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

EXTERNAL EXAMINER

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. INTRODUCTION

1.1 PROJECT SCOPE

This project is titled as “Students live behaviour monitoring in online classes using Artificial Intelligence. Human behavior analysis is an important area of computer vision research dedicated 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.

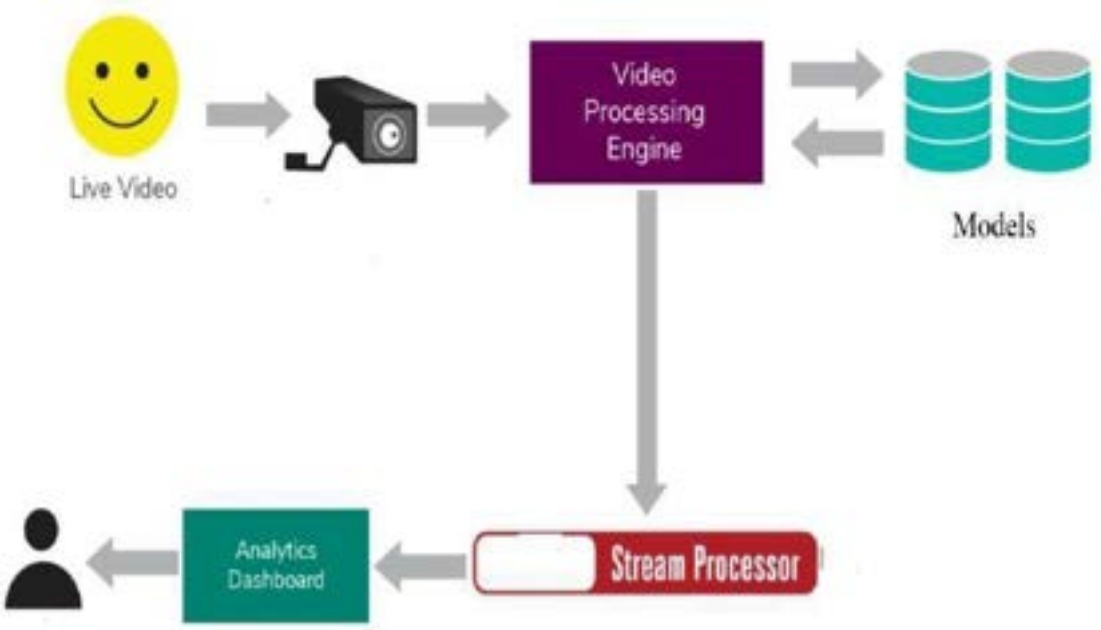

Figure 3.1: Project Architecture

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.

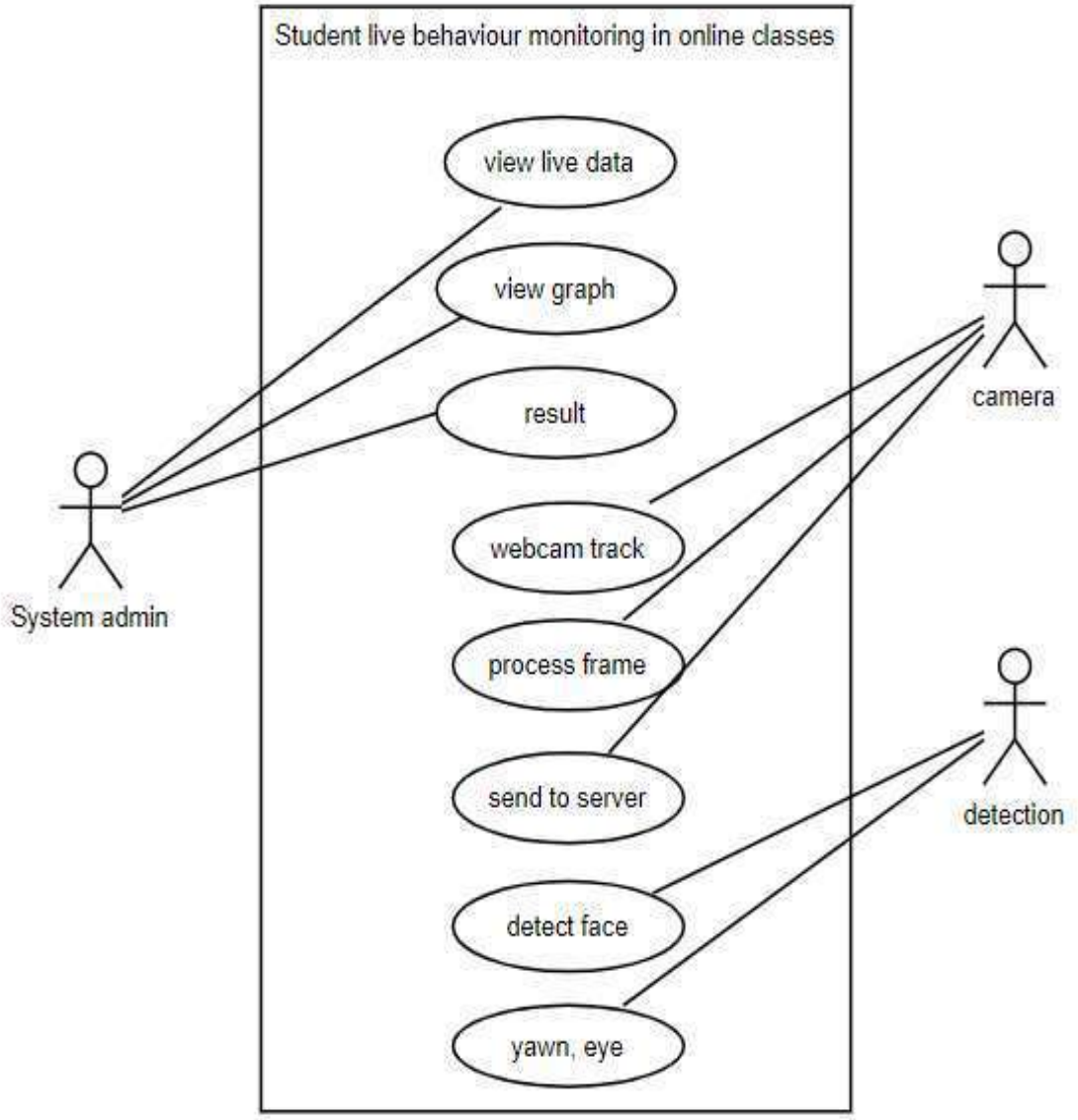

Figure 3.2: Use Case Diagram for pupil supervising using artificial intelligence

3.4 CLASS DIAGRAM

Class Diagram is a collection of classes and objects.

