A

Major Project

On

PUPIL SUPERVISING USING ARTIFICIAL INTELLIGENCE

(Submitted in partial fulfillment of the requirements for the award of Degree)

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CMR TECHNICAL CAMPUS

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled "**PUPIL SUPERVISING USING ARTIFICIAL INTELLIGENCE**" being submitted by **Humera Naaz(187R1A05E6), Bommala Shruthi(187R1A05D7) & Bijja Ravali(187R1A05D6)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide workcarried out by him/her under our guidance and supervision during the year 2021-22.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

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HOD

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Submitted for viva voice Examination held on _____

ACKNOWLEGDEMENT

Apart from the efforts of us, the success of any project depends largely on the encouragement and guidelines of many others. We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project.

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ABSTRACT

Due to the health emergency situation, which forced universities to stop using their centers as a means of teaching, many of them opted for virtual education. Affecting the learning process of students, which has predisposed many of them to become familiar with this new learning process, making the use of virtual platforms more common. Many educational centers have come to rely on digital tools such as: Discord, Google Meet, Microsoft Team, Skype and Zoom. The objective of the research is to report on the impact of student learning through the use of the aforementioned videoconferencing tools. Surveys were conducted with teachers and students who stated that 66% were not affected in their educational development. Most of them became familiar with the platforms; however, less than 24% qualified that their academic performance has improved, some teachers still have difficulties at a psychological level due to this new teaching modality. In conclusion, teachers and students agree that these tools are a great help for virtual classes.

The primary objective of this project is to create a self-sufficient agent that can offer information to both teachers and pupils. The level of student involvement is directly related to important academic outcomes like critical thinking and the marks students get in a topic.

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1. INTRODUCTION

1.1 PROJECT SCOPE

This project is titled as “Students live behaviour monitoring in online classes usingArtificial Intelligence. Human behavior analysis is an important area of computer vision researchdedicated to the detection, monitoring and understanding human physical actions. The teaching and learning cycle may be regarded to be the most critical operation in the academic institution. During classes, attendance and student behavior are closely monitored alongside teaching activities. Information has demonstrated that student interest is a central element in participation and performance

1.2 PROJECT PURPOSE

The project is designed to create a self-sufficient agent that can offer information to both teachers and pupils. The level of student involvement is directly related to important academic outcomes like critical thinking and the marks students get in a topic. Information has demonstrated that student interest is a central element in participation and performance

1.3 PROJECT FEATURES

The core features of this project is to predict behaviour of student in online classes when student is live. Student features are captured from every frame and data is analysed based on different types of activity related to eye movement, mouth movements, head movements and analysis is done on student active status on that respective class. Graphical representation is used to show performance of student.

2. SYSTEM ANALYSIS

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SYSTEM ANALYSIS

System Analysis is the important phase in the system development process. The System is studied to the minute details and analyzed. The system analyst plays an important role of an interrogator and dwells deep into the working of the present system. In analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is done. A key question considered here is, “what must be done to solve the problem?” The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

Due to the health emergency situation, which forced universities to stop using their centers as a means of teaching, many of them opted for virtual education. Affecting the learning process of students, which has predisposed many of them to become familiar with this new learning process, making the use of virtual platforms more common. Many educational centers have come to rely on digital tools such as: Discord, Google Meet, Microsoft Team, Skype and Zoom. The objective of the research is to report on the impact of student learning through the use of the aforementioned videoconferencing tools. Surveys were conducted with teachers and students who stated that 66% were not affected in their educational development. Most of them became familiar with the platforms; however, less than 24% qualified that their academic performance has improved, some teachers still have difficulties at a psychological level due to this new teaching modality. In conclusion, teachers and students agree that these tools are a great help for virtual classes.

2.2 EXISTING SYSTEM

Teaching is at a distance where the use of different means of videoconferencing is relevant in education. Since, it has a very significant role in the learning experience of the students . This indicates that ICT (Information and Communication Technology) has contributed to the new educational reforms. Google meet was mostly used by students in work meetings as opposed to teachers who preferred to zoom in on class meetings.

2.2.1 LIMITATIONS OF EXISTING SYSTEM

In an investigation, explains that students have learning effectiveness during their online classes using Zoom, as it allows access to requested activities and availability.

2.3 PROPOSED SYSTEM

In proposed system artificial intelligence is used to predict behavior of student in online classes when student is live. Student features are captured from every frame and data is analyzed based on different types of activity related to eye movement, mouth movements, head movements and analysis is done on student active status on that respective class. Graphical representation is used to show performance of student.

2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

The system is very simple in design and to implement. The system requires very low system resources and the system will work in almost all configurations. It has got following features:

- Helps in understanding interest of student for respective class.
- Teachers can take decisions in improving effective ways of teachings.

2.4 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the user.

Three key considerations involved in the feasibility analysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.4.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it give an indication of the system is economically possible for development.

2.4.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.4.3 BEHAVIORAL FEASIBILITY

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

2.5 HARDWARE & SOFTWARE REQUIREMENTS

2.5.1 HARDWARE REQUIREMENTS:

Hardware interfaces specifies the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

- Processor : Intel core i5
- Input Devices : Keyboard, Mouse
- RAM : 4GB
- Space on Hard Disk : 10GB

2.5.2 SOFTWARE REQUIREMENTS:

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements,

- Operating System : Windows 10
- Coding language : Python 3.10.0
- Interface : Flask web app
- Tool : Anaconda

3. ARCHITECTURE

3. ARCHITECTURE

3.1 PROJECT ARCHITECTURE

This project architecture describes how the application is going to function. The detailed architecture is explained below.

