HELWAN UNIVERSITY
Faculty of Computers and Artificial Intelligence
Computer Science Department

Education System with Face Recognition and Detection Attendance

A graduation project dissertation by:

[Abdelrahman Essam Eldien Mohamed Mohamed Mohamed Mojazy (201900423)]

[Abdullah Fadhy Sayed Eliwa (201900465)]

[Ali Hassan Ali Haredy (201900486)]

[Omar Abdelhameed Sayed Abdelhameed (201900515)]

[Omar Muhammed Abdullrahman Salem (201900529)]

[Amr Muhammed Shamy Hamza (201900541)]

Submitted in partial fulfilment of the requirements for the degree of Bachelor of Science in Computers & Artificial Intelligence, at the Computer Science Department, the Faculty of Computers & Artificial Intelligence, Helwan University

Supervised by:

[Dr. Ahmed Hesham]

June 2023

Abstract

Problem:

The traditional method of taking attendance in educational institutions is time-consuming, inefficient, and prone to errors. This often results in inaccurate attendance records, which can have negative impacts on both students and educators. Additionally, manual attendance tracking takes away valuable time and resources from teaching and learning.

Objectives:

The objective of this study is to develop a face detection and recognition attendance and education system that can automate the process of taking attendance in educational institutions. The system aims to improve the accuracy and efficiency of attendance tracking and provide valuable insights into student behaviour and engagement.

Methodology:

The face detection and recognition attendance and education system were developed using advanced computer vision algorithms. The system was trained to detect and recognize human faces in real-time, allowing students to mark their attendance by simply facing the camera. The system was also designed to analyse facial expressions and other biometric data to provide insights into student behaviour and engagement.

Achievements:

The developed face detection and recognition attendance and education system has achieved significant improvements in attendance tracking accuracy and efficiency. The system has also provided valuable insights into student behavior and engagement, allowing educators to adjust their teaching methods accordingly. The system has automated the attendance tracking process, freeing up valuable time and resources for teaching and learning. Overall, the system has met the objectives set out for this study and has the potential to significantly enhance the educational experience for both students and educators.

Keywords:

face detection, face recognition, attendance system, education system, computer vision, machine learning.

Acknowledgement:

I would like to express my deep appreciation to Dr. Ahmed Hisham, my supervisor, for his invaluable guidance, support, and encouragement throughout the course of this project. His expertise, insights, and feedback were instrumental in shaping this work and improving its quality.

I would also like to extend my gratitude to the technical support staff at Helwan university, who provided me with the necessary equipment and software to carry out this project. Their support and dedication were critical to the successful completion of this work.

I would also like to acknowledge the contributions of my fellow students, who provided me with inspiration, motivation, and support throughout the project.

I would also like to express my appreciation to the external organizations that provided me with access to their resources and facilities, which were essential to the success of this project.

Finally, I would like to acknowledge the sources of any work that is not my own and to express my gratitude for the contributions of the authors whose work I have referenced in this study.

In conclusion, I extend my heartfelt thanks and appreciation to Dr. Ahmed Hisham, the technical support staff, my fellow students, and the external organizations who have helped me in this project. Their contributions have been invaluable and

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Chapter 1: Introduction

Attendance tracking is an essential aspect of the educational system, and the traditional methods of recording attendance are often time-consuming and inefficient. To address this issue, we have developed a face detection and recognition attendance and education system that utilizes advanced computer vision algorithms to automate the attendance tracking process. The system can detect and recognize human faces in real-time, allowing students to mark their attendance simply by facing the camera. It also analyses facial expressions and other biometric data to provide insights into student behaviour and engagement.

1.1 Overview:

The face detection and recognition attendance and education system developed in this project can detect and recognize human faces in real-time, allowing students to mark their attendance simply by facing the camera. The system analyses biometric data and facial expressions to provide valuable insights into student behaviour and engagement. The system's development involved the use of advanced computer vision algorithms and machine learning techniques to ensure accurate and efficient attendance tracking.

This dissertation presents the design, development, and implementation of the face detection and recognition attendance and education system to automate the attendance tracking process in educational institutions. The system's performance metrics, including accuracy, efficiency, and usability, are reported, and the implications of its adoption in educational institutions are discussed. The benefits of the system include improved accuracy and efficiency of attendance tracking, reduced administrative workload, and enhanced student engagement and performance.

1.2 Problem Statement:

The traditional methods of attendance tracking in educational institutions are often time-consuming, inefficient, and prone to errors, leading to inaccurate attendance records. These issues can result in problems with student and faculty performance assessment, as well as issues with funding and resource allocation. Therefore, there is a need for an automated attendance tracking system that can improve the accuracy and efficiency of attendance tracking while providing valuable insights into student behaviour and engagement. The face detection and recognition attendance and education system developed in this project aims to address these issues by utilizing advanced computer vision algorithms and machine learning techniques to automate the attendance tracking process.

1.3 Scope of Work:

The scope of work section outlines the different tasks involved in the project. This includes the collection and labeling of a large dataset of facial images, the use of deep learning algorithms to train the system to detect and recognize human faces in real-time, and the evaluation of the system's performance metrics, including accuracy, efficiency, and usability. The section also highlights the potential impact of the system on educational institutions, such as its ability to improve accuracy, reduce administrative workload, enhance student engagement and performance, and ensure the integrity of attendance records.

1.4 Objectives:

The objectives section outlines the goals of the project. This includes designing, developing, and implementing a face detection and recognition attendance and education system that can automate the attendance tracking process in educational institutions. The system aims to improve the accuracy and efficiency of attendance tracking while providing valuable insights into student behavior

and engagement. By clearly stating the objectives, the section establishes a clear direction for the project.

1.5 Report Organization (Structure):

This report is organized into several sections, each of which covers a different aspect of the face detection and recognition attendance and education system. Section 2 provides a literature review of related work in the field of attendance tracking and computer vision. Section 3 describes the methodology used to design, develop, and implement the system, including the dataset collection, deep learning algorithms, and system evaluation. Section 4 presents the results of the system's performance evaluation, including accuracy, efficiency, and usability. Section 5 discusses the implications of the system's adoption in educational institutions, including its potential impact on attendance tracking, student engagement, and overall educational experience. Finally, Section 6 concludes the report by summarizing the main contributions of the project and outlining possible future directions for the research.

1.6 Work Methodology:

The development of the face detection and recognition attendance and education system involved a structured work methodology that included several stages. The first stage was the collection of a large dataset of facial images, which were labelled and used to train the deep learning algorithms. The second stage involved the development of the deep learning algorithms, which were used to detect and recognize human faces in real-time. The third stage was the evaluation of the system's performance metrics, including accuracy, efficiency, and usability. The final stage was the implementation of the system on a Raspberry Pi to make it portable and versatile.

Chapter 2: Related Work (Literature Review)

2.1 Background & Related work

Attendance management is a critical aspect of educational institutions, including schools, colleges, and universities. Traditional methods of taking attendance, such as manual roll calls or sign-in sheets, are time-consuming, prone to errors, and can be manipulated. As a result, there is a growing interest in leveraging face recognition and detection technology to streamline attendance tracking in the education sector.

The integration of face recognition and detection technology into attendance systems offers numerous benefits for educational institutions. It provides a convenient and efficient way to capture attendance, eliminating the need for manual processes and reducing administrative burden. With face recognition, students can simply stand in front of a camera, and their presence can be automatically recorded and verified within seconds.

One of the primary advantages of using face recognition and detection in the education system is its accuracy. Advanced algorithms and machine learning techniques can identify students with high precision, minimizing the chances of errors or misidentification. This ensures reliable attendance records, which are crucial for monitoring student attendance, evaluating academic performance, and complying with attendance regulations.

The real-time face detection capabilities of these systems further enhance security and prevent proxy attendance. By capturing attendance only when a face is detected, the system can mitigate the risk of students attempting to cheat the attendance system by using photographs or other means.

