



Daffodil
International
University

Project Title:

**Students Attendance System using
Computer Vision**

Submitted By:

Md. Shakil Anower

ID: 191-35-2809

Department of Software Engineering

Daffodil International University

Supervised by:

Mr. Sk. Fazlee Rabby

Lecturer (Senior Scale)

Department of Software Engineering

Daffodil International University

This Project report has been submitted in fulfillment of the requirements for the Degree of Bachelor of Science in Software Engineering

APPROVAL

This thesis titled on "Students Attendance System using Computer Vision", submitted by **Md. Shakil Anower (ID: 191-35-2809)** to the Department of Software Engineering, Daffodil International University has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Bachelor of Science in Software Engineering and approval as to its style and contents.



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Faculty of Science and Information Technology

Daffodil International University



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Technology Team

a2i Programme

DECLARATION

I hereby declare that I have done this project under the supervision of Mr. Sk. Fazlee Rabby Lecturer, Department of Software Engineering, Daffodil International University. I also declare that this project is my original work for the degree of B.Sc. in Software Engineering and that neither the whole work nor any part has been submitted for another degree in this or any other university.

Submitted By:

Shakil
.....

Md. Shakil Anower

ID: 191-35-2809

Department of Software Engineering

Daffodil International University

Certified by:

[Signature]
.....

Mr. Sk. Fazlee Rabby

Lecturer (Senior Scale)

Department of Software Engineering

Daffodil International University

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At this point, I want to express my gratitude to Allah, the Almighty, for enabling me to finish the final thesis. I also want to thank my family, who have always been encouraging and have always believed in me.

I would wish to thank Mr. Sk. Fazlee Rabby, a lecturer in the Daffodil International University department of software engineering who served as my honorary supervisor, for his appropriate guidance, assistance, support, and collaboration. someone without whom I couldn't have done my thesis. His unwavering patience, intellectual leadership, relentless encouragement, constant and forceful supervision, constructive criticism, astute advice, reading multiple poor versions, and improving them at every level made this endeavor possible.

I'd want to thank everyone of my Daffodil International University classmates who took part in this discussion while also in class.

Finally, I want to thank my parents for always being there for me. They continually offer my suggestions and motivation top importance.

Muhammad Shakil Anower

Abstract

There are numerous attempts to automate this process in classrooms using a variety of technologies, but few attempts are there to use biometrics in class attendance. This project focuses on the use of face recognition to acquire data related to class attendance, which is a concept that applies to various daily life activities and functions. The findings demonstrate that the suggested solution can enhance the timing and validity of the attendance process.

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Introduction:

Project Overview

The classroom attendance system using real time face recognition is a computer vision project this system will help teachers to take attendance of students easily. It does very fast and instant attendance system. recognizing the faces of students can be taken attendance. this system provides very fast to store attendance history of students.

Project purpose

The teachers must spend a lot of time and laboriously mark attendance by hand, which has historically been a big worry for institutions. There is currently no automatic biometric attendance system.

because of this, it takes a lot of time, is challenging to maintain, and necessitates a line to scan attendees' fingerprints to verify their attendance.

Background

In modern time computer vision became very successful for solving many problems using camera. in Europe America there are many Educational Institute you are using computer vision for attendance. in our country it's not using broadly in Institutions

Benefits

this system will help teachers to make attendance 80% faster than manual system. There will be no fake proxies.

Stakeholders

The stakeholders are they who use the system. They can be external or internal. the stakeholders of my system are teachers and students

Related Work:

Today, technology is developing more quickly, and devices are moving more and more toward automation. As a result, software technology is advancing quickly. Different methods of attendance-taking and monitoring are used in businesses, industries, and educational institutions. The majority of the time, teaching members' attendance sheets or registers are used to record student attendance. It requires a lot of effort and time. It also leads to manual mistakes because we are unsure if a verified student has responded or not. Some kids may even misplace or steal the attendance sheet. The identification of fingerprints is part of another biometric system. Using this technique, each student's fingerprint is first taken and saved in a database that has a fingerprint sensor.

After that, the finger print is compared to the database and the attendance is recorded, but its main drawback is that students must line up and wait in line, which takes a lot of work and time. Additionally, if the system is unable to recognize the finger print correctly, the attendance will not be recorded, making it ineffective. Another biometric device that is available detects the location of the iris and measures blink rate and ocular motion. Since no two people have the same eyeball, the initial iris or eyeball for each person is maintained in the database in this system.

Although each student's eyeball cannot be captured in a single image, the resulting image's eyeball is compared to an eyeball in the database and attendance is noted.

Haar Cascade Algorithm:

I used the Haar Cascade technique to find the student's face. No matter where they are in the image or how big they are, objects can be found using the process known as the Haar cascade. This algorithm can operate in real-time and is not overly complex. A Haar Cascade detector can be made to recognize different objects.

Even though Haar Cascade Detection is one of the earliest face detection techniques, it is also very effective. It existed for a very, very long time before Deep Learning became well-known. In addition to detecting faces, Haar Features were also utilized to identify license plates, eyes, and lips. We may access the models using OpenCV techniques because they are available on GitHub.

OpenCV:

For this project, I utilized OpenCV. A computer vision and machine learning software library called OpenCV is available for free use. A standard infrastructure for computer vision applications was created with OpenCV in order to speed up the incorporation of artificial intelligence into products. OpenCV makes it simple for businesses to use and alter the code because it is a product with an Apache 2 license.

More than 2500 optimized algorithms are available in the collection, including a wide range of both traditional and cutting-edge computer vision and machine learning techniques. These algorithms may be used to identify objects, classify human behaviors in films, track camera motions, track moving objects, and much more. They can also be used to detect and recognize faces.

