**SOCIAL ROBOT**

## AN END-SEMESTER PROJECT REPORT ON THE SUBJECT OF INTRODUCTION TO AI ROBOTICS

***Submitted to***

## Amrita Vishwa Vidyapeetham

***in partial fulfillment for the award of the degree of***

## BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE ENGINEERING (AIE)

***By***

**GURUPRASATH M R**

# CH.EN.U4AIE22015

***Submitted to***

**DR. GOLAK BIHARI MAHANTA**

****

# AMRITA VISHWA VIDYAPEETHAM AMRITA SCHOOL OF COMPUTING

# CHENNAI – 601103

## April 2024

****

**BONAFIDE CERTIFICATE**

Certified that this project report **SOCIAL ROBOT”** is the bonafide work of **“Guruprasath M R”** who carried out the project work under my supervision towards his completion of the end semester project for the subject “INTRODUCTION TO AI ROBOTICS (22AIE214)”.

|  |
| --- |
| **SIGNATURE** |
| **Dr. Golak Bihari Mahanta**  **Course Instructor**  Assistant Professor (Sr. Gr)  Dept. of Mechanical Engineering Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Chennai |

Project Overview:

The robotics project is a comprehensive system designed to interact with humans through various modalities including face recognition, speech-to-text conversion, emotion detection, and natural language processing. The project is divided into three main parts, each handled by a separate team, given below

Team-A(My self): Face Recognition

**Objective**: Implement a face recognition system capable of identifying known individual

**Methodology**: Utilize computer vision techniques and machine learning algorithms to train a model for face recognition.

**Output:** Upon detecting a face, the system will identify the individual if they are registered in the database.

Team-B: Speech-to-Text and Emotion Detection

**Objective:** Develop a system to capture speech, convert it to text, and detect emotions from the speech input.

**Methodology:** Employ speech recognition algorithms to transcribe spoken words into text. Additionally, utilize sentiment analysis techniques to detect emotions such as happiness, sadness, excitement, etc.

Output: The system will provide both the transcribed text and the detected emotions from the speech input.

Team-C: UI

**Objective:** Design a user interface to display the emotions detected by Team-B's system.

**Methodology:** Create an interactive web interface using HTML, CSS, and JavaScript, Integrated with Flask for backend functionality. The interface will dynamically showcase detected emotions through text and emojis.

**Output:** The interface will provide users with a visual representation of emotions, along with options for manual input of emotions and speech recording.

MY PART(TEAM A – FACE RECOGNITION)

Dataset Creation

To create a dataset for face recognition using images captured from a webcam, you can utilize the OpenCV library in Python. OpenCV provides a comprehensive set of tools for image processing and computer vision tasks. First, we will need to set up your Python environment with OpenCV installed. Then, you can write a script to capture images from the webcam and save them along with labels corresponding to the identities of the individuals in the images.

Here's a general outline of the steps involved:

Install Libraries: To install the opencv library excute the code below in the command prompt

pip install opencv-python

Import Libraries: Then import libraries the OpenCV, and OS.

Initialize Webcam: Use OpenCV to initialize the webcam and start capturing frames.

Capture Images: Capture successive image frames from the webcam with a 5-millisecond interval between each.

Save Images: Once a face is detected, save the cropped face region along with its corresponding label (e.g., person's name or ID) into a dataset directory.