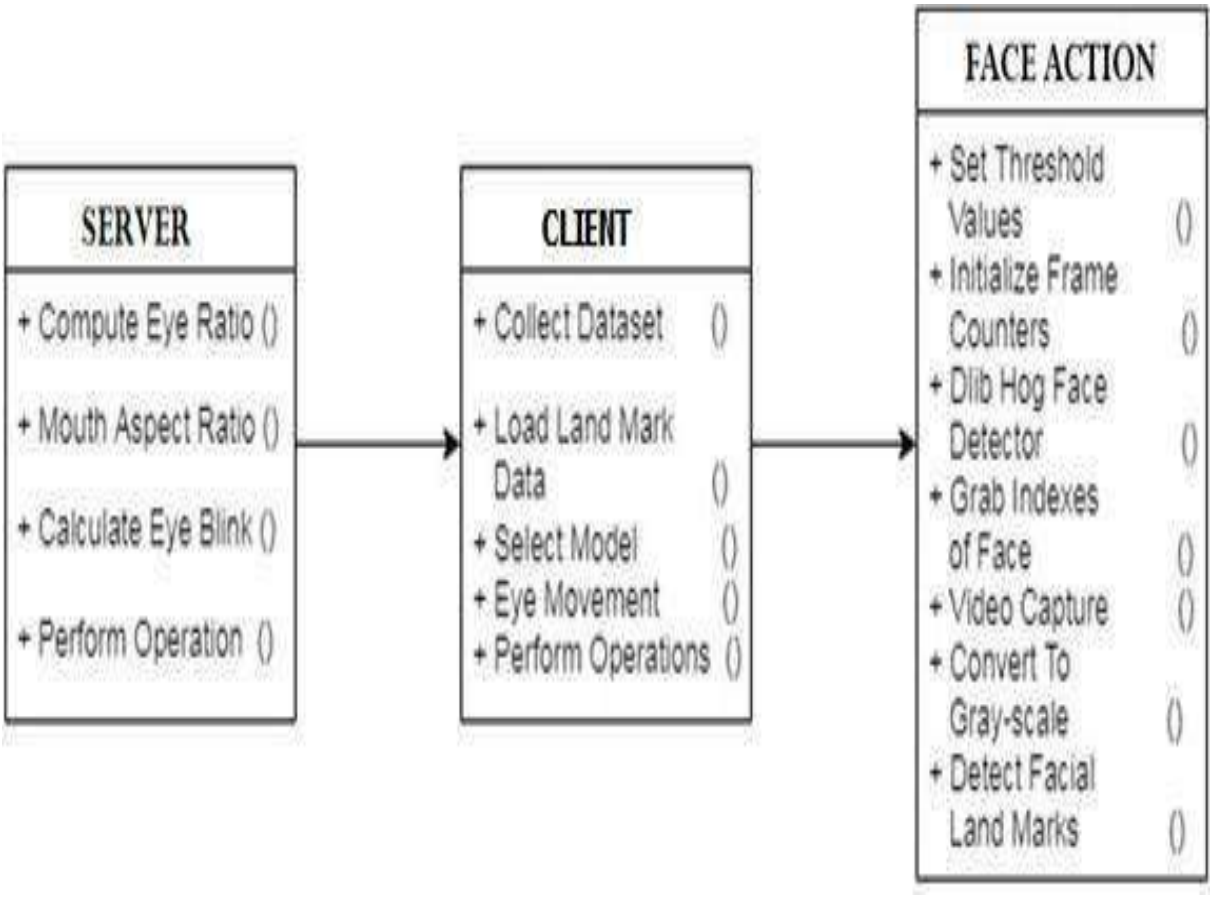

Figure 3.3: Class Diagram for pupil supervising using artificial intelligence

3.5 SEQUENCE DIAGRAM

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

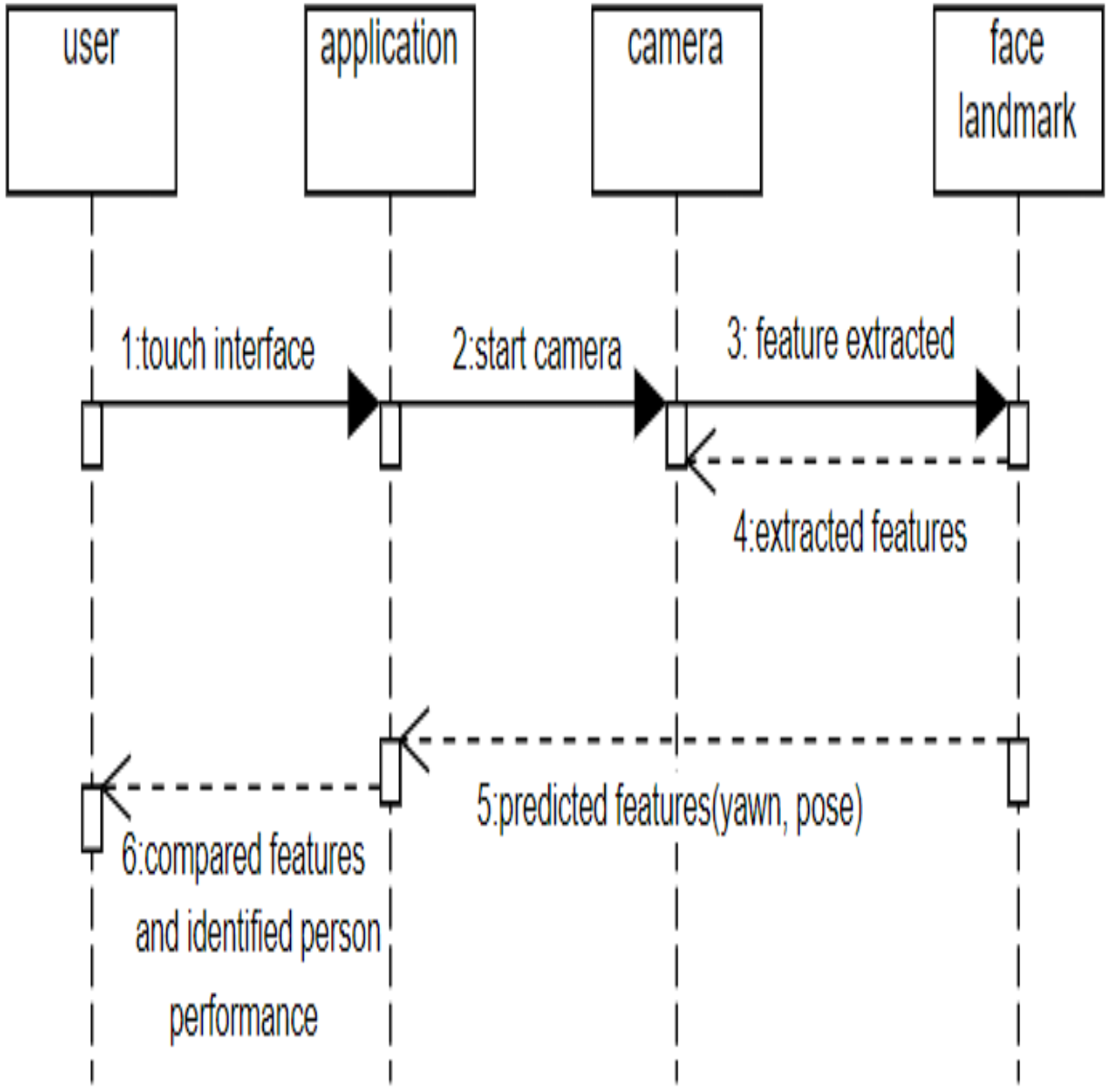

Figure 3.4: Sequence Diagram for pupil supervising using artificial intelligence