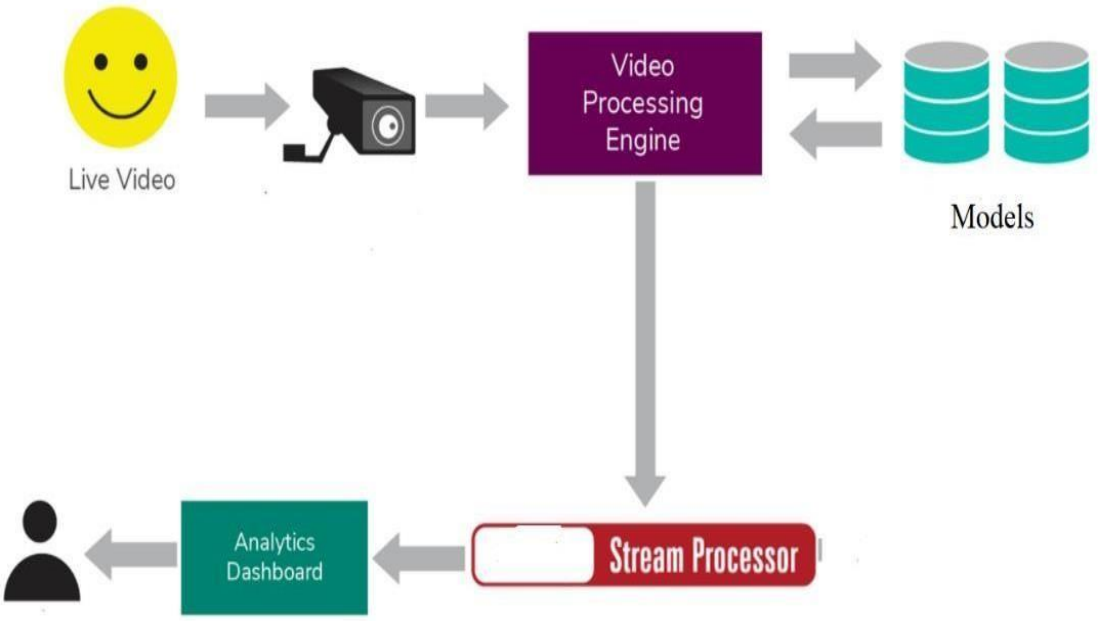

Figure 3.1: Project Architecture

3.2 MODULES DESCRIPTION

Modules

- **CLIENT**
- **SERVER MODULE**
- **FACE PROCESSING MODULE**

CLIENT:

- This application is run by student where camera will open and student's video is displayed on screen. Details of each frame are shared is sent to other modules for processing and analyzing with trained model. Result is shown in graph after analysis.

SERVER MODULE:

- This module is executed to track details of student and analyze actual performance. Each frame is sent to face processing module for checking with trained model. Server Module is used to process data between client and face processing module.

FACE PROCESSING MODULE:

- This module each frame is taken as input and shape predictor model is used to predict various aspects of features like (eye aspect ratio, mouth aspect ratio, drowsy, yawn, head pose. After calculating these values are sent to server module.

3.3 USECASE DIAGRAM

In the use case diagram, we basically have three actors namely: the camera, detection and system administrator. The system administrator has the following methods, receive instructions and give requests. The User has works like to enroll the input file and get the output file and generates the databases.

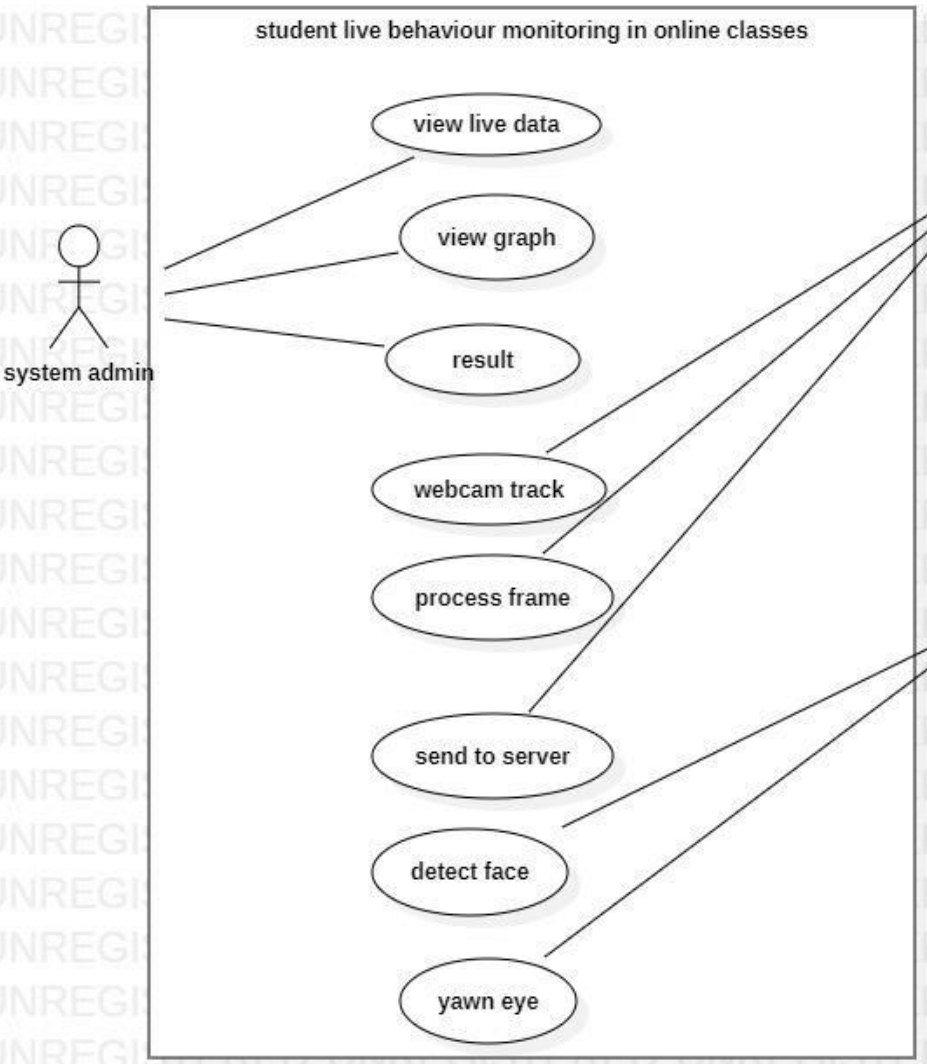

Figure 3.2: Use Case Diagram for Students live behaviour monitoring in online classes

3.4 CLASS DIAGRAM

Class Diagram is a collection of classes and objects.

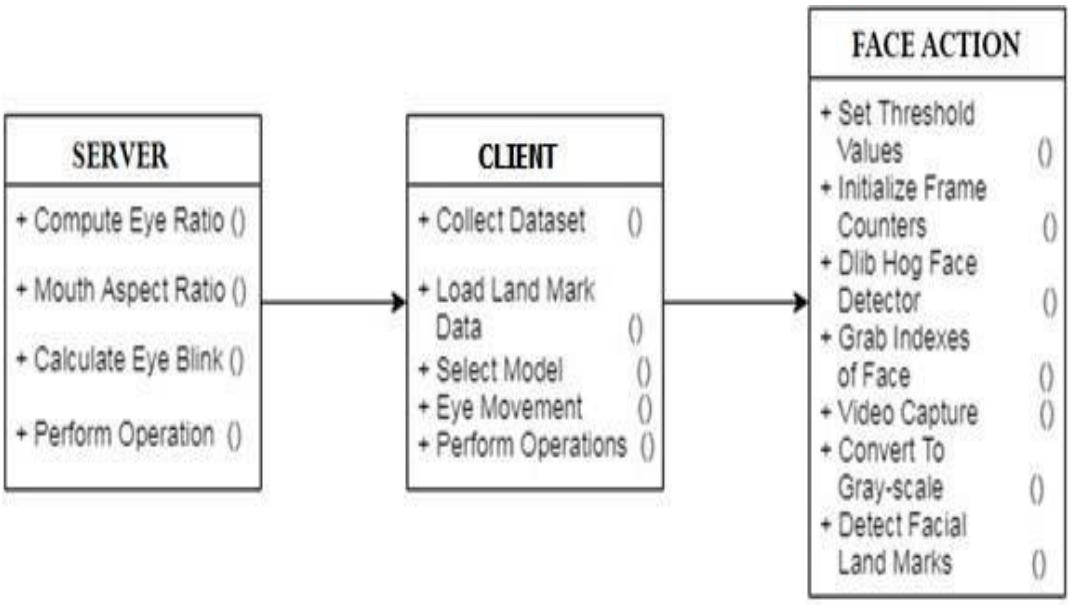

Figure 3.3: Class Diagram for Students live behaviour monitoring in online classes

3.5 SEQUENCE DIAGRAM

The sequence diagram shows the sequence in which different tasks are being carried out by the actors.