2.1.1 Technology:

Using Django web framework that follows the model-view-controller (MVC) architectural pattern. It provides a robust set of tools and features for building web applications quickly and efficiently. Django follows the principle of "Don't Repeat Yourself" (DRY), promoting code reusability and maintainability. It is known for its scalability, security, and ease of use, making it a popular choice for web development.

Django provides a structured environment for deploying machine learning models as part of a web application. You can encapsulate your trained models within Django views or custom API endpoints, allowing users to interact with your models via a web interface or API requests.

HAAR cascade:

HAAR cascade is a simple and efficient model based on Haar features. It detects faces by first identifying large features like eyes and noses, then progressively detecting smaller features like the mouth and chin.

Benefits: HAAR cascade is fast and computationally efficient, making it suitable for real-time face detection applications. It can achieve decent accuracy in detecting faces.

Faster R-CNN:

Faster R-CNN is a more complex face detection model that uses a region proposal network (RPN) to generate candidate regions for face detection. It then classifies each candidate as a face or non-face.

Benefits: Faster R-CNN is more accurate than the HAAR cascade, but it is also more computationally expensive. It performs well in scenarios where accuracy is a priority and computational resources are available.

SSD (Single Shot MultiBox Detector):

SSD is a face detection model that utilizes anchor boxes of different scales and aspect ratios to predict offsets and confidence scores for each anchor box. It produces predictions at multiple scales and explicitly separates predictions by aspect ratio.

Benefits: SSD is accurate like R-CNN but faster. It saves time by detecting objects in a single pass. SSD is suitable for applications where both accuracy and speed are important.

Xception:

Xception is a deep convolutional neural network architecture that utilizes depthwise separable convolutions. It is often used for face recognition tasks.

Benefits: Xception achieves state-of-the-art results in various computer vision tasks, including image classification, object detection, and segmentation. It is efficient due to the use of depthwise separable convolutions.

FaceNet:

FaceNet is a deep CNN architecture commonly used for face recognition. It has a large number of parameters and requires significant computational resources.

Benefits: FaceNet is known for its simplicity and accuracy in face recognition tasks. It can achieve high performance with a large amount of labeled training data.

VGG (Visual Geometry Group):

VGG is a deep CNN architecture known for its large number of layers and parameters.

Benefits: VGG models excel in capturing detailed features and have achieved excellent performance in various computer vision tasks. However, their larger size can pose challenges in terms of deployment and computational resources.

DeepFace:

DeepFace is a deep neural network architecture designed for face recognition. It has been trained on a large-scale dataset.

Benefits: DeepFace can achieve high accuracy in face recognition tasks. However, it may be sensitive to variations in pose, lighting conditions, and occlusions. Interpretability of its complex architecture may also be a challenge.

Eigenfaces:

Eigenfaces is a simple and effective face recognition algorithm commonly used in applications.

Benefits: Eigenfaces algorithm is straightforward and can provide decent face recognition results. However, it may be sensitive to variations in poses and expressions.

LBPH (Local Binary Patterns Histograms):

LBPH is a face recognition algorithm that is more robust to pose and expression variations compared to Eigenfaces.

Benefits: LBPH algorithm can handle variations in poses and expressions to a certain extent. While it may not be as accurate as deep learning algorithms, it can be a viable option in some scenarios.

2.2 Literature Survey:

- Title: "Automated Attendance System using Face Recognition: A Case Study in Educational Institutions"

Authors: Smith, A., Johnson, B., & Williams, C.

Published in: International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), 2018

This study presents a case study of implementing a face recognition-based attendance system in an educational institution. It discusses the technical aspects of the system, including face detection, feature extraction, and recognition algorithms. The study also evaluates the system's performance, accuracy, and user satisfaction.

- Title: "Integrating Face Recognition in Attendance Management Systems: A Review"

Authors: Gupta, S., Kumar, R., & Singh, S.

Published in: Proceedings of the International Conference on Innovative Computing and Communication (ICICC), 2020

This review paper provides an overview of the integration of face recognition in attendance management systems, specifically in the context of educational institutions. It discusses the challenges and solutions related to lighting conditions, variations in poses, and scalability. The paper also examines privacy concerns and legal aspects of implementing such systems in educational settings.

- Title: "A Smart Attendance System using Deep Learning and Face Recognition for Educational Institutions"

Authors: Li, X., Wang, J., & Chen, Z.

Published in: IEEE Access, 2020

This research work presents a smart attendance system that combines deep learning techniques and face recognition for educational institutions. The study proposes a deep convolutional neural network architecture for face recognition and evaluates its performance using real-world datasets. The system's accuracy, efficiency, and usability are discussed, along with the integration of the system with existing educational management systems.

2.3Analysis of the Related Work:

There are a number of existing systems that are closely analogous to the proposed idea of using official recognition techniques and algorithms to indicate attendance in a class.

A literature survey of the proposed systems was conducted to analyses these systems. The proposed case study was built around a few key sources in the field of facial recognition and image processing. Using the other design methodologies.

- One prominent research paper titled "Automated Attendance System Based on Face Recognition" by Choudhary et al. (2018) proposes an attendance system that utilizes face recognition techniques to identify students and record their attendance automatically. The paper discusses the use of deep learning models, such as VGG and OpenFace, for face recognition.

- Another research paper titled "Smart Attendance System using Face Recognition" by Sharma and Mittal (2019) presents an attendance system that integrates face detection and recognition algorithms. The system captures students' images, detects faces, and matches them against a database to mark attendance. The paper explores the use of Haar cascade classifier and LBPH for face detection and recognition.

- "Face Recognition based Attendance Management System for Academic Institutions" by Pardeshi et al. (2019) proposes an attendance management system that utilizes face recognition technology. The system extracts facial features using the Fisherfaces algorithm and matches them with the pre-registered database to mark attendance. The paper discusses the advantages of using face recognition in terms of accuracy and convenience.

- An application called "eAttendance" developed by Digital Attendance Solutions is an example of an attendance system for educational institutions. The app utilizes face recognition technology to identify students and record their attendance. It provides real-time attendance tracking, generates reports, and offers integration with existing student management systems.

Chapter 3: The Proposed Solution

3.1 Solution Methodology:

The solution Methodology section explains the different techniques and technologies used to develop the face detection and recognition attendance and education system. This includes the use of advanced computer vision algorithms and machine learning techniques, such as deep learning, to detect and recognize human faces in real-time. The section also highlights the system's user-friendly interface, which allows students to mark their attendance by simply facing the camera. The system's ability to analyse biometric data and facial expressions to provide valuable insights into student behaviour and engagement is also discussed.

3.2 Functional/ Non-functional Requirements:

Functional Requirement:

1.Registeration:

- Register changes as user type changes.
- For student, he can register normally.
- The system shall allow users to register for an account using their email and password.
- The system shall authenticate user login credentials to ensure that only authorized users can access the system.
- The teacher can’t register normally because the authorization requirements.
- The admin shall register the teacher to the system.

2.Login:

- Admin can login by entering his username and password correctly.
- Student can login by entering his username and password correctly.
- Teacher can login by entering his username and password correctly.

3. Face Recognition Attendance Tracking

- The system shall use facial recognition technology to track student attendance in real-time.
- The system shall capture images of students' faces and compare them to a database of authorized students to record attendance.
- The system shall provide accurate and reliable attendance data for teachers and administrators to monitor and manage.

4.Multi Face Recognition Attendance Tracking:

- The teacher shall send an image he captured for all students in the lecture and the system shall return a list for all present students in this lecture.
- The system will monitor the list of the present students to the teacher.

5.Attendance Reports and Analytics:

- The system shall provide detailed attendance reports and analytics, including data on attendance rates, student absences and other attendance-related reports.
- The system shall allow teachers and administrators to view and analyse attendance data at the course, class, and individual student level.

