

# **INTRODUCTION**

The face recognition is an integral part of biometrics. In biometrics, basic traits of human are matched to the existing data. Facial features are extracted and implemented through algorithms, which are efficient and some modifications are done to improve the existing algorithm models.

Computers that detect and recognize faces could be applied to a wide variety of practical applications including criminal identification, security systems, identity verification etc

A facial recognition attendance system uses facial recognition technology to identify and verify a person using the person's facial features and automatically mark attendance.

The software can be used for different groups of people such as employees, students, etc. The system records and stores the data in real-time

# **PROJECT PROFILE**

## **Objective**

Smart Attendance , Time Saving , accuracy , Easy way to manage attendance sheet

## **Front End Tool**

Python 3.7.2

## **Back End Tool**

Microsoft Excel (.CSV)

## **Other Tool**

OpenCV 3.4.3.18 , OpenCV-Contribute 3.4.3.18 , Pandas , numpy , tkinter

## **MINIMUM SOFTWARE REQUIREMENT**

|                          |  |
|--------------------------|--|
| <b>Operating System</b>  | <b>Any Compatible Operating System</b>                   |
| <b>Software Required</b> | Python ,Webcam Driver                                    |
| <b>Tools / Libraries</b> | OpenCV 3.4.3.18, Opencv-Contrib 3.4.3.18, pandas,tkinter |

# **HARDWARE & SOFTWARE REQUIREMENT**

## **MINIMUM HARDWARE REQUIREMENT**

|                  |                |
|------------------|----------------|
| <b>Processor</b> | <b>2.5 GHz</b> |
| <b>RAM</b>       | <b>1 GB</b>    |
| <b>HDD</b>       | <b>5 GB</b>    |
| <b>Camera</b>    | <b>1</b>       |

## **ABOUT PYCHARM**

- **PyCharm** is an integrated development environment (IDE) used in computer programming, specifically for the Python language
- **PyCharm** is cross-platform, with Windows, macOS and Linux versions.
- It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems and supports web development with Django as well as data science with Anaconda.

## **FEATURES OF PYCHARM**

- Coding assistance and analysis, with code completion, syntax and error highlighting, linear integration, and quick fixes
- Project and code navigation: specialized project views, file structure views and quick jumping between files, classes, methods and usages
- Python, refactoring : includes rename, extract method, introduce variable, introduce constant, pull up, push down and others

# **FUNCTIONAL SPECIFICATION**

## **MODULE SPECIFICATION**

### **Fill Student Detail**

- First Name
- Middle Name
- Last Name
- Eno Number
- Course & Semester

### **Submit And Capture**

**{Step 1 To insert the student data in appropriate Folder and .csv file }**

- When you click on button firstly it inserts the student detail in to specific course & semester .csv excel sheet and capture photo into The same course & semester Folder.
- During Capturing The images it also validate the incoming face is Frontal Face or Not.

## **Training**

**{Step 2 To Train the student photograph and save in to .yaml file }**

- It Collect All the Photo from the selected Folder And Convert into NumPy array and split the id from the name of photo And Save in **.yaml** extension. Which Help to identifying while recognition

