

Department of Computer Science & Engineering

PROJECT FILE

TITLE: “FACE RECOGNITION ATTENDANCE SYSTEM”

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*in partial fulfilment for the award of the degree
of*



BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE ENGINEERING

AT

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COLLEGE OF ENGINEERING,

**LANDRAN, MOHALI,
DECEMBER 2022**

CERTIFICATE

I hereby certify that the work which is being presented in the B.Tech. Major Project Report entitled “**FACE RECOGNITION ATTENDANCE SYSTEM**”, in partial fulfillment of the requirements for the award of the **Bachelor of Technology in Computer Science & Engineering** and submitted to the Department of Computer Science & Engineering of CGC-College of Engineering Landran, Mohali Punjab is an authentic record of my own work carried out during a period from **September 2022 to December 2022** under the supervision of **Dr. Kapil Mehta, Department of CSE.**

The matter presented in this Project Report has not been submitted by me for the award of any other degree elsewhere.

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This is to certify that the above statement made by the “Utkarsh Kumar Singh” and “Tarundeep” is correct to the best of my knowledge.

December 2022

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I would like to express my gratitude towards my parents for their kind co-operation and encouragement which helped me in completion of this project.

My thanks and appreciation also go to my friends in developing the project.

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ABSTRACT

We are living in a world where everything is automated and linked online. The internet of things, image processing, and machine learning are evolving day by day. Many systems have been completely changed due to this evolve to achieve more accurate results. The attendance system is a typical example of this transition, starting from the traditional signature on a paper sheet to face recognition. This Project proposes a method of developing a comprehensive embedded class attendance system using facial recognition with showing whether the face of the person is the student for that specified class or not.

The system is based on the machine learning algorithm which is to be implemented on python language and using computer/laptop camera for the input image of the students or a normal outer camera can also be used which has to be connected to the system which is programmed to handle the face recognition by implementing the Local Binary Patterns algorithm LBPs.

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INTRODUCTION

To maintain the attendance record with day-to-day activities is a challenging task. The conventional method of calling name of each student is time consuming and there is always a chance of proxy attendance. The following system is based on face recognition to maintain the attendance record of students. The daily attendance of students is recorded subject wise which is stored already by the administrator. As the time for corresponding subject arrives the system automatically starts taking snaps and then apply face detection and recognition technique to the given image and the recognize students are marked as present and their attendance update with corresponding time and subject id. We have used deep learning techniques to develop this system, histogram of oriented gradient method is used to detect faces in images and deep learning method is used to compute and compare feature facial of students to recognize them.

Our system is capable to identify multiple faces in real time. The main objective of this project is to develop face recognition based automated student attendance system. In order to achieve better performance, the test images and training images of this proposed approach are limited to frontal and upright facial images that consist of a single face only. The test images and training images have to be captured by using the same device to ensure no quality difference. In addition, the students have to register in the database to be recognized. The enrolment can be done on the spot through the user-friendly interface.

According to the previous attendance management system, the accuracy of the data collected is the biggest issue. This is because the attendance might not be recorded personally by the original person, in another word, the attendance of a particular person can be taken by a third party without the realization of the institution which violates the accuracy of the data. For example, student A is lazy to attend a particular class, so student B helped him/her to sign for the attendance which in fact student A didn't attend the class, but the system overlooked this matter due to no enforcement practiced. Supposing the institution establish an enforcement, it might need to waste a lot of human resource and time which in turn will not be practical at all. Thus, all the recorded attendance in the previous system is not reliable for analysis usage. The second problem of the previous system is where it is too time consuming. Assuming the time taken for a student to sign his/her attendance on a 3-4 paged name list is approximately 1 minute. In 1 hour, only approximately 60 students can sign their attendance which is obviously inefficient and time consuming. The third issue is with the accessibility of those information by the legitimate concerned party. For an example, most of the parents are very concerned to track their child's actual whereabouts to ensure their kid really attend the classes in college/school. However, in the previous system, there are no ways for the parents to access such information. Therefore, evolution is needed to be done to the previous system to improve efficiency, data accuracy and provides accessibility to the information for those legitimate party.