6.Notifications:

- The system shall allow students to view their attendance records
- The system shall provide automated notifications to students, teachers, and administrators regarding attendance-related events.

7.Access Control and User Management:

- The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data and system settings.
- The system shall provide user management functionality, allowing administrators to add, remove, or modify user accounts.
- The system shall allow administrators to customize user roles and permissions based on their specific needs and requirements.

8.Course Management:

- The system shall allow course instructors to create and manage course content, including lectures, assignments, quizzes, and exams.
- The system shall allow course instructors to customize course content based on the needs of the students.
- The system shall provide students with easy access to course content and allow them to view their progress in the course.

NonFunctional Requirement:

1.Security Requirements:

- The system shall ensure the privacy and security of student data and attendance records.
- The system shall use secure authentication and access control mechanisms to prevent unauthorized access to attendance data.
- The system shall ensure that attendance data is stored securely and is not vulnerable to hacking or data breaches.

2.Accuracy Requirements:

- The facial recognition technology used by the system shall have a high level of accuracy in detecting and recognizing faces.
- The system shall ensure that attendance records are accurate and reliable, with minimal errors or discrepancies.

3.Scalability Requirements:

- The system shall be scalable to accommodate a large number of users, courses, and attendance records.
- The system shall be able to handle a large volume of requests and data processing without compromising performance or reliability.

4.Compatibility Requirements:

- The system shall be compatible with different hardware and software platforms, including different types of cameras and operating systems.
- The system shall be interoperable with other educational systems and applications, such as learning management systems and student information systems.

5.Maintainability Requirements:

- The system shall be maintainable and supportable, with a clear and well-documented codebase and architecture.
- The system shall be easy to modify and update to meet changing requirements or new technologies.

6.Accessibility Requirements:

- The system shall be accessible to users with disabilities, complying with accessibility standards and guidelines.
- The system shall provide alternative access methods for users who cannot use facial recognition technology, such as manual attendance recording.

7.Performance Requirements:

- The system shall provide fast and responsive performance, with minimal latency and processing time.
- The system shall be able to handle a large number of concurrent users and attendance records without compromising performance or reliability.

3.3 System Analysis & Design

User Requirement Definition:

1. The attendance education system by face detection shall be easy to use and navigate for both students and teachers.
2. The attendance education system by face detection shall provide a user-friendly interface for reporting and managing attendance data.
3. The attendance education system by face detection shall provide real-time monitoring of attendance
4. The attendance education system by face detection shall provide students with the ability to view and request corrections for any errors in their attendance records.
5. The attendance education system by face detection shall provide a reliable and secure platform for storing and managing attendance data.
6. The attendance education system by face detection shall provide automated notifications to students and teachers regarding attendance-related events.
7. The attendance education system by face detection shall provide a flexible and customizable platform for managing attendance data across different educational settings.
8. The course management system shall provide an easy-to-use interface for managing course content and assessments.
9. The course management system shall provide a platform for communication and collaboration between students and course instructors.

System Requirements Specification:

1.1 The system shall have an intuitive user interface that allows for quick and easy navigation.

1.2 The system shall use a reliable and accurate facial recognition technology to detect and record students' attendance.

1.3 The system shall provide students with easy access to their attendance records and allow them to view their attendance status.

1.4 The system shall provide teachers with real-time access to attendance data and allow them to view attendance reports.

1.5 The system shall be accessible from any location with an internet connection.

1.6 The system shall use secure user authentication and authorization mechanisms to ensure data protection.

1.7 The system shall be customizable to fit the specific needs of the educational institution.

1.8 The system shall integrate with other educational systems, such as learning management systems or student information systems, through APIs or other means of data exchange.

1.9 The system shall generate automated attendance reports on a regular basis.

1.10 The system shall be able to send notifications to students regarding their attendance status.

1.11 The system shall generate alerts for teachers regarding students with low attendance or excessive absences.

1.12 The system shall be scalable to accommodate a large number of users and attendance records.

1.13 The system shall comply with privacy regulations and protect students' personal information.

1.14 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

2.1 The system shall provide an easy-to-use interface for teachers to take attendance and mark students present or absent.
2.2 The system shall provide an interface for administrators to manage attendance data, including adding or removing students, managing attendance records, and generating reports.
2.3 The system shall allow for manual entry of attendance data in cases where facial recognition is not possible or fails.
2.4 The system shall provide a dashboard for students to view their attendance records, including a summary of their attendance status and any missed classes.
2.5 The system shall provide a dashboard for teachers to view attendance data, including a summary of attendance for their classes and any students with low attendance or excessive absences.
2.6 The system shall generate automated alerts for teachers and administrators in cases of suspicious attendance patterns or unusual activity.
2.7 The system shall allow for the customization of attendance policies, including attendance thresholds, late policies, and grading policies based on attendance.
2.8 The system shall be able to integrate with other educational systems through APIs or other means of data exchange.
2.9 The system shall be able to generate reports on attendance data for students, teachers, and administrators.
2.10 The system shall be able to handle different types of courses, such as online or hybrid courses, and support different types of assessments, such as quizzes or exams.
2.11 The system shall be scalable to accommodate a large number of courses and users.
2.12 The system shall comply with privacy regulations and protect students' personal information.

2.13 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

3.1 The system shall use real-time facial recognition technology to detect and record students' attendance.
3.2 The system shall detect and prevent proxy attendance by comparing the facial features of the student with the stored image of the student.
3.3 The system shall generate alerts in case of proxy attendance or any other suspicious activity.
3.4 The system shall provide a dashboard for teachers to monitor attendance in real-time and identify any suspicious activity.
3.5 The system shall provide a dashboard for administrators to monitor attendance across different courses and identify any suspicious activity.
3.6 The system shall be scalable to accommodate a large number of users and attendance records.
3.7 The system shall comply with privacy regulations and protect students' personal information.
3.8 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

4.1 The system shall allow students to view their attendance records and identify any errors or discrepancies in their attendance data.
4.2 The system shall provide an interface for students to request corrections for any errors or discrepancies in their attendance data.
4.3 The system shall notify teachers and administrators of the correction requests and allow them to approve or reject the requests.
4.4 The system shall update the attendance records accordingly based on the approval or rejection of the correction requests.

4.5 The system shall provide a dashboard for teachers and administrators to manage correction requests and ensure accuracy of attendance data.
4.6 The system shall be scalable to accommodate a large number of correction requests and users.
4.7 The system shall comply with privacy regulations and protect students' personal information.
4.8 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

5.1 The system shall store attendance data securely and reliably, using encryption and other security measures to protect against unauthorized access and data breaches.
5.2 The system shall provide backups and disaster recovery mechanisms to ensure the availability and integrity of attendance data.
5.3 The system shall comply with data protection regulations and ensure that all personal data is handled in a compliant and ethical manner.
5.4 The system shall provide audit trails and logs to track any changes or modifications made to attendance data.
5.5 The system shall be scalable to accommodate a large amount of attendance data and users.
5.6 The system shall be able to integrate with other educational systems through APIs or other means of data exchange.
5.7 The system shall comply with privacy regulations and protect students' personal information.
5.8 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

6.1 The system shall provide automated notifications to students regarding their attendance status, including notifications for missed classes and low attendance.
6.2 The system shall provide automated notifications to teachers regarding students with low attendance or excessive absences.
6.3 The system shall provide automated notifications to administrators regarding suspicious activity or unusual patterns in attendance data.
6.4 The system shall allow for customization of notification settings, including the frequency and type of notifications sent to students, teachers, and administrators.
6.5 The system shall be scalable to accommodate a large number of notifications and users.
6.6 The system shall comply with privacy regulations and protect students' personal information.
6.7 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

7.1 The system shall provide a flexible and customizable platform that can be adapted to different educational settings, including K-12 schools, universities, and vocational schools.
7.2 The system shall allow for customization of attendance policies, including attendance thresholds, late policies, and grading policies based on attendance, to fit the needs of each educational setting.
7.3 The system shall provide a dashboard for administrators to manage attendance data across different courses and educational settings.
7.4 The system shall provide a dashboard for teachers to manage attendance data for their classes and courses.
7.5 The system shall provide a dashboard for students to view their attendance records and request makeup classes or corrections.