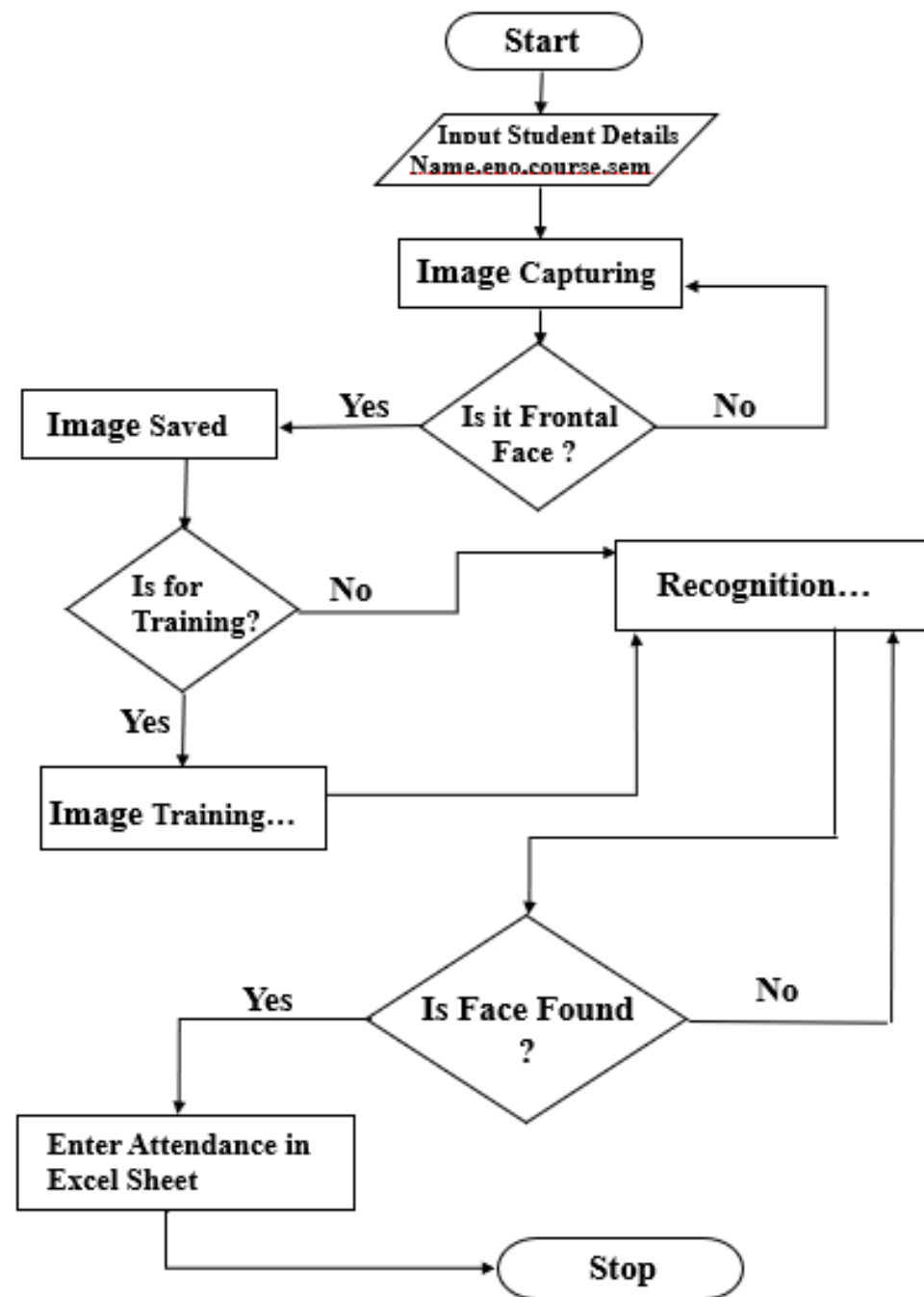
## **Recognition**

**{Step 3 To Recognition the student Live face to train face data and make attendance in .csv File. }**

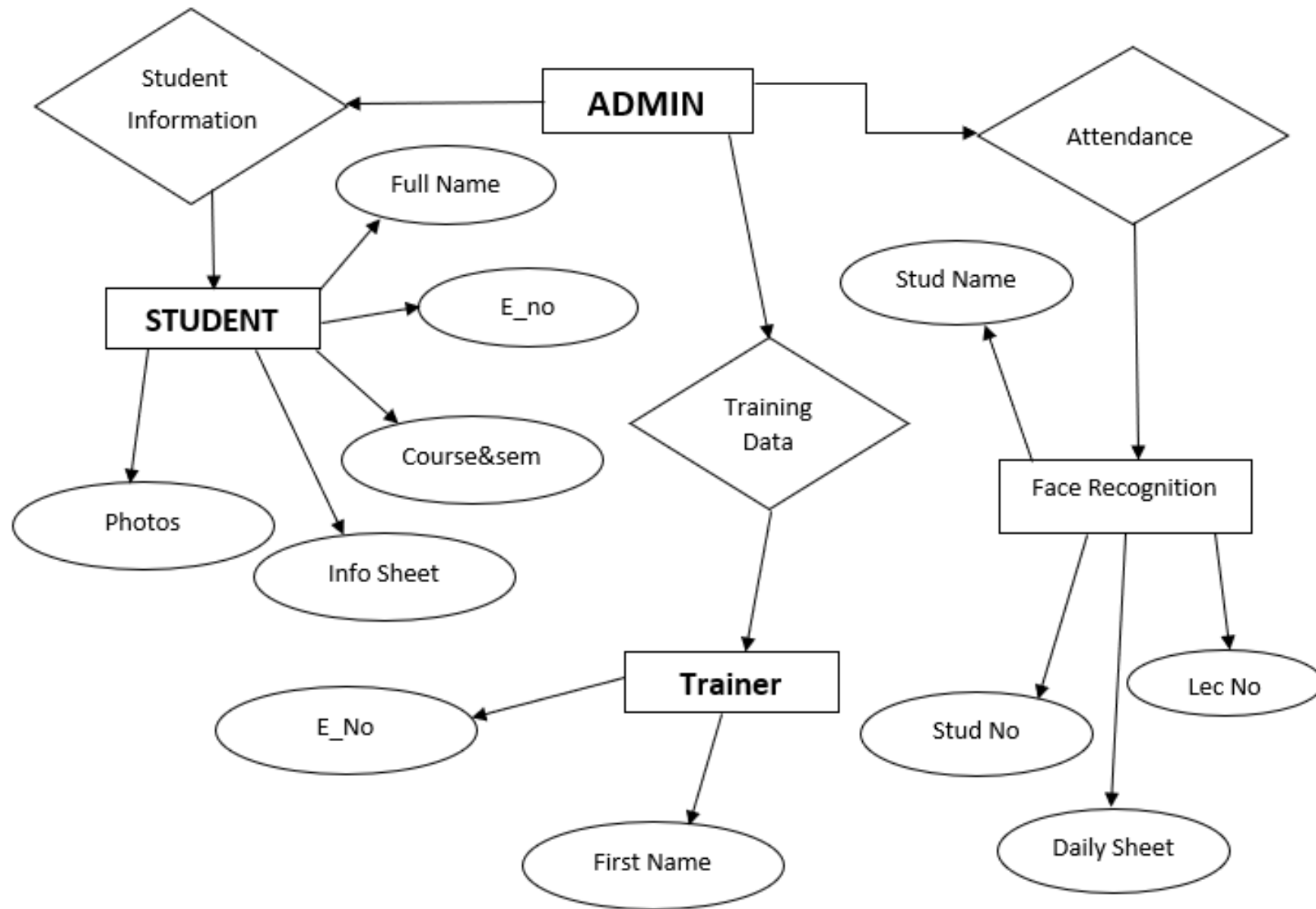
- Open the webcam for the selected course & semester. And recognize the live face with the train **.yaml** Data of the student face. Match found then enter the attendance to the selected excel .csv sheet