3.6 ACTIVITY DIAGRAM

It describes about flow of activity states.

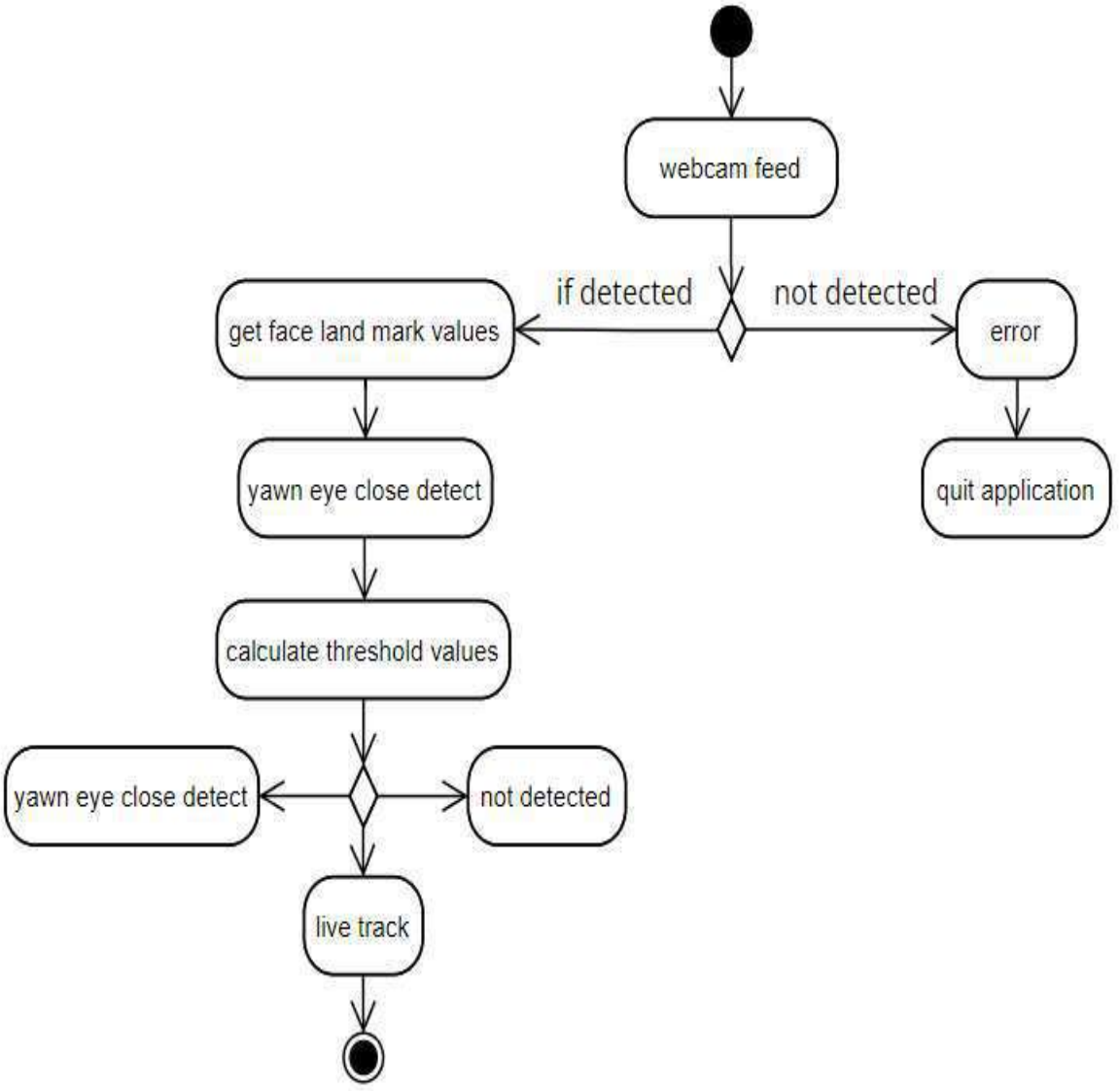

Figure 3.5: Activity Diagram for pupil supervising using artificial intelligence

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.