Functional requirement:

It defines a system what should the system do. Also, requirement by user and it's very important to meet these requirements.

The functional requirements:

- Registration
- Login
- train data
- face recognition
- attendance history
- Take sample
- Reset password
- forget password

Non-functional Requirements

Non-functional requirements specify a system's quality attribute. "How should the technology meet the required functionality?" is specified. Technical experts or software developers specify non-functional requirements. You must comply with these conditions. It is recorded as a characteristic of quality.

The non-functional requirements of this system are:

- Compliance
- Documentation
- Privacy
- Quality
- Stability
- Authority
- Response time
- Reliability

Proposed System:

The algorithm demonstrates the proposed system's step-by-step operation in more detail as follows:

Input: Image of a classroom is captured by a camera.

Output: Accurately marking attendance

Step 1: Begin

Step 2: Add students to the face database by Name and Roll Number.

Step 3: Install a camera in the classroom.

Step 4: Take a picture with the camera

Step 5: Face Recognition

- Choose the area of the photograph that interests you.
- Crop the faces of the kids.
- Count the students.
- Create a spreadsheet for them.

Step 6: Face Classification

- Pre-trained model identifies pupils by comparing cropped faces to photographs in the face database

Step 7: Finish

Use case description:

Registration:

this is a form for users to submit their details for the system

Login:

this is used for sign in to the system for uses

Train:

this module is used for training students face or images which are taken for training

Take sample:

this module is used for taking images as a sample

Attendance:

this is used for or taking attendance by recognizing faces of students

Update details

This module is used for updating the details of particular students

Reset details

This model was used for reset the details of students

Update attendance:

If there is any problem recognizing system teachers can manually update the students attendance status

Project Schedule

I need to prepare a scheduling plan quickly to complete the project on time. It also means to communicate about tasks that must be completed quickly.

Gantt Chart:

activities	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Market Research	Blue	Green										
Specifications		Blue	Blue	Blue								
Planning			Blue	Green								
Design				Red	Blue							
Development				Green	Green	Green	Red	Blue	Blue			
Testing						Blue	Green	Blue				
Assessment									Red	Green		
Documentation										Green	Green	Blue

The release plan and milestones are given below:

Activities	Duration in week	Total week
Research	W1, W2	2
Specifications	W2, W3, W4	3
Planning	W3, W4	2
Design	W4, W5	2
Development	W4, W5, W6, W7	4
Testing	W7, W8	2
Assessment	W9, W10	2
Documentation	W10, W11, W12	3
Software release	W12	1

Objectives:

The main objective of this project is to serve people with all kinds of services. This is an instant online service management system.

- **Practically:**

The output must be accurate, timely, and complete; the program must be stable and easy for persons of average intellect to use.

- **Efficiency:**

As long as it satisfies all the objectives, it is preferable to aim for a system with a minimal cost.

- **Cost:**

The web application needs to work in all settings.

- **Portability:**

The web application should be portable to all environments.

- **Security:**

The physical security of data is covered by this significant design element. A login feature that allows a username and password for the administrator and user could provide this. Consequently, it makes administrative tasks simple and 100% effective.