# SYSTEM FLOW CHART

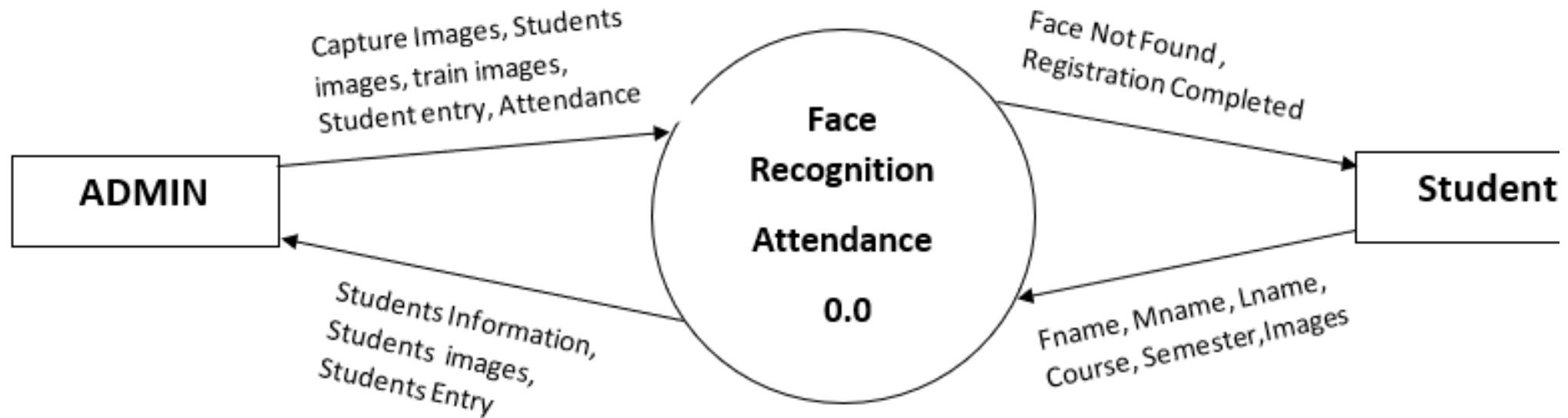


# E R DIAGRAM

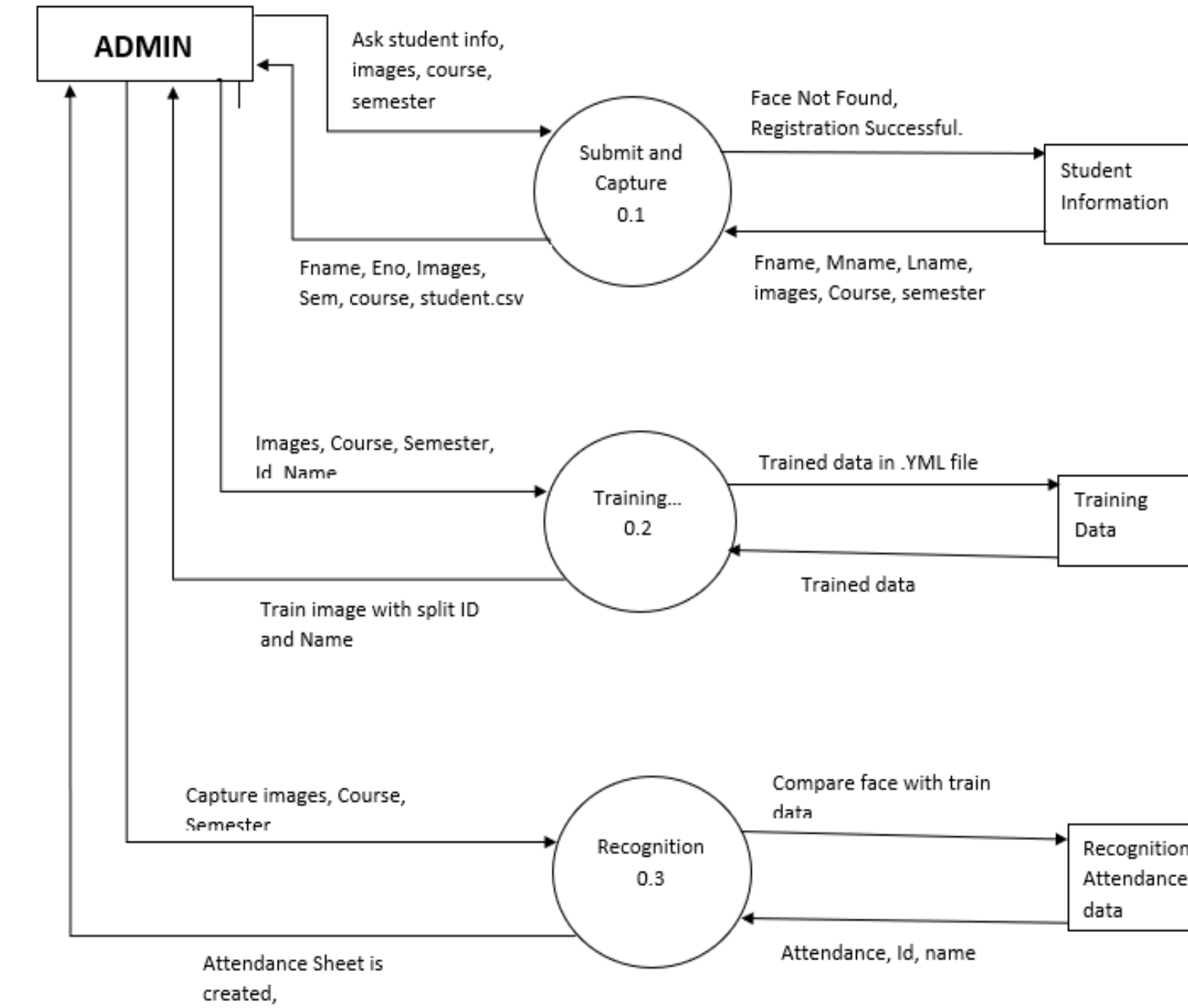


# DATA FLOW DIAGRAM

## Context Level / Level Zero DFD



## First Level DFD



# **FILE STRUCTURE**

1)

**BSc Sem (semester no).CSV   =>   File**

| COLUMN | DATA TYPE |
|--------|-----------|
| Eno    | Numeric   |
| Name   | Text      |

**Eg: -**

| Eno    | Name |
|--------|------|
| harsh  | 019  |
| Hemant | 739  |

2)

**BSc Sem (semester no)      =>   Folder**

- Contain the collection of the images capture by the system using Fname, Eno as an image name in folder.

3)

**Attendance/ BSc Sem (semester no)**

=>

**File**

| COLUMN | DATA TYPE |
|--------|-----------|
| Eno    | Numeric   |
| Name   | Text      |
| Lec 1  | Numeric   |
| Lec 2  | Numeric   |
| Lec 3  | Numeric   |
| Lec 4  | Numeric   |
| Lec 5  | Numeric   |
| Lec 6  | Numeric   |
| Lec 7  | Numeric   |
| Total  | Numeric   |

**Eg:-**

| Eno | Name  | Lec 1 | Lec 2 | Lec 3 | Lec 4 | Lec 5 | Lec 6 | Lec 7 | Total |
|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 019 | Harsh | 1     | 1     | 1     | 1     | 0     | 1     | 1     | 6     |