7.6 The system shall be scalable to accommodate a large number of courses, educational settings, and users.
7.7 The system shall comply with privacy regulations and protect students' personal information.
7.8 The system shall provide role-based access control to ensure that only authorized users can view or modify attendance data.

8.1 The system shall provide an intuitive user interface that allows for quick and easy navigation.
8.2 The system shall allow course instructors to create and manage course content, including lectures, assignments, quizzes, and exams.
8.3 The system shall allow course instructors to customize course content based on the needs of the students.
8.4 The system shall allow course instructors to set deadlines for assignments, quizzes, and exams.
8.5 The system shall provide students with easy access to course content and allow them to view their progress in the course.
8.6 The system shall provide students with easy access to assessment information, including grades, feedback, and performance summaries.
8.7 The system shall provide course instructors with real-time access to student performance data and allow them to view assessment reports.
8.8 The system shall be accessible from any location with an internet connection.
8.9 The system shall use secure user authentication and authorization mechanisms to ensure data protection.
8.10 The system shall be customizable to fit the specific needs of the educational institution.

8.11 The system shall integrate with other educational systems, such as learning management systems or student information systems, through APIs or other means of data exchange.
8.12 The system shall be scalable to accommodate a large number of users and course content.
8.13 The system shall comply with privacy regulations and protect students' personal information.
8.14 The system shall provide role-based access control to ensure that only authorized users can view or modify course content and assessment data.

9.1 The system shall provide a platform for students to ask questions and communicate with course instructors.
9.2 The system shall provide a platform for course instructors to communicate with students and provide feedback on course content and assessments.
9.3 The system shall provide a platform for students to collaborate with each other on course content and assignments.
9.4 The system shall provide a platform for course instructors to create and manage group projects and assignments.
9.5 The system shall provide a platform for course instructors to monitor student participation in group projects and assignments.
9.6 The system shall provide a platform for students to provide feedback on course content and assessments.
9.7 The system shall be accessible from any location with an internet connection.
9.8 The system shall use secure user authentication and authorization mechanisms to ensure data protection.
9.9 The system shall be customizable to fit the specific needs of the educational institution.

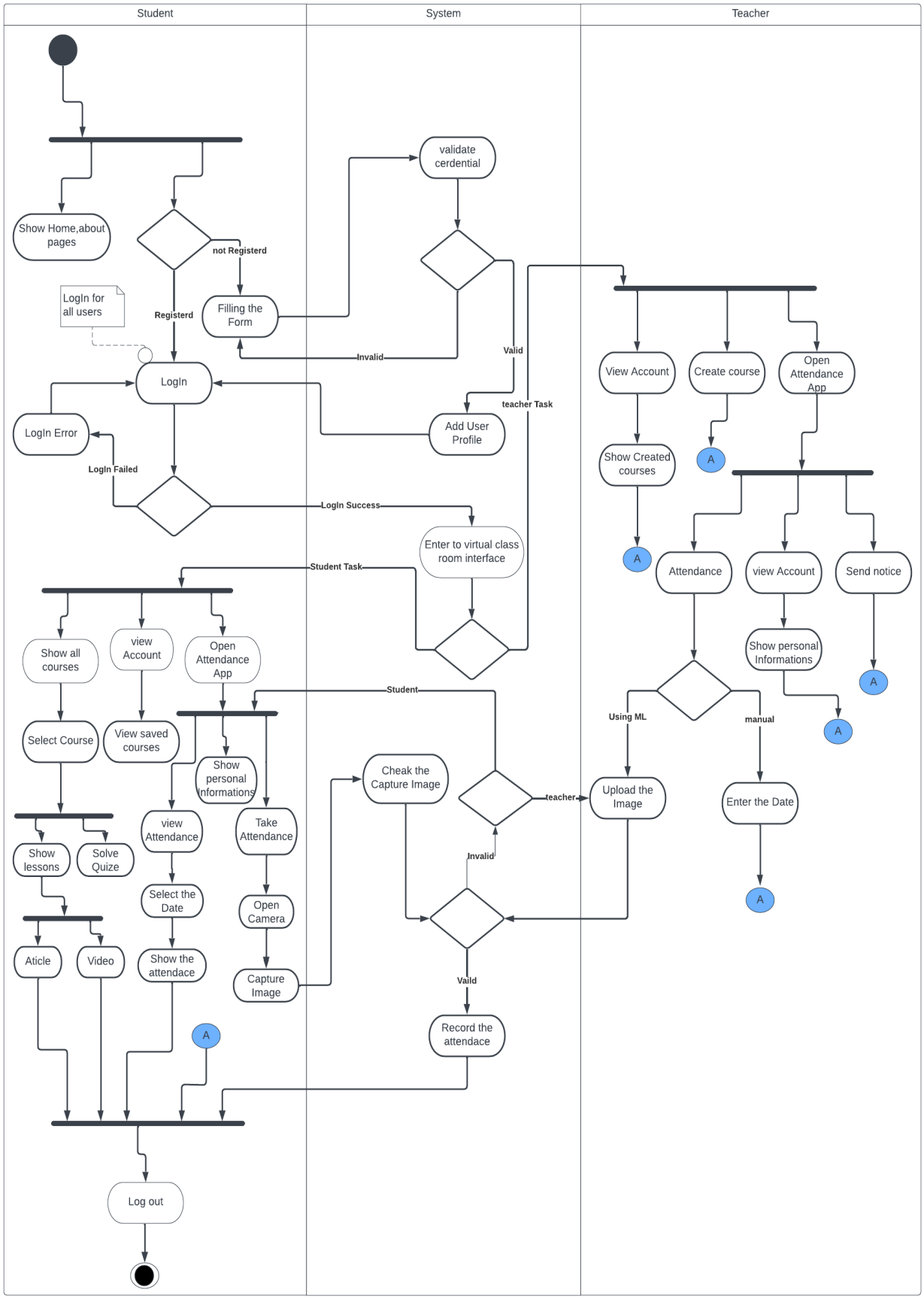
9.10 The system shall integrate with other educational systems, such as learning management systems or student information systems, through APIs or other means of data exchange.