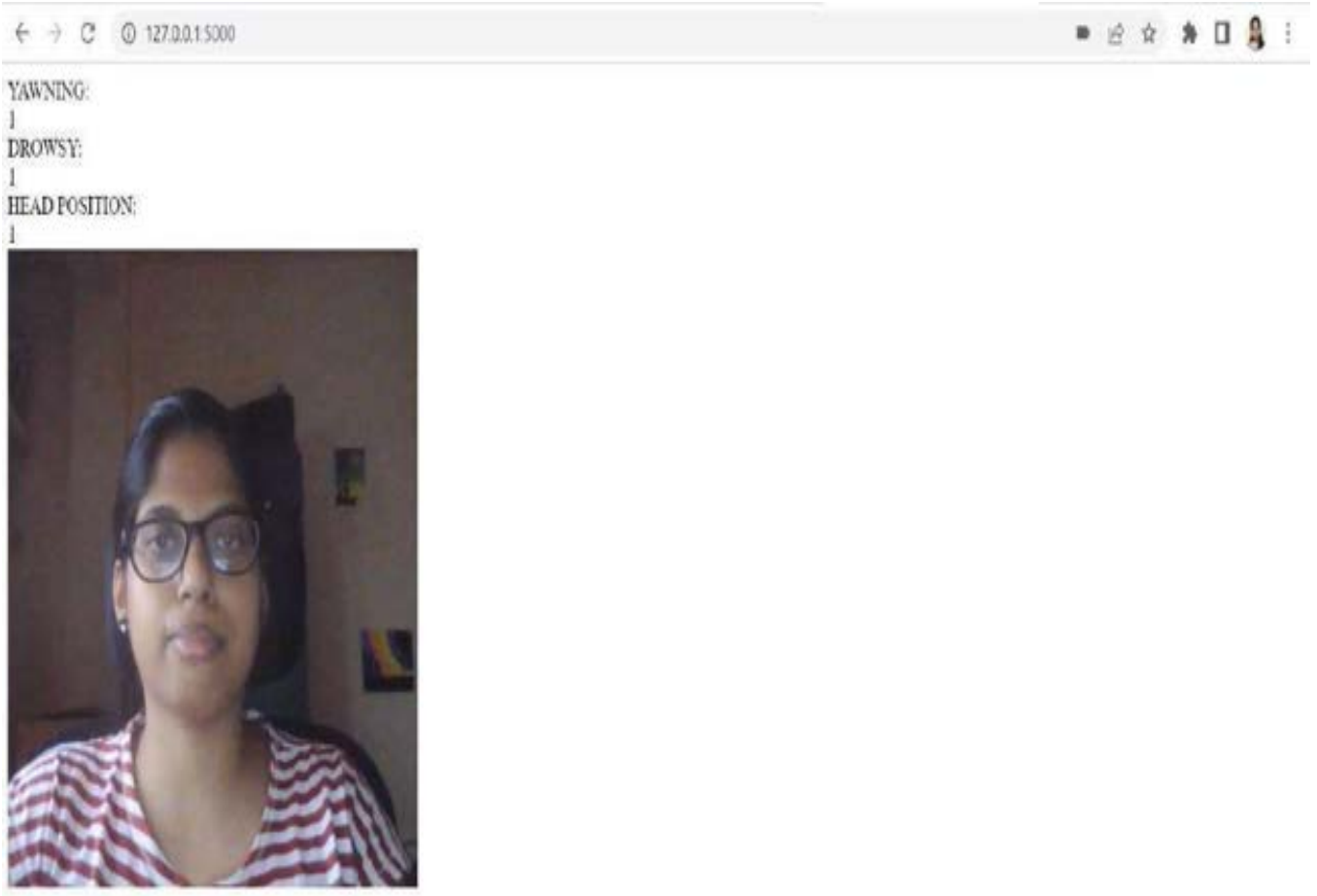

Fig 5.1 FaceAction Notices

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.