# INPUT DESIGN

## *Welcom To the Face Recognition Project*

### Student Details :

First Name -

Middle Name -

Last Name -

Enrolment No -

Course -

Semester -

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V  
Step 1

<< Submit & Capture >>

V  
Step 2

<< Train Data >>

V  
Step 3

<< Recognition >>



# Welcom To the Face Recognition Project

## Student Details :

First Name -

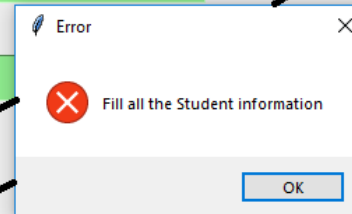
Middle Name -

Last Name -

Enrolment No -

Course -

Semester -



ALL the Detail's  
are BLANK

V  
Step 1

<< Submit & Capture >>

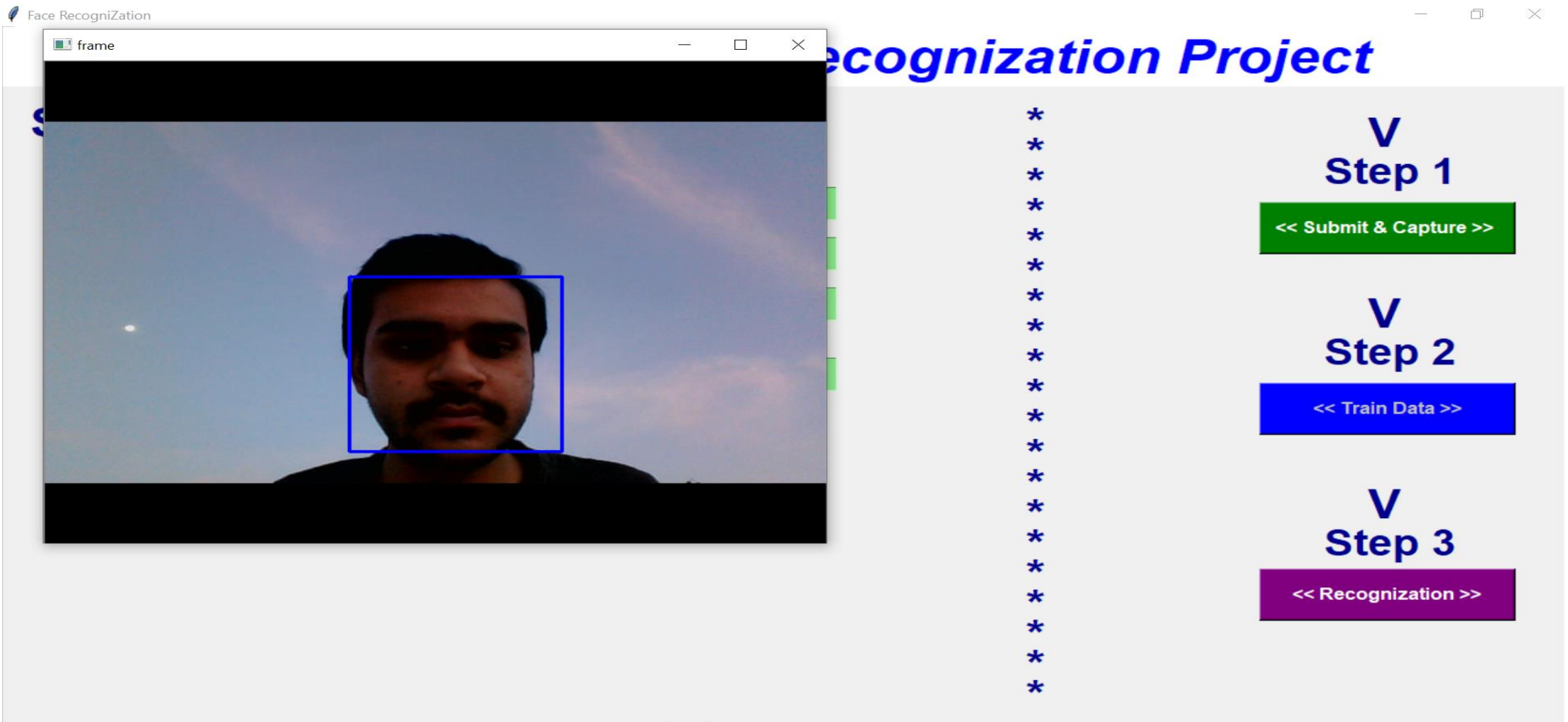
