A

Major Project

On

STUDENTS LIVE BEHAVIOUR MONITORING IN ONLINE CLASSES 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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2018-2022

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the project entitled "**STUDENTS LIVE BEHAVIOUR MONITORING IN ONLINE CLASSES USING ARTIFICIAL INTELLIGENCE**" being submitted by **MOHAMMED ADNAN(187R1A05M2),G.SAHITHI(187R1A05J6),B.BHARATH (187R1A05N8)** in partial fulfillment of the requirements for the award of the degree of B. Tech in Computer Science and Engineering of the Jawaharlal Nehru Technological University Hyderabad, during the year 2021-2022.

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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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 people.

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LIST OF FIGURES

LIST OF SCREENSHOTS

TABLE OF CONTENTS

Page No's

1. INTRODUCTION

1.INTRODUCTION

1.1 PROJECT SCOPE

The application of machine learning and computer vision methods has made tremendous progress over the last decade and has been successfully employed in various applications such as automated assessment such as security, image data investigation, general identity verification, and surveillance. One example of automated assessment is applied in a classroom setup. One way to determine whether or not the student is conscientious in the classroom is by facial expressions.

1.2 PROJECT PURPOSE

The purpose of the project is to monitor student behavior. It's important to allow teachers to easily identify and correct improper behavior. By tracking student actions, schools may assist students in achieving behaviouraltargets, help consider the student's own conduct and effect on others, and eventually empower students to identify and implement habits that are important for their performance.

1.3 PROJECT FEATURES

This project is to monitor student behavior. It's important to allow teachers to easily identify and correct improper behavior. By tracking student actions, schools may assist students in achieving behavioral targets.

2. SYSTEM ANALYSIS

2.SYSTEM ANALYSIS

System analysis is an important phase in the system development process. The system is studied in minute details and analyzed. The system analyst plays an important role as an interrogator and dwells deeply into the workings of the present system. In the analysis, a detailed study of these operations performed by the system and their relationships within and outside the system is conducted. A key question being 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.

2.1 PROBLEM DEFINITION

Currently, in times of pandemic, teaching is at a distance where the use of different means of video conferencing is relevant in education. Since then, it has played a very significant role in the learning experience of the students. indicates that ICT 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.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. Teachers will be able to track student activity and recognize relevant indicators to draw assumptions regarding the student's real involvement in learning experiences .

2.2 EXISTING SYSTEM

Currently, in times of pandemic, teaching is at a distance where the use of different means of video conferencing is relevant in education. Since it has a very significant role in the learning experience of the students, indicates that ICT 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

- It explains that students have learning effectiveness during their online classes using Discord, as it allows access to requested activities and availability.

2.3 PROPOSED SYSTEM

In the proposed system, artificial intelligence is used to predict the behaviour of students in online classes when they are 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 in that respective class. Graphical representation is used to show the performance of a student.

2.3.1 ADVANTAGES OF THE PROPOSED SYSTEM

- It helps in understanding student interests for respective classes.
- Teachers can take decisions to improve effective ways of teaching.

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 a project, which will give the user the best quality of life possible. 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 proposed system. Also all the resources are already available, it give indication of the system economically 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.

- Processer : Intel Core I5
- Hard Disk : 500 GB.
- Input Devices : Keyboard, Mouse
- RAM : 4 GB.

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 8 or 10.
- Coding Language : Python(3.9)
- IDE : Anaconda
- Interface : Flask Web App

3. ARCHITECTURE

3.1 PROJECT ARCHITECTURE

This project architecture describes how the application is going to function. This describes how the user's request is taken as input and how the output is delivered to them. The detailed architecture is explained below.

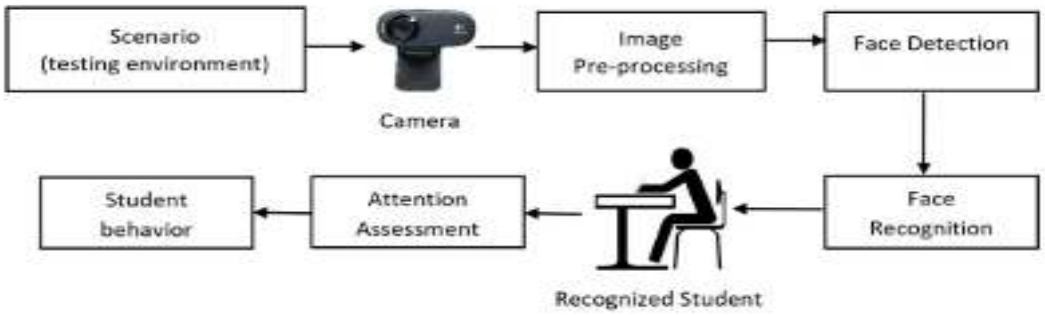


Fig. 3.1 Project Architecture of students live behaviour monitoring in online classes using artificial intelligence.

3.2 MODULES DESCRIPTION

Client:

This application is run by student where camera will open and students' 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 USE CASE DIAGRAM

In To model a system, the most important aspect is to capture the dynamic behavior. To clarify a bit in details, dynamic behavior means the behavior of the system when it is running/operating. So only static behavior is not sufficient to model a system rather dynamic behavior is more important than static behavior. In UML there are five diagrams available to model dynamic nature and use diagram is one of them.

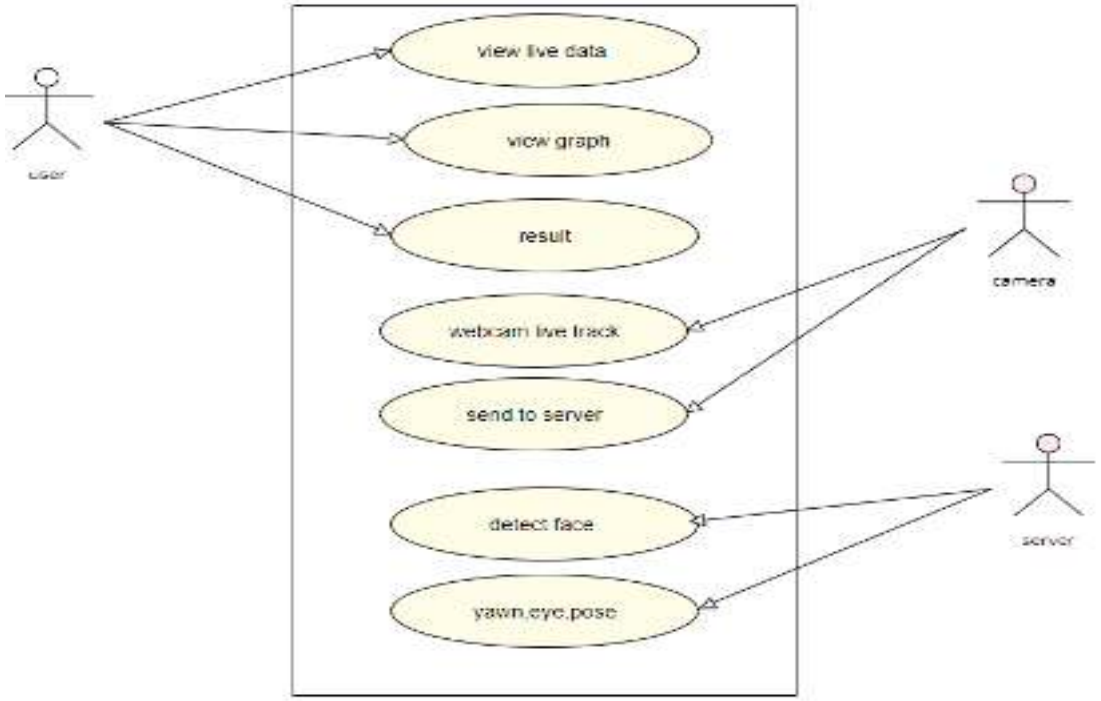


Fig. 3.3 Use Case Diagram for students live behaviour monitoring in online classes using artificial intelligence.