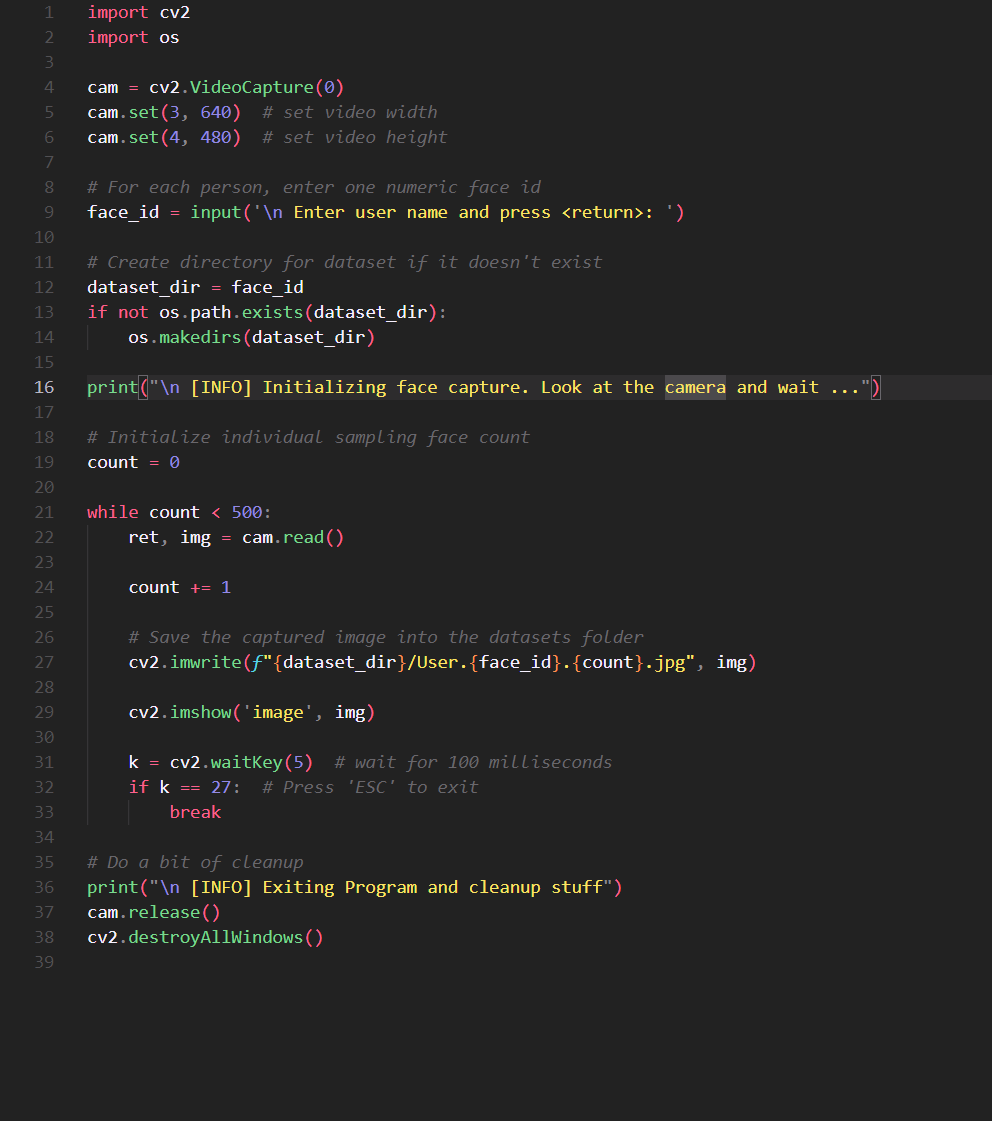
Dataset Organization: Organize the dataset directory structure with subdirectories for each individual, containing their respective images.

Face Detection:

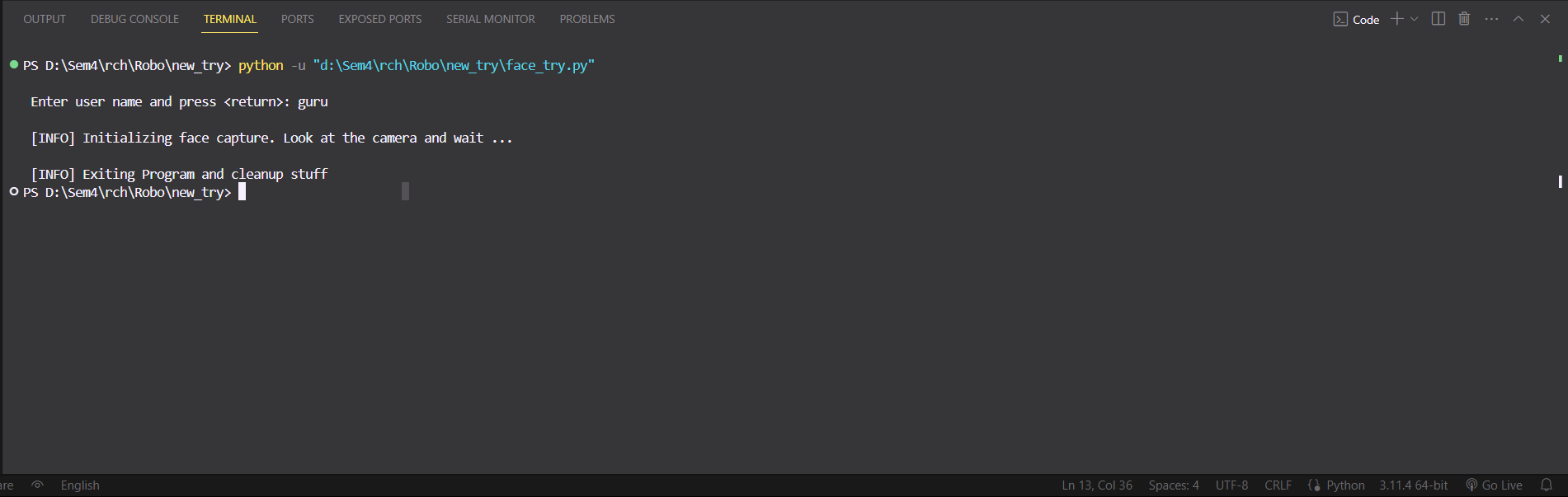
Initially, I and deepak attempted to utilize OpenCV's pre-trained Haar cascades,with the first 30 images, then 50, 100, and 200, and finally 500, but we encountered problem while testing , and only we got 50% accuracy rate. However, upon receiving a suggestion from my friend Neelraj, we decided to discontinue its use and instead transitioned to employing YOLO v8.and by this we got 98% accuracy