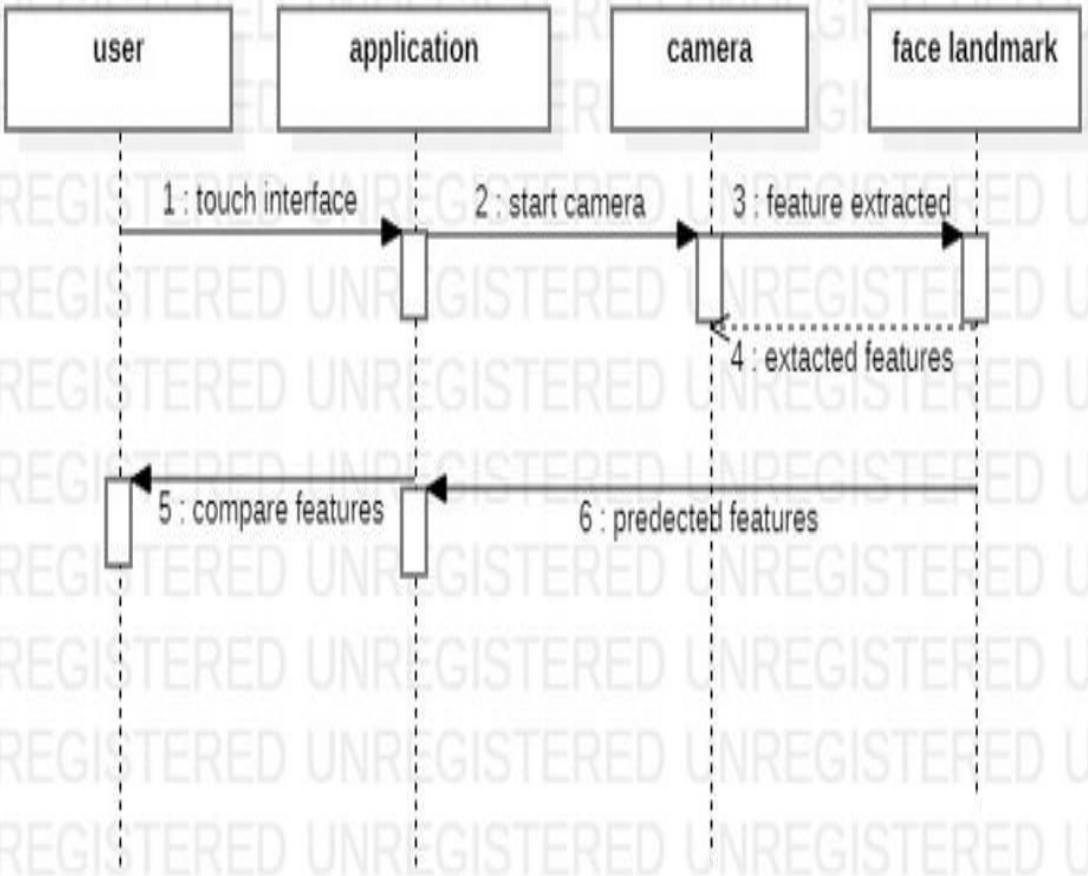

Figure 3.4: Sequence Diagram for Students live behaviour monitoring in online classes

3.6 ACTIVITY DIAGRAM

It describes about flow of activity states.

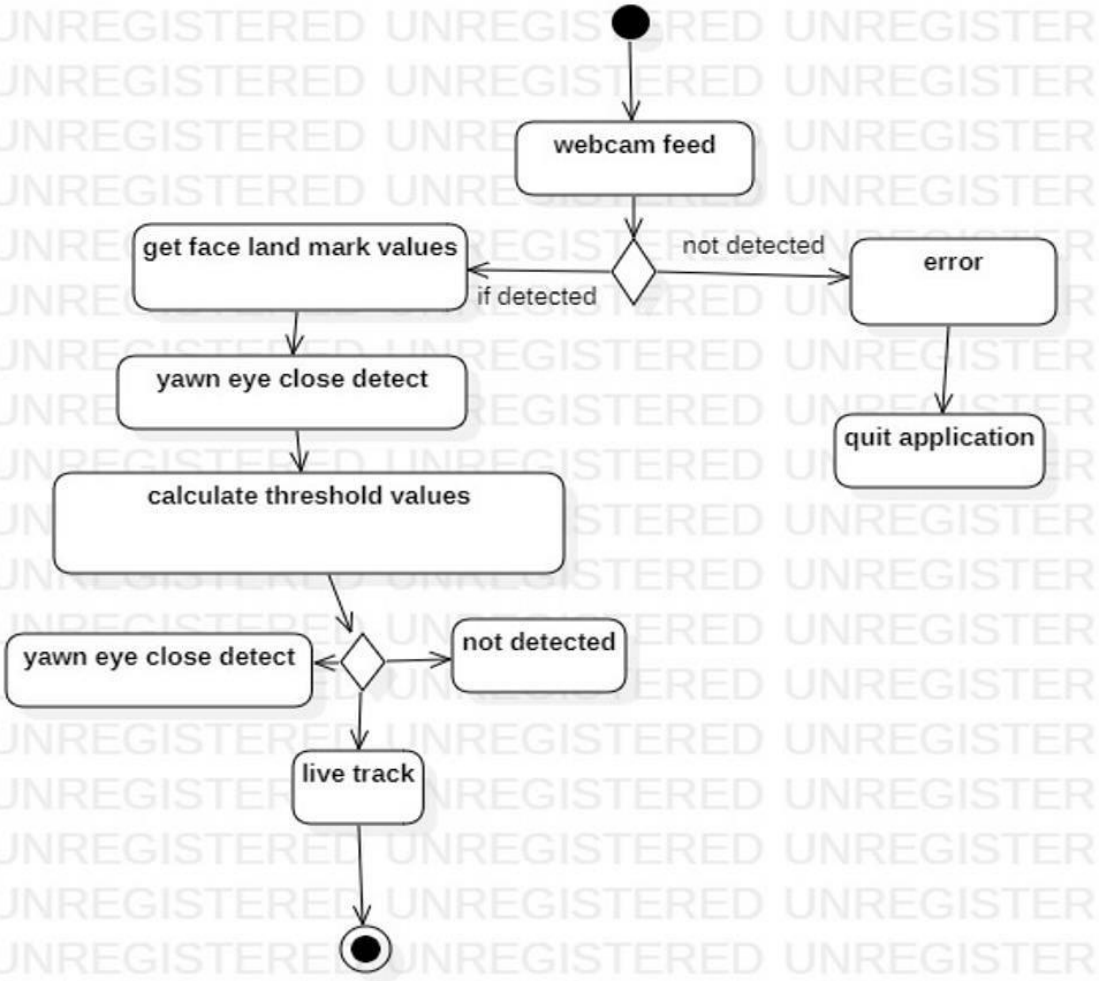

Figure 3.5: Activity Diagram for Students live behaviour monitoring in online classes