3.4 CLASS DIAGRAM

Class Diagram is a collection of classes and objects.

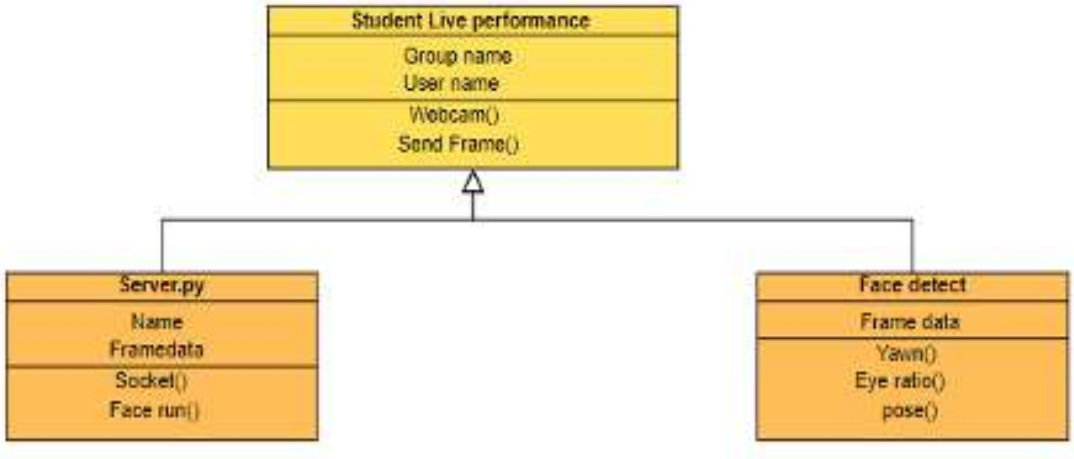


Fig. 3.4 Class Diagram for students live behaviour monitoring in online classes using artificial intelligence.

3.5 SEQUENCE DIAGRAM

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

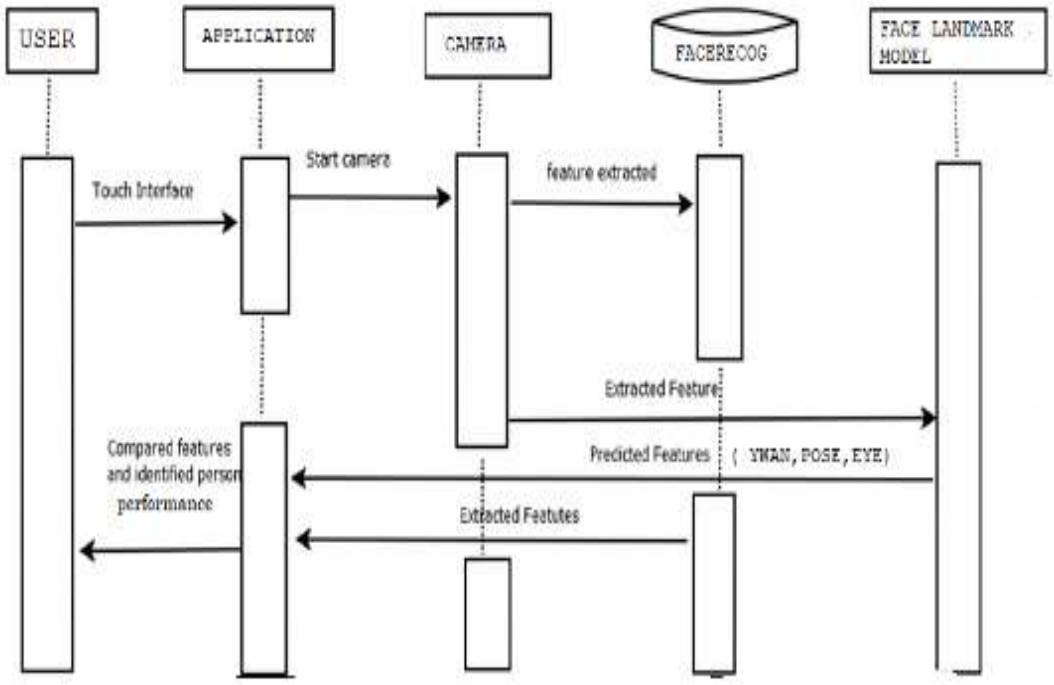


Fig.35 Sequence Diagram for AI students live behaviour monitoring in online classes using artificial intelligence.

3.6 ACTIVITY DIAGRAM

It describes the flow of activity states.