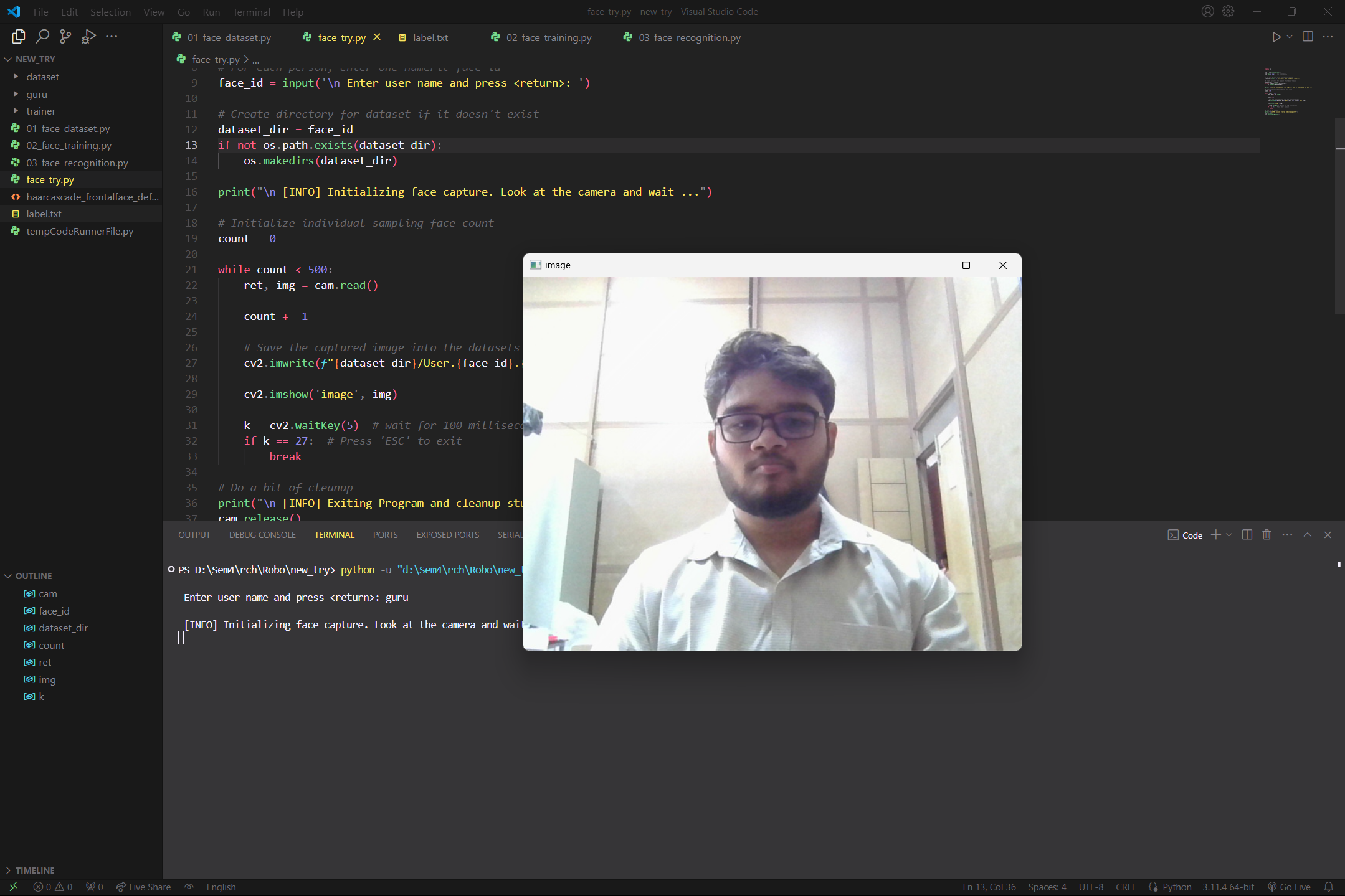
Code

