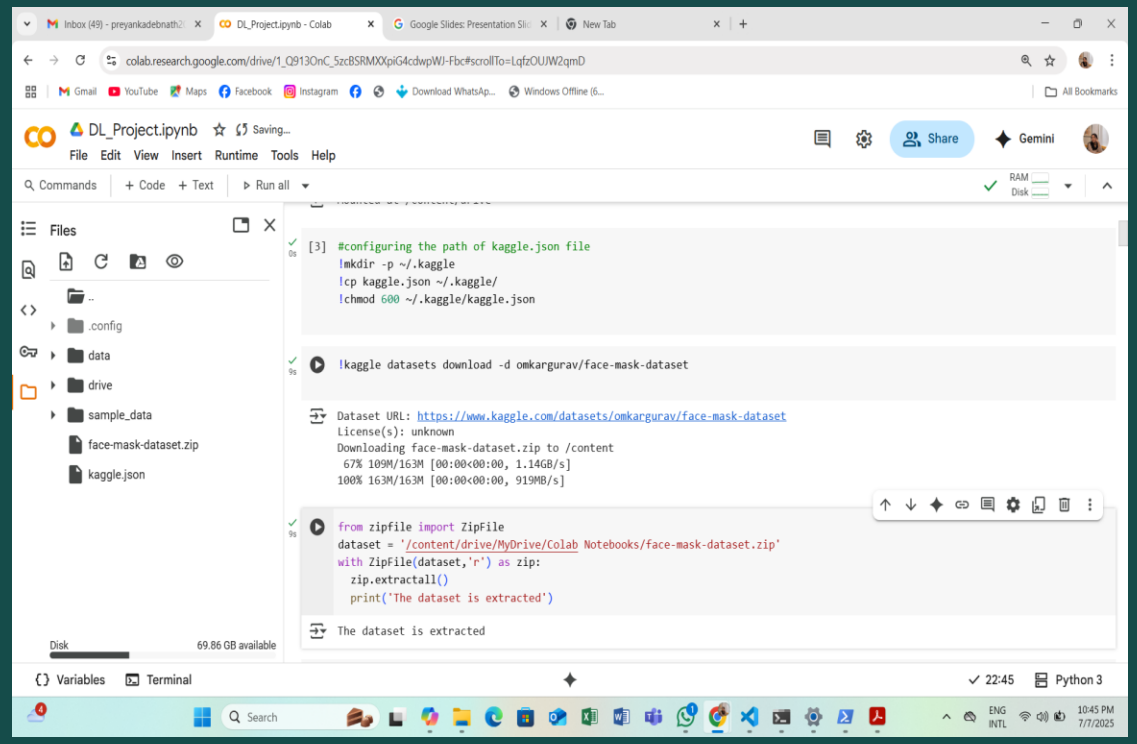
1. I downloaded the dataset from Kaggle and saved it in my Google Drive. I also downloaded the **`kaggle.json`** file using API.
Then, I have started working on my project in Google Colab and uploaded the **`kaggle.json`** file there.