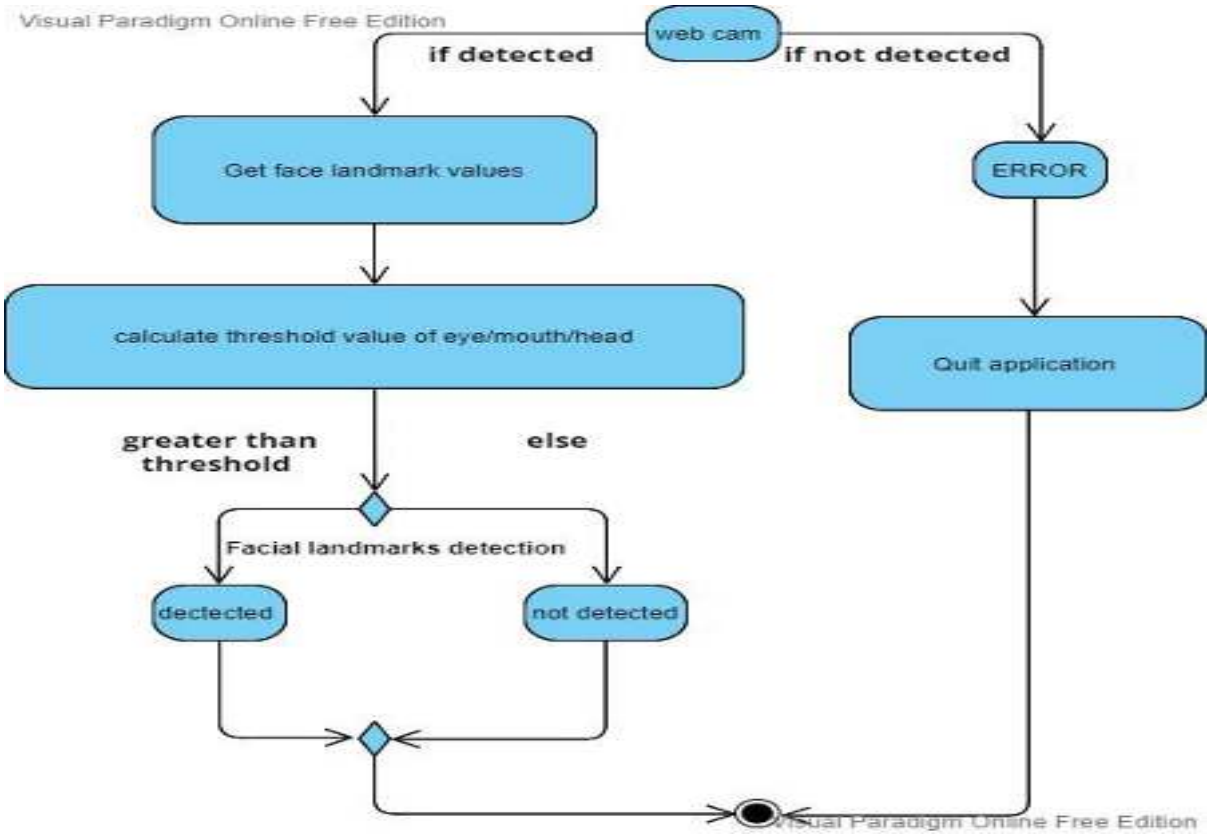


Fig.3.6 Activity diagram for AI students live behaviour monitoring in online classes using artificial intelligence.

4.IMPLEMENTATION

4.IMPLEMENTATION

4.1 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')
```

FACE ACTION.PY

```
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

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).
```

INDEX.HTML:

```
<!DOCTYPE html>

<html id="home" lang="en">

<head>
<link rel="stylesheet" href="static/css/main.css">
<script>
        if (!location.hash.replace('#', '').length) {
location.href = location.href.split('#')[0] + '#' + (18 *
100).toString().replace('.', '');
location.reload();
        }
</script>
```

```
<title>Student Live Behaviour</title>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-scale=1.0, user-scalable=no">


<meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1">
</head>




<body>
<article>
<table class="visible">
<tr>
<td style="text-align: right;">
<input type="text" id="conference-name" placeholder="Broadcast Name">
</td>
</tr>
<tr>
<td>
<button id="start-conferencing" class="btn draw-border">New Broadcast</button>
</td>
</tr>
</table>
```

```
<script src="https://cdn.jsdelivr.net/npm/sweetalert2@9"></script>
<table id="rooms-list-head" class="visible">
<tr>
<span style="border-width: 0px;"></span>
<th>Join these Rooms:</th>
</tr>
</table>
<table id="rooms-list" class="visible"></table>


<div id="participants"></div>
<div id="students">
<div></div>
</div>
<canvas id="myChart"></canvas>
<div id="livestatus">
</div>
<a href="/result"><button id="close">Close</button></a>



<script src="static/chart.js"></script>
<script src="static/jquery.slim.min.js"></script>
<script src="static/adapter-latest.js"></script>
<script src="static/socket.io.js">
</script>
<script src="static/RTCPeerConnection-v1.5.js">
</script>
<script src="static/broadcast.js">
</script>
<script src="static/broadcast-ui.js">
```

```
</script>
<script src="static/file.js">
</script>
<script src="https://cdn.jsdelivr.net/npm/sweetalert2@9"></script>
<script src="https://cdn.jsdelivr.net/npm/promise-polyfill"></script>
<script src="https://cdnjs.cloudflare.com/ajax/libs/limonte-
sweetalert2/8.11.8/sweetalert2.all.min.js"></script>
<script src="https://cdnjs.cloudflare.com/ajax/libs/limonte-
sweetalert2/8.11.8/sweetalert2.min.js"></script>
<link rel="stylesheet"
href="https://cdnjs.cloudflare.com/ajax/libs/limonte-
sweetalert2/8.11.8/sweetalert2.min.css">


</article>

</body>

</html>
```

RESULT.HTML:

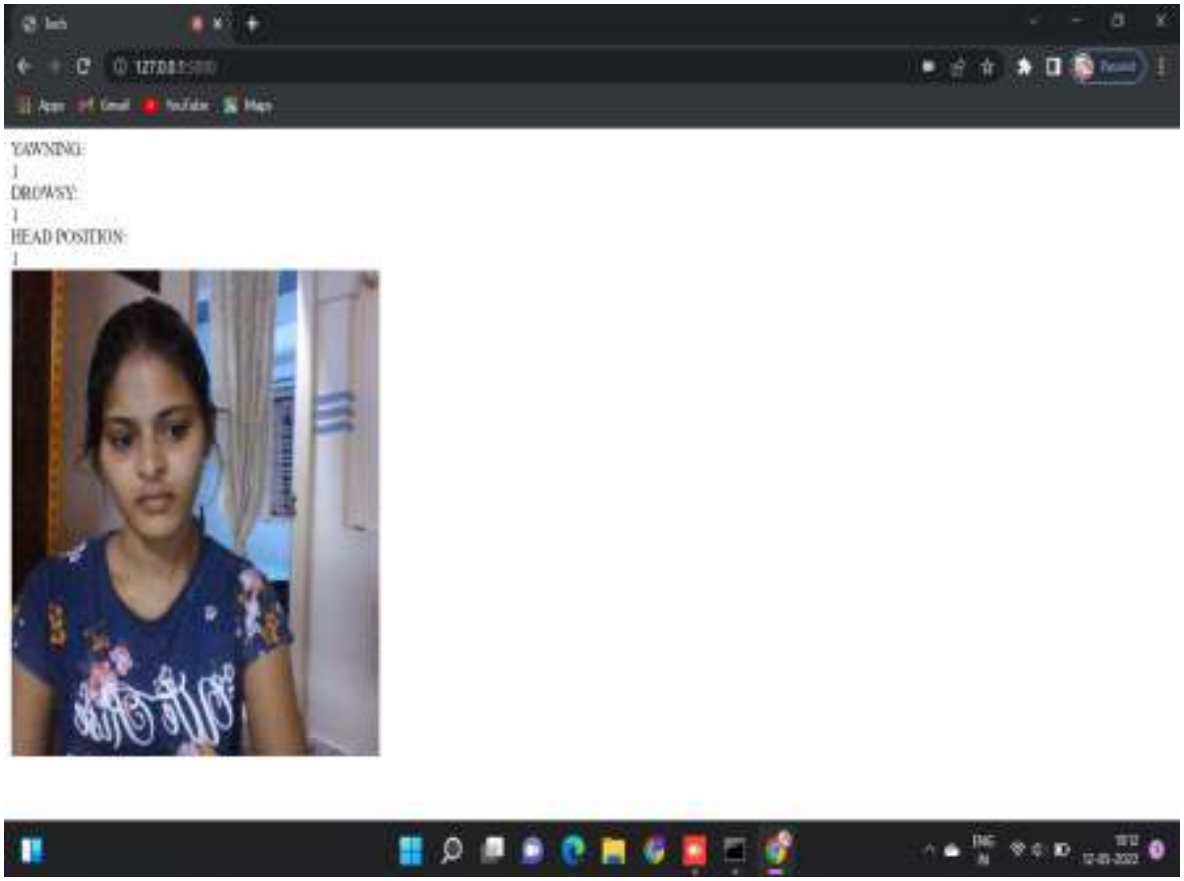
```
<!DOCTYPE html>
<html id="home" lang="en">