4. IMPLEMENTATION

4. IMPLEMENTATION

SAMPLE CODE:

Server.py

```
from flask import Flask, render_template, request, url_for, redirect, jsonify
import json
app = Flask(_name_)
userdata = 0
@app.route('/')
def hello_world():
    return render_template('index.html')
@app.route('/new')
def new():
    print("Here we are")
    return render_template('result.html')
    # return jsonify(userdata)
@app.route('/getdata', methods=['GET'])
def getdata():
    print("here getedata")
    return jsonify(userdata)
@app.route('/result', methods=['GET', 'POST'])
def your_func():
    print(request.form)
    # print(type(request.form['data']))
    # print(json.loads(request.form))
    global userdata
    userdata = request.form
    # print(request.method)
    # print(request.form)
    # if (request.method == 'POST'):
    #     print("here I am")
    # return render_template('result.html')
    return redirect(url_for('new'))
if__name__== '_main_':
    app.run(debug=True, host='127.0.0.1', port=5500)
```

Serverf.py

```
import os
from flask import Flask, request, Response, jsonify, render_template
import cv2
from FaceAction import FaceAction
from PIL import Image
import numpy
import time
app = Flask(_name_)
mydict = {}
rooms = {}

@app.after_request
def after_request(response):
    response.headers.add('Access-Control-Allow-Origin', '*')
    response.headers.add('Access-Control-Allow-Headers',
                         'Content-Type,Authorization')
    response.headers.add('Access-Control-Allow-Methods',
                         'GET,PUT,POST,DELETE,OPTIONS')
    return response

@app.route('/')
def index():
    return Response(open('./static/local.html').read(), mimetype="text/html")
def last5secAverage(prevc, newc, prevavg, newavg):
    return (newavg*newc-prevavg*prevc)/(newc-prevc)

@app.route('/image', methods=['POST', 'OPTIONS'])
def image():
    image_file = request.files['image']
    name = request.form['name']
    room = request.form['room']
    docopen = request.form['docopen']
    teacher = request.form['teacher']
    end = request.form['end']
    print(end)
    image_object = numpy.array(Image.open(image_file).convert('RGB'))
    image_object = image_object[:, :, ::-1].copy()
```

```
    drow, yawn, pos, number = FaceAction().run_frame(image_object)
    drow_val = drow
if (drow < 0.2):
        drow = 1
    else:
        drow = 0
    if (yawn > 0.3):
        yawn = 1
    else:
        yawn  = 0
    if(docopen == "false"):
        docopen = 0
    else:
        docopen =  1
    # print(docopen)
    if room in rooms:
        if name in rooms[room]:
            if (end == '1'):
                rooms[room]['class&']['ClassEndTime'] = time.time()
            #print("I am here")
            rooms[room][name]['drow'] = drow
            rooms[room][name]['yawn'] = yawn
            rooms[room][name]['pos'] = pos
            rooms[room][name]['number'] = number
            rooms[room][name]['docopen'] = docopen
            if (rooms[room][name]['drow_val'] == drow_val):
                rooms[room][name]['paused'] = 1
            else:
                rooms[room][name]['paused'] = 0

            #rooms[room][name]['drow_val'] = drow_val
            rooms[room][name]['avgdrow'] = (rooms[room][name]['avgdrow'] *
                                    rooms[room][name]['count']+rooms[room][name]['drow']) / \
                (rooms[room][name]['count'] + 1)
            rooms[room][name]['avgyawn'] = (rooms[room][name]['avgyawn'] *
                                    rooms[room][name]['count']+rooms[room][name]['yawn']) / \
                (rooms[room][name]['count'] + 1)
            rooms[room][name]['avgpos'] = (rooms[room][name]['avgpos'] *
                                    rooms[room][name]['count']+rooms[room][name]['pos']) / \
```

```
            (rooms[room][name]['count'] + 1)
        rooms[room][name]['avgdocopen'] = (rooms[room][name]['avgdocopen'] *
                                rooms[room][name]['count']+rooms[room][name]['docopen']) / \
            (rooms[room][name]['count']+1)
        rooms[room][name]['count'] += 1
        # Dont update if Not going in if condition
        rooms[room][name]['update'] = 0
        nowtime = time.time()
        #print((nowtime - rooms[room][name]['last5']))
if ((nowtime - rooms[room][name]['last5']) >= 5):
            # print("I am here")
rooms[room][name]['lastavgdrow'] = last5secAverage(
                rooms[room][name]['pcount'], rooms[room][name]['count'], rooms[room][name]['pavgdrow'],
rooms[room][name]['avgdrow'])
            rooms[room][name]['lastavgyawn'] = last5secAverage(
                rooms[room][name]['pcount'], rooms[room][name]['count'], rooms[room][name]['pavgyawn'],
rooms[room][name]['avgyawn'])
            rooms[room][name]['lastavgpos'] = last5secAverage(
                rooms[room][name]['pcount'], rooms[room][name]['count'], rooms[room][name]['pavgpos'],
rooms[room][name]['avgpos'])
            rooms[room][name]['lastavgdocopen'] = last5secAverage(
                rooms[room][name]['pcount'], rooms[room][name]['count'], rooms[room][name]['pavgdocopen'],
rooms[room][name]['avgdocopen'])
            rooms[room][name]['update'] = 1 # Update Graph if here
            # print(rooms[room][name]['lastavgdocopen'])
            # print(rooms[room][name]['pcount'])
            # print(rooms[room][name]['count'])
            # print(rooms[room][name]['pavgdocopen'])
            # print(rooms[room][name]['avgdocopen'])
            rooms[room][name]['drow_val'] = drow_val
            # Now change prev values to current values
            rooms[room][name]['last5'] = nowtime
            rooms[room][name]['pavgdrow'] = rooms[room][name]['avgdrow']
            rooms[room][name]['pavgyawn'] = rooms[room][name]['avgyawn']
            rooms[room][name]['pavgpos'] = rooms[room][name]['avgpos']
            rooms[room][name]['pavgdocopen'] = rooms[room][name]['avgdocopen']
            rooms[room][name]['pcount'] = rooms[room][name]['count']
```

```
        # We have to update Class Avg only when req is coming from teacher
        if (teacher == "true"):
            avg_drow = 0
            avg_yawn = 0
            avg_pos = 0
            avg_docopen = 0
            ccc = 0
            for x in rooms[room]:
                if (x != 'class&'):
                    # print(x)
                    # print(rooms[room][x]['lastavgyawn'])

                    avg_drow += rooms[room][x]['lastavgdrow']
                    avg_yawn += rooms[room][x]['lastavgyawn']
                    avg_pos += rooms[room][x]['lastavgpos']
                    avg_docopen += rooms[room][x]['lastavgdocopen']
                    ccc += 1
            rooms[room]['class&']['Cdrow'] = avg_drow / ccc
            rooms[room]['class&']['Cyawn'] = avg_yawn / ccc
            rooms[room]['class&']['Cpos'] = avg_pos / ccc
            rooms[room]['class&']['Cdocopen'] = avg_docopen / ccc
    else:

        rooms[room][name] = {}
        rooms[room][name]['drow'] = drow
        rooms[room][name]['yawn'] = yawn
        rooms[room][name]['pos'] = pos
        rooms[room][name]['number'] = number
        rooms[room][name]['docopen'] = docopen
        # When particular student joined the room
        rooms[room][name]['SessionStart'] = time.time()
        rooms[room][name]['avgdrow'] = rooms[room][name]['drow']
        # Current Average
        rooms[room][name]['avgyawn'] = rooms[room][name]['yawn']
        rooms[room][name]['avgpos'] = rooms[room][name]['pos']
        rooms[room][name]['avgdocopen'] = rooms[room][name]['docopen']
        rooms[room][name]['lastavgdrow'] = 0
        rooms[room][name]['lastavgyawn'] = 0
        rooms[room][name]['lastavgpos'] = 0  # Last 5 second average
```

```
        rooms[room][name]['lastavgdocopen'] = 0
        rooms[room][name]['update'] = 1  # Tells js to update values
        rooms[room][name]['last5'] = time.time()
        rooms[room][name]['count'] = 1
        rooms[room][name]['drow_val'] = drow_val
        rooms[room][name]['paused'] = 0
        rooms[room][name]['pavgdrow'] = rooms[room][name]['avgdrow']
        rooms[room][name]['pavgyawn'] = rooms[room][name]['avgyawn']
        rooms[room][name]['pavgpos'] = rooms[room][name]['avgpos']
        # Will be used to calculate last5 second average
        rooms[room][name]['pavgdocopen'] = rooms[room][name]['avgdocopen']
        rooms[room][name]['pcount'] = rooms[room][name]['count']
else:

    rooms[room] = {}
    rooms[room][name] = {}
    rooms[room]['class&'] = {}
    # For Average of Class
    rooms[room]['class&']['Cdrow'] = 0
    rooms[room]['class&']['Cyawn'] = 0
    rooms[room]['class&']['Cpos'] = 0  # Initially everything is zero
    rooms[room]['class&']['Cdocopen'] = 0
    # time in seconds when room was made
    rooms[room]['class&']['ClassStartTime'] = time.time()
    rooms[room]['class&']['ClassEndTime'] = 0
    # For Room Mader ->Teacher
    rooms[room][name]['drow'] = drow
    rooms[room][name]['yawn'] = yawn
    rooms[room][name]['pos'] = pos
    rooms[room][name]['number'] = number
    rooms[room][name]['docopen'] = docopen
    rooms[room][name]['avgdrow'] = rooms[room][name]['drow']
```

```
 # Current Average
        rooms[room][name]['avgyawn'] = rooms[room][name]['yawn']
        rooms[room][name]['avgpos'] = rooms[room][name]['pos']
        rooms[room][name]['avgdocopen'] = rooms[room][name]['docopen']
        rooms[room][name]['lastavgdrow'] = 0
        rooms[room][name]['lastavgyawn'] = 0
        rooms[room][name]['lastavgpos'] = 0  # Last 5 second average
        rooms[room][name]['lastavgdocopen'] = 0
        rooms[room][name]['drow_val'] = drow_val
        rooms[room][name]['paused'] = 0
        rooms[room][name]['update'] = 1 # Tells js to update values
        rooms[room][name]['last5'] = time.time()
        rooms[room][name]['count'] = 1
        rooms[room][name]['pavgdrow']  =  rooms[room][name]['avgdrow']
        rooms[room][name]['pavgyawn'] = rooms[room][name]['avgyawn']
        rooms[room][name]['pavgpos'] = rooms[room][name]['avgpos']
        # Will be used to calculate last5 second average
        rooms[room][name]['pavgdocopen'] = rooms[room][name]['avgdocopen']
        rooms[room][name]['pcount'] = rooms[room][name]['count']
    d = {"Dictionary": rooms}
    # print(room)
    return jsonify(d)


if__name__== '_main_':
    app.run(debug=True, host='127.0.0.1')
```