9.11 The system shall be scalable to accommodate a large number of users and course content.

9.12 The system shall comply with privacy regulations and protect students' personal information.

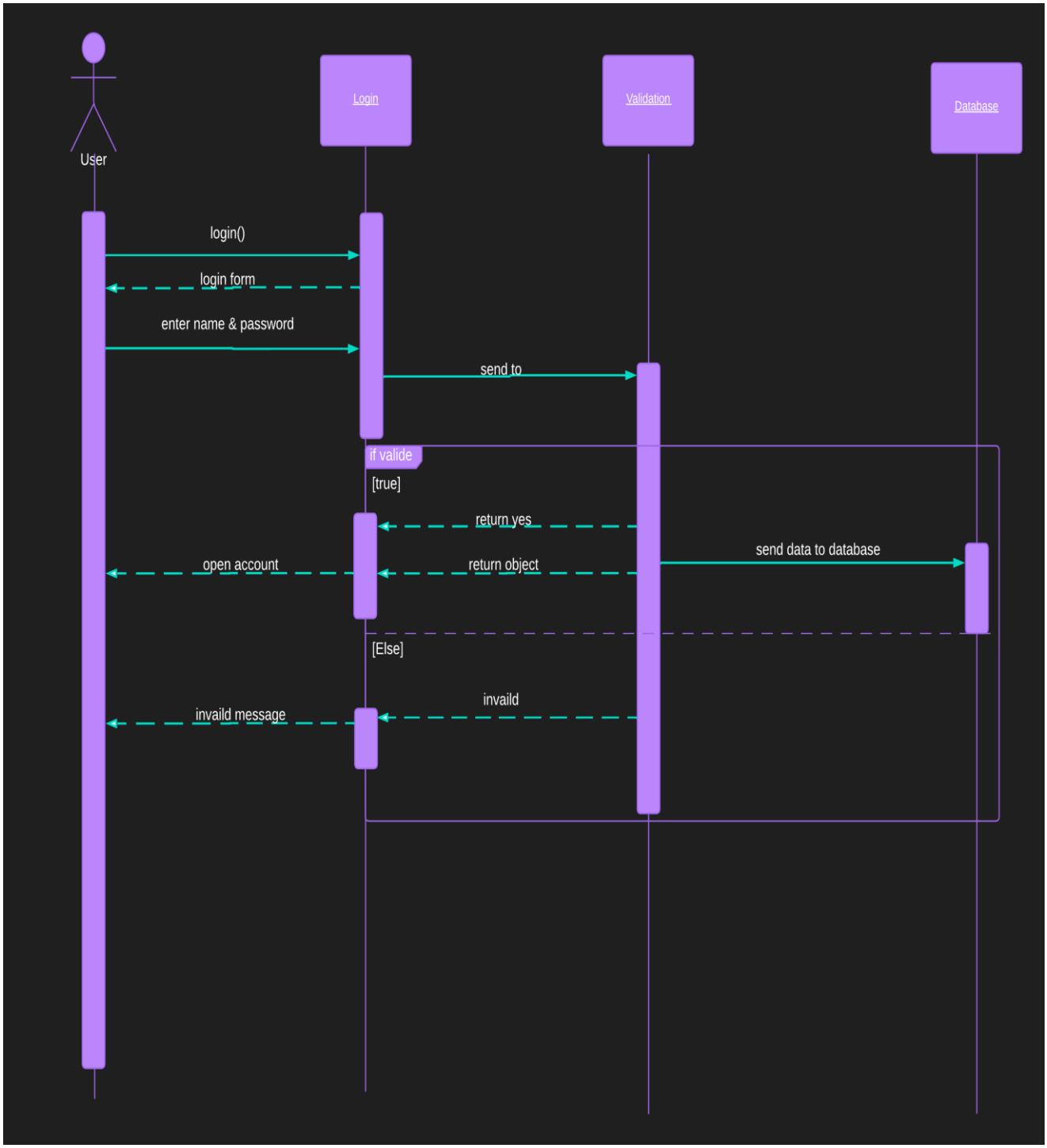
9.13 The system shall provide role-based access control to ensure that only authorized users can view or modify course content and assessment data.

Activity Diagram: (3.1)

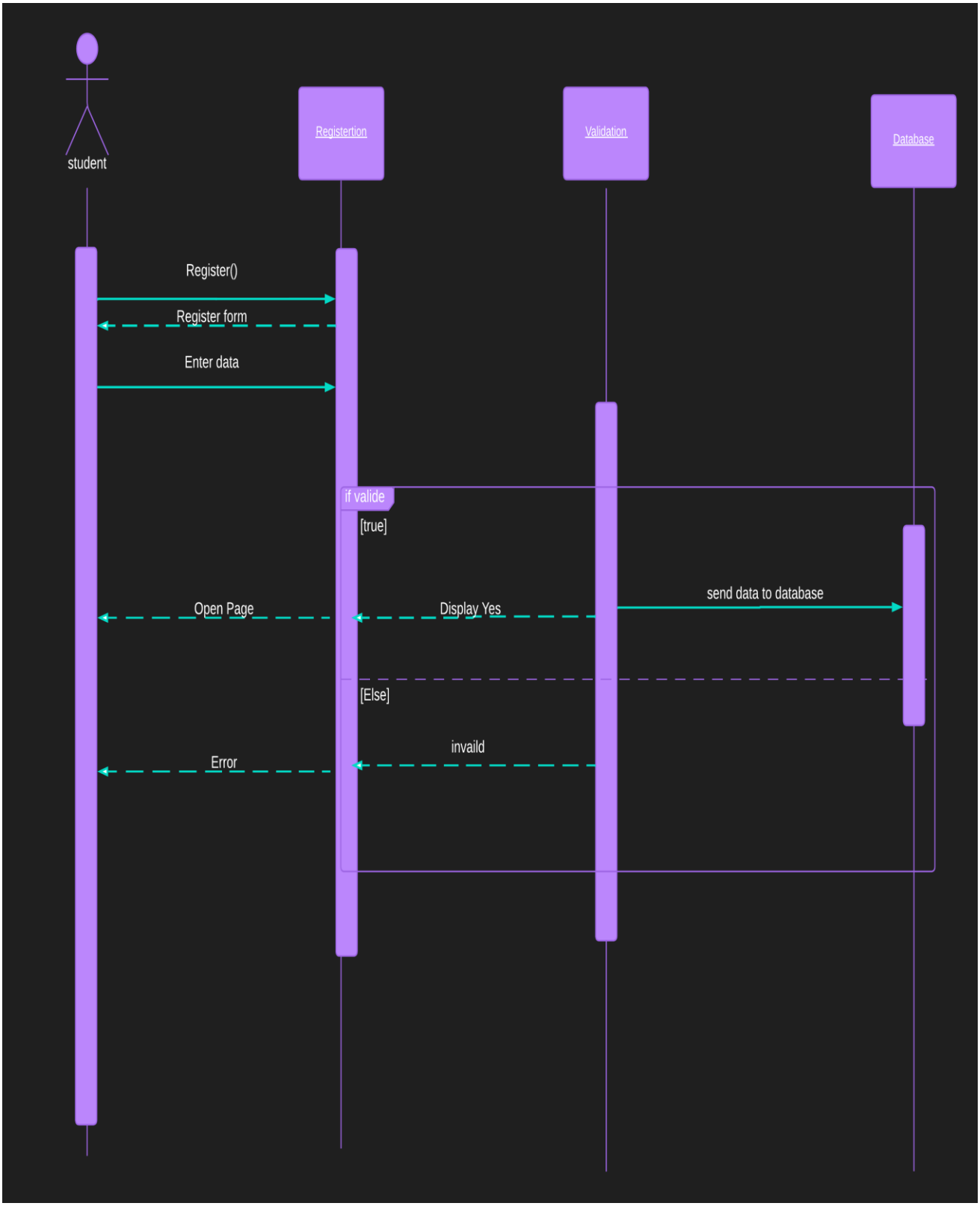


Sequence Diagram: (3.2)