OBJECTIVE

The aim is though many people want to further their education, it can be difficult to commit to traditional courses. The online learning platform allows learners to dip in and out at times that suit them. Learners can also engage with an online education platform wherever they are, on whatever digital device is available to them.

To identify the student faces accurately. To mark the attendance automatically. To reduce the time and the efforts required for manual attendance to provide a valuable attentive system for both teacher and students. It provides flexibility and reduces the time loss. There will be no chance for a proxy.

The objective of this project is to develop face recognition based automated student attendance system. Expected achievements in order to fulfill the objectives are:

- To detect the face segment from the video frame.
- To extract the useful features from the face detected.
- To classify the features in order to recognize the face detected.
- To record the attendance of the identified student.

TECHNOLOGIES USED

- 1) **Python:** Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built-in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse.

The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

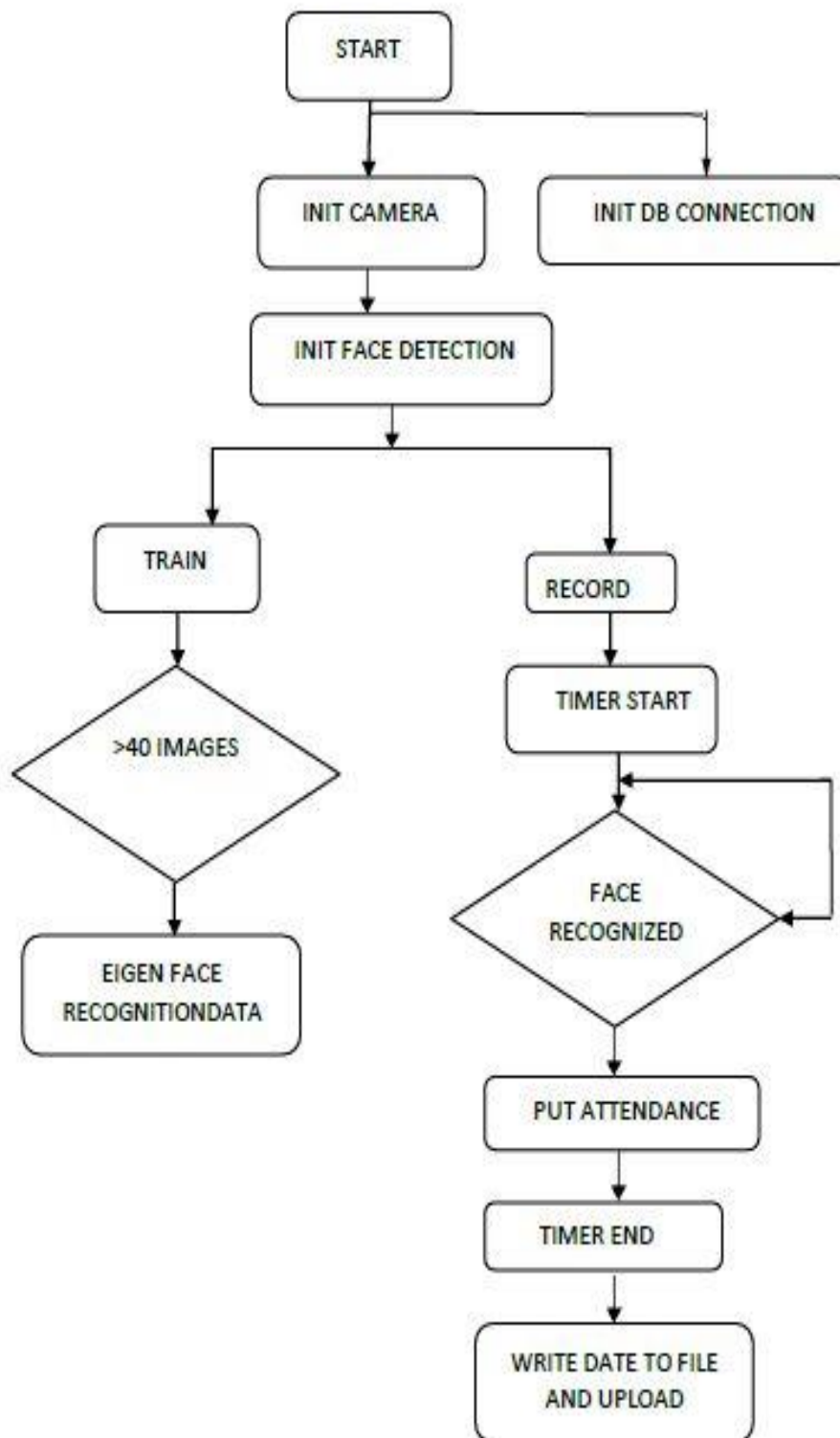
- 2) **OpenCV:** OpenCV is a huge open-source library for computer vision, machine learning, and image processing. OpenCV supports a wide variety of programming languages like Python, C++, Java, etc. It can process images and videos to identify objects, faces, or even the handwriting of a human. When it is integrated with various libraries, such as NumPy which is a highly optimized library for numerical operations, then the number of weapons increases in your Arsenal i.e., whatever operations one can do in NumPy can be combined with OpenCV.
- 3) **Tkinter:** Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is the most commonly used method. It is a standard Python interface to the Tk GUI toolkit shipped with Python. Python with tkinter is the fastest and easiest way to create the GUI applications. Creating a GUI using tkinter is an easy task.
- 4) **Pandas:** Pandas is an open-source library that is made mainly for working with relational or labeled data both easily and intuitively. It provides various data structures and operations for manipulating numerical data and time series. This library is built on top of the NumPy library. Pandas is fast and it has high performance & productivity for users.
- 5) **NumPy:** NumPy is a general-purpose array-processing package. It provides a high-performance multidimensional array object, and tools for working with these arrays. It is the fundamental package for scientific computing with Python. It is the library of python that provide vast mathematical functions that we can implement in our program.