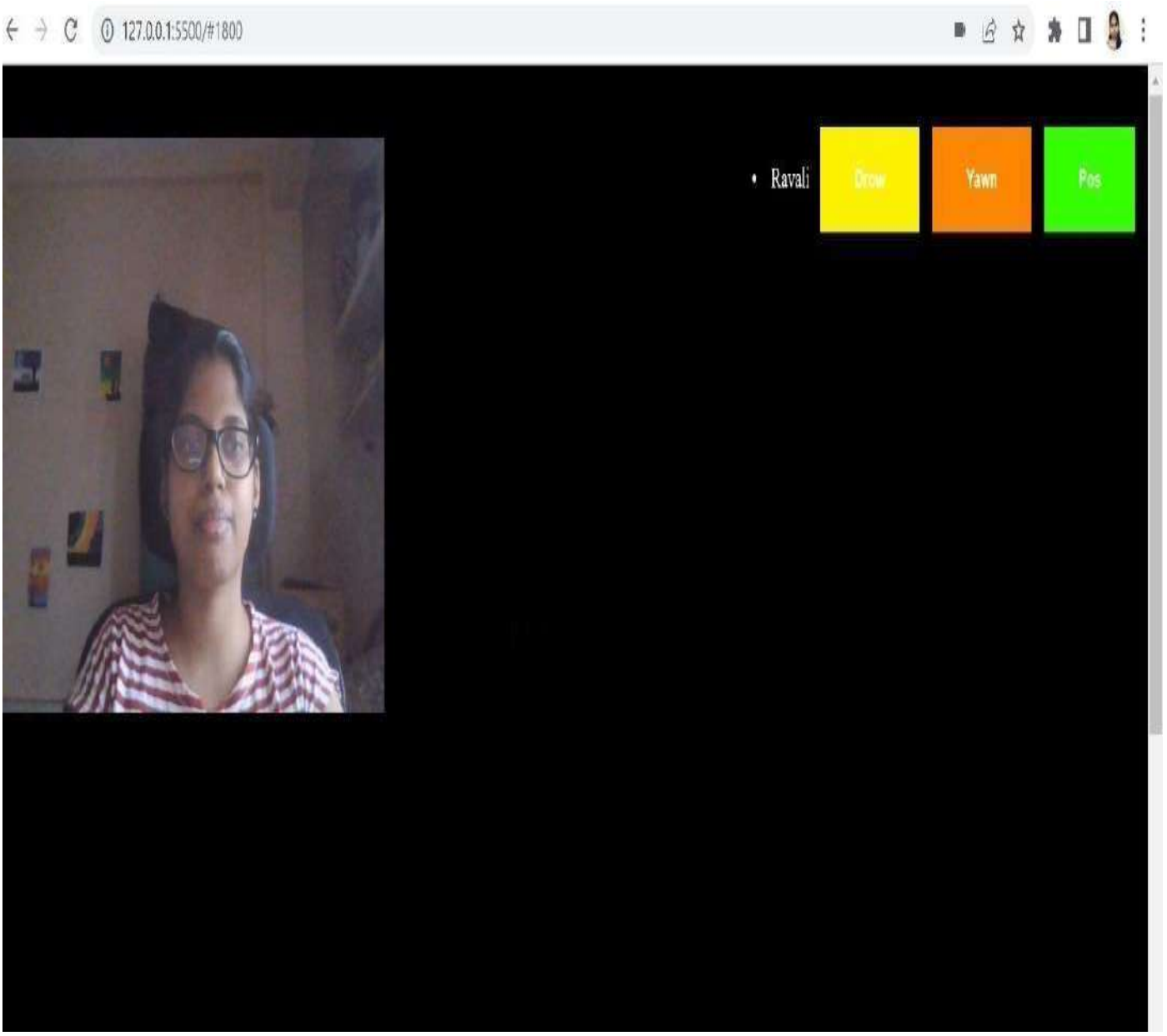

Fig 5.2 Main server page/site

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.

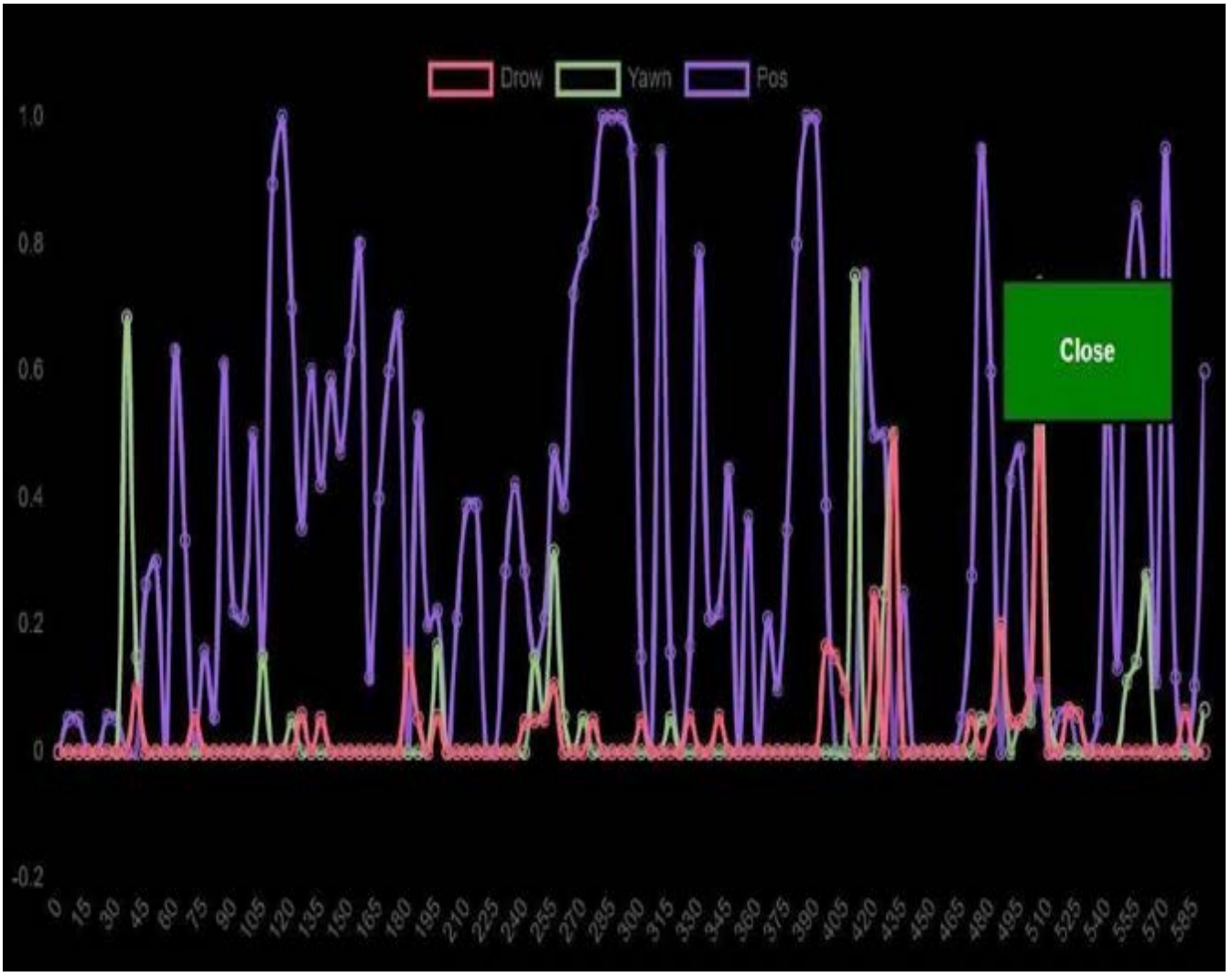

Fig 5.3 generating output 1

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.