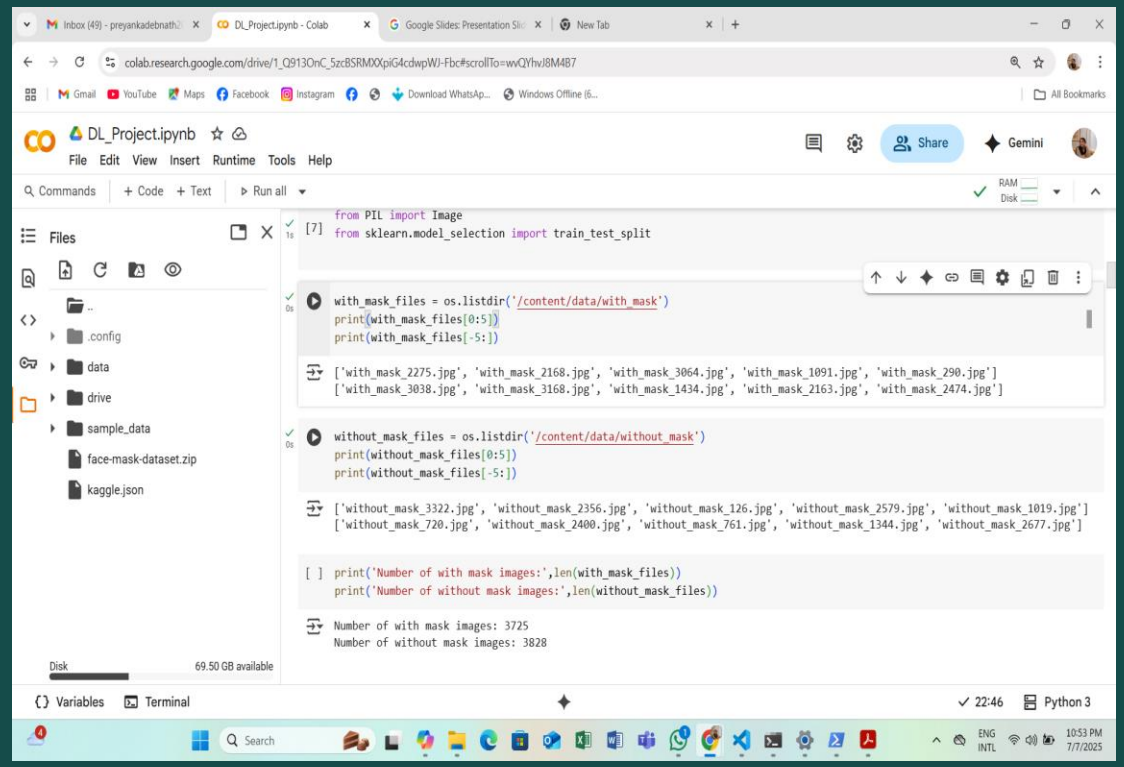
Dataset link:Face Mask Detection Dataset on Kaggle
kaggle link:https://www.kaggle.com

Here, I am adding a picture where I am connecting Google Colab with my Google Drive...





In this picture, it can be seen that I have run the Kaggle file and uploaded the dataset to Google Colab from Google Drive.At the same time, I also extracted the zip file.



I have listed the libraries that I will be using in this project. Then, I checked the first 5 and last 5 images from the dataset, which contains two types of data: (1) people wearing masks, and (2) people without masks.I calculated the total number of mask and without-mask images. I labeled the mask images as 1 and the without-mask images as 0.

I resized the images and converted them to NumPy arrays,because:
1.Images are resized to ensure all inputs have the same dimensions for the model.
2.Images are converted to NumPy arrays so they can be efficiently processed by machine learning models.