6) **Django:** Python Django is a web framework that allows to quickly create efficient web pages. Django is also called batteries included framework because it provides built-in features such as Django Admin Interface, default database – SQLite3, etc. When you're building a website, you always need a similar set of components: a way to handle user authentication (signing up, signing in, signing out), a management panel for your website, forms, a way to upload files, etc. Django gives you ready-made components to use.

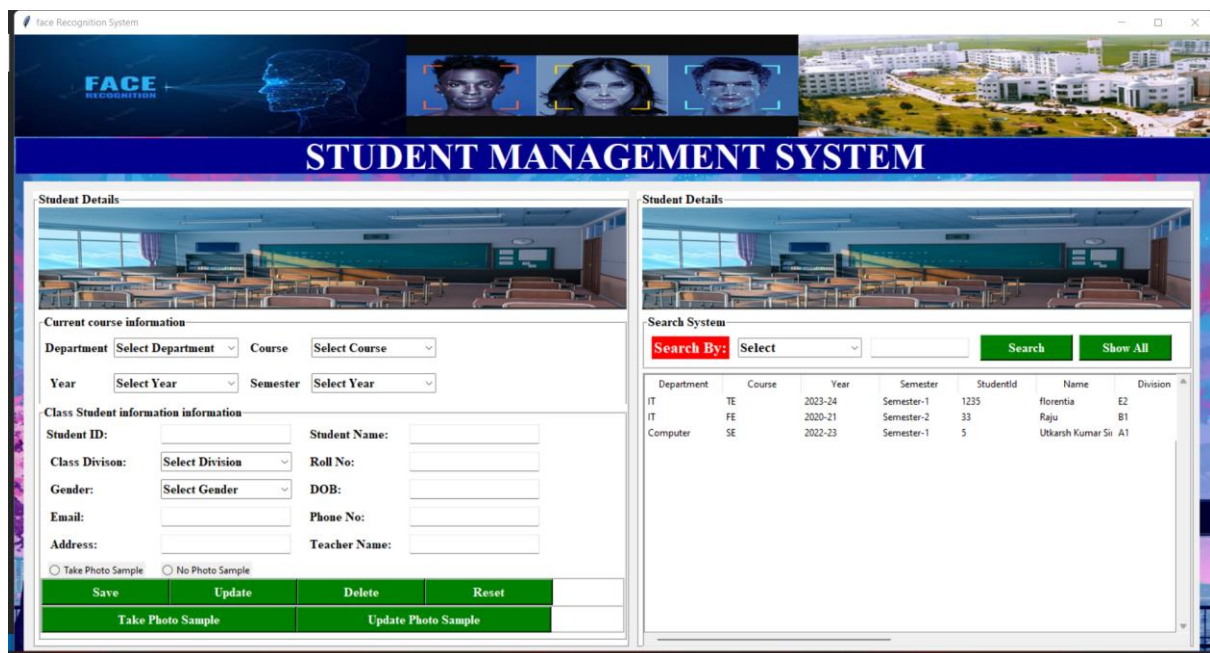