FaceAction

```
from scipy.spatial import distance
from imutils import face_utils, resize
from dlib import get_frontal_face_detector, shape_predictor
import cv2
import numpy as np
class FaceAction:
    tot = 0
    detect = get_frontal_face_detector()
    predict = shape_predictor("shape_predictor_68_face_landmarks.dat")
    (lStart, lEnd) = face_utils.FACIAL_LANDMARKS_68_IDXS["left_eye"]
    (rStart, rEnd) = face_utils.FACIAL_LANDMARKS_68_IDXS["right_eye"]
    (mStart, mEnd) = face_utils.FACIAL_LANDMARKS_68_IDXS["mouth"]
    K = [6.5308391993466671e+002, 0.0, 3.1950000000000000e+002,
        0.0, 6.5308391993466671e+002, 2.3950000000000000e+002,
        0.0, 0.0, 1.0]
    D = [7.0834633684407095e-002, 6.9140193737175351e-002,
        0.0, 0.0, -1.3073460323689292e+000]
    cam_matrix = np.array(K).reshape(3, 3).astype(np.float32)
    dist_coeffs = np.array(D).reshape(5, 1).astype(np.float32)
    object_pts = np.float32([[6.825897, 6.760612, 4.402142],
                             [1.330353, 7.122144, 6.903745],
                             [-1.330353, 7.122144, 6.903745],
                             [-6.825897, 6.760612, 4.402142],
                             [5.311432, 5.485328, 3.987654],
                             [1.789930, 5.393625, 4.413414],
                             [-1.789930, 5.393625, 4.413414],
                             [-5.311432, 5.485328, 3.987654],
                             [2.005628, 1.409845, 6.165652],
                             [-2.005628, 1.409845, 6.165652],
                             [2.774015, -2.080775, 5.048531],
                             [-2.774015, -2.080775, 5.048531],
                             [0.000000, -3.116408, 6.097667],
                             [0.000000, -7.415691, 4.070434]])
```

```
reprojectsrc = np.float32([[10.0, 10.0, 10.0],
                           [10.0, 10.0, -10.0],
                           [10.0, -10.0, -10.0],
                           [10.0, -10.0, 10.0],
                           [-10.0, 10.0, 10.0],
                           [-10.0, 10.0, -10.0],
                           [-10.0, -10.0, -10.0],
                           [-10.0, -10.0, 10.0]])

  def eye_aspect_ratio(self, eye):
      A = distance.euclidean(eye[1], eye[5])
      B = distance.euclidean(eye[2], eye[4])
      C = distance.euclidean(eye[0], eye[3])
      ear = (A + B) / (2.0 * C)
      return ear

  def mouth_aspect_ratio(self, mouth):
      A = distance.euclidean(mouth[13], mouth[19])
      B = distance.euclidean(mouth[14], mouth[18])
      C = distance.euclidean(mouth[15], mouth[17])
      D = distance.euclidean(mouth[12], mouth[16])
      mar = (A + B + C) / (2.0 * D)
      return mar

  def drowsy(self, frame):
      frame = resize(frame, width=450)
      gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
      subjects = self.detect(gray, 0)
      self.tot = len(subjects)
      # print(len(subjects))
      # print(self.tot)
      if (len(subjects) == 0):
          return 1
```

```
for subject in subjects:
        shape = self.predict(gray, subject)
        shape = face_utils.shape_to_np(shape)
        leftEye = shape[self.lStart:self.lEnd]
        rightEye = shape[self.rStart:self.rEnd]
        leftEAR = self.eye_aspect_ratio(leftEye)
        rightEAR = self.eye_aspect_ratio(rightEye)
        ear = (leftEAR + rightEAR) / 2.0
        return ear

 def yawn(self, frame):
    frame = resize(frame, width=450)
    gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
    subjects = self.detect(gray, 0)
    if (len(subjects) == 0):
        return 0
    for subject in subjects:
        shape = self.predict(gray, subject)
        shape = face_utils.shape_to_np(shape)
        mouth = shape[self.mStart:self.mEnd]
        mar = self.mouth_aspect_ratio(mouth)
        return mar

 def get_head_pose(self, shape, object_pts, cam_matrix, dist_coeffs, reprojectsrc):
    image_pts = np.float32([shape[17], shape[21], shape[22], shape[26], shape[36],
                            shape[39], shape[42], shape[45], shape[31], shape[35],
                            shape[48], shape[54], shape[57], shape[8]])

    _, rotation_vec, translation_vec = cv2.solvePnP(
        object_pts, image_pts, cam_matrix, dist_coeffs)

    reprojectdst, _ = cv2.projectPoints(reprojectsrc, rotation_vec, translation_vec, cam_matrix,
                                        dist_coeffs)
```

```
reprojectdst = tuple(map(tuple, reprojectdst.reshape(8, 2)))
        # calc euler angle
        rotation_mat, _ = cv2.Rodrigues(rotation_vec)
        pose_mat = cv2.hconcat((rotation_mat, translation_vec))
        _, _, _, _, _, _, euler_angle = cv2.decomposeProjectionMatrix(pose_mat)

        return reprojectdst, euler_angle

    def head_pose(self, frame):

        face_rects = self.detect(frame, 0)
        if(len(face_rects) > 0):
            shape = self.predict(frame, face_rects[0])
            shape = face_utils.shape_to_np(shape)

            _, euler_angle = self.get_head_pose(
                shape, self.object_pts, self.cam_matrix, self.dist_coeffs, self.reprojectsrc)
            if(-10 <= euler_angle[2, 0] and euler_angle[2, 0] <= 10):
                return 0
            else:
                return 1
        else:
            return 1

    def run_frame(self, frame):
        return (self.drowsy(frame), self.yawn(frame), self.head_pose(frame), self.tot)
```