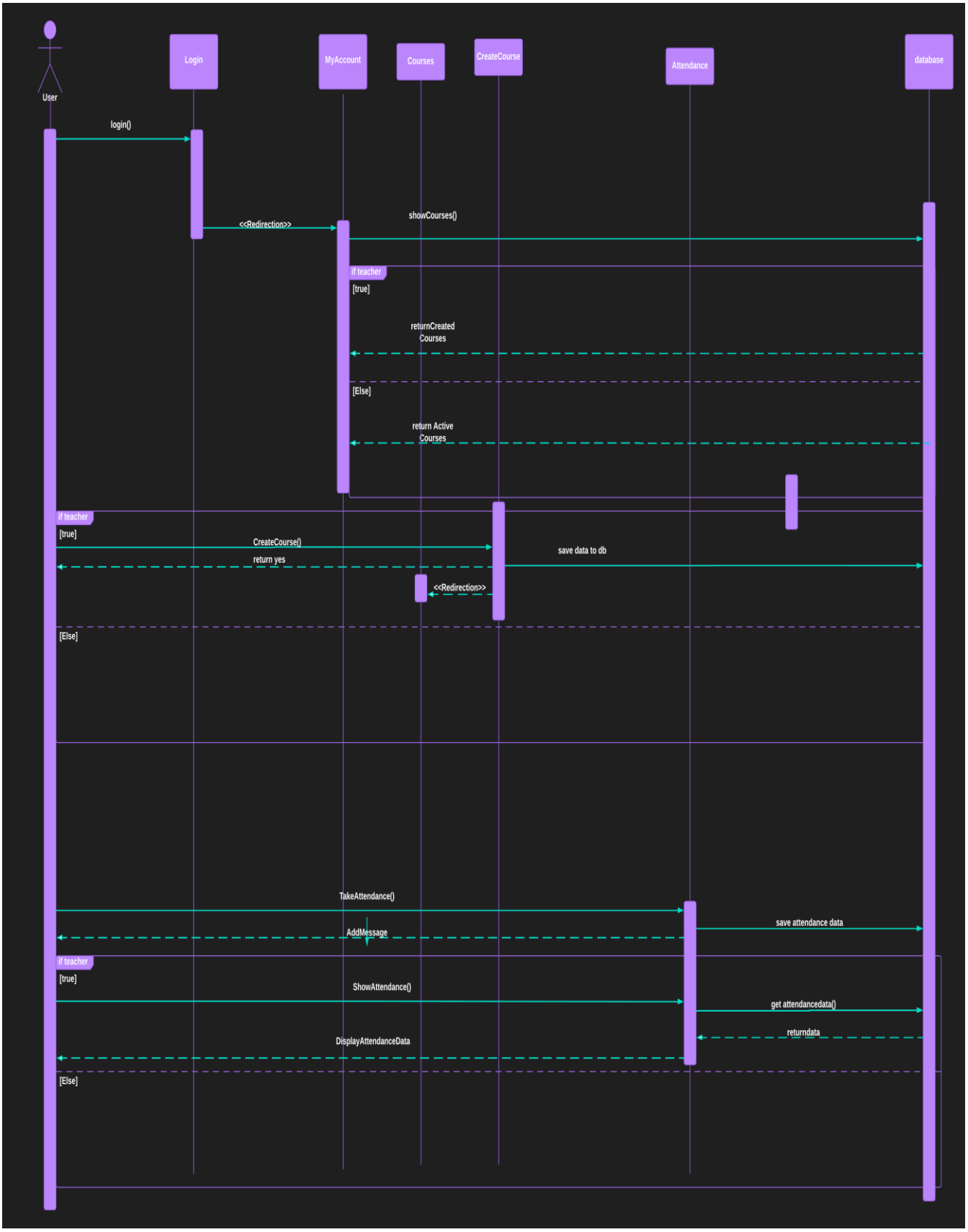
Login:



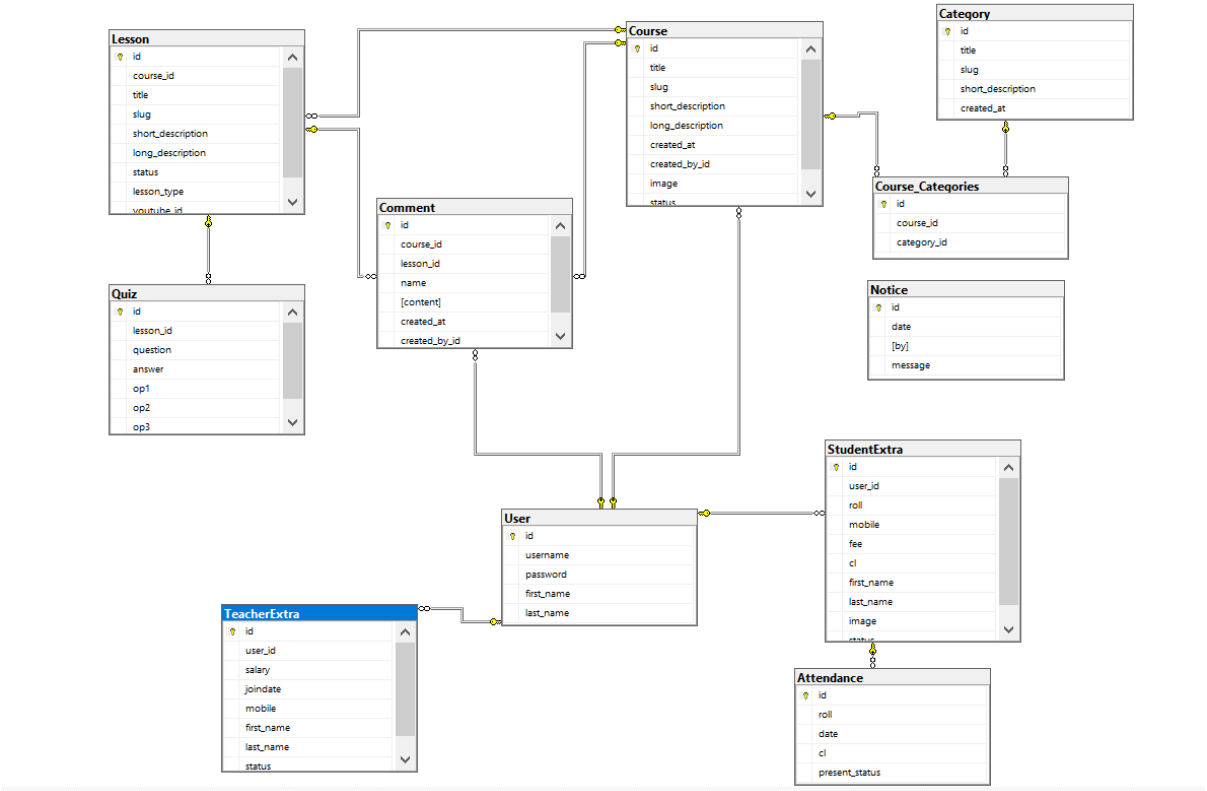
Register:


student
Registertion
Validation
Database
Register()
Register form
Enter data
if valide
[true]
Open Page
Display Yes
send data to database
[Else]
invaild
Error