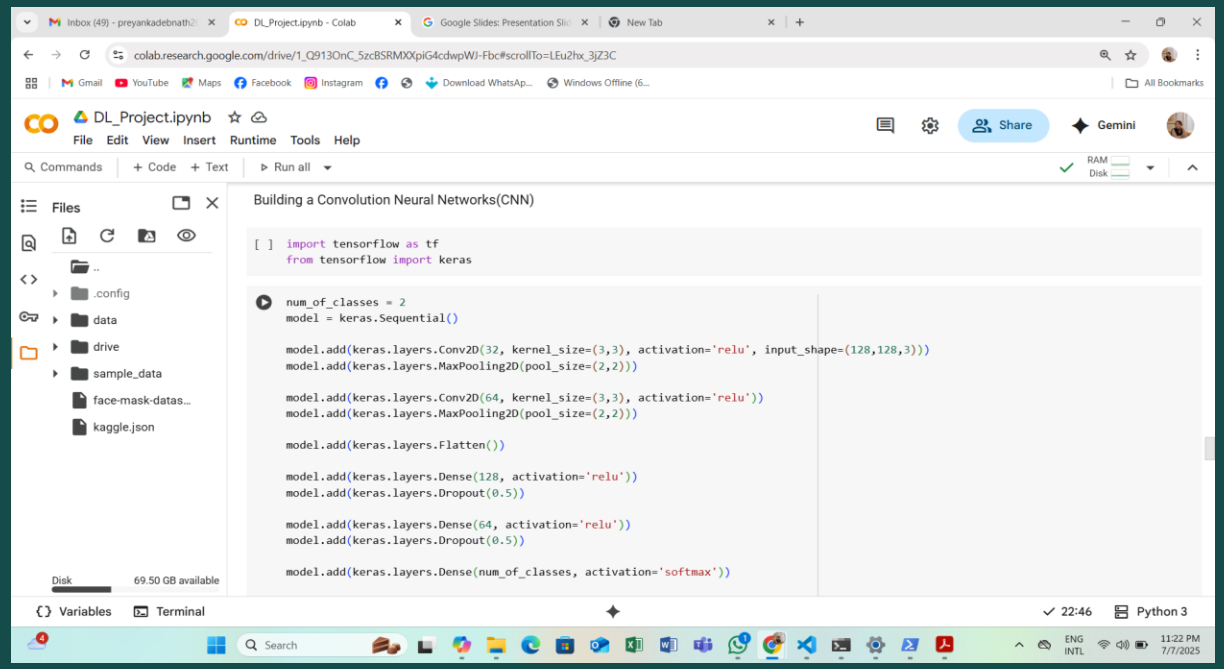
I stored all the resized images in a list inside a variable named `data.and then` To ensure everything was correct, I checked the data type, shape, and length of the 'data'.now I splits the data into training and testing sets, with 20% of the data reserved for testing.Now, I will scalling the data by dividing both the training and testing datasets by 255.

Note:scales the image pixel values from 0–255 to a 0–1 range for better model performance

Here, I built a CNN model using ReLU and Softmax activation functions.and then I waill compile the neural network .This compiles the neural network by specifying the optimizer, loss function, and evaluation metric.

It tells the model how to learn (Adam optimizer), what loss to minimize, and which metric (accuracy) to track during training then I will do trains the neural network that on the scaled training data, using 10% of it for validation to monitor performance.

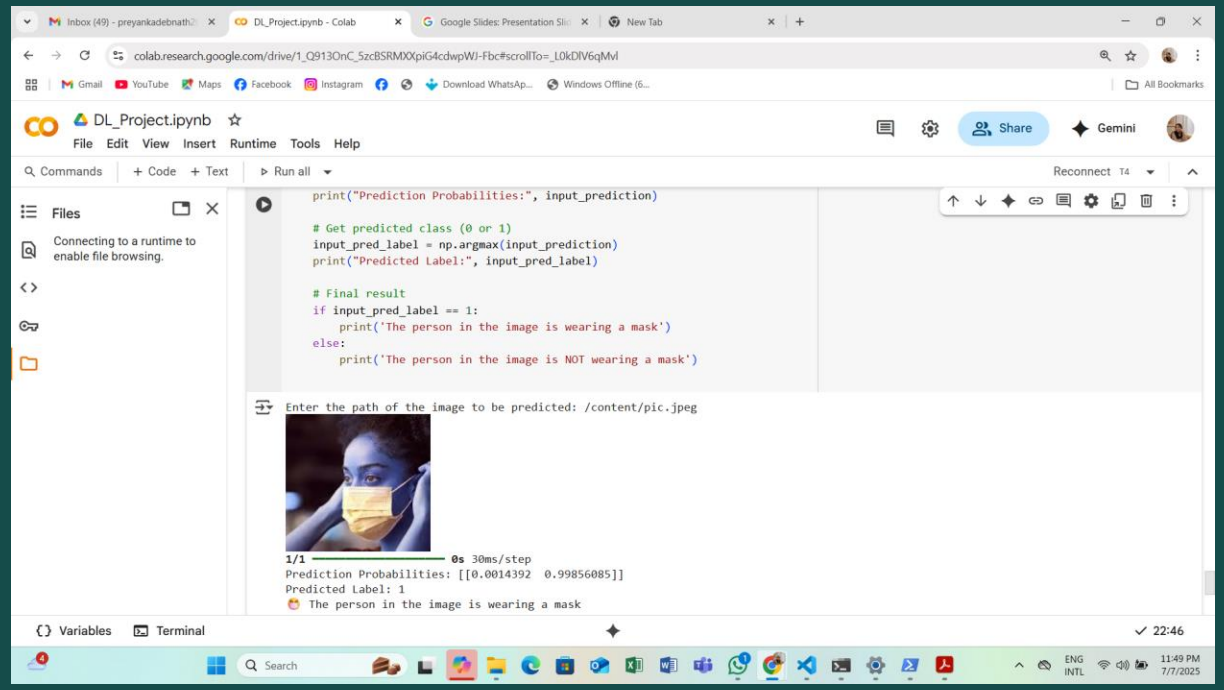
That will runs for 10 epochs with batches of 32 samples to update the model weights gradually.finnaly I will save the model as the name of mask_detector_model.keras