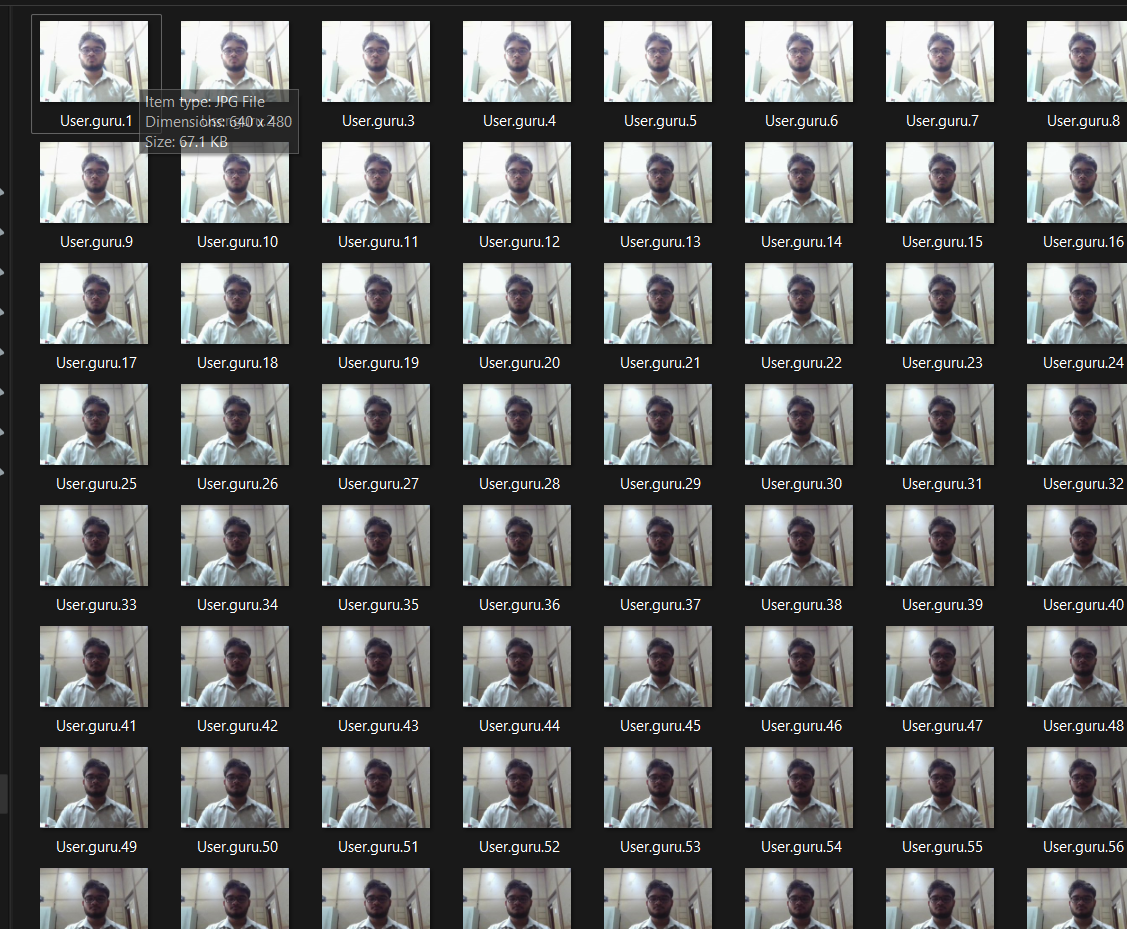
Dataset creation



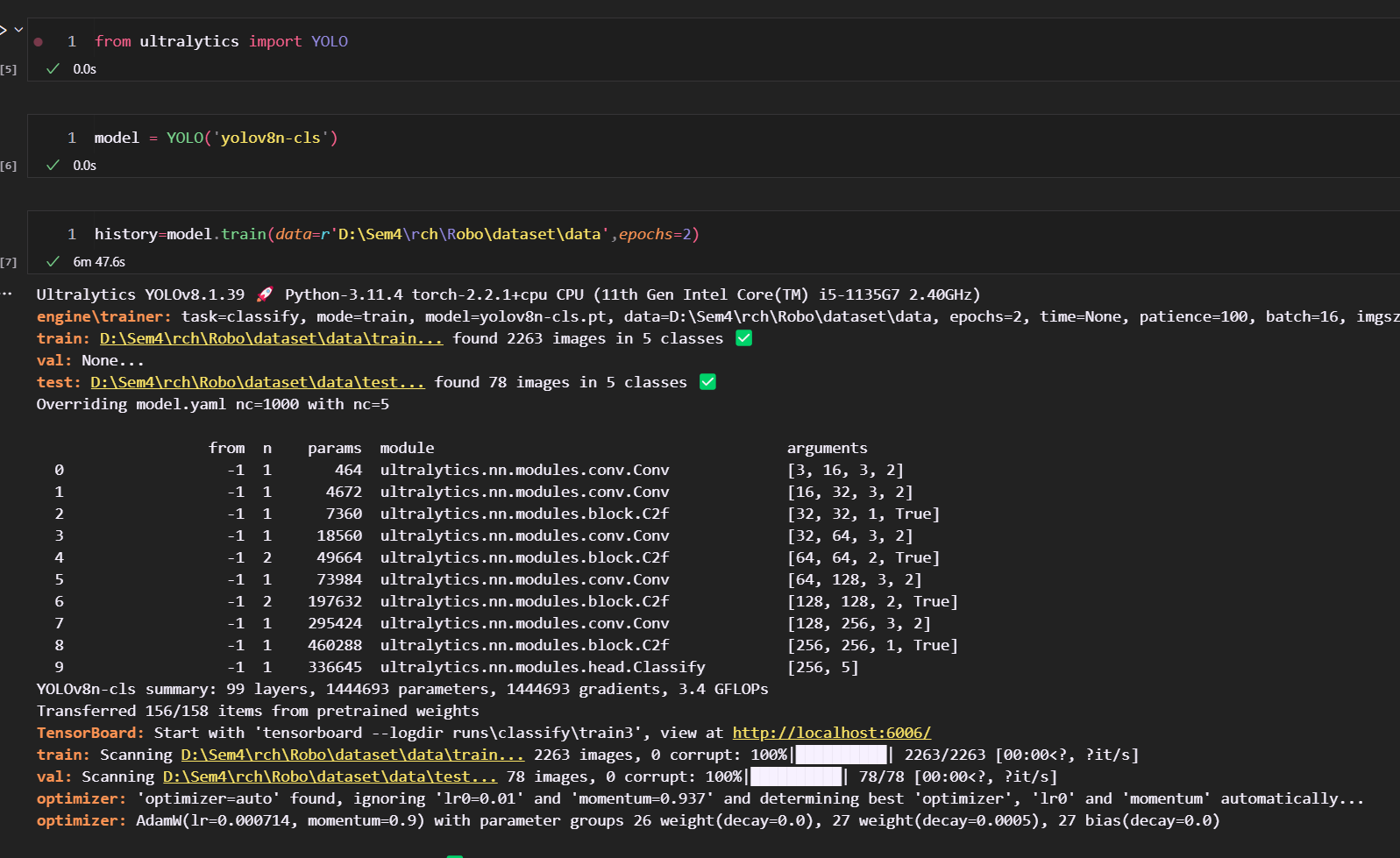