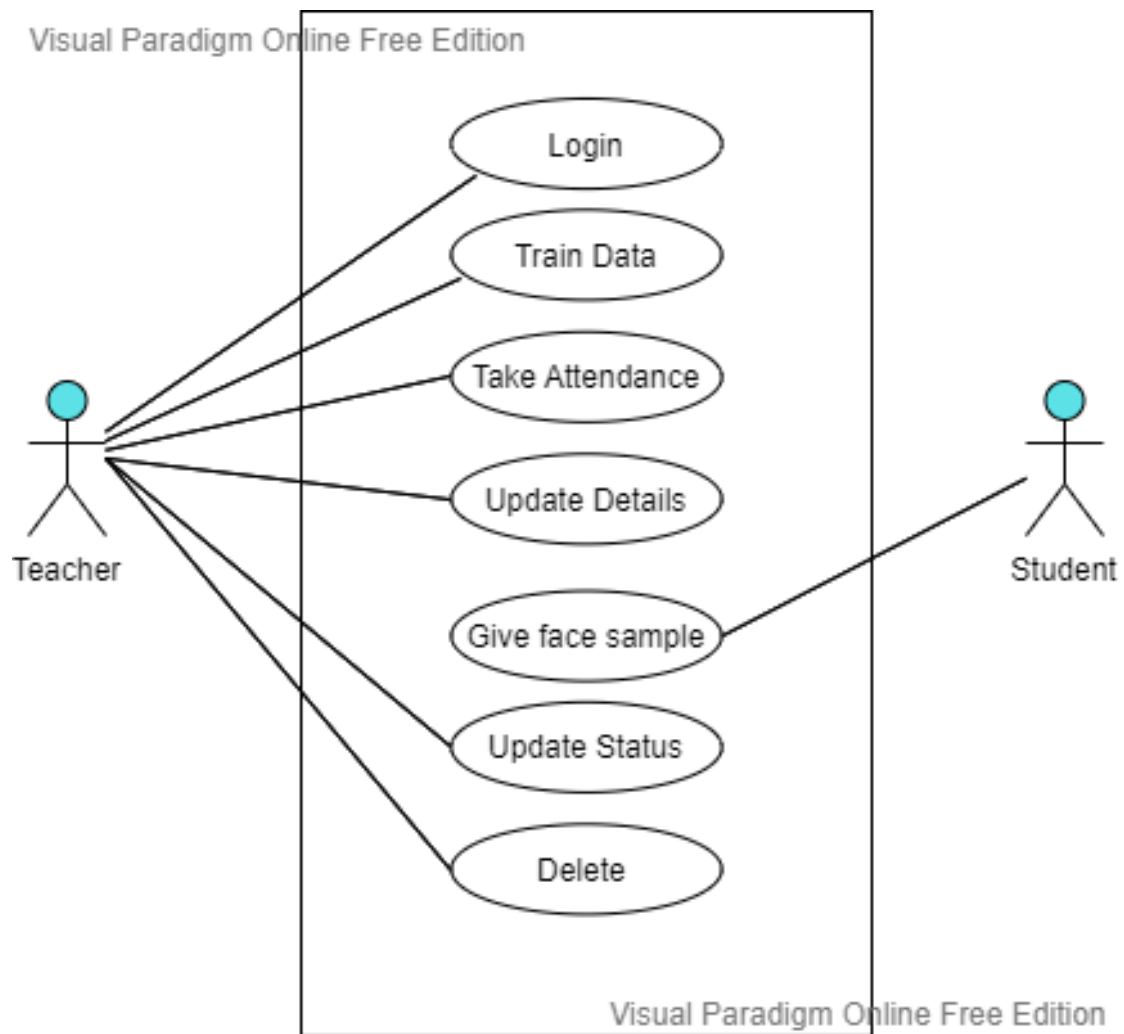
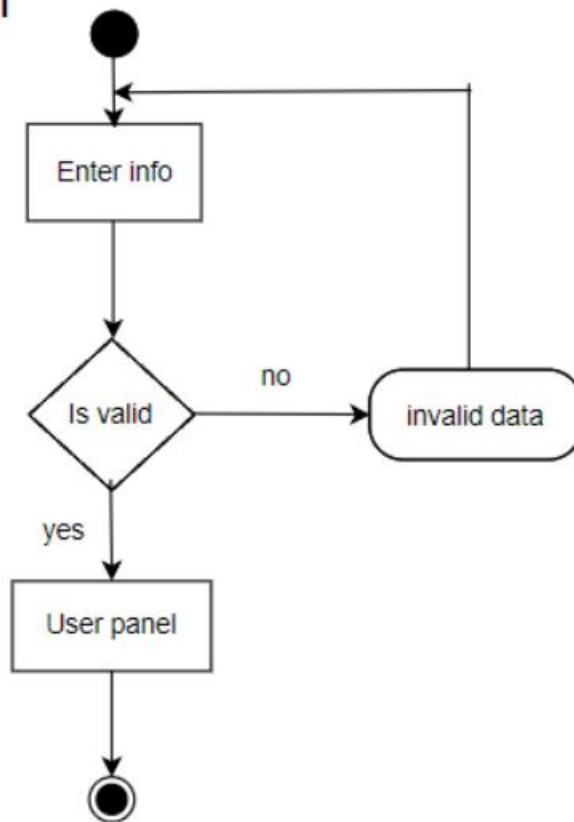