7) **Dlib:** Dlib is one of the most powerful and easy-to-go *open-source library* consisting of machine learning library/algorithms and various tools for creating software. It was initially released in 2002. It has been used widely in many big industries, companies and for various big projects, etc. It also has many more types of algorithms that have a greater role in the real world.

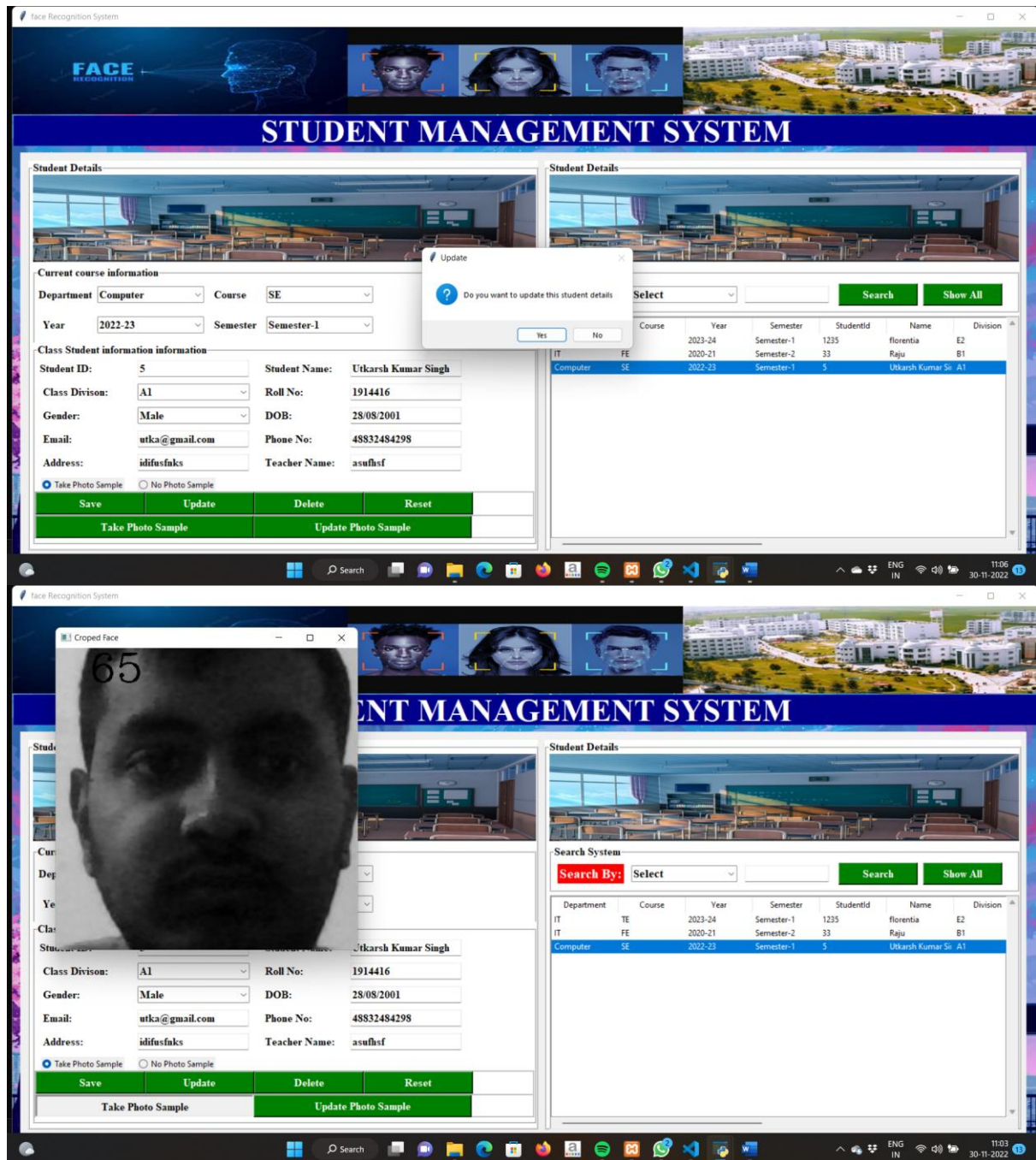
Dlib is mostly used for face recognition purposes. They analyzed the object/face using the functions called HOG (Histogram of oriented gradients) and CNN (Convolutional Neural Networks). Face recognition nowadays are been used widely in many applications.