5. SCREENSHOTS

5. SCREENSHOTS

5.1 FACEACTION NOTICES

In this image, once the server is run on a site this is the screen it displays and runs on the background in the command prompt.

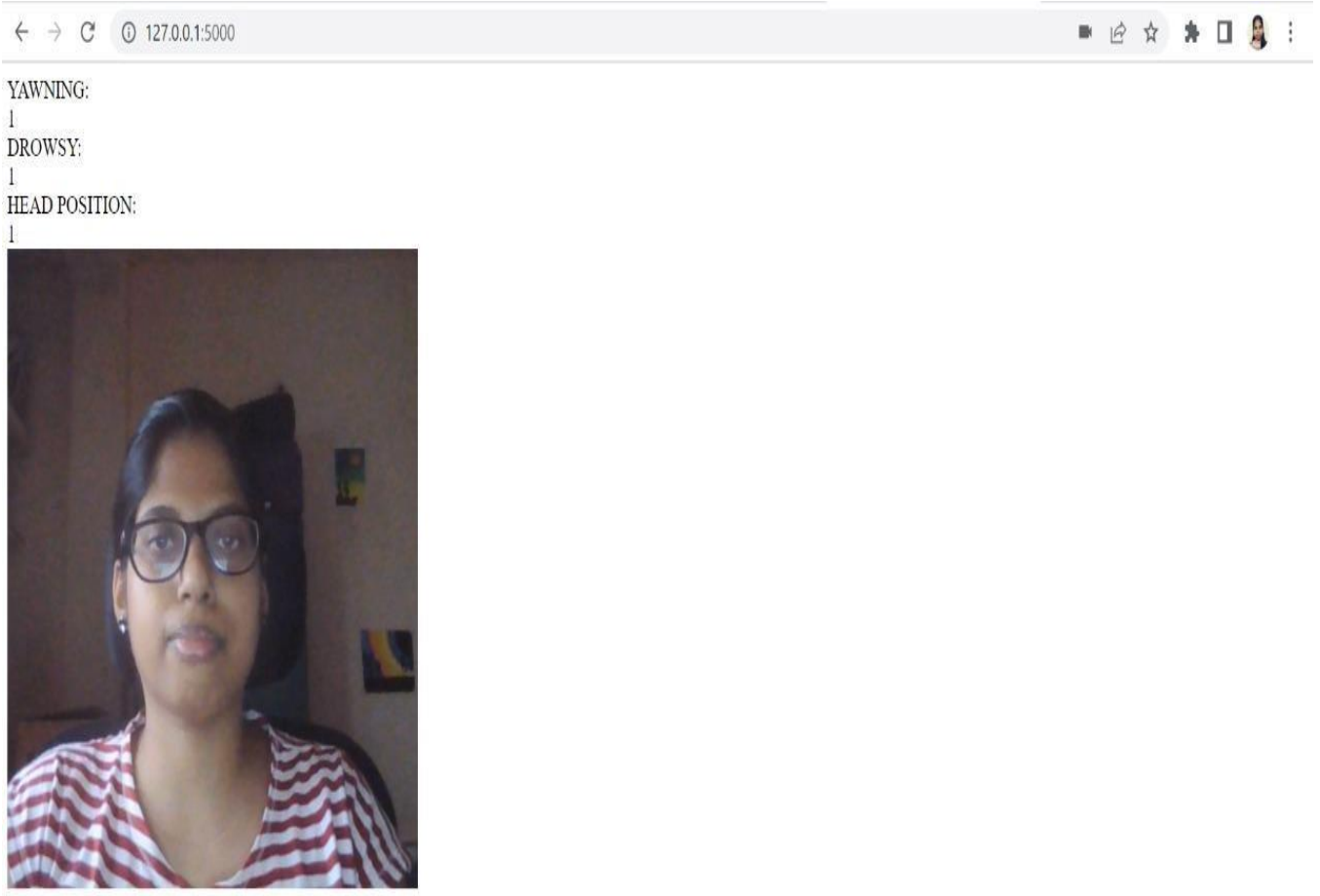

Fig 5.1 FaceAction Notices

5.2 MAIN SERVER SITE

This is where the main page to get recorded all the face actions from the video which is shown in figure and shows the how we are active in the classes/meetings etc.