<head>
<link rel="stylesheet" href="static/css/res.css">
<link rel="stylesheet" href="static/bootstrap.min.css">
<link rel="stylesheet" type="text/css"
href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.5/css/bootstrap.
```

```
min.css">
<script src="static/jquery.slim.min.js"></script>
<script src="static/bootstrap.min.js"></script>
<script src="static/popper.min.js"></script>

<link rel="stylesheet" href="https://cdnjs.cloudflare.com/ajax/libs/font-
awesome/4.7.0/css/font-awesome.min.css">

<title>Your Result</title>
<meta charset="utf-8">
<meta name="viewport" content="width=device-width, initial-
scale=1">
</head>

<body style="background-color: lavender;">
<div class="topnav" id="myTopnav">
<a href="home" class="active">Home</a>
<a href="news">News</a>

<a href="javascript:void(0);" class="icon" onclick="myFunction()">
<i class="fa fa-bars"></i>
</a>
</div>
<div class="row">
<div class="col-lg-6 col-sm-4">
<canvas id="myPieChart1"></canvas>
</div>
<div class="col-lg-6 col-sm-4"><canvas
id="myPieChart2"></canvas></div>
<div class="w-100 d-none d-md-block"></div>

<div class="col-lg-6 col-sm-4"><canvas
id="myPieChart3"></canvas></div>
```

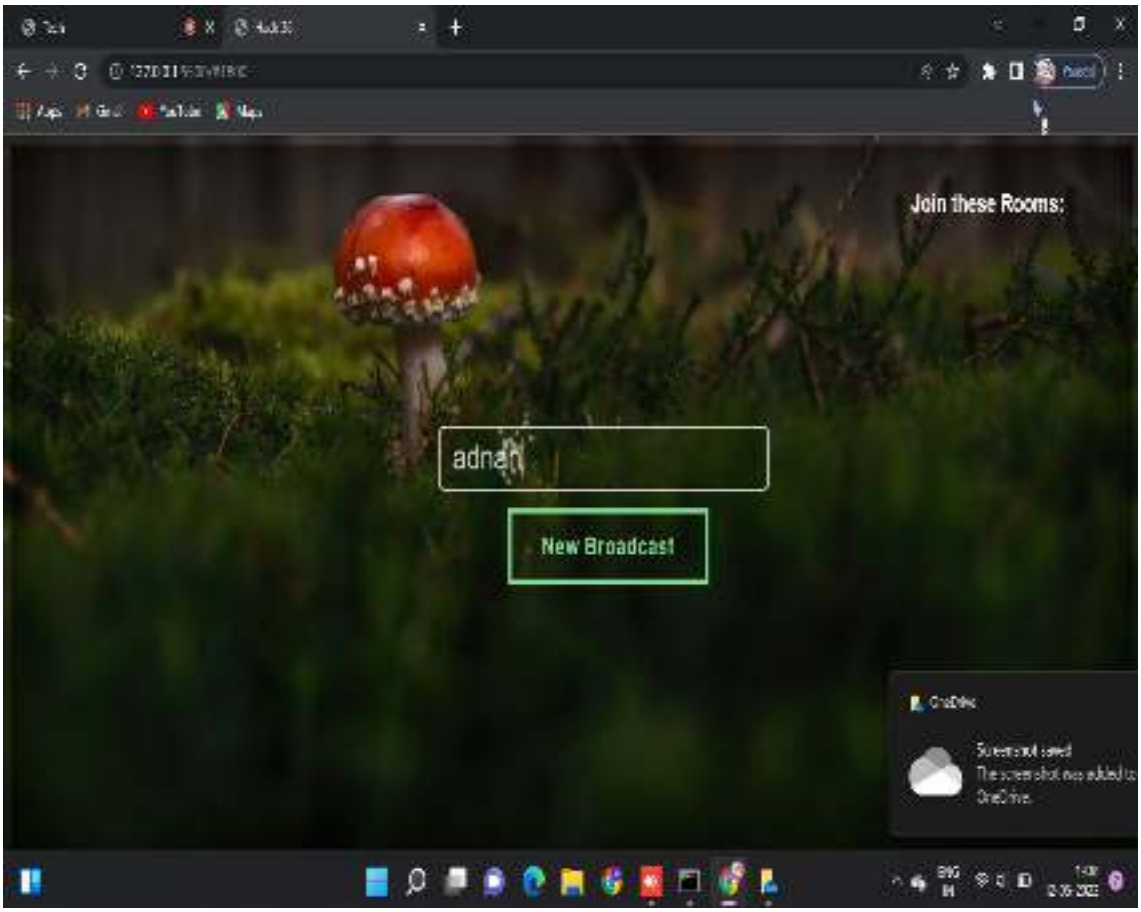
```
<div class="col-lg-6 col-sm-4"><canvas
id="myPieChart4"></canvas></div>
</div>
<div>
<h3>Various Other Data</h3>
<h5 id="mydata"></h5>
</div>
<script src="static/chart.js"></script>
<script src="static/res.js"></script>
<script src="https://code.jquery.com/jquery-2.1.4.js"></script>
<script
src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.5/js/bootstrap.min
.js"></script>
</body>