V  
Step 2

<< Train Data >>

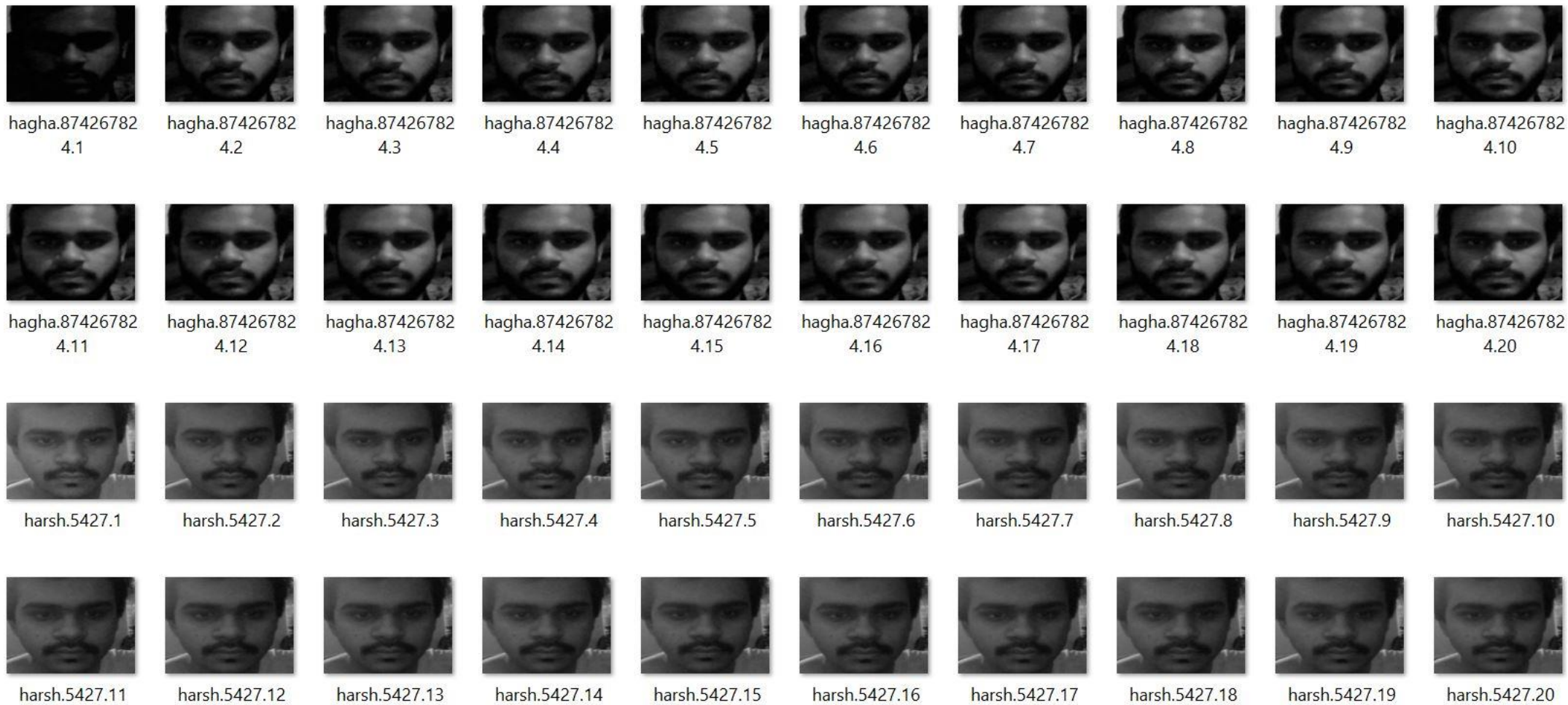
V  
Step 3

<< Recognition >>

**Description:** At the step One If You forget to input any detail of student,  
It Display This Error Message Box.  
It Help To understand That all the field are mandatory so it should be field.



**Description:** After Filling All the Information About the Student.  
Press Submit & capture Button,  
Firstly, it Store the Student info into specific class .csv file.  
And Take The 20 Photos of the student and store to that  
Student class Folder. With Fname, Eno as the image name.