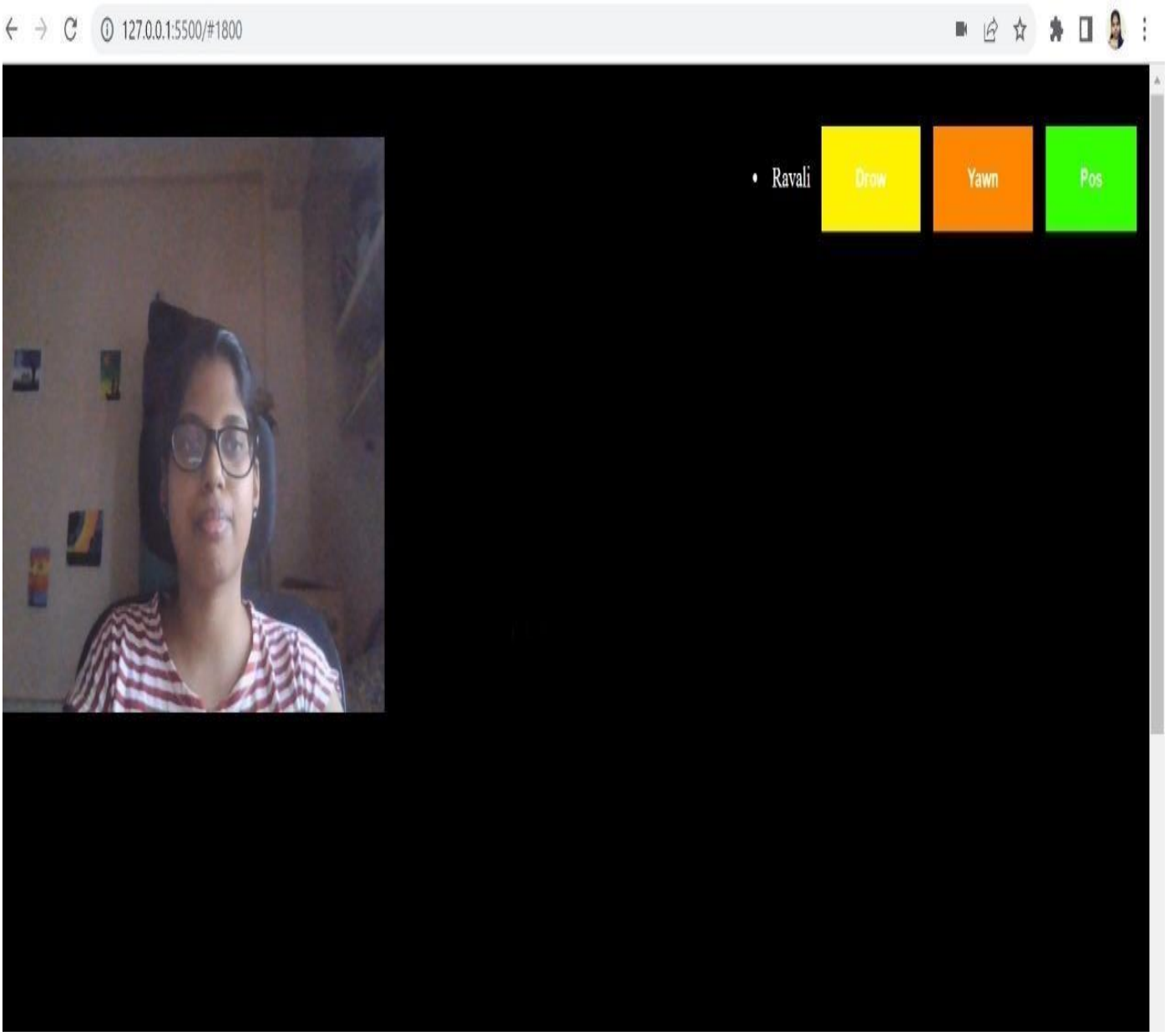

Fig 5.2 Main server page/site

5.3 OUTPUT-1 GENERATION

This is where the output in terms of graph, here we can observes all the actions like Drow, Yawn, Pos etc.