</html>
```

5. RESULT

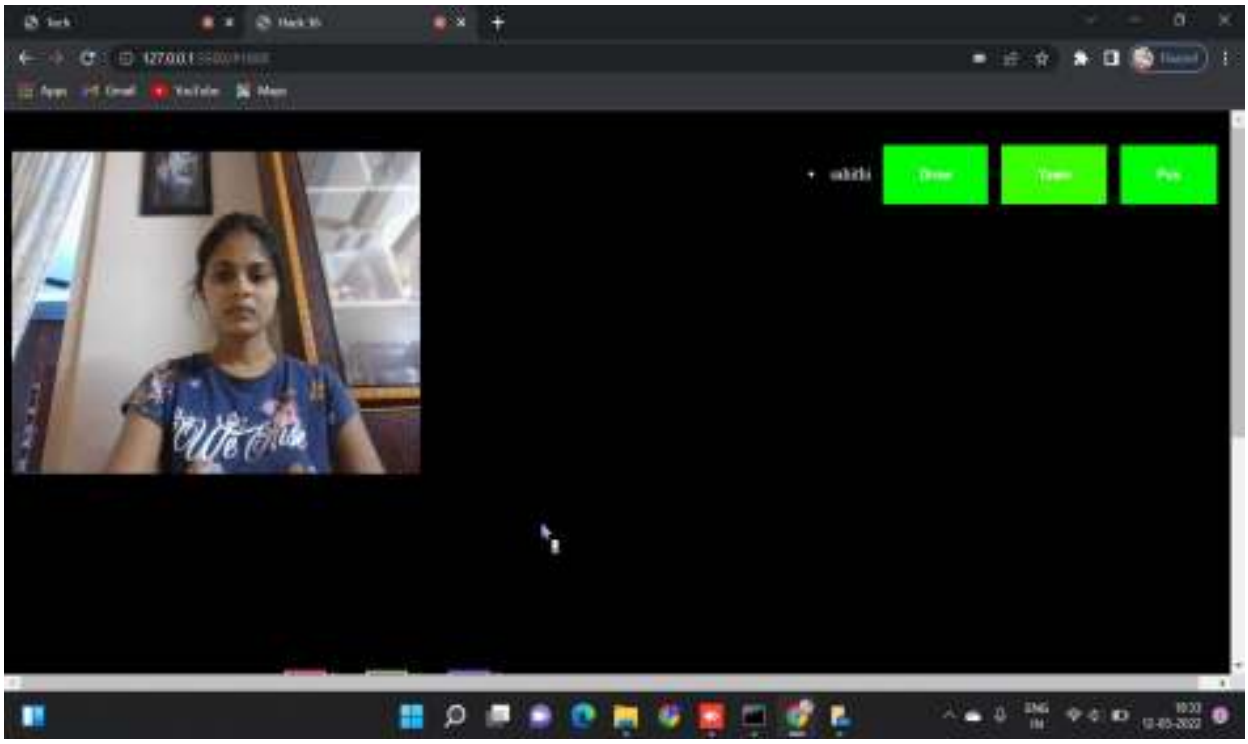
5.RESULT



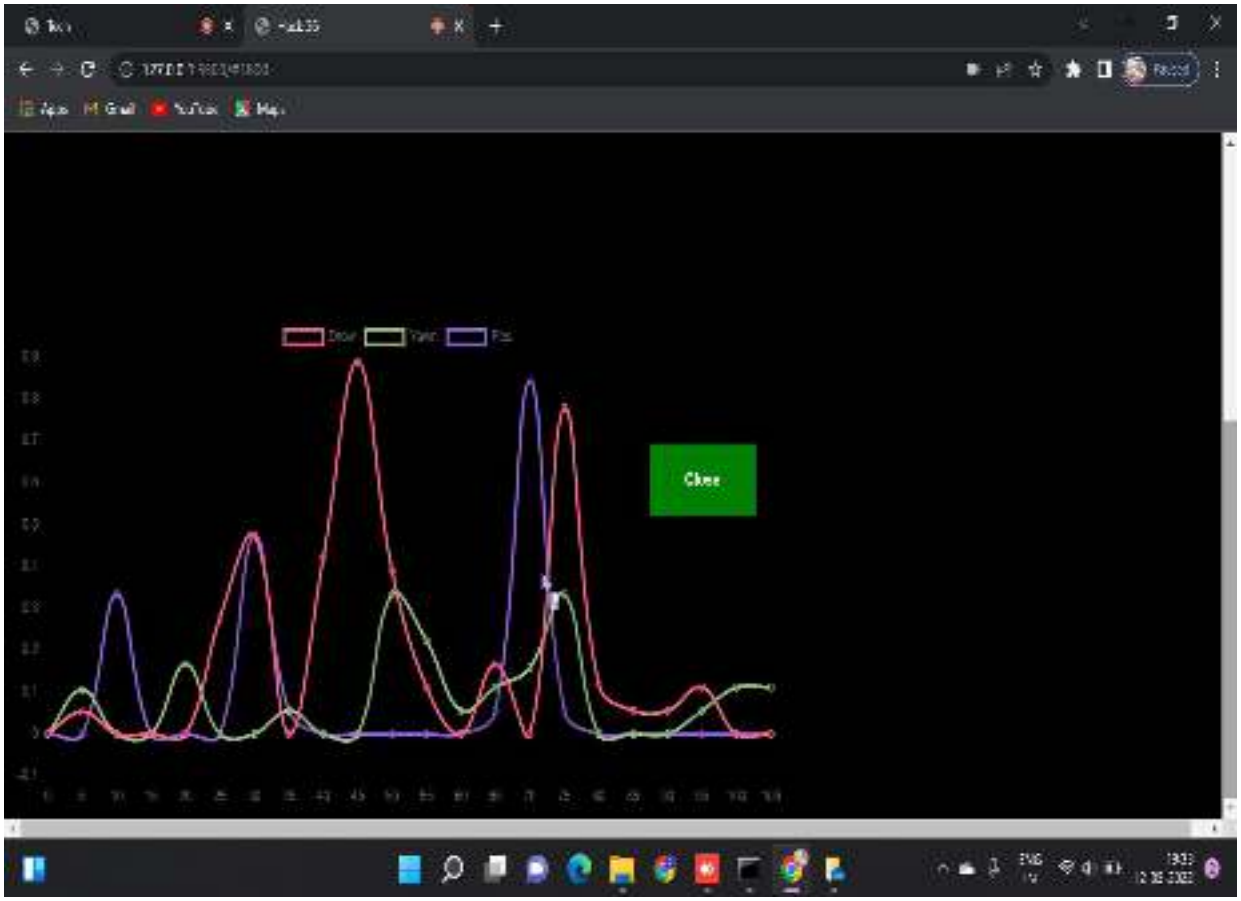
Screenshot 1:student webcam interface



Screenshot 2:faculty interface



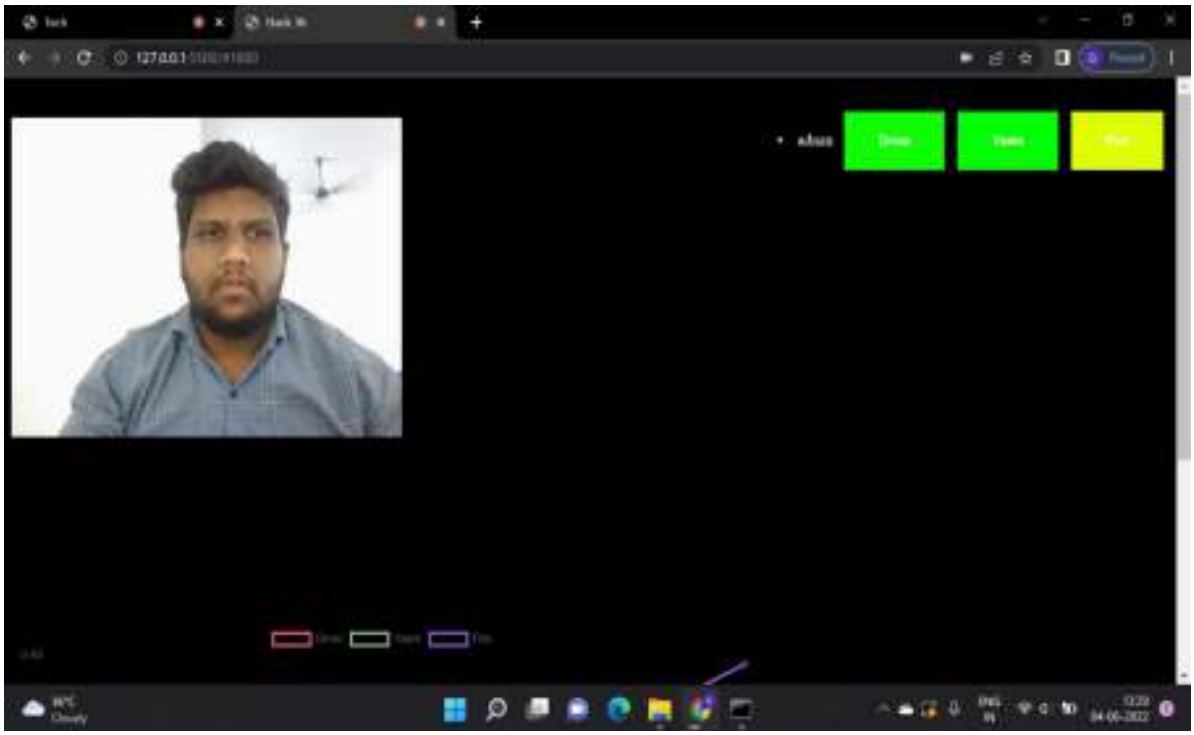
Screenshot 3:faculty interface with student webcam



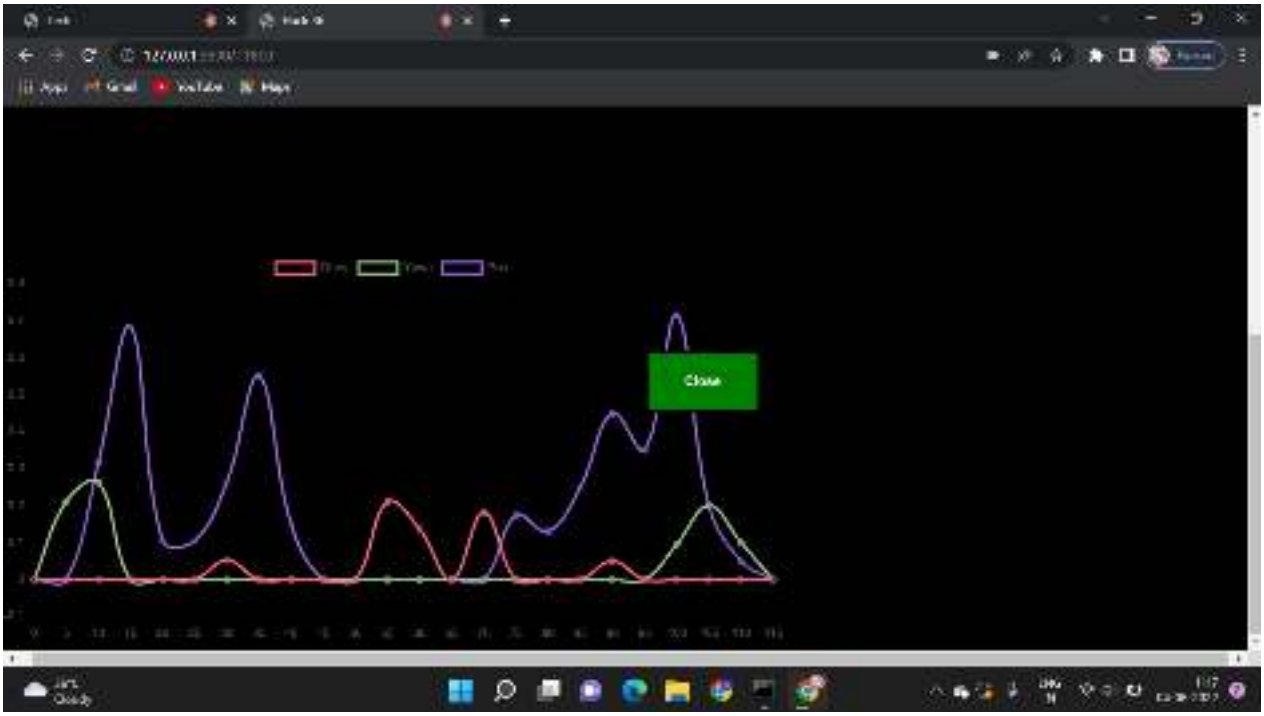
Screenshot 4:Student behavior graph in class

Student2:

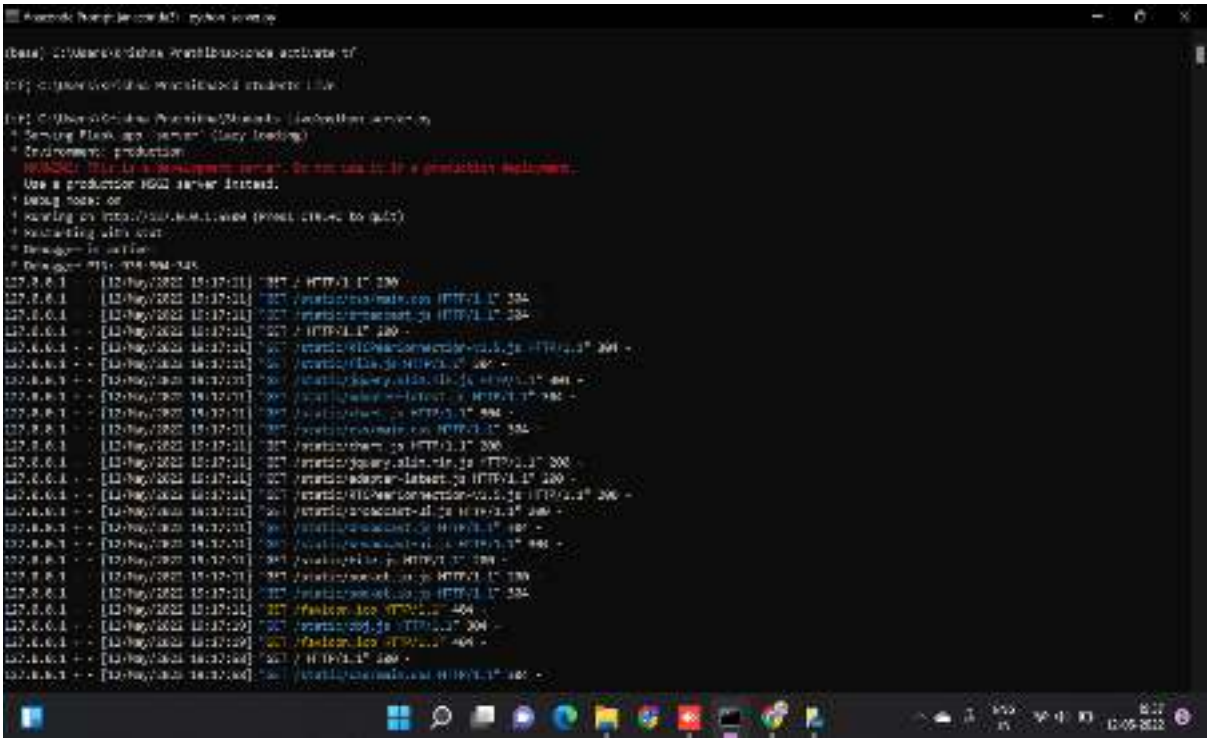
`



Screenshot 5: Second Student webcam interface



Screenshot 6: Second Student behavior analysis graph



Screenshot 7:Console interface of student behavior analysis in online class

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 tests. 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 satisfied, as shown by successfully unit testing, the combination of components correct and consistent. Integration testing is specifically aimed at exposing the problems thatarise from 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.

6.1 TEST CASES

6.3.1 ANALYSING THE STUDENT LIVE PERFORMANCE

Test case ID	Test case name	Purpose	Test Case	Output
1	Single person is present	To get the graph	To get the graph of student performance if single person is present	Graph is shown
2	More than one person is present	To get the graph	To get the graph of student performance if more than one person is present	No proper graph is drawn
3	No person is present	To get the graph	To get the graph of student performance if person is not present	No graph is drawn

7. CONCLUSION

7.CONCLUSION & FUTURE ENHANCEMENTS

A.PROJECT CONCLUSION :

We analyzed by deep learning method using the YOLOv3 algorithm was used to evaluate the student's observable actions in the classroom teaching system identification of student actions based on specified scenes. The evaluation was created right after the live feed review. DLIB models have been produced. Such models were tested using OPENCV for object detection. Tests indicate that this method offers reasonable pace of identification and positive outcomes for the measurement of student interest dependent on observable student actions in classroom instruction. The suggested approach is often versatile and responsive to different situations, since more students would be interested in greater room sizes, utilizing a higher form of camera with certain enhancements such as IP camera for continuously capturing images of the students, detect the faces in images and compare the detected faces with the database. It may be used such as greater input picture measurements, anchor box dimensions ideal for different situations and further training details.

