SOFTWARE REQUIREMENTS SPECIFICATION

for

Advance Attendance System

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1 Introduction

1.1 Purpose

The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institutions to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that causes inaccurate and inefficient attendance taking. Many problems arise when the authority is unable to enforce the regulations that exist in the old system. The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low. In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically, saving necessary information into a record.

1.2 Scope

The main intention of this project is to solve the issues encountered in the old attendance system while reproducing a brand new innovative smart system that can provide convenience to the institution. In this project, an application will be developed which is capable of recognising the identity of each individual and eventually record down the data into a database system.

1.3 Technologies to be used

1. LBPH algorithm: Local Binary Pattern (LBP) is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighborhood of each pixel and considers the result as a binary number. Using the LBP combined with histograms we can represent the face images with a simple data vector.

2. Haarcascades: Haar Cascade is a machine learning-based approach where a lot of positive and negative images are used to train the classifier. Haar cascade is an algorithm that can detect objects in images, irrespective of their scale in image and location. This algorithm is not so complex and can run in real-time.

3. Object Detection: Object detection is a computer technology related to computer vision and image processing that deals with detecting instances of semantic objects

of a certain class (such as humans, buildings, or cars) in digital images and videos. Well-researched domains of object detection include face detection and pedestrian detection. Object detection has applications in many areas of computer vision, including image retrieval and video surveillance.

4. Tkinter: Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit.

1.4 Overview

"Advance Attendance System" is Web Application developed for maintaining the attendance of the student on the daily basis in the college. Taking and tracking students' attendance manually, losing attendance sheets, dishonesty, wasted time and high error scales are problems facing the lecturers use the existing attendance system. It is a hard process, takes time and cause a lot of paper-based work. As a result, in order to solve these problems and avoid errors we suggest computerizing this process by providing a system that records and manages students' attendance automatically without needing lecturers' interference. To overcome this Scenario, we can design a face recognition-based attendance monitoring system for educational institutions to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The proposed system is a software system which will mark attendance using facial recognition. In this project we used OpenCV module integrated with Python which will help the institution to make the attendance process easy and efficient.

2 Overall Description

2.1 Product Perspective

To overcome this Scenario, we can design a face recognition-based attendance monitoring system for educational institutions to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The proposed system is a software system which will mark attendance using facial recognition. In this project we used OpenCV module integrated with Python which will help the institution to make the attendance process easy and efficient.

2.2 User Classes and Characteristics

"Advance Attendance System" has basically 2 types of users.

- Student

- Teachers

2.3 Product Functions

Face recognition is a biometric method of identifying an individual by comparing live capture or digital image data with the stored record for that person. Face recognition attendance system is a marking of attendance based on this technology. Face recognition attendance system makes use of facial recognition technology to identify and verify a person and mark attendance automatically. Face recognition systems have led to the advancement of multimedia information access. Also, implementing network access control via face recognition not only makes it virtually impossible for hackers to steal a user's password but also improves human-computer interaction. This is one of the reasons why facial recognition attendance systems are gaining popularity.

2.4 Constraints

The Internet connection is a constraint for the application. Since the application fetches data from the server over the Internet, it is crucial that there is an Internet connection for the application to function.The web portal will be constrained by the capacity of the database. Since the database is shared with the larger system, it may be forced to queue

incoming requests and as a result,increase the time it takes to fetch data.The computers must be equipped with web browsers such as Internet explorer.All Python code shall conform to the Python Code Convention standards.The Camera which is detecting the face is working properly guidelines, including data protection and privacy regulations.

2.5 Assumptions And Dependencies

Every system requires some certain parameters to work, to work as per the requirement,our system also requires some parameters, and we assume them as fulfilled before using this system, which is as:To develop a portable Smart Attendance System which is handy and self-powered.Software is dependent on access to the Internet, as it is a remote application, it is necessary to have internet access.The system is required to save the generated reports.The Application is fully dependent on the data which is fetched by the camera.