**DESCRIPTION:** It Display collection of capture images into the Specific folder.

# Welcom To the Face Recognition Project

## Student Details :

First Name -

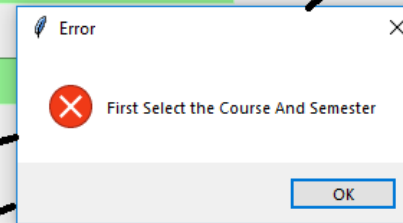
Middle Name -

Last Name -

Enrolment No -

Course -

Semester -



Course And  
Semester Is  
Blank

V  
Step 1

<< Submit & Capture >>

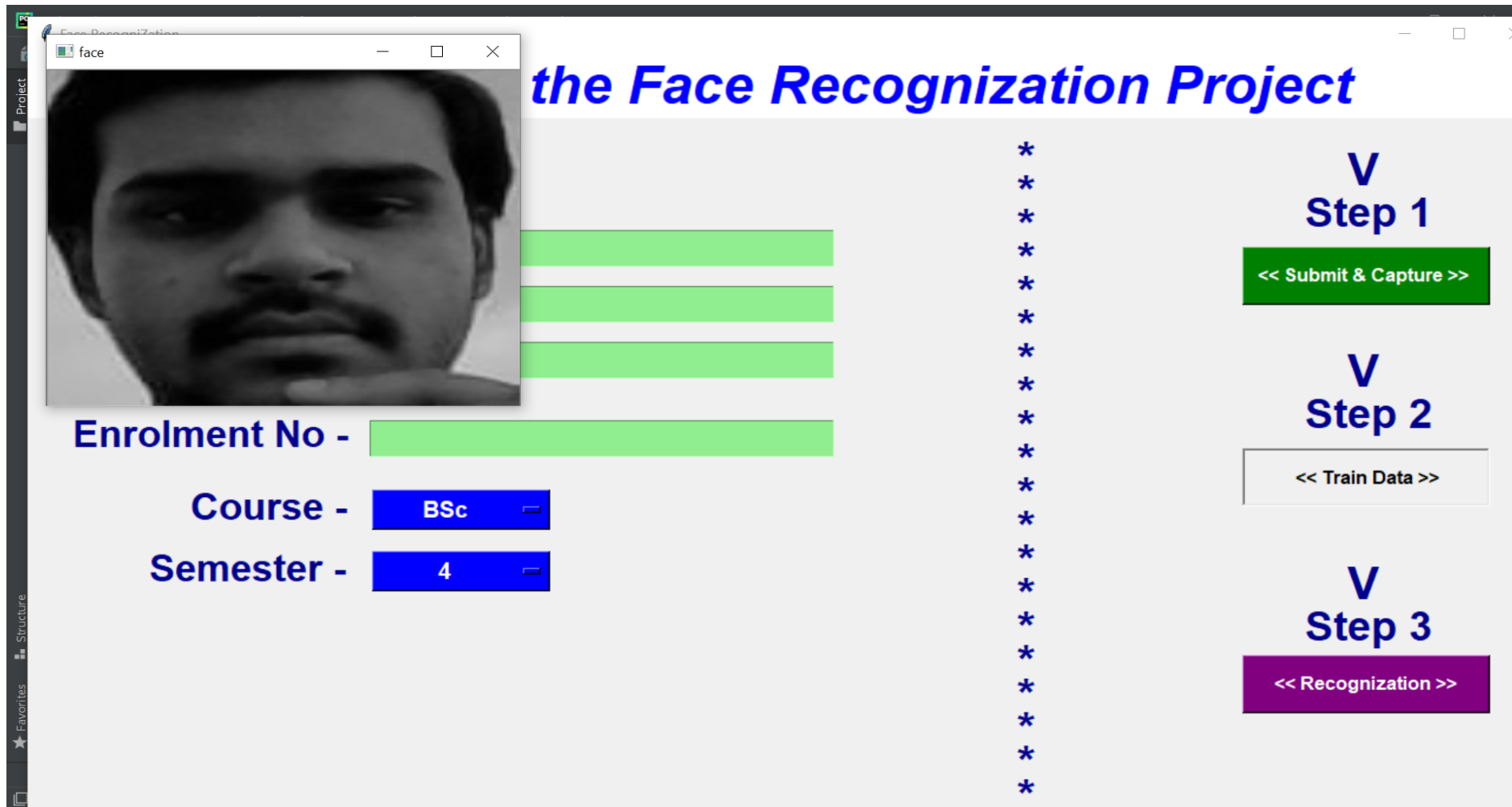
V  
Step 2

<< Train Data >>

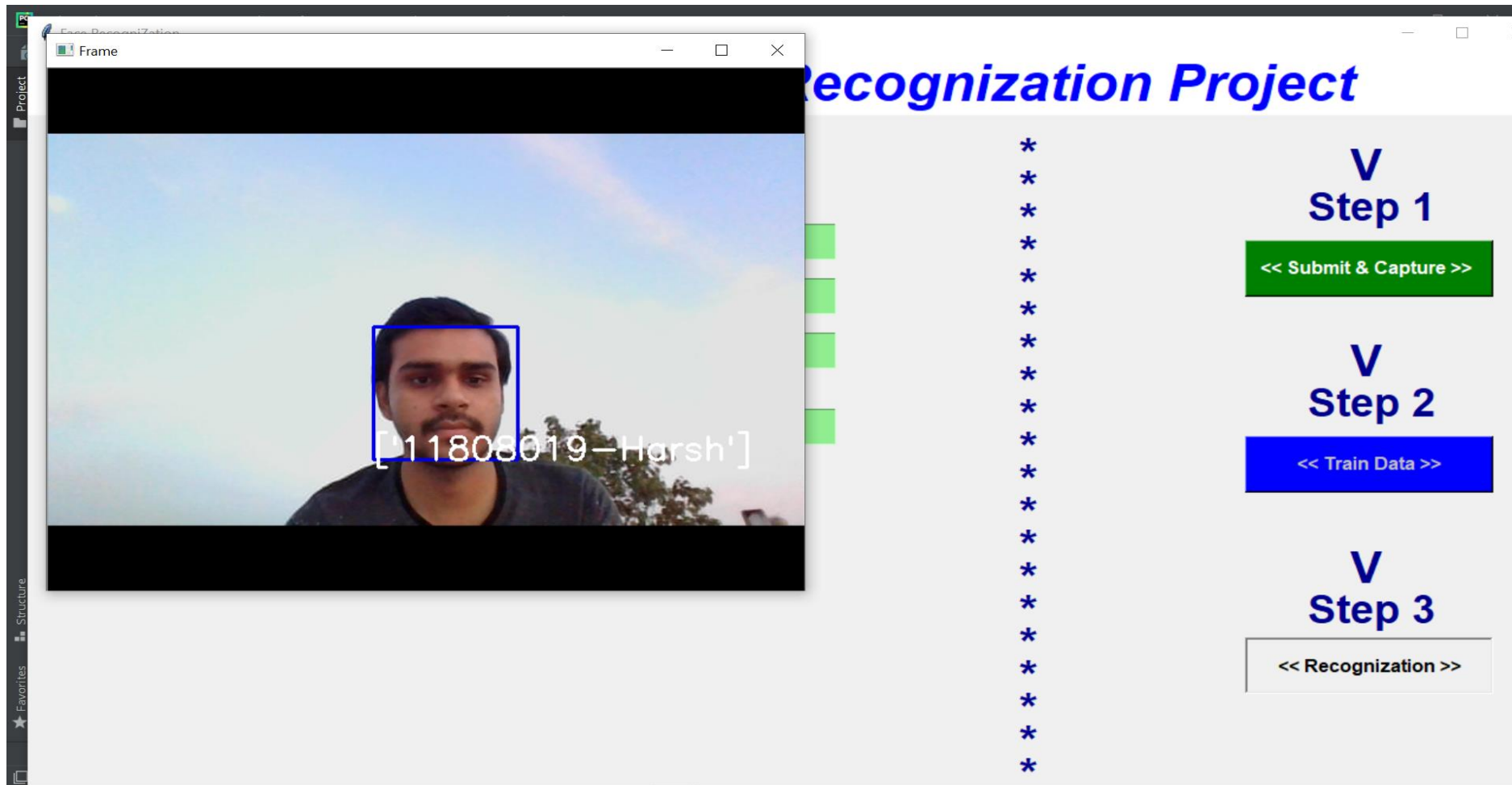
V  
Step 3

<< Recognition >>

**DESCRIPTION:** Step 2 Here the collected images are going for training.  
As per the selected Course and Semester it open the folder  
Of capture images.  
If Course or Semester is not selected it display the Error Box  
To force user to select the Course and semester.



**DESCRIPTION:** Step 2 Here the collected images are going for training.  
 As per the selected Course and Semester it open the folder  
 Of capture images.  
 Firstly, it split the image name in 2 division Id, Name  
 Then train the all stored image data and store the **.YML** into  
 The train\_data Folder.



**DESCRIPTION:** Step 3 Recognition.

It captures the live face and then Compare With the  
Selected Course and Semester **Train.yml** data

And Get the name of student and display below It face.

After recognition It store the attendance into **Attendance.csv** file.

# OUTPUT DESIGN

|    | A        | B          | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
|----|----------|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1  | ID       | NAME       |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2  | 11808019 | Harsh      |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3  | 11814739 | hemant     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4  | 11807895 | avinash    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5  | 11814932 | abhinandan |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6  | 11515054 | kishan     |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7  |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8  |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9  |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 11 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 12 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 13 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 14 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 15 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 16 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 17 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 18 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 19 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 20 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 21 |          |            |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

**DESCRIPTION:** Display student info which is stored into .CSV file.



|  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|---|---|---|---|---|---|---|---|---|