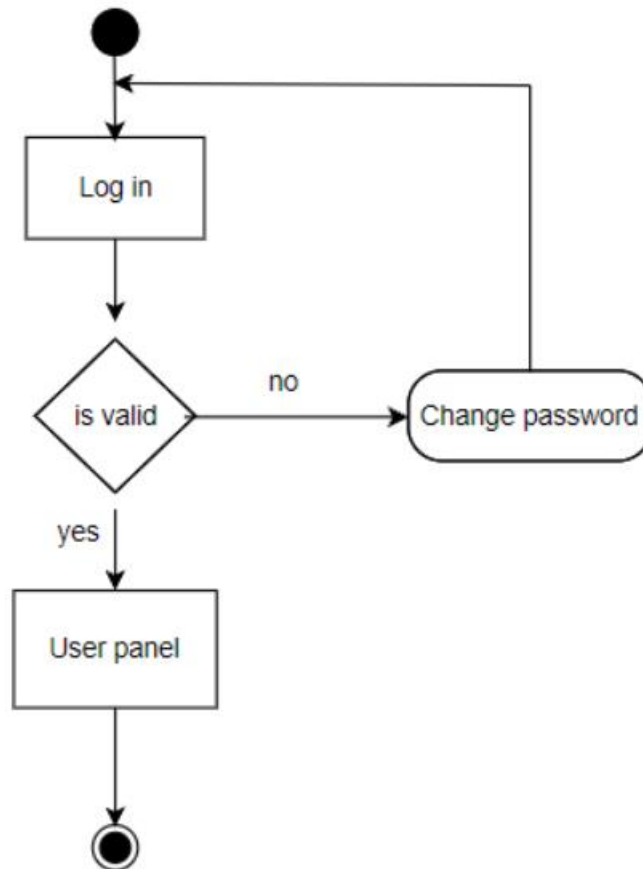
Figure 1: Use case Diagram

Activity Diagram

Registration



Log in



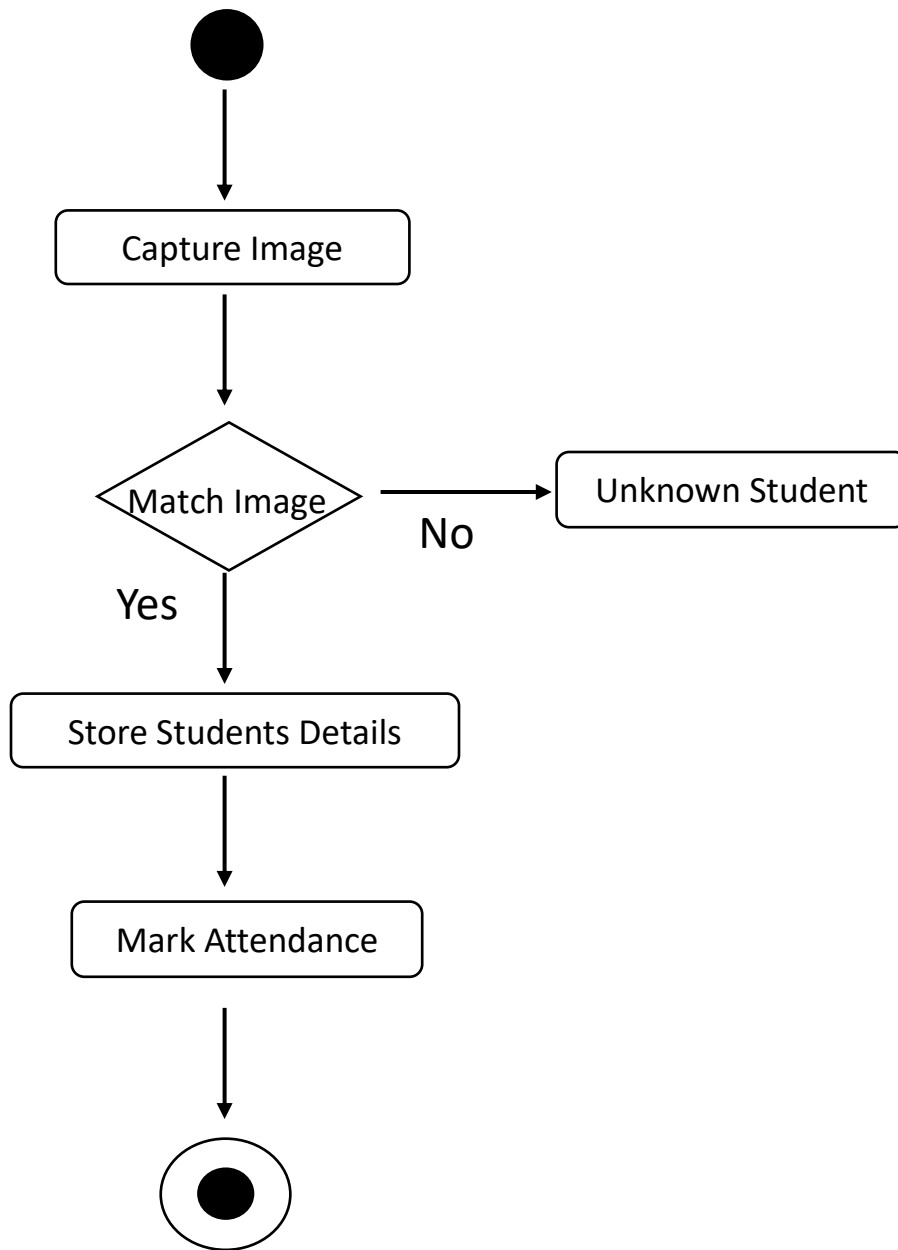
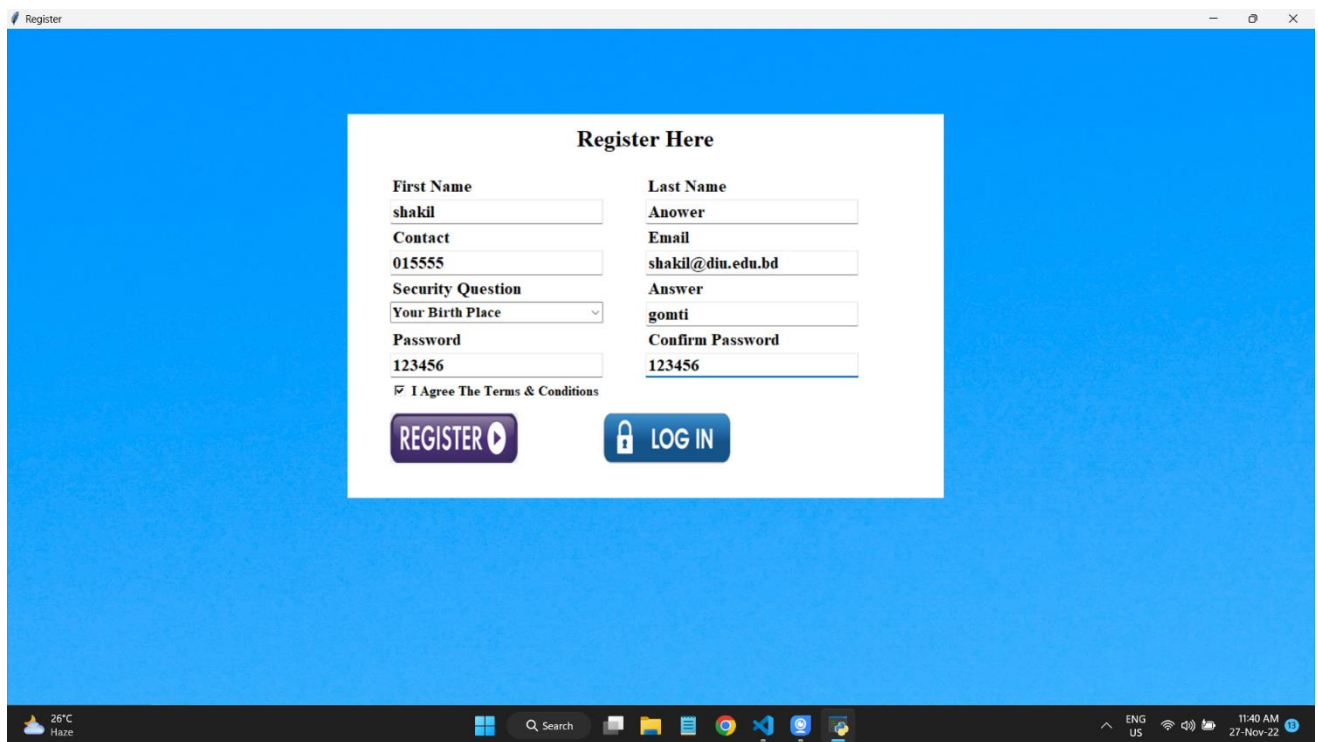