3 External Interface Requirements

3.1 Hardware Interfaces

1. Laptop with 4gb RAM or above

2. Camera 720p or above.

3.2 Software Interfaces

1. Python del 3.7 version

2. Visual Studio Code

3. Tkinter

3.3 Functional Requirements

Functional requirements outline what the system should do and support the user activities in performing and completing tasks by using the proposed system. The list below shows the functional requirements of this project:-

1. The system will be able to detect a human face from an image.

2. The system will be able to recognize faces based on existing data.

3. The system must be able to identify the students and mark them as attended.

4. The system must be able to update the attendance database based on attended students.

5. The system will only take attendance of the class based on when activated to do so.

3.4 Non-Functional Requirements

3.4.1 Performance Requirements

1. The performance of the system should be optimized based on users' device and related running environment. The response of the system should be reasonable time-based Internet speed and hardware related factors.

2. The system must respond to users' operations depending on the hardware of users' devices and running speed.

3. The system must respond to any actions operated by the user in a visible way.

3.4.2 Design Constraints

In the implementation process of this system, Python Programming Language will be the main development language. Since Python is selected to be the main development language, Python Programming Language Code Convention published by Oracle is chosen as a standard for the development process of the system. In the process of the documentation of the system, IEEE standards will be used and UML standards will be used while designing the diagrams.Since this system will be a part of a much larger system, it must be portable to this larger system. That's why portability is one of the most important attributes of this system.

3.4.3 Security

Since the images of students are quite sensitive and involve personal privacy, the system aims to use this information in a safe way. The security of the system is separate to information interaction and information storage.

3.4.4 Usability

The usability non-functional requirements relate to how easy for users to learn about a product's usage, and how effective they are at achieving tasks once they have understood it and how multiple errors they make when they use the product. Here are some aspect describing the usability requirements:

1. Understandability: The system shall be usable, and the interface must be easy to understand.

2. Efficiency: The system should be efficient for everyday use.

3. Learnability: The system shall be easy to learn for both trainees and qualified users of similar systems.

4 Behavioral Model and Description

This subsection describes the major events and states of our software. recommendations. First of all, students will need to register in the application and then the camera will take the photos samples of students after that admin will manage and train all the student data . Admin will login the system and according to the detection of face it will mark the attendance of the students and if no match is found it will show an unknown face. Admin can also view the records and import/export attendance. This is a very basic and working project on face recognition attendance system.
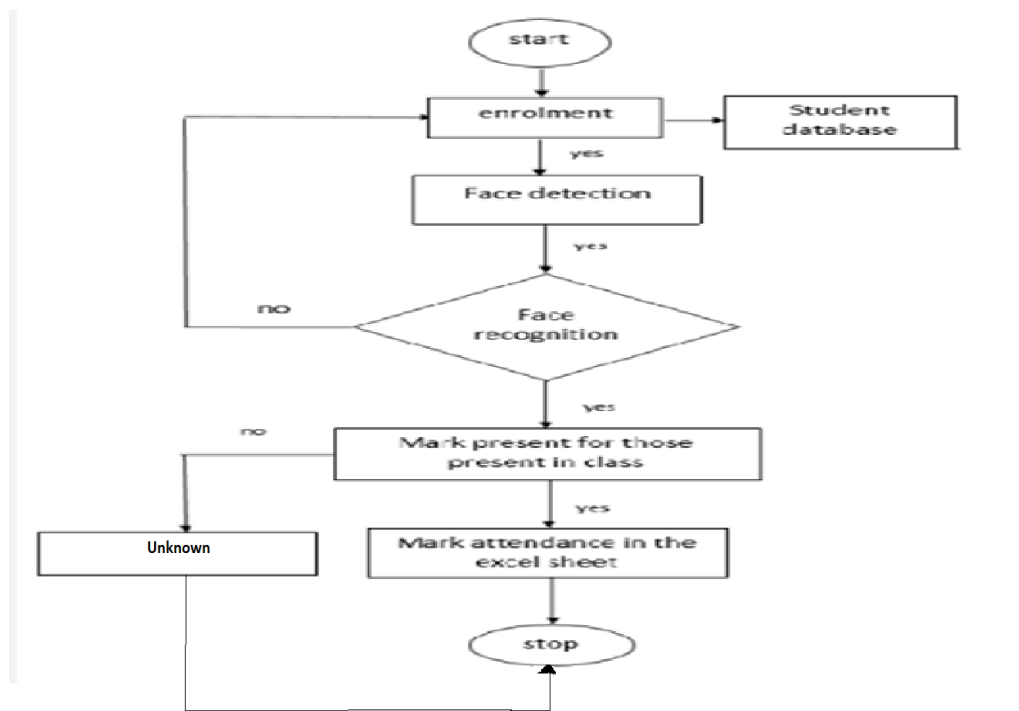
4.1 State Transition Diagram