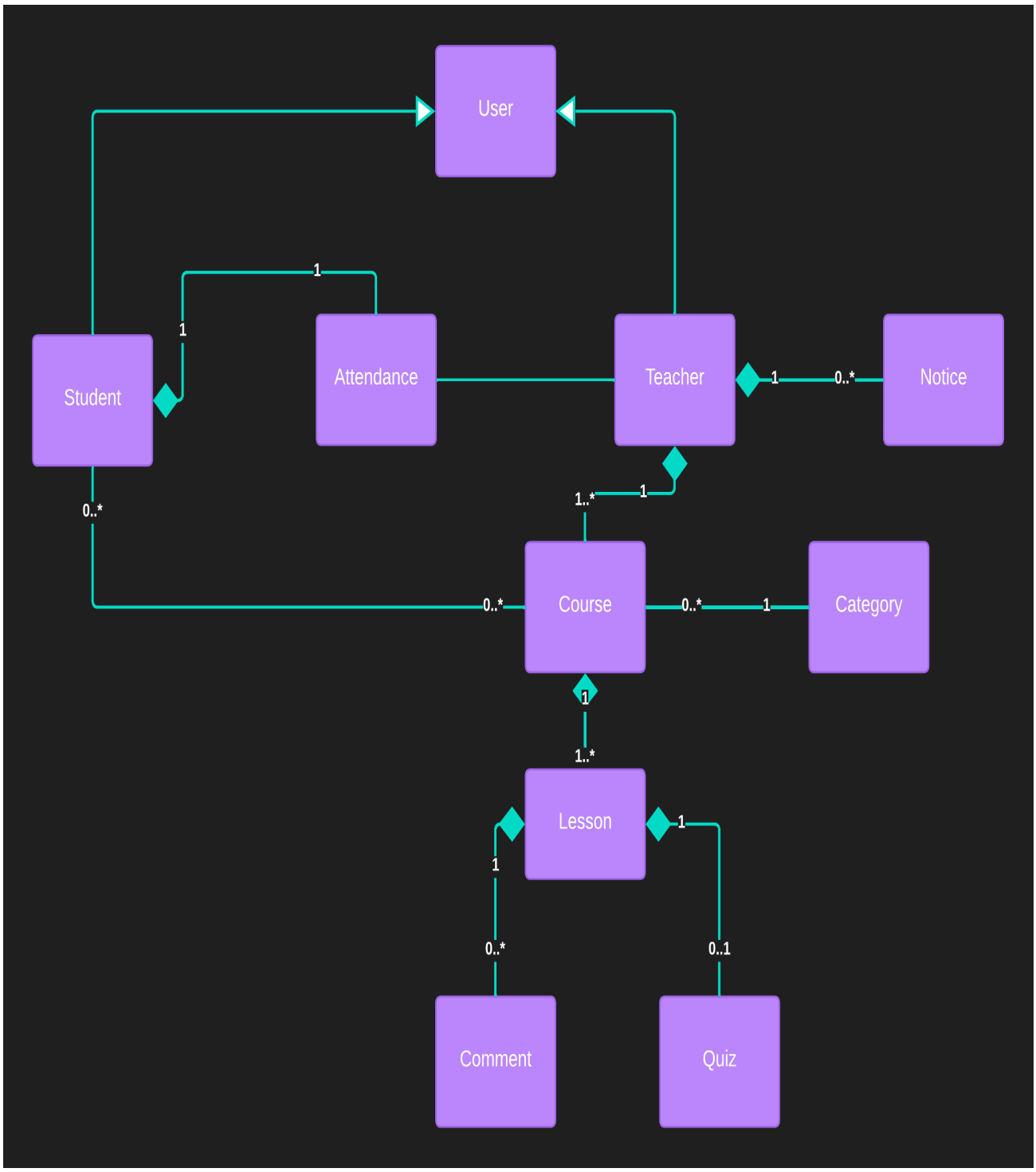
System:

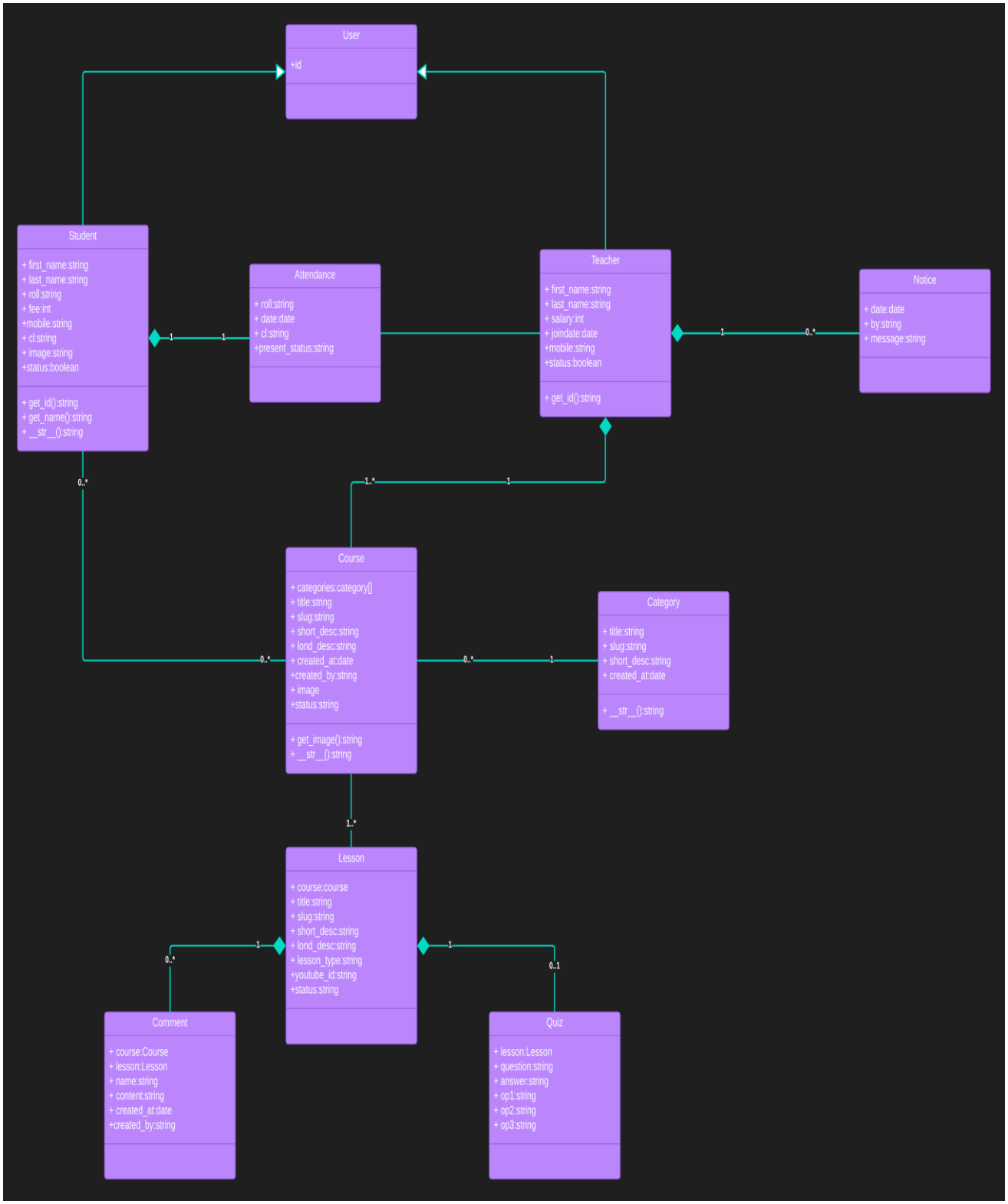

User
Login
MyAccount
Courses
CreateCourse
Attendance
database
login()
<<Redirection>>
showCourses()
if teacher
[true]
returnCreated Courses
[Else]
return Active Courses
if teacher
[true]
CreateCourse()
return yes
save data to db
<<Redirection>>
[Else]
TakeAttendance()
AddMessage
save attendance data
if teacher
[true]
ShowAttendance()
get attendancedata()
returndata
DisplayAttendanceData
[Else]

DB Schema: (3.3)


Lesson
id
course_id
title
slug
short_description
long_description
status
lesson_type
youtube_id
Course
id
title
slug
short_description
long_description
created_at
created_by_id
image
status
Category
id
title
slug
short_description
created_at
Course_Categories
id
course_id
category_id
Comment
id
course_id
lesson_id
name
[content]
created_at
created_by_id
Notice
id
date
[by]
message
Quiz
id
lesson_id
question
answer
op1
op2
op3
StudentExtra
id
user_id
roll
mobile
fee
cl
first_name
last_name
image
User
id
username
password
first_name
last_name
TeacherExtra
id
user_id
salary
joindate
mobile
first_name
last_name
status
Attendance
id
roll
date
cl
present_status

Class Diagram: (3.4)




User
+id
Student
+ first_name:string
+ last_name:string
+ roll:string
+ fee:int
+mobile:string
+ cl:string
+ image:string
+status:boolean
+ get_id():string
+ get_name():string
+ __str__():string
Attendance
+ roll:string
+ date:date
+ cl:string
+present_status:string
Teacher
+ first_name:string
+ last_name:string
+ salary:int
+ joindate:date
+mobile:string
+status:boolean
+ get_id():string
Notice
+ date:date
+ by:string
+ message:string
Course
+ categories:category[]
+ title:string
+ slug:string
+ short_desc:string
+ lond_desc:string
+ created_at:date
+created_by:string
+ image
+status:string
+ get_image():string
+ __str__():string
Category
+ title:string
+ slug:string
+ short_desc:string
+ created_at:date
+ __str__():string
Lesson
+ course:course
+ title:string
+ slug:string
+ short_desc:string
+ lond_desc:string
+ lesson_type:string
+youtube_id:string
+status:string
Comment
+ course:Course
+ lesson:Lesson
+ name:string
+ content:string
+ created_at:date
+created_by:string
Quiz
+ lesson:Lesson
+ question:string
+ answer:string
+ op1:string
+ op2:string
+ op3:string