Figure 2: Activity Diagram for Auto Attendance

Graphical User Interface:

Registration:



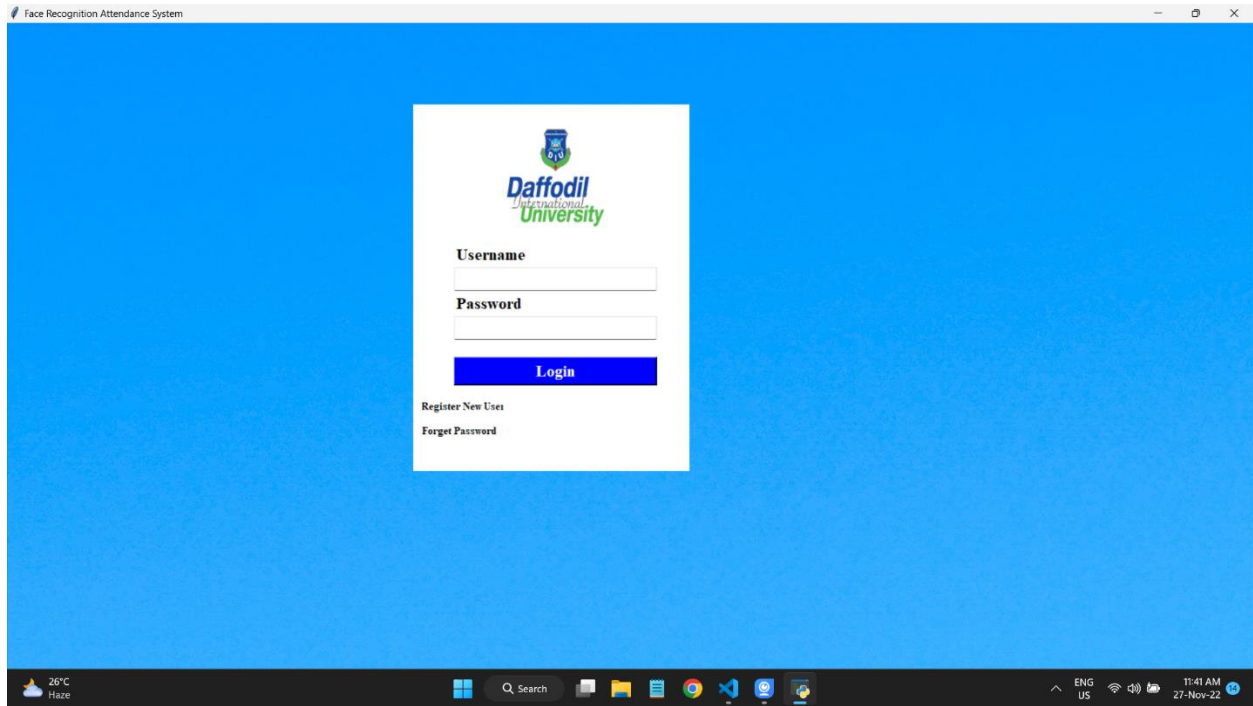
The screenshot shows a web browser window with a blue background. In the center is a white registration form titled "Register Here". The form contains the following fields and elements:

Field	Value
First Name	shakil
Contact	015555
Security Question	Your Birth Place
Password	123456
Last Name	Anower
Email	shakil@diu.edu.bd
Answer	gomti
Confirm Password	123456

Below the form, there is a checked checkbox labeled "I Agree The Terms & Conditions". At the bottom of the form are two buttons: a purple "REGISTER" button with a play icon and a blue "LOG IN" button with a lock icon.

The Windows taskbar at the bottom shows the system tray with weather (25°C Haze), search, and system icons (network, volume, battery). The system clock indicates 11:40 AM on 27-Nov-22.

Login:



Main interface:



Student Details:

The screenshot displays a web application interface for a face recognition system. The interface is divided into two main sections: 'Students details' and 'Students Attendance Search'.

Students details:

- Current Course Information:** Department: Software Engineering, Course: Math, Year: 2022, Semester: Fourth Semester.
- Student's Information:** Student's id: 191-35-2809, Name: Shakil Anower, Section: A, Gender: Male, Email: ki35-2809@diu.edu.bd, mobile: 01537439055.
- Buttons: Save, Update, Delete, Reset, Take Photo Sample, Update Photo Sample.