Figure 4.1: State Transition Diagram
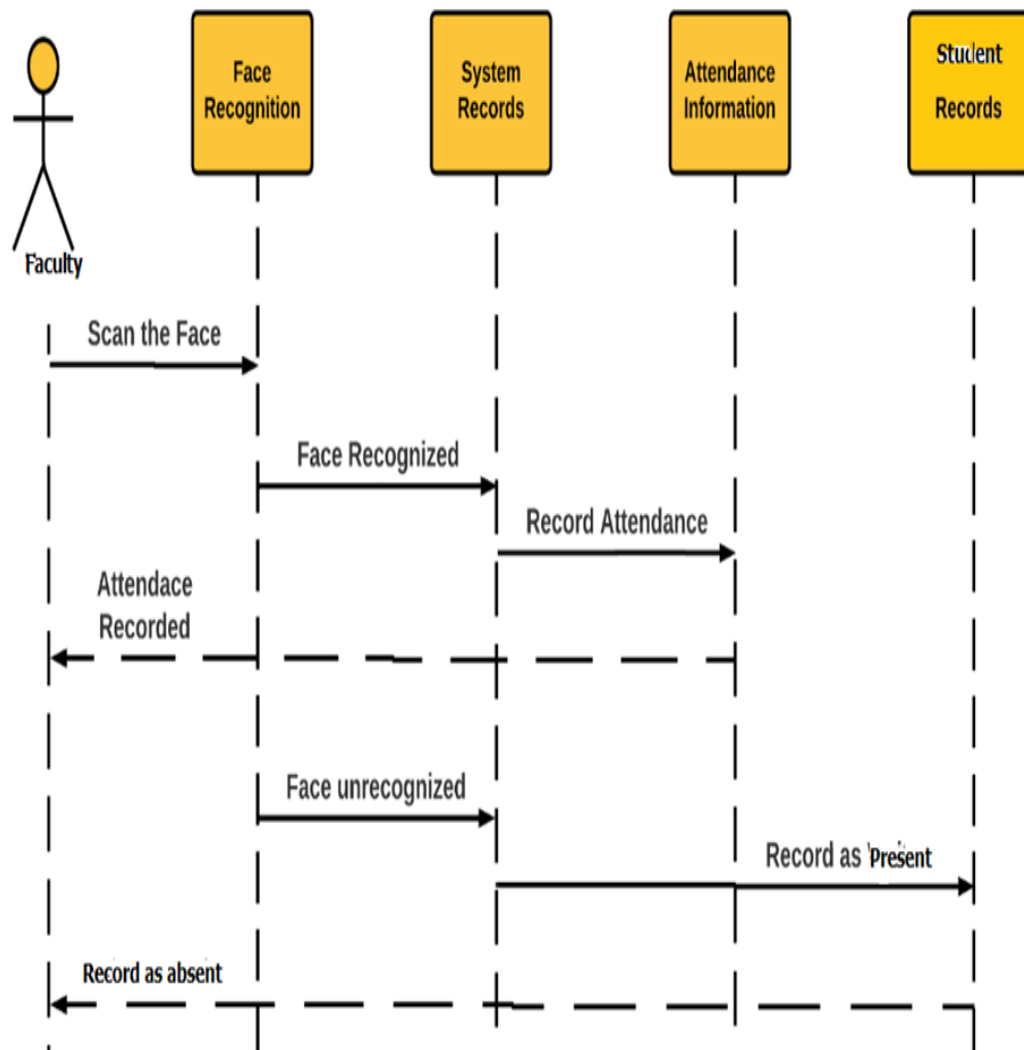
8

4.2 Sequence Diagram

Figure 4.2: Sequence Diagram

4.3 Data Flow Diagram
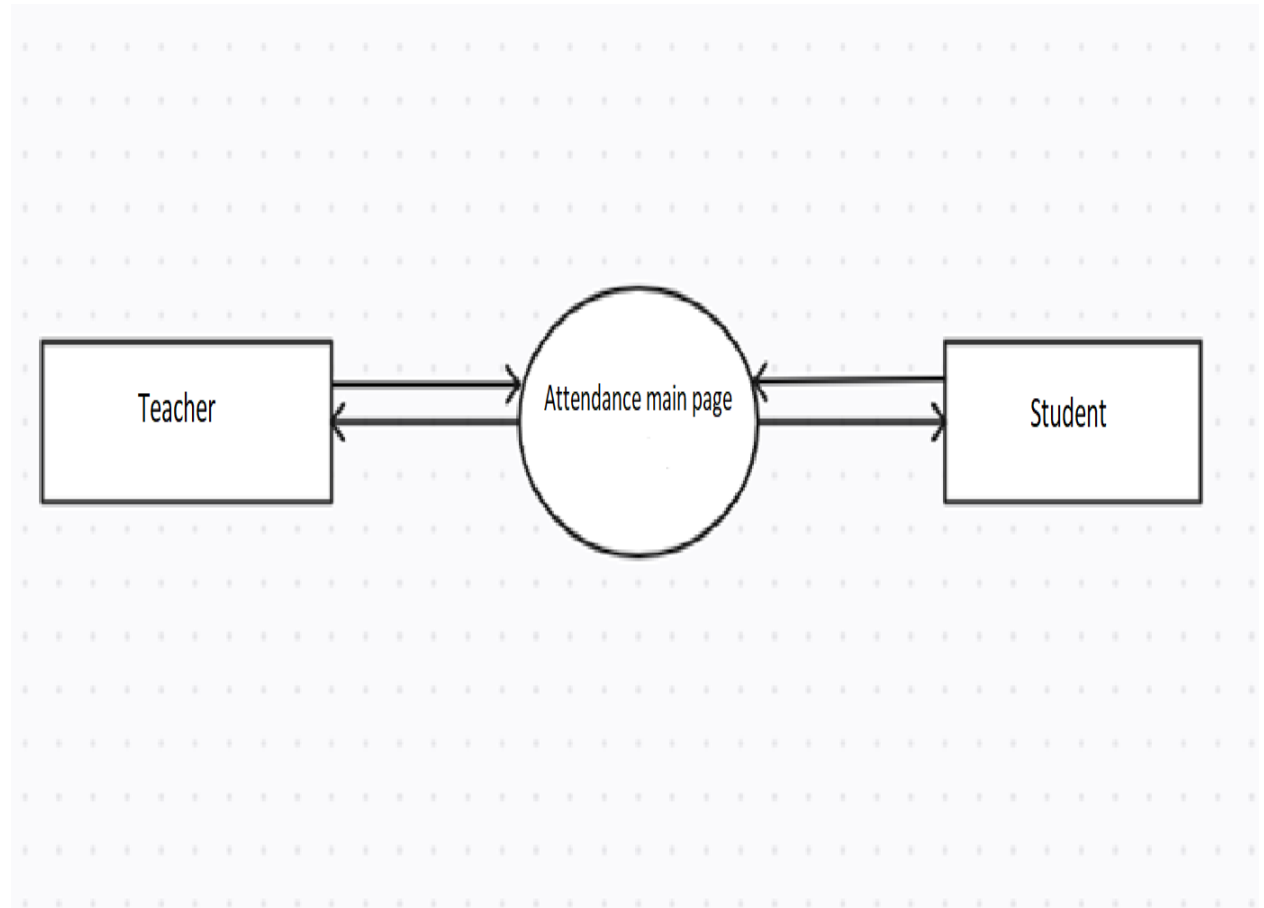
4.3.1 Level 0 Data Flow Diagram

Figure 4.3: Level 0 Data Flow Diagram

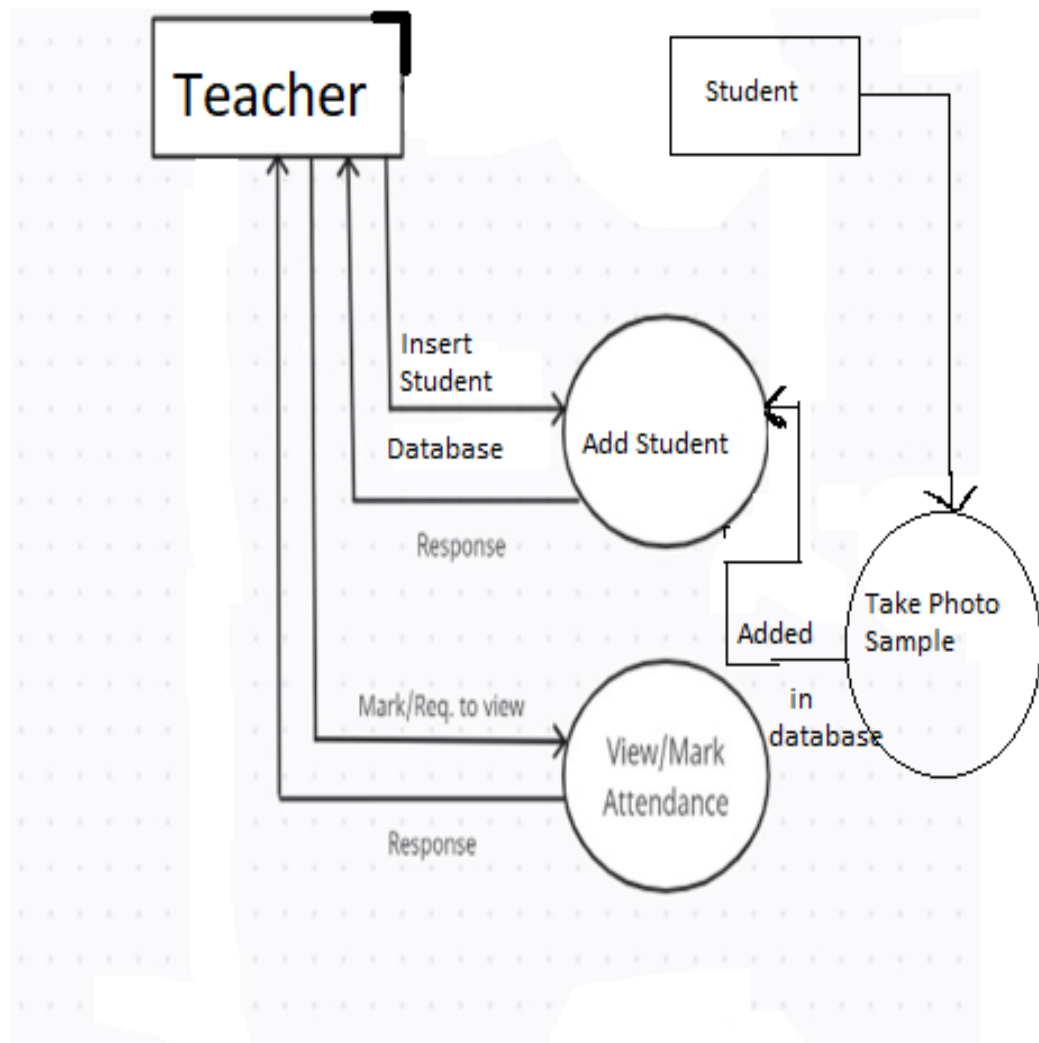### 4.3.2 Level 1 Data Flow Diagram

Figure 4.4: Level 1 Data Flow Diagram
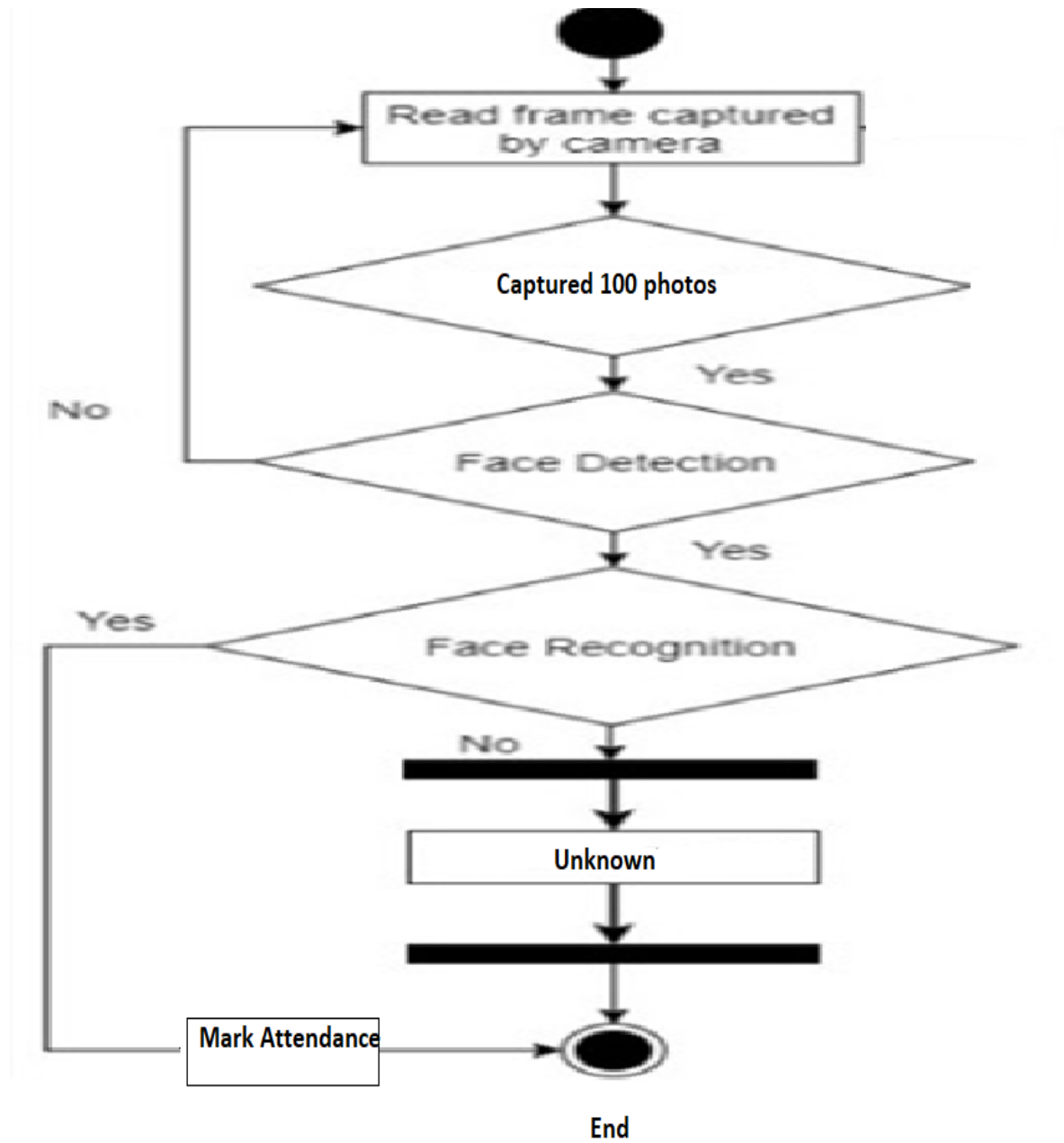
4.4 Activity Diagram

Figure 4.5: Activity Diagram

5 Future Scope

The project has a very vast scope in future. The project can be implemented on intranet in future. Project can be updated in near future as and when requirement for the same arises, as it is very flexible in terms of expansion. With the proposed software of database Space Manager ready and fully functional the client is now able to manage and hence run the entire work in a much better, accurate and error free manner.
The following are the future scope for the project.

1. Discontinuation of particular students eliminates potential attendance.

2. Bar code Reader based attendance system.

3. Individual Attendance system With photo using Student login.

6 References

As the Internet is an Ocean of knowledge, we, too, have been helped by the same inter network of systems. We've referenced from many sites to get Information and to understand the current scenario of the market, below are the references which helped us and we acknowledge the same:

1. OpenCV Documentation -https://opencv.org

2. https://www.slideshare.net/VigneshLakshmanan8/smart-attendance-system-using-facial-recognition

3. https://www.academia.edu/42472760/Face_Recognition_Based_Attendance_System

4. https://www.timedynamo.com/blog/face-recognition-attendance-system

5. https://github.com/mansi1021/Advance-Attendance-System.git