Input and Output

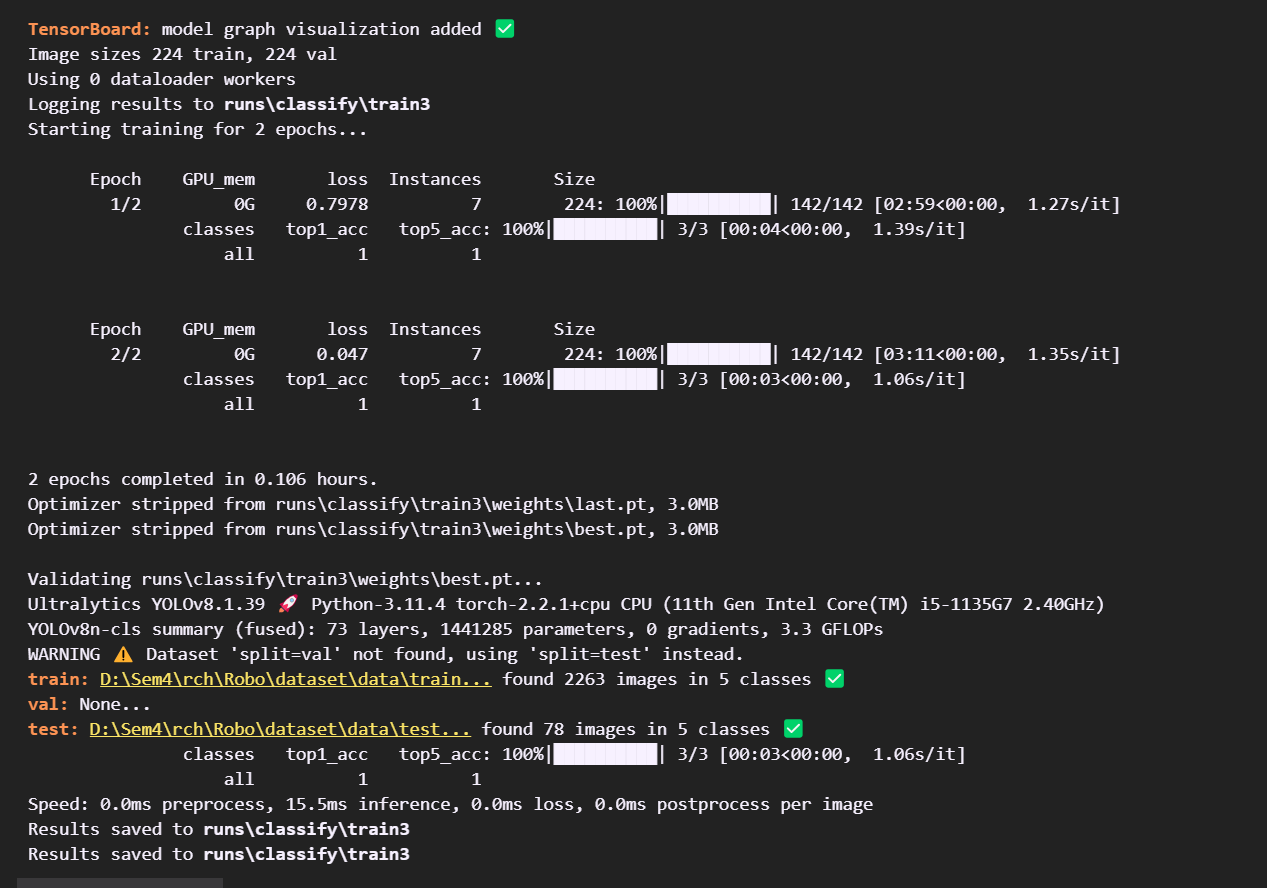