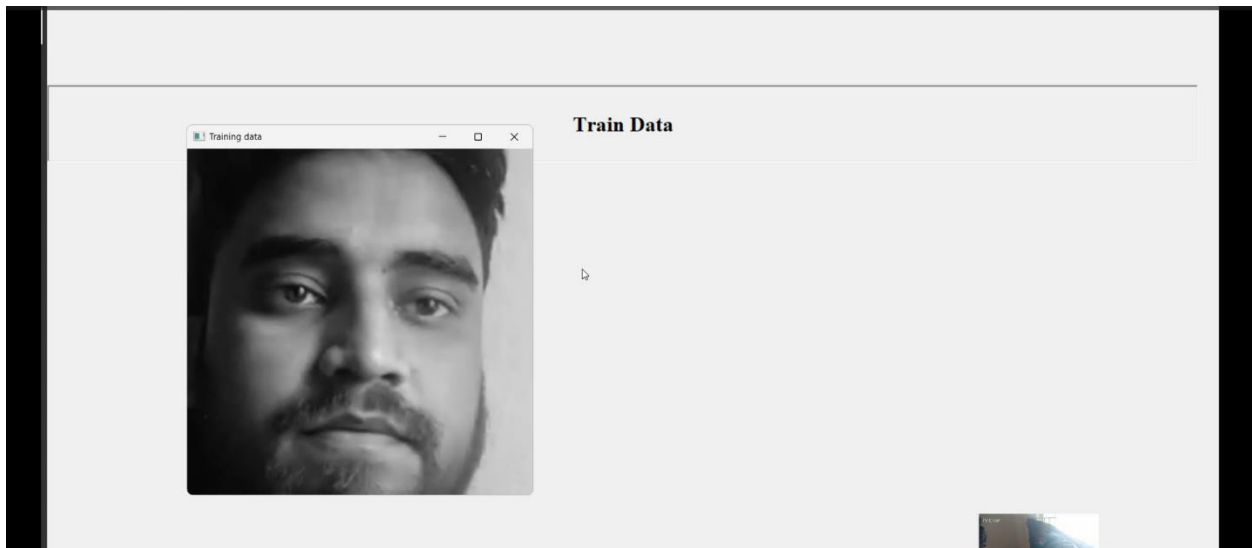
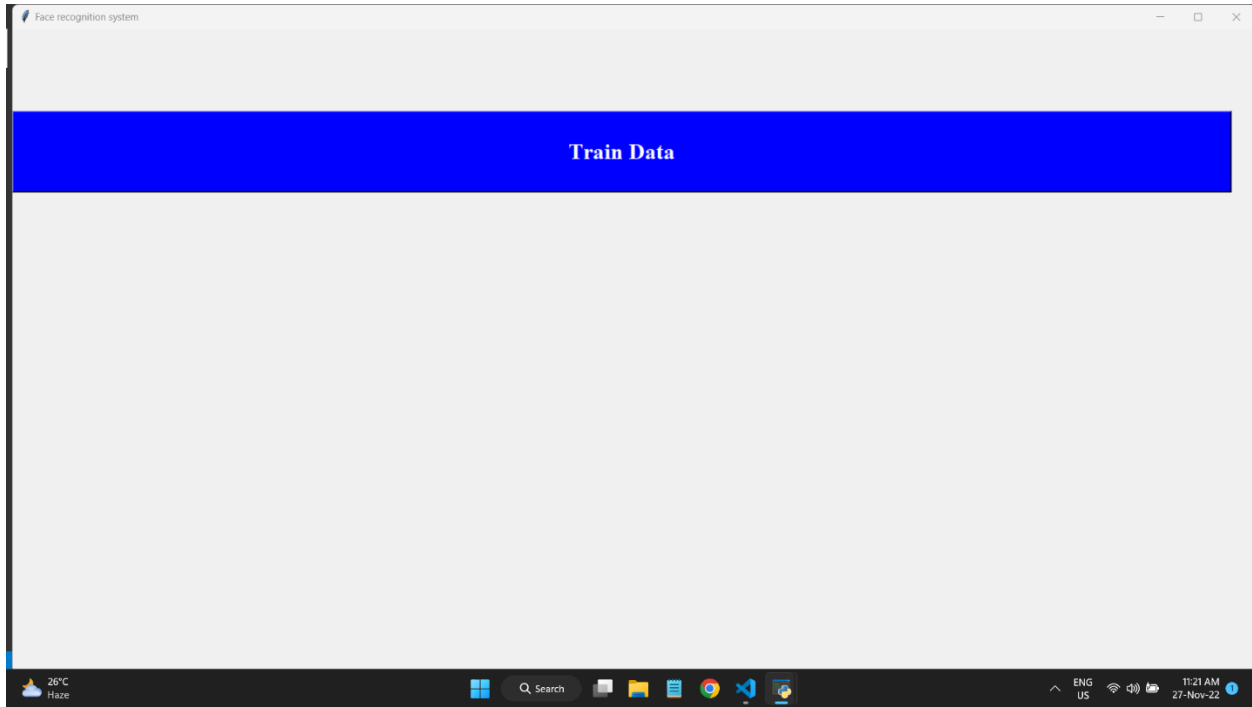
Students Attendance Search:

- Search System:** Search by: Select, Search, Show All.
- Table:**

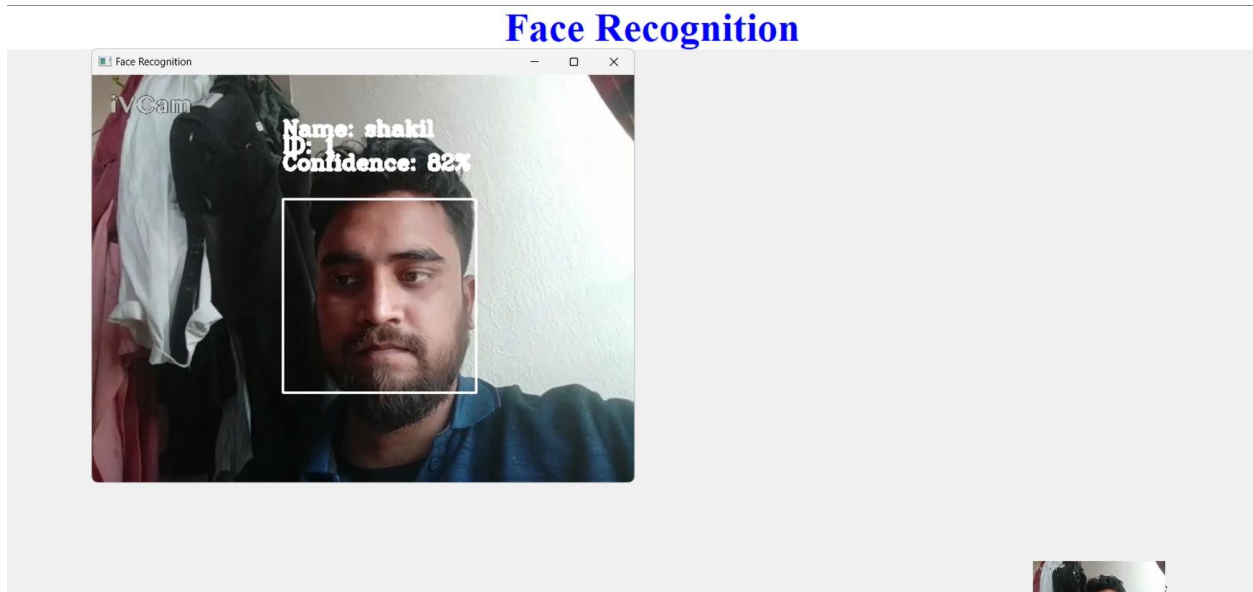
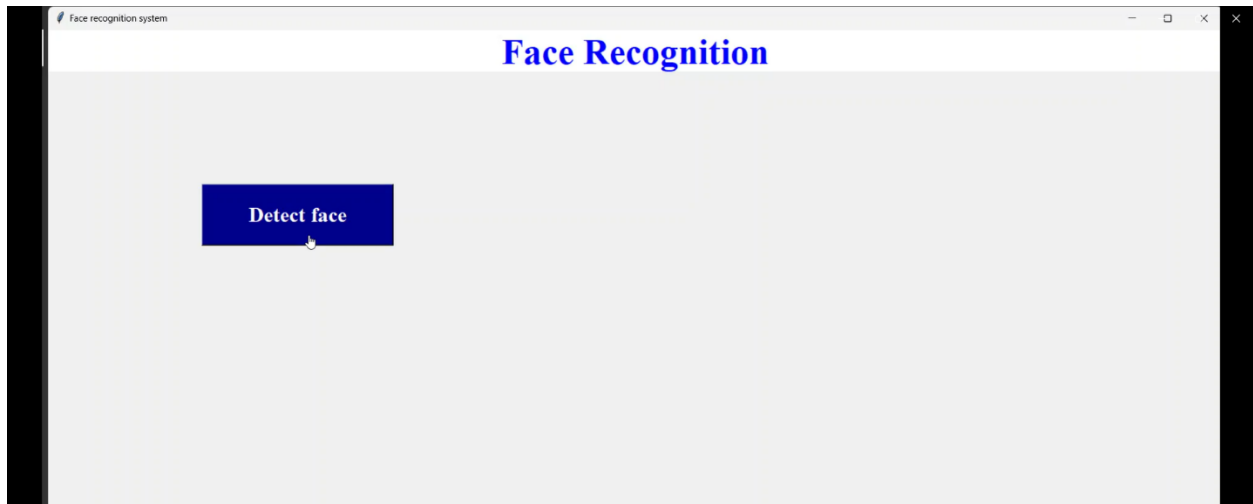
Student's id	Name	Department	Section	Course	Semester
1	s	Software Enginee	a	Math	First Semester
191-35-2809	Shakil Anower	Software Enginee	A	Math	Fourth Semester

The application is running in a browser window titled 'Face recognition system'. The Windows taskbar at the bottom shows the date as 27-Nov-22 and the time as 11:24 AM.

Training image Interface:



Face Recognition Interface:



Student's Attendance Details:

The screenshot displays a web application window titled "Face recognition system" with a main heading "Attendance Details". The interface is divided into two main sections: "Students details" and "Students Attendance".

Students details section contains a form with the following fields and controls:

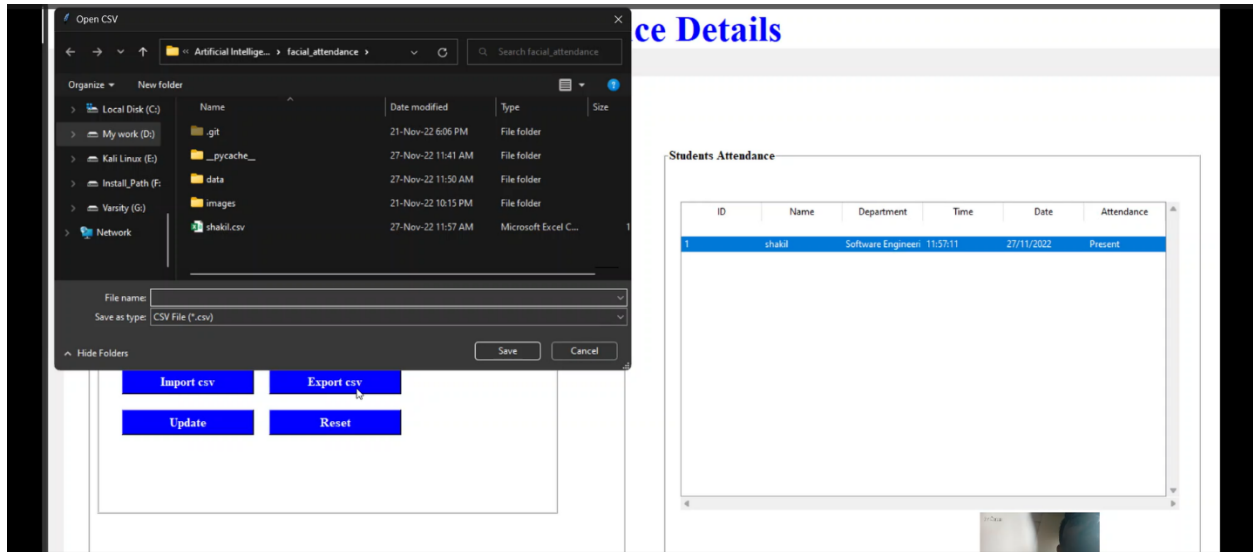
- Student's id:
- Name:
- Department:
- Time:
- Date:
- Attendance:
- Buttons: Import csv, Export csv, Update, Reset

Students Attendance section displays a table with the following data:

ID	Name	Department	Time	Date	Attendance
1	shakil	Software Engineeri	11:57:11	27/11/2022	Present
2	rifat	Pharmacy	12:00:22	27/11/2022	Present

The Windows taskbar at the bottom shows the system tray with weather (26°C Haze), search, and system icons (network, volume, battery, date/time: 12:01 PM 27-Nov-22).