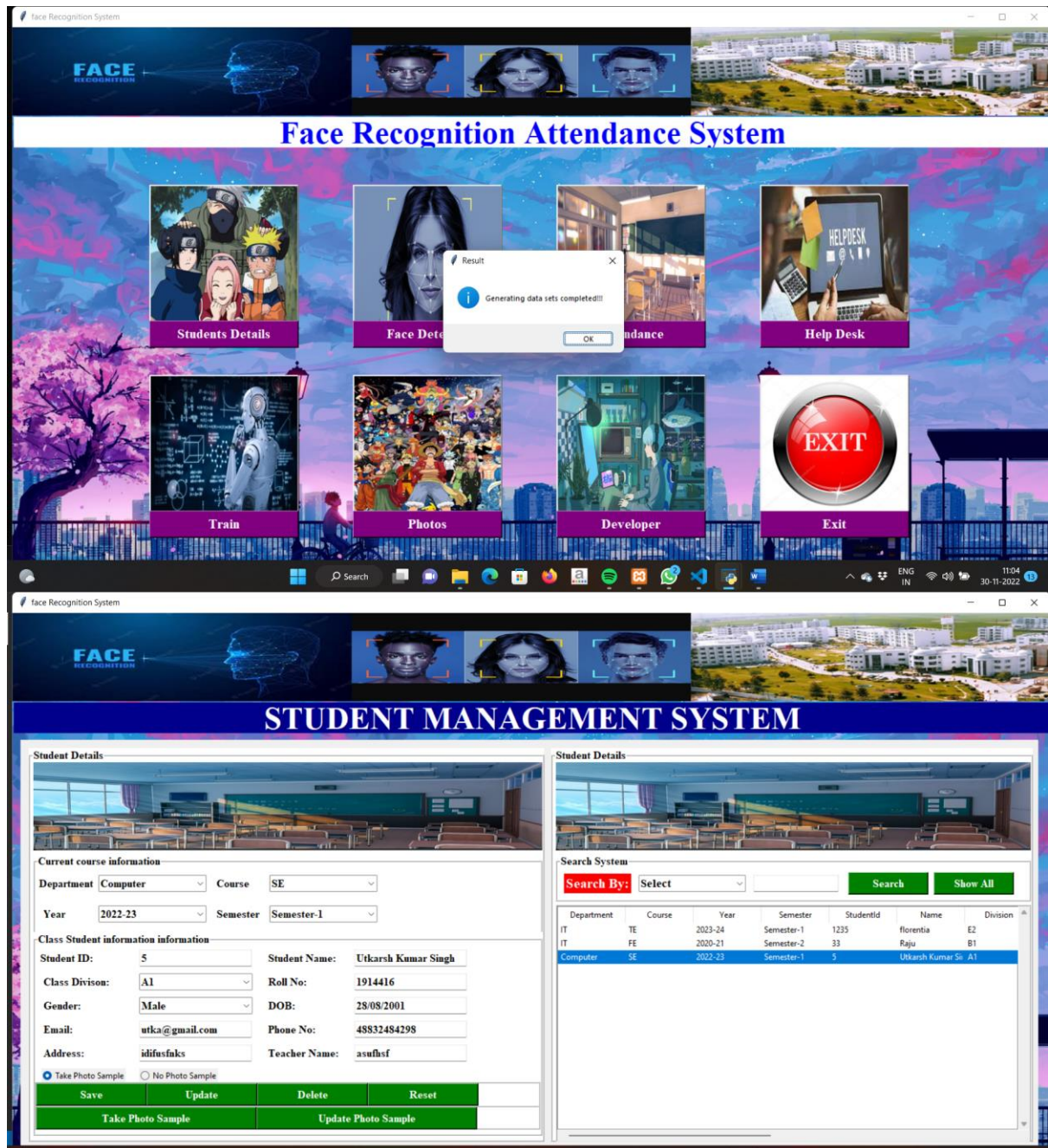
FLOWCHART

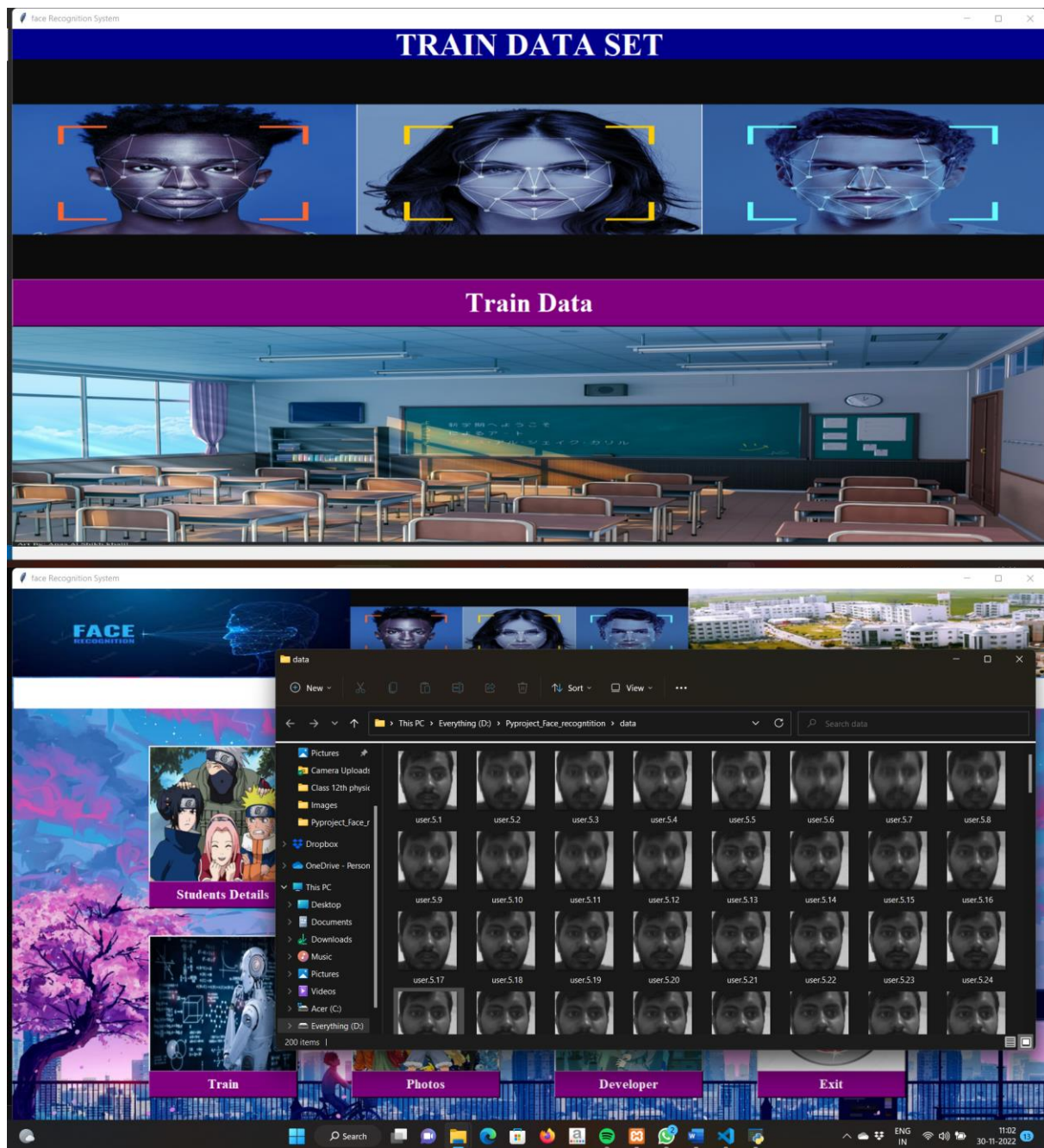


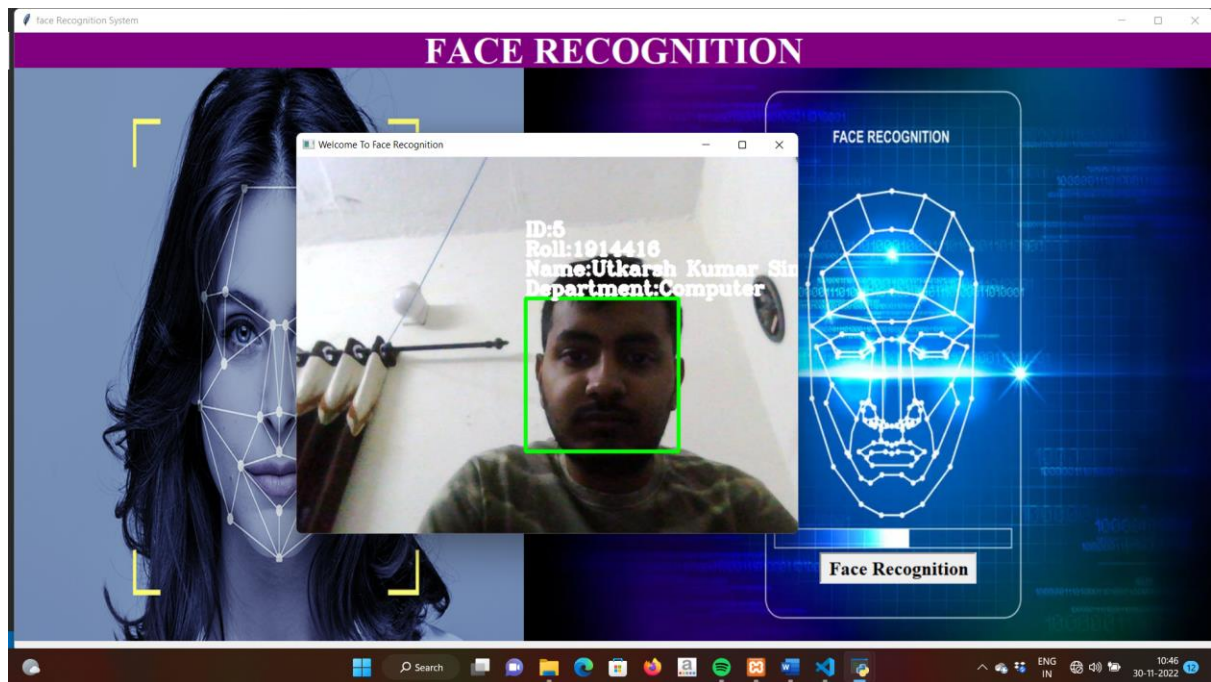
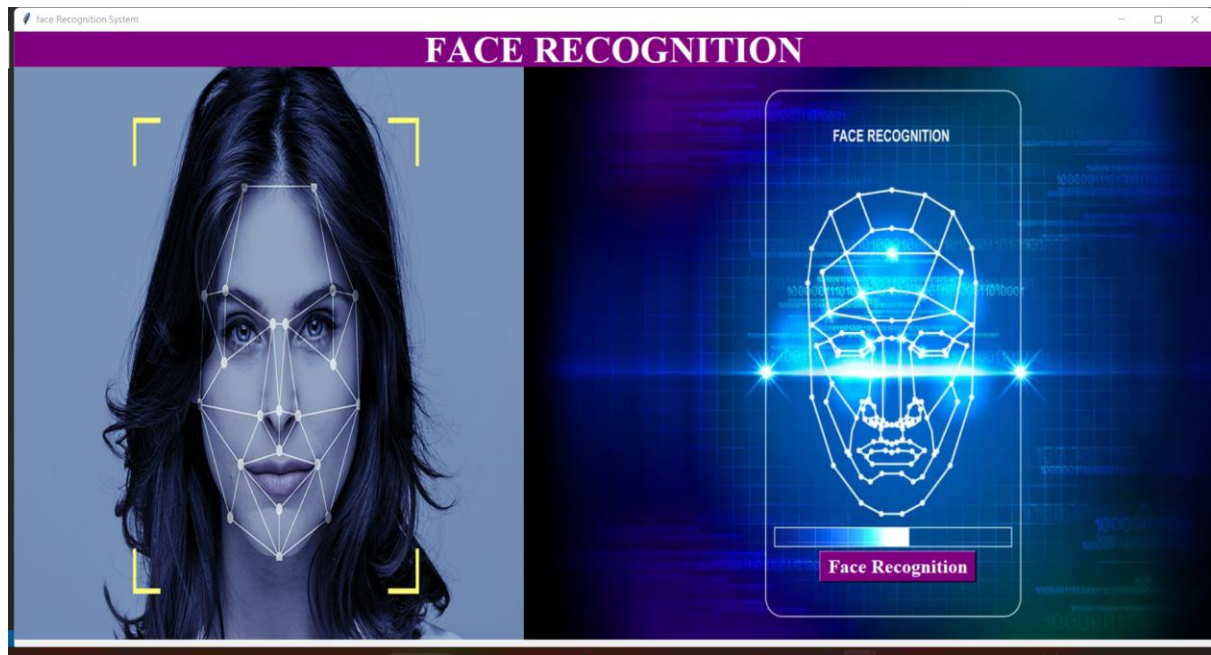
RESULTS













Applications /Social Benefits:

With facial recognition attendance systems, the monitoring of entry and exit times can be completely automated. The system can locate and identify faces using advanced algorithms without human intervention or physical verification. Facial recognition automates employee timekeeping.

This Technology can be useful in following sectors:

- ❖ To verify identities in Government organizations.
- ❖ Enterprises.
- ❖ Attendance in Schools and colleges.
- ❖ To detect fake entries at international borders.
- ❖ Industries.

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