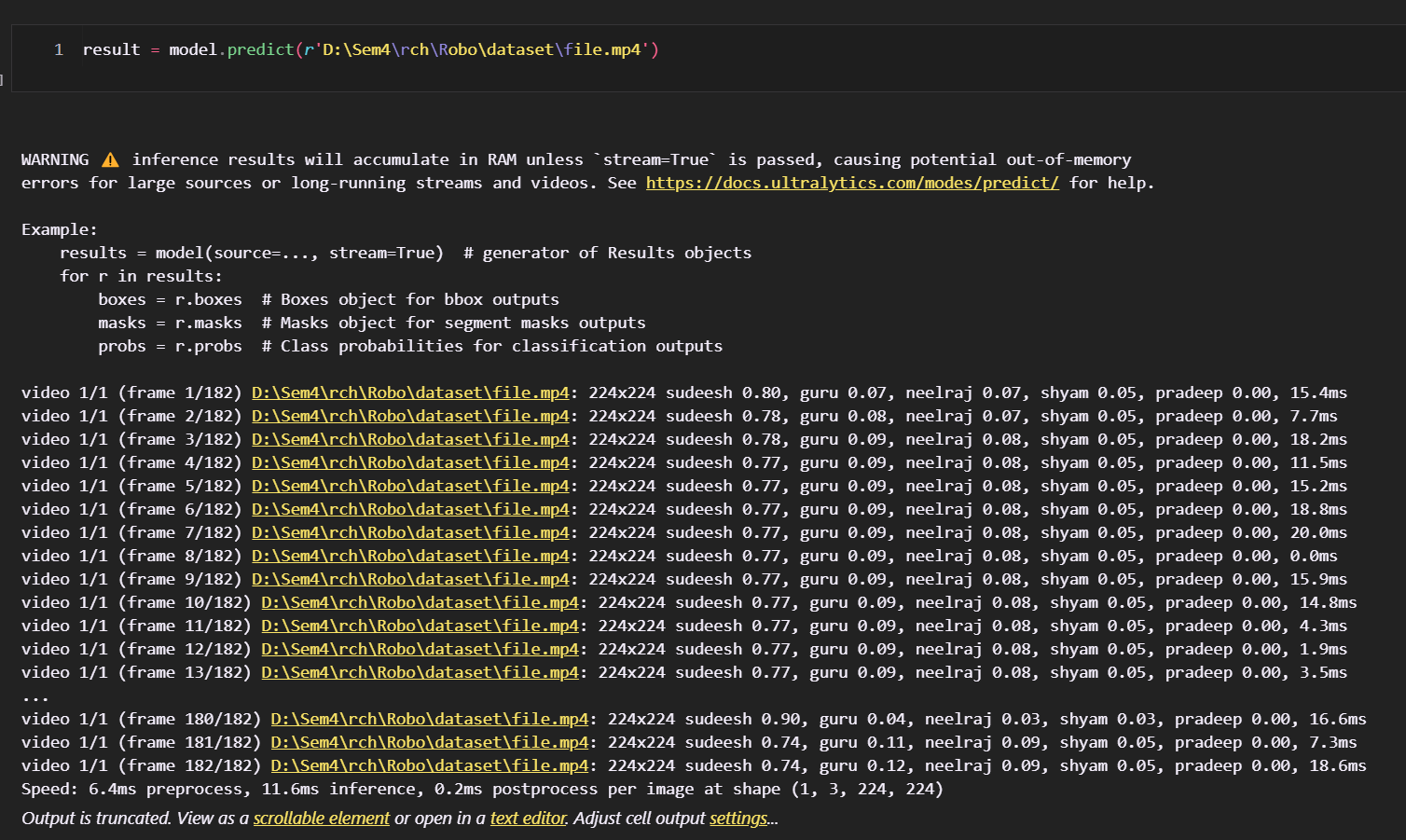