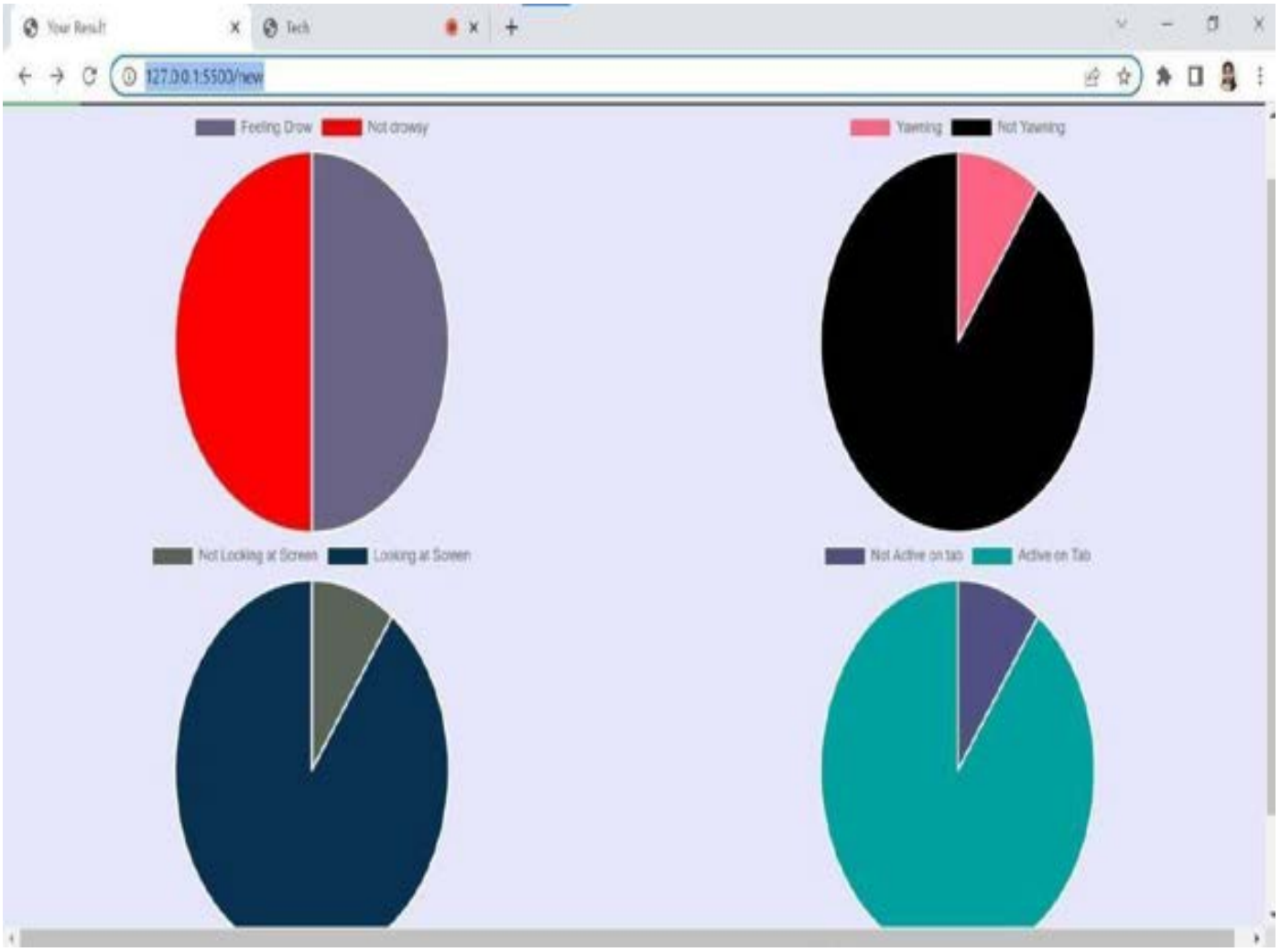

Fig 5.4 Generating final output

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 GITHUB LINK

https://github.com/humeranaaz/Major_project.git
https://bommalashruthi.github.io/Major_project/
https://github.com/ravalibijja/Major_Project

8.2 REFERENCES

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9. JOURNAL

PUPIL SUPERVISING USING ARTIFICIAL INTELLIGENCE

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***Abstract*— The health emergency situation, which mandatory universities to stop using their classrooms as a means of teaching, many of them opted for virtual education. Affecting the learning process of students, which has made many of them to become familiar with this new learning process, making the use of virtual platforms more used. Many educational centers have come to rely on online tools such as: Discord, Google Meet, Microsoft Team, Skype and Zoom. The purpose of the research is to report on the impact of pupil learning through the use of the videoconferencing tools Most of them became familiar with the platforms; however, less than 24% qualified that their educational performance has improved, some teachers still have difficulties at a psychological level due to this new educate modality. In conclusion, teachers and students agree that these tools are a great help for virtual classes. The primary aim of this project is to create a independent agent those can offer information to both teachers and pupils. The level of student involvement is directly related to important conceptunanal outcomes like critical thinking and the marks students get in a topic.**

***Keywords*— Face recognition, student behaviour, live detection, artificial learning, flask web app**

I. INTRODUCTION

. Human behaviour analysis is an important area of computer vision research dedicated 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 behaviour are closely monitored alongside teaching activities. Information has demonstrated that student interest is a central element in participation and the project is designed to create a self-sufficient agent that can offer information to both teachers and pupils. The students are needed to be managed closely to have the correct behaviour of the student online as well as the physically.The level of student involvement is directly related to important academic outcomes like critical thinking and the marks students get in a topic. . Attention is a way of feeling in one part of the world while looking at others. "Hear!" Isa term often used by many teachers around the world to refer to experts. In the learning process, attention is a basic skill. The use of machine learning and computer monitoring systems has made great strides over the past decade and has been successfully implemented in various programs such as automated testing, security, image data analysis, generalization, validation and monitoring. One example of automated testing is used in a learning environment. One way to determine if a student is paying attention in class is to look at his facial expressions. Face detection means computer programs that require automatic translation and identification of facial features and changes in facial data. Ina one-person study, facial expressions can respond to current sensory functions and can be assessed while looking at the action unit features. Monitoring of students' behavior and actions is important for teachers, so that they can easily identify student misconduct or negligence in the classroom. By following student actions, schools or colleges can easily understand student behavior and help students and their parents to understand their behavior and attention in theclassroom. Following the trail, it will help students to develop and pay more attention in class. Parents will know about their children's behavior in the classroom. The project describes about the how would the student being traced or being noticed carefully by all the features like eye movement, position, and the yawn being calculated based on the values all values Information has demonstrated that student interest is a central element in participation and performance.