B.FUTURE ENHANCEMENTS:

In student behavior monitoring system it can be added an extra feature that sends an alert message to specific student whose behavior is not idle or near to ideal behavior in that specific period of time so students get to know be attentive in the online classes.

Ex: sends an alert message every 15 minutes of time span after checking the behavior of student that time span.

8. BIBLIOGRAPHY

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8.1 References

[1]S. Wang, L. L. Minku, and X. Yao, "Resampling-based ensemble methods for online class imbalance learning," IEEE Transactions on Knowledge and Data Engineering, vol. 27, no. 5, pp. 1356–1368, 2015.

[2] J. Nainggolan, G. Christian, K. Adari, Y. Bandung, K. Mutijarsa, and L. B. Subekti, "Design and implementation of virtual class box 5.0 for distance learning in rural areas," in 2016 8th International Conference on Information Technology and Electrical Engineering (ICITEE), 2016, pp. 1–6.

[3] F. Lu, X. Chen, X. Ma, Z. Liu, and Y. Chen, "The exploration and practice of it solutions for online classes in higher education during covid-19 pandemic," in 2020 International Symposium on Educational Technology (ISET), 2020, pp. 298–302.

[4] C. Marconi, C. Brovetto, I. Mendez, and M. Perera, "Learning through videoconference. research on teaching quality," in 2018 XIII Latin American Conference on Learning Technologies (LACLO), 2018, pp. 37–40.

8.2WEBSITES:

- www.stackoverflow.com
- www.wikipedia.com
- www,github.com

8.4GITHUB LINK:

https://github.com/samadnan2000/studentLive

8.5DRIVE LINK:

https://drive.google.com/drive/folders/1PMDXc-qJ1oK8tIZy66FEs_tgFkeO86x5

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LIVE ACTIVITY ANALYSIS IN VIRTUAL CLASS ROOMS BY ARTIFICIAL INTELLIGENCE

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ABSTRACT