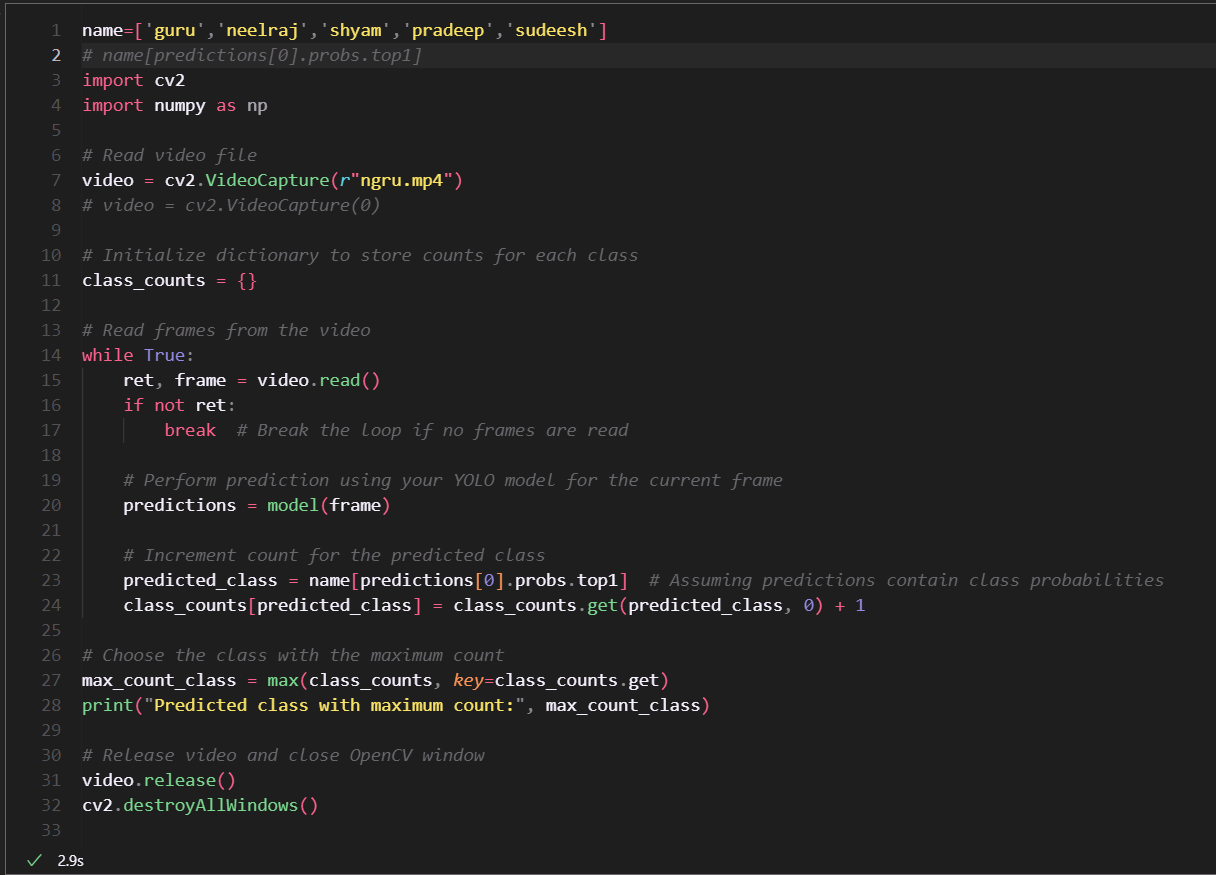


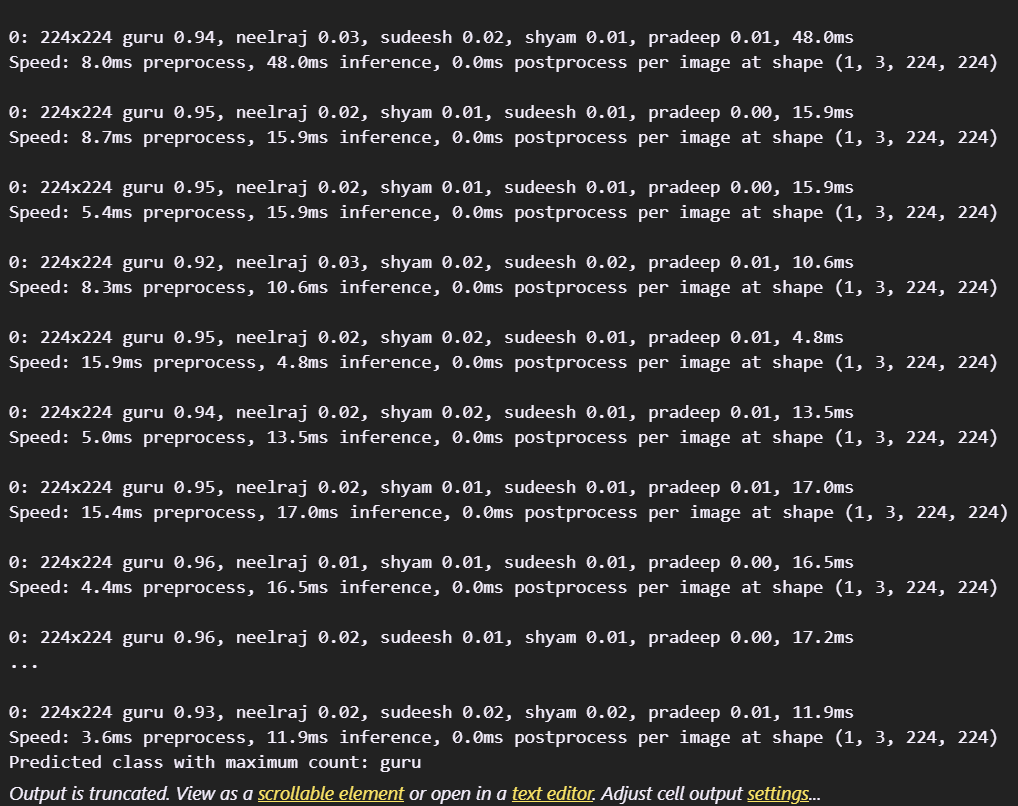
Face Detection











video Used to test



Label :Guru