II. PROJECT FEATURES

The core features of this project is to predict behaviour of student in online classes when student is live. The features are captures from the live feed of the camera by which the recording of each frame is being done on the system models which helps in the output generation of the project. When the Student features are captured from everyframe 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. Face recognition algorithm is used to identify a person's face in photo or video data using digital cameras for diagnostic purposes .In the case of class tests, this will help mark student direct engagement and student behaviour analysis .There are many face recognition algorithms to extract facial expressions. With the growth of the field of computer vision, the task of assessing and analysing student behaviour in the classroom in real time is not an impossibility right now. H.K. Ning and K.Downing believed that a large part of student behaviour, including study skills, study attitude, and motivation, had a strong connection with student learning outcomes. Students' perceptions of the teaching and learning environment influence their behaviour and academic performance. When the features of each student is captured based on the different features in different data models then the final result is obtained in the form of graph. The graph differ based on the Graphical representation is used to show performance of student.

III. 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 three-tiered software platform (three-layer building) emerged in the 1990s to overcome the two-stage design constraints. The third phase (intermediate phase server) is between visual usage (client) and data management components (server). This intermediate section provides process management where business thinking and rules are applied and can accommodate hundreds of users (compared to only 100 users with two-phase structures) by providing services such as queuing, application, and website platform. A three-phase structure is used when an effective distributed client / design is required that provides (compared to two phases) enhanced functionality, flexibility, retention, usability, and scalability, while hiding the complexity of distributed distribution to the user. These features have made the three-layer structure a popular choice for online applications and mid-net information systems.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.

IV. PROPOSED SYSTEM

In proposed system artificial intelligence is used 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.

Advantages of proposed system

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

V. PROJECT ARCHITECTURE

This project architecture describes how the application is going to function. The detailed architecture is explained below. A system armature or systems armature is the abstract model that defines the structure, geste, and further views of a system. An armature description is a formal description and representation of a system. Organized in a way that supports logic about the structures and actions of the system. The architecture says that when the data is captured with the live feed from the server. The data from the live feed is captures and being shared to the data models to check the data with the pre given threshold values. The he data is taken by the stream processor then being analysed which gives the output to the the user or the client

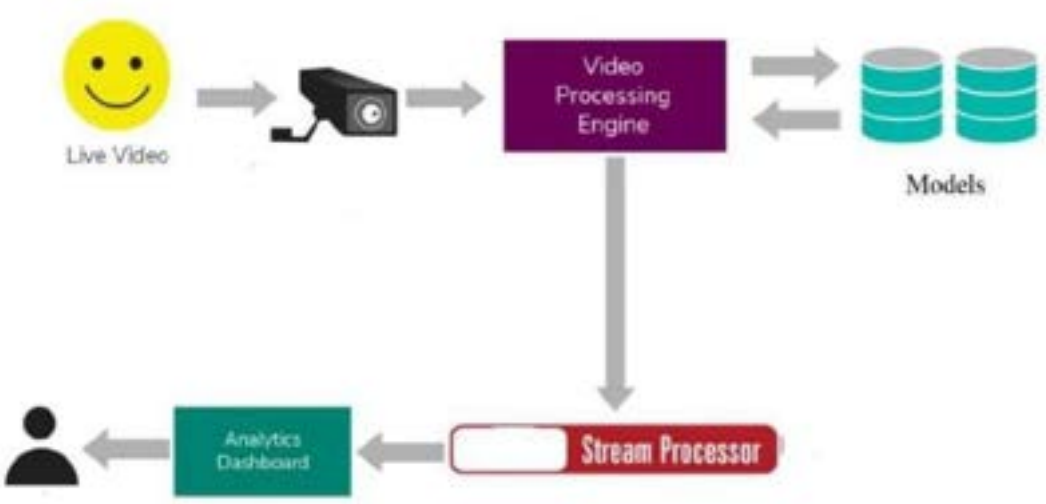

Fig 1: Project Architecture

VI . LITERATURE

A .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 analysing with trained model. Result is shown in graph after analysis.

B. SERVER MODULE:

This module is executed to track details of student and analyse 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.

C. 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

VII .EVALUATION OF MODEL

A .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.

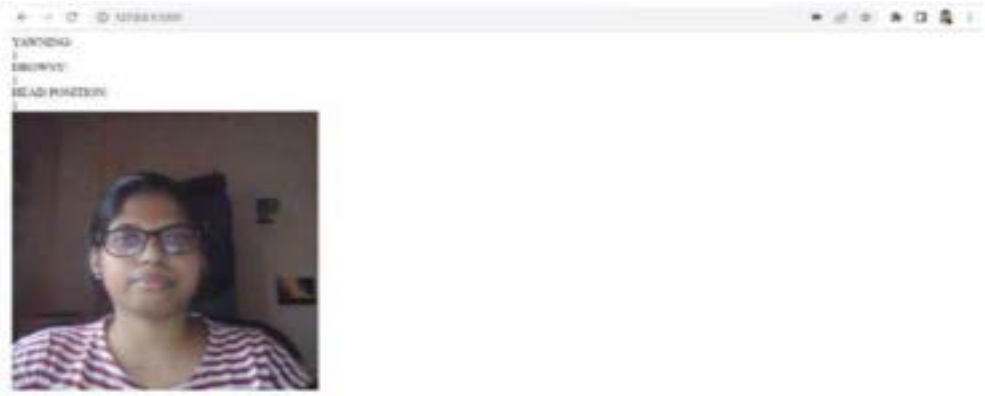

Fig 2 face action notices

B.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.