Many institutions have selected for virtual education as a result of the health issue that forced them to stop use their campuses as a way of teaching. Affecting students' active learning, which has predisposed many of them to get familiar with this new learning method, resulting in the increased usage of virtual platforms. Discord, Google Meet, Microsoft Team, Skype, and Zoom are one of the digital tools used by many public universities. The main goal of this project is to focus on self agent that can provide information to both teachers and students. Important academic outcomes such as critical thinking and the grades students receive in a topic are closely tied to the extent of class participation.

Keywords: Face Landmark Detection; Activity Graph; Student Monitoring ; Student Activity Analysis; Face Landmark Aspect Ratio.

I. INTRODUCTION

Human activity analysis is the application of computer vision research which focuses on detecting, tracking, and comprehending human physical movements. The teaching and learning cycle is perhaps the most important operation in any academic institution. Attendance and student activity are closely monitored throughout courses, as are instructional activities. As according data, student interest is a critical factor in engagement and performance. Teachers will be able to monitor student activity and discern key signs in order to make assumptions about the students' true engagement in learning activities. It is critical to keep track of student conduct so that teachers may quickly recognize and rectify inappropriate activity.

II. METHODOLOGY

Artificial intelligence is applied in the proposed work to forecast the activity of students in live online classes. Every frame collects student characteristics, and data is examined based on many sorts of activity including such eye movement, lip movement, and head movement, as well as student active status in that particular class. A graphical portrayal is intended to show a student's performance.

III. MODELING AND ANALYSIS

When a student is in front of the video camera in this application , it first detects the facial land marks on the student's face, such as (eye, lip, and head position), by applies the face landmark module to collect the value and send it to the server. There is an optimal value of the face landmarks of a ideal position of the face landmarks in the server, and These real-world and ideal-world values are compared, and a graph is created as a result of the comparison of both the values..