| BSc Sem 1 - Excel  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| harsh .  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| File Home Insert Draw Page Layout Formulas Data Review View Help Tell me what you want to do |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| Clipboard Font Alignment Number Styles Cells Editing   |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| K6   |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
|  | A     | B     | C     | D     | E     | F     | G     | H     | I     | J | K | L | M | N | O | P | Q | R | S |
| 1  | E_NO  | Name  | Lec 1 | Lec 2 | Lec 3 | Lec 4 | Lec 5 | Lec 6 | Lec 7 |   |   |   |   |   |   |   |   |   |   |
| 2  | 25489 | harsh | 0     | 0     | 0     | 0     | 0     | 0     | 0     |   |   |   |   |   |   |   |   |   |   |
| 3  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| 4  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| 5  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |
| 6  |       |       |       |       |       |       |       |       |       |   |   |   |   |   |   |   |   |   |   |

**DESCRIPTION:** Display student Attendance Sheet With Lec no stored into .CSV file.



# Testing

| NO | Test Case                                      | Input                         | Result   | Pass / Fail |
|----|--|-------------------------------|--|-------------|
| 1  | Frontal face                                   | Cover face with hands         | Face Not Found                                       | Pass        |
| 2  | Recognize another person face                  | Untrain face, Image capturing | Unknown face   | Pass        |
| 3  | During the taring Course & Sem is Not selected | Null Course & Semester        | Error: Please Select the Course and Semester         | Pass        |
| 4  | During registration No detail is filled        | Null student info             | Error: Please Fill all the student information       | Pass        |
| 5  | Eno No More the 6 Digits                       | 11808019                      | It can't able to read it.<br>Create the random value | Pass        |
| 6  | Detect multiple Face at same time              | Multiple faces                | Only one class student can detect.                   | Fail        |

## **Future Enhancement**

- Can Detect face in any background.
- Provide the lecture vies attendance .
- Detect Multiple class student together.
- Auto training of Data
- Increase accuracy level of face detection.
- Provide student search function.
- Location Tracing of the Student.
- Create the Bunk Student List
- Month Wise Attendance Sheet.

# Bibliography

- [www.w3school.com](http://www.w3school.com)
- [www.youtube.com](http://www.youtube.com)
- [www.python.org](http://www.python.org)
- [www.stackoverflow.com](http://www.stackoverflow.com)
- [https://docs.opencv.org/3.4.2/dd/d65/classcv\\_1\\_1face\\_1\\_1FaceRecognizer.html](https://docs.opencv.org/3.4.2/dd/d65/classcv_1_1face_1_1FaceRecognizer.html)