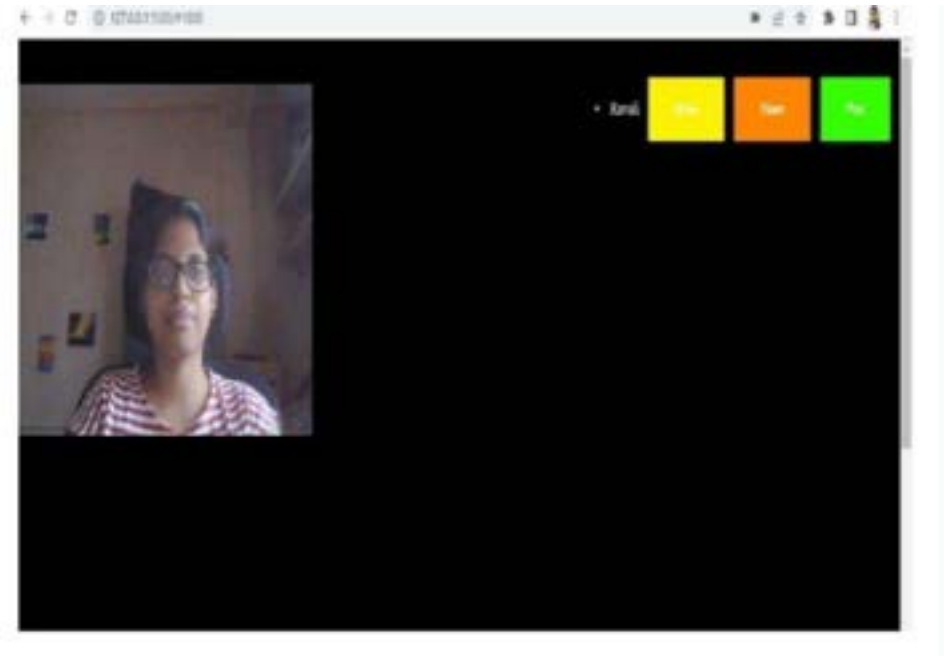

Fig 3 main server page/site

C.OUTPUT-1 GENERATION

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

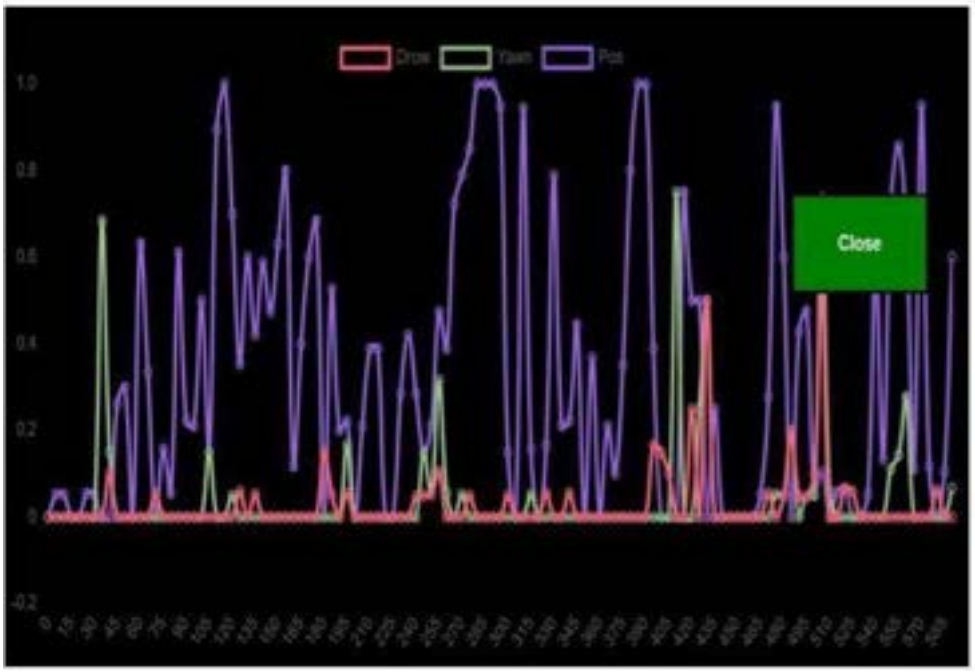

Fig 4 generating output 1

D.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.

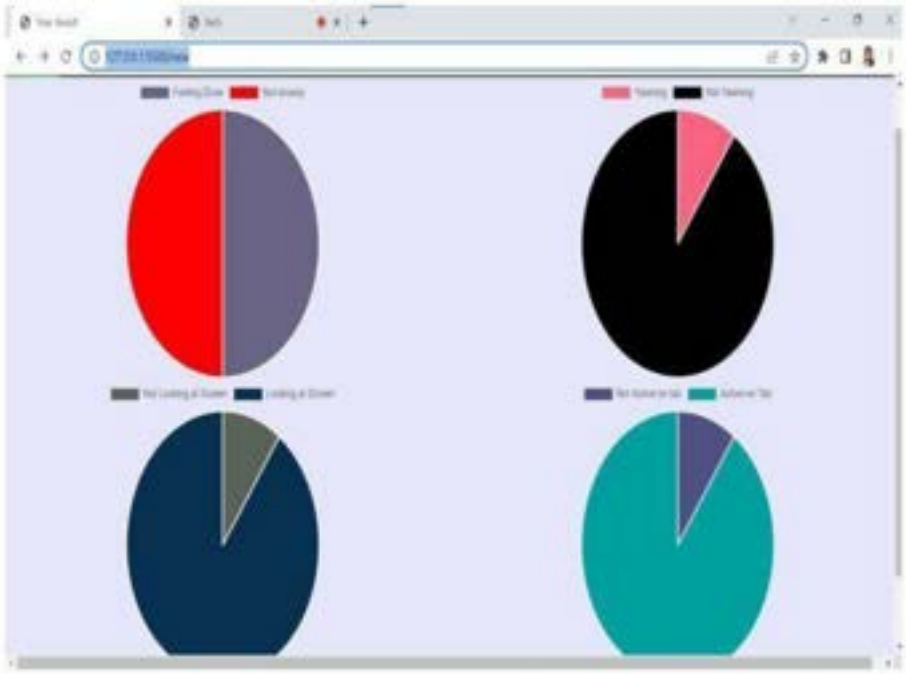

Fig 5 generating final output

VIII CONCLUSIONS

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'sthe live identification of student actions based on specified scenes. A whole system that supports student behavior recording, mathematical continuity, and demonstration of the completed structure of the entire system that supports student behavior recording, data continuity. Our first limitation includes a lack of knowledge of other useful information, such as emotions. Many behaviour's, such as facial expressions, posture, etc ..., are most appropriate for subsequent system development. Another issue we want to investigate more clearly is the level of correlation between behavior and student outcomes. This program is used as the primary purpose for further studies of the various relationships in different areas. Our graphs displayed on the web application are said to be easy to use for non- technical users. We are conducting a search for more closely related data recognition strategies. Besides, the current architecture requires a very expensive processing process. We need to build a better platform to reduce operating costsand repairs. The evaluation was created right after the live feed review.

ACKNOWLEDGMENT

Apart from our 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. We take this opportunity to express my profound gratitude and deep regard to our guide Dr. K. Maheswari for her exemplary guidance, monitoring and constant.

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Authored by :

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