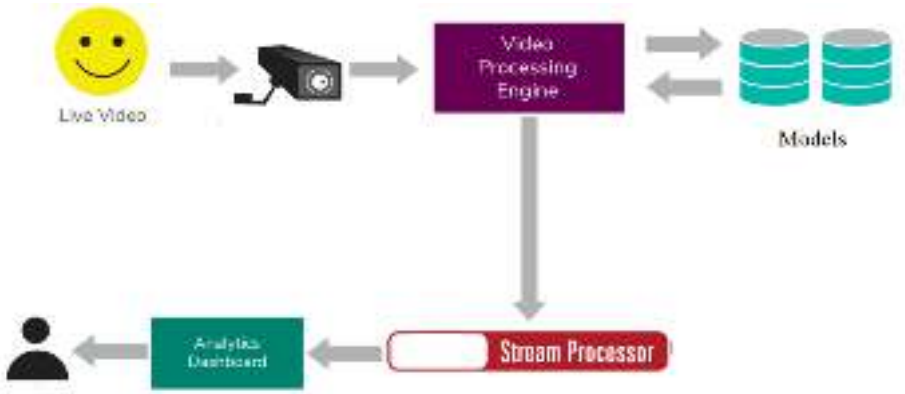

Figure 1: Architecture

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ARCHITECTURE DESCRIPTION:

Client:

This application is run by student where camera will open and students' 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.

IV. RESULTS AND DISCUSSION

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

Figure 2: Student web cam

When students turn on the camera, the application takes frames for every millisecond and sends them to the server for analysis. The server then returns a result depending on the frames that were supplied to it.

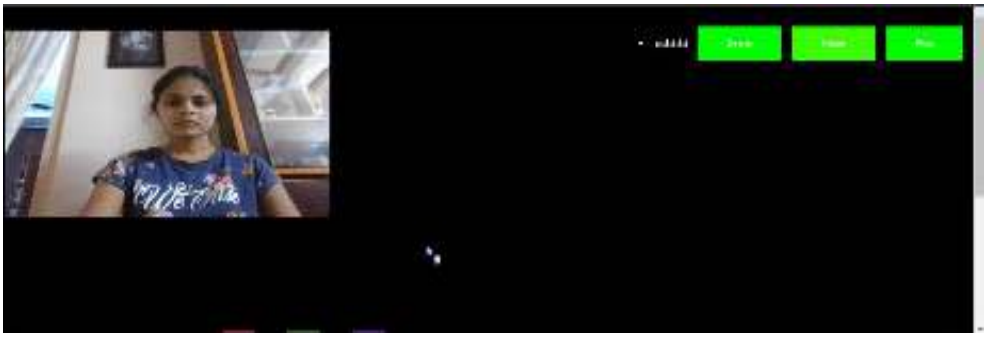

Figure 3: Faculty interface with student webcam

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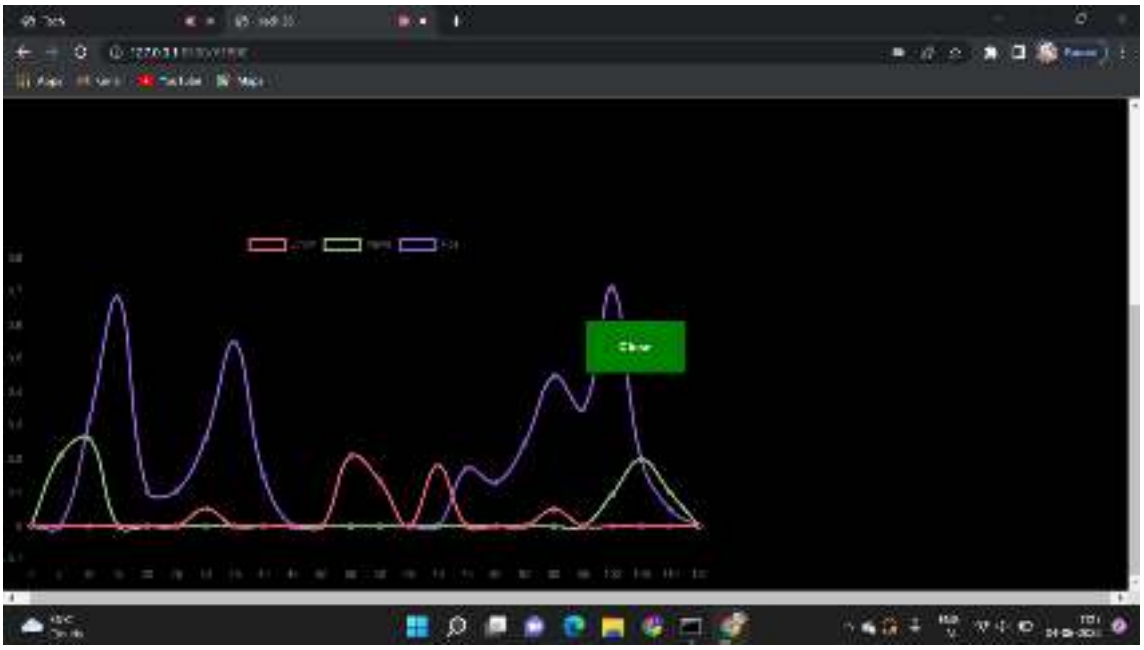

Figure 4: Student activity analysis graph

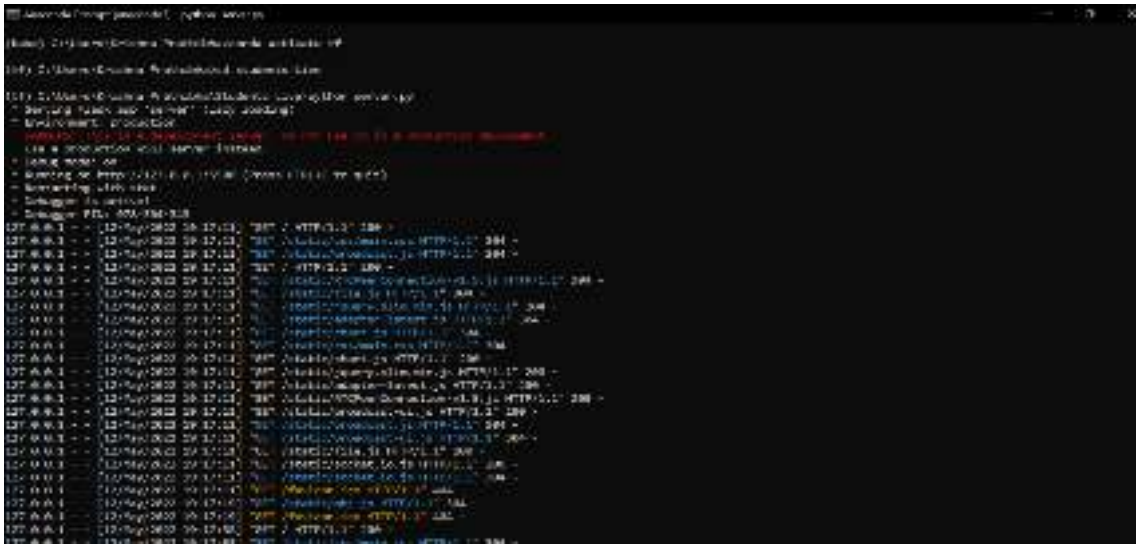

Figure 5: code execution

V. CONCLUSION

The YOLOv3 algorithm was used to evaluate the students' observable activitys in the classroom instruction syst em detection of student actions based on defined scenarios using a deep learning approach. Following the live s tream review, the assessment was made.Models for DLIB have been created.Tests show that this strategy provi des a decent rate of identification and positive results for determining student interest based on observable stu dent activities in the classroom. Since more students would be interested in larger room sizes, the proposed sol ution is frequently adaptable and sensitive to changing conditions, employing a higher type of camera with spec ific additions such as an IP camera for continually taking photos of the students.

VI. REFERENCES

[1] S. Wang, L. L. Minku, and X. Yao, "Resampling-based ensemble methods for online class imbalance learning," IEEE Transactions on Knowledge and Data Engineering, vol. 27, no. 5, pp. 1356–1368, 2015.

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[4] C. Marconi, C. Brovetto, I. Mendez, and M. Perera, "Learning through videoconference. research on teaching quality," in 2018 XIII Latin American Conference on Learning Technologies (LACLO), 2018, pp. 37–40.

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