Model Evaluation:

1. model accuracy
2. loss accuracy
3. plot both the training and validation loss
4. plot both the training and validation accuracy

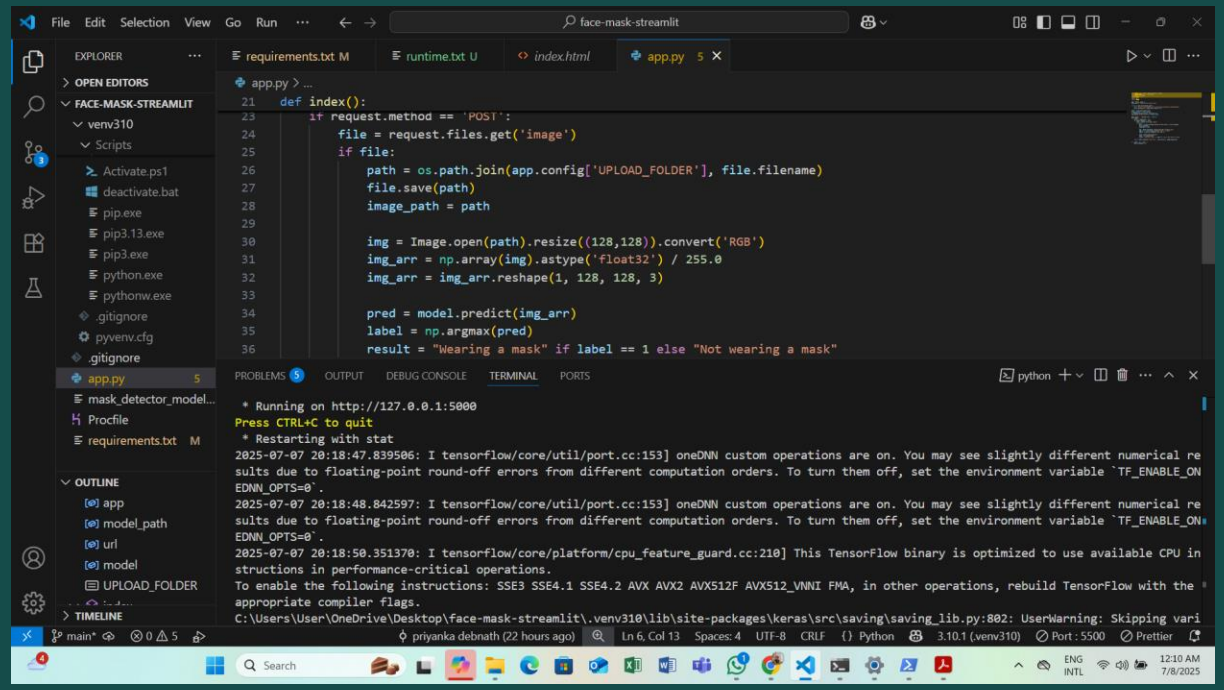
This code loads and preprocesses an input image to prepare it for prediction by the trained model.Then, it predicts whether the person in the image is wearing a mask or not and prints the result.then we get final result of the project