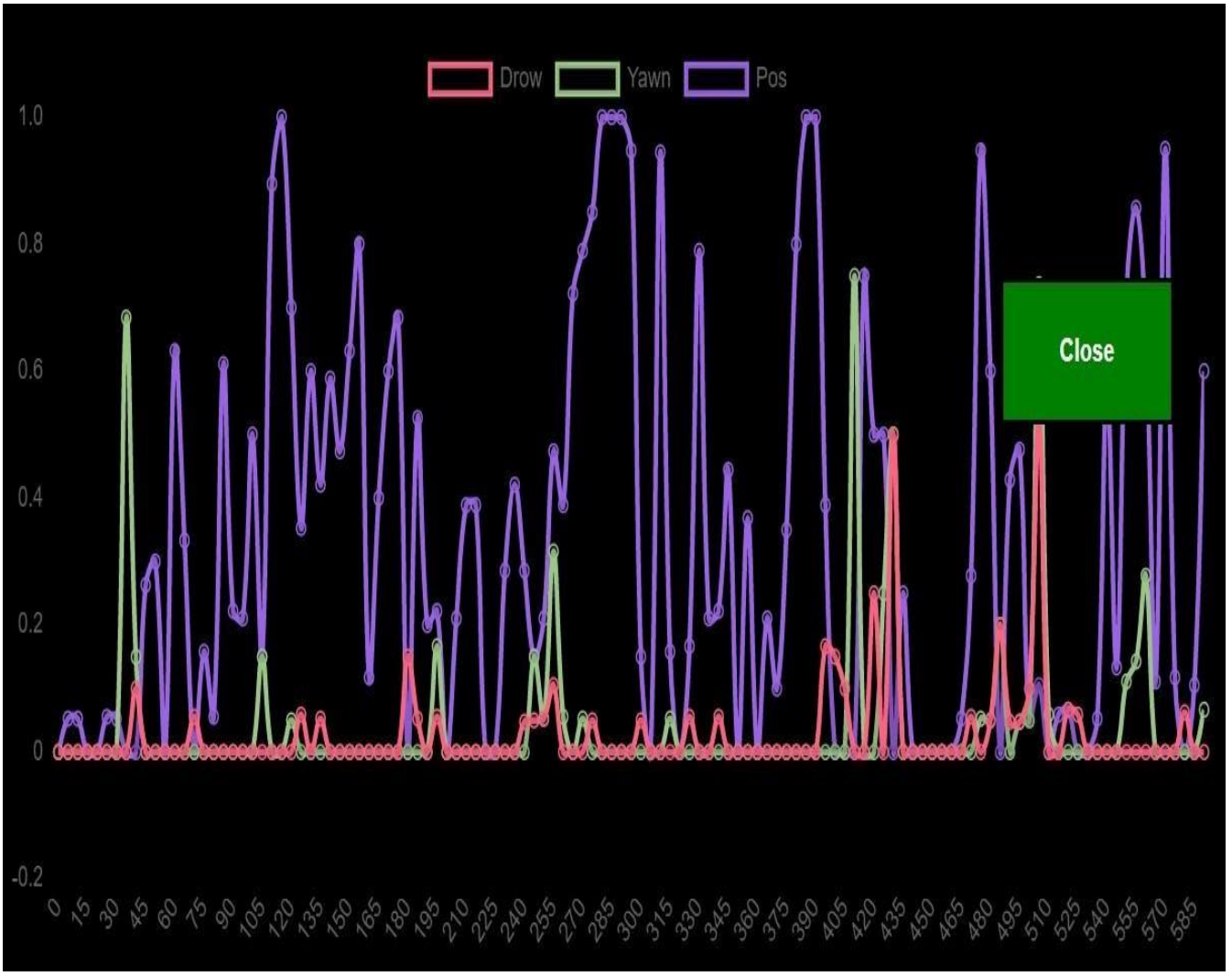

Fig 5.3 generating output 1

5.4 OUTPUT-2 GENERATION

This is where the final output in terms of pie chart, in this pie chart we can get result like we are active or not, we are yawning or not, looking at screening or not etc., like this we get the result.

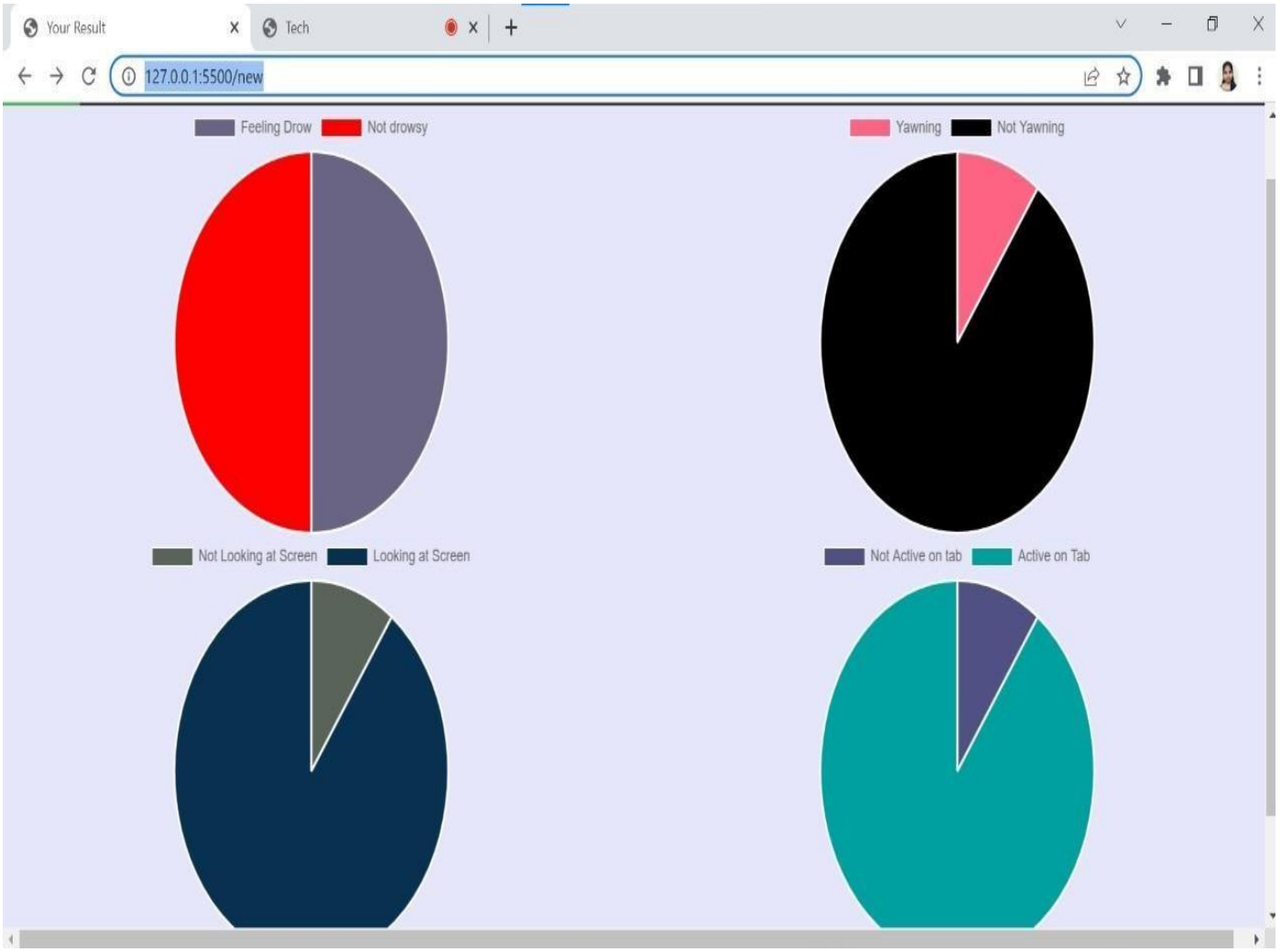

Fig 5.4 Generating final output

6. TESTING

6. TESTING

6.1 INTRODUCTION TO TESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of test. Each test type addresses a specific testing requirement.

6.2 TYPES OF TESTING

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .it is done after the completion of an individual unit before integration. This is a structural testing, that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results.

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing the problems that arise from the combination of components.

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals. Functional testing is centered on the following items:

Valid Input	: identified classes of valid input must be accepted.
Invalid Input	: identified classes of invalid input must be rejected.
Functions	: identified functions must be exercised.
Output	: identified classes of application outputs must be exercised.

Systems/Procedures: interfacing systems or procedures must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identify Business process flows; data fields, predefined processes.

7. CONCLUSION

7.CONCLUSION & FUTURESCOPE

7.1 PROJECT CONCLUSION

It is used to evaluate the student's observable actions in the classroom teaching system. Student features are captured from every frame and data is analysed based on different types of activity related to eye movement, mouth movements, head movements and analysis is done on student active status on that respective class. Which display's the live identification of student actions based on specified scenes.The evaluation was created right after the live feed review.

7.2 FUTURE SCOPE

The future scope is that it is to create a self-sufficient agent that can offer information to both teachers and pupils. The level of student involvement is directly related to important academic outcomes like critical thinking and the marks students get in a topic.

8. BIBILOGRAPHY

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8.1 REFERENCES

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8.2 GITHUB LINK

https://github.com/humeranaaz/Major_project.git