Import or Export Attendance csv file:



The screenshot displays a web application interface. On the left, a file explorer window titled 'Open CSV' is open, showing the contents of a folder named 'facial_attendance'. The file list includes folders like '.git', 'data', and 'images', and a file named 'shakil.csv'. Below the file explorer, there are four blue buttons: 'Import csv', 'Export csv', 'Update', and 'Reset'. On the right, a section titled 'Attendance Details' contains a table with the heading 'Students Attendance'. The table has columns for ID, Name, Department, Time, Date, and Attendance. One row is visible with the following data:

ID	Name	Department	Time	Date	Attendance
1	shakil	Software Engineer	11:57:11	27/11/2022	Present

Attendance Details can be Modified:

Attendance Details

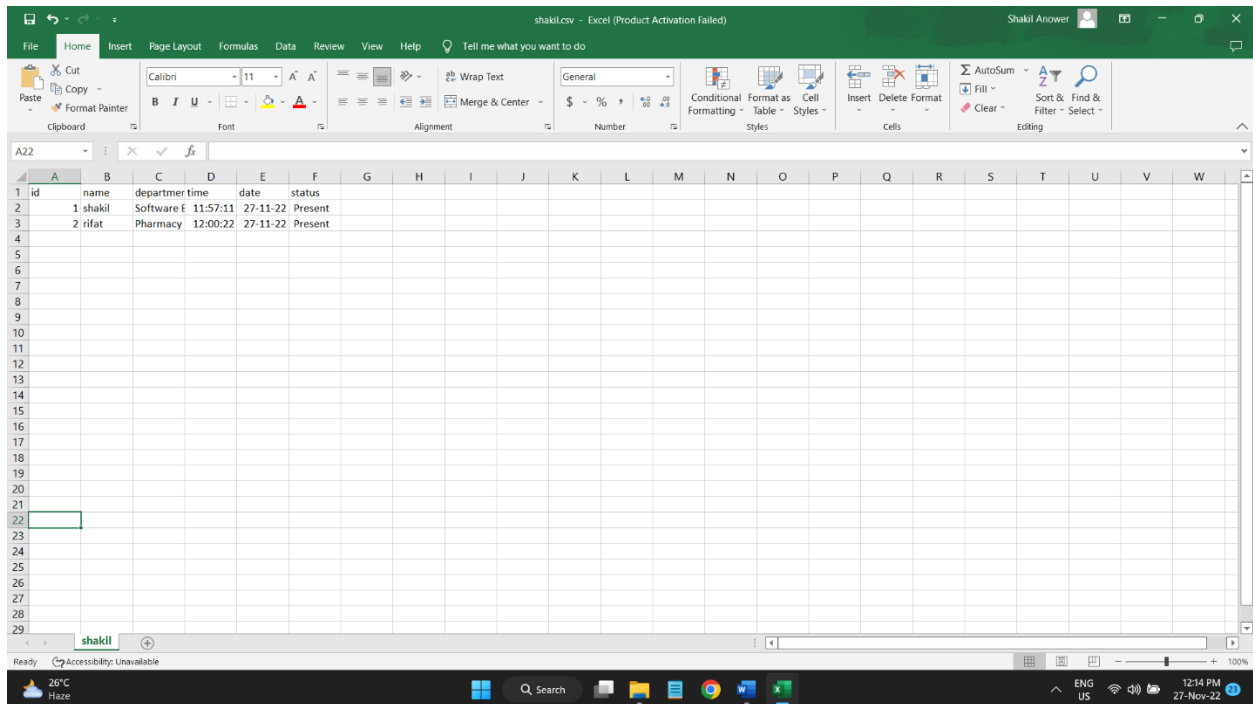
Students details

Student's id	<input type="text" value="1"/>	Name	<input type="text" value="shakil"/>
Department	<input type="text" value="Software Engineering"/>	Time	<input type="text" value="11:57:11"/>
Date	<input type="text" value="27/11/2022"/>		
Attendance	<input type="text" value="Present"/>		

Students Attendance

ID	Name	Department	Time	Date	Attendance
1	shakil	Software Engineer	11:57:11	27/11/2022	Present

Students Attendance History in CSV file:



The screenshot shows a Microsoft Excel spreadsheet with the following data:

id	name	departmer	time	date	status
1	shakil	Software E	11:57:11	27-11-22	Present
2	rifat	Pharmacy	12:00:22	27-11-22	Present

The spreadsheet is titled 'shakil.csv' and is open in the 'Home' tab. The data is located in rows 2 and 3 of the spreadsheet. The columns are labeled 'id', 'name', 'departmer', 'time', 'date', and 'status'. The status for both students is 'Present'.

Tools and Technology:

Operating System	Windows 11
Framework	TkInter
Back End	Python
Code Editor	Visual Studio Code
Database	MySQL
Drawing Tools	Visual Paradigm Online

Limitation:

- Message alert is not available
- Registration Email verification is not available

Project summery:

“Students attendance system using computer vision” types of technology is not being used in our country broadly. As a digital Bangladesh we have to make our educational institute digital. My project helps teachers to make attendance by using real-time camera.

At first student’s pictures will be taken for train model. Then when students come classroom camera can automatically take attendance by recognizing students face. After that, the data will be saved in excel file. This file also can be download.