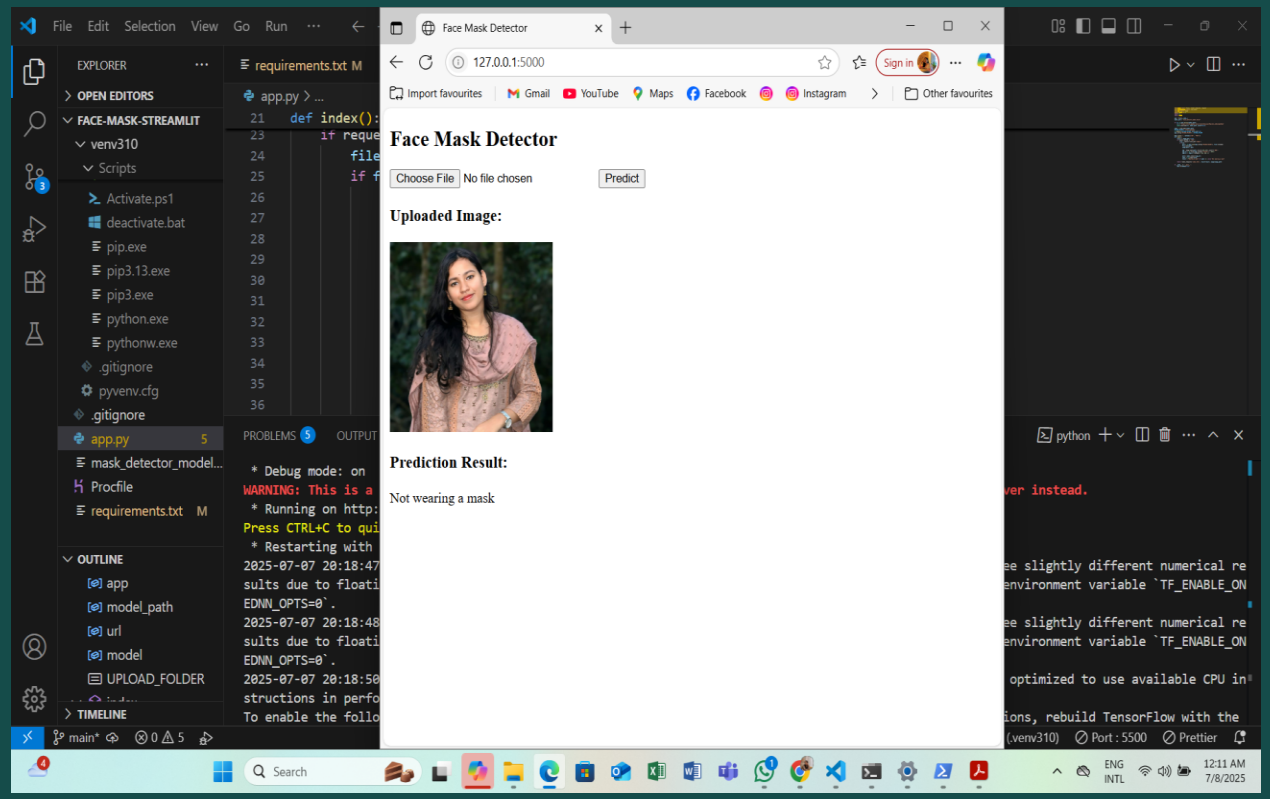
The following components were needed to deploy my project locally:

- **Trained model (`.pkl` file)**
- **Python environment** with all necessary libraries installed
- **Flask** for creating the local web application
- **HTML/CSS** (optional) for designing the front-end
- **Input interface** (such as image upload or form)
- **Code** to load the model and perform predictions
- **Command** to run the server locally (`flask run app.py`)
- **Browser** to open the local web interface (http://127.0.0.1:5000)

By following these components, I successfully got the correct output — this is the result.I got the local deploy link,which is * Running on http://127.0.0.1:5000



This is my final output



Thank You Everyone