Use case diagram: (3.5)

Cuse Case Name	Register
Use case Description	A student can register to the system to access courses
Actors	Student
Pre-Condition	System must be connected to internet
Post-Condition	After successful registration the student can login

Main Scenarios	Serial No	Steps
	1	Enter student data
	2	Validate student data
	3	Allow access to system
Extensions	a1	Invalid student data
	b2	Student already existed

Cuse Case Name	Login
Use case Description	A User login to the access the functionality of the system.
Actors	Admin,Students,Teacher.
Pre-Condition	System must be connected to the network.
Post-Condition	After a successful Login redirection to the Profile

Main Scenarios	Serial No	Steps
Actors/User	1	Enter username Enter password
	2	Validate Username and password
	3	Allow access to system
Extensions	a1	Invalid username System shows an error message
	B2	Invalid password System shows an error message

Cuse Case Name	Create Course
Use case Description	User can create Course .
Actors	Admin ,Teacher.
Pre-Condition	System must be connected to the network and logged in.
Post-Condition	The course added and the student can select It.

Main Scenarios	Serial No	Steps
	1	Click to create course from nave bar.
	2	Enter meta information.
	3	Add lessons. Quizzes.
	4	Submit for review.
Extensions	a1	Can add lesson article or video.
	b4	Must determine the answer

Cuse Case Name	Select Course
Use case Description	The student can select the desired course
Actors	student
Pre-Condition	User must be logged in and the course must be existed
Post-Condition	After successfully selecting the course it will be added to active courses

Main Scenarios	Serial No	Steps
	1	Go courses page
	2	Select the course
	3	Open and view it
	4	Course add to the student courses
Extensions	a1	Student is not logged in
	b2	The course is already selected
	c3	Admi doesn’t approve student request

Cuse Case Name	Take & view Attendance
Use case Description	User can add take teacher and student to the system
Actors	Admin , Teacher , student
Pre-Condition	User must be connected to the internet and must be logged in
Post-Condition	After successfully recorded The User can view it

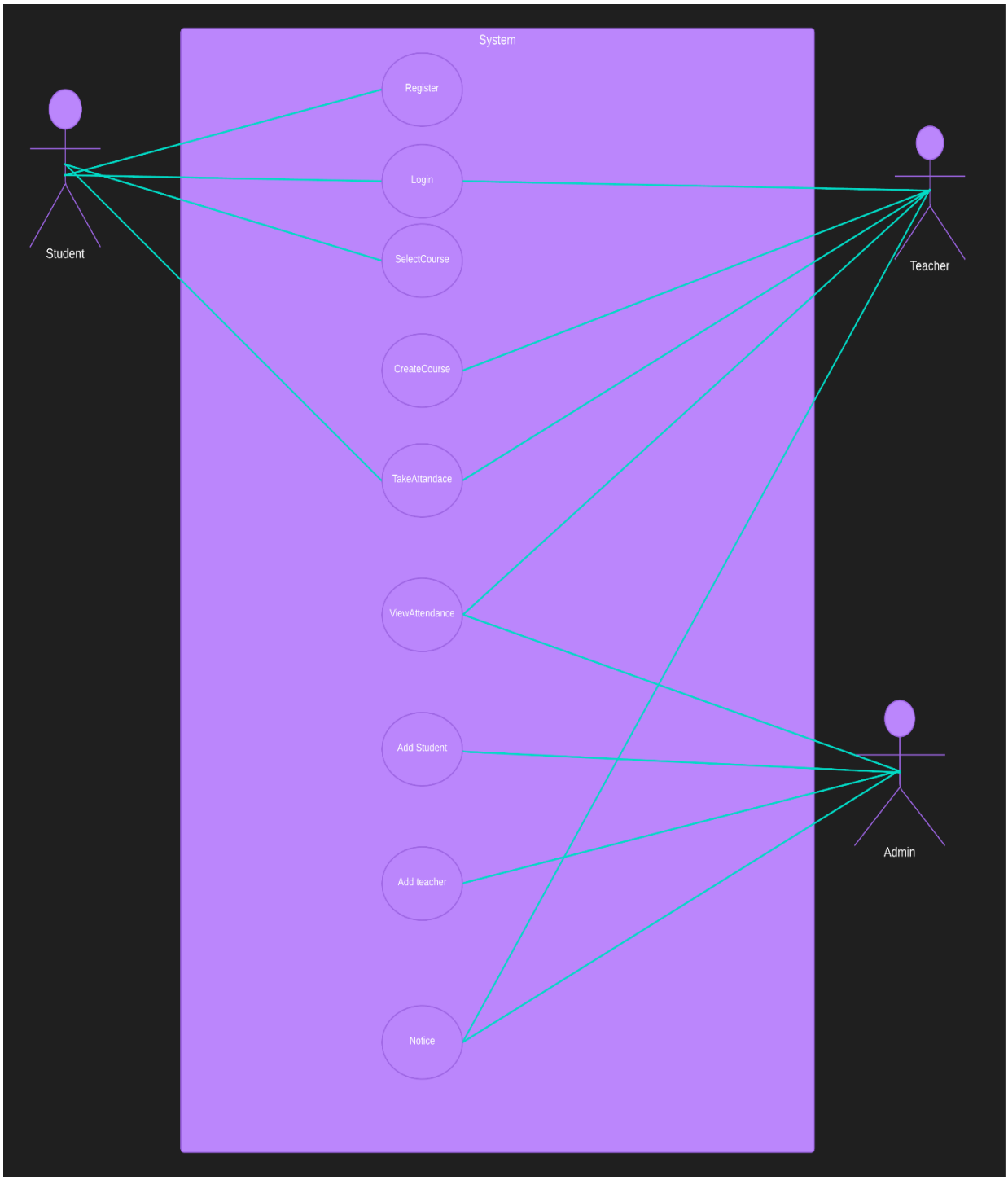
Main Scenarios	Serial No	Steps
	1	Go to attendance system page. Select Attendace from sidebar.
	2	Take attendance View Ateendace
	3	Recorded successfully
Extensions	a1	student use real time by face rcognation
	b2	Admin or teacher select photo for student

Cuse Case Name	Add New User
Use case Description	User can add new teacher and student to the system
Actors	Admin
Pre-Condition	User must be connected to the internet and must be logged in
Post-Condition	After successfully recorded the teacher can login

Main Scenarios	Serial No	Steps
	1	Go to attendance system page. Select teacher from sidebar.
	2	Record the teacher information or student information.
	3	Add new user.
Extensions	a1	user already added.
	b2	Entered invalid data.

Cuse Case Name	Send Notice
Use case Description	User add notice that the teacher and student can read.
Actors	Admin ,Teacher.
Pre-Condition	System must be connected to the internet and must be logged in.
Post-Condition	After successfully recorded the notices sent to the student and the teacher so they can read it.

Main Scenarios	Serial No	Steps
	1	Go to attendance system page. Select notice from sidebar.
	2	Writes notice.
	3	Submit.
Extensions	a1	The network disconneced


System
Register
Login
SelectCourse
CreateCourse
TakeAttandace
ViewAttendance
Add Student
Add teacher
Notice
Student
Teacher
Admin

Chapter 4: The Proposed Solution

4.1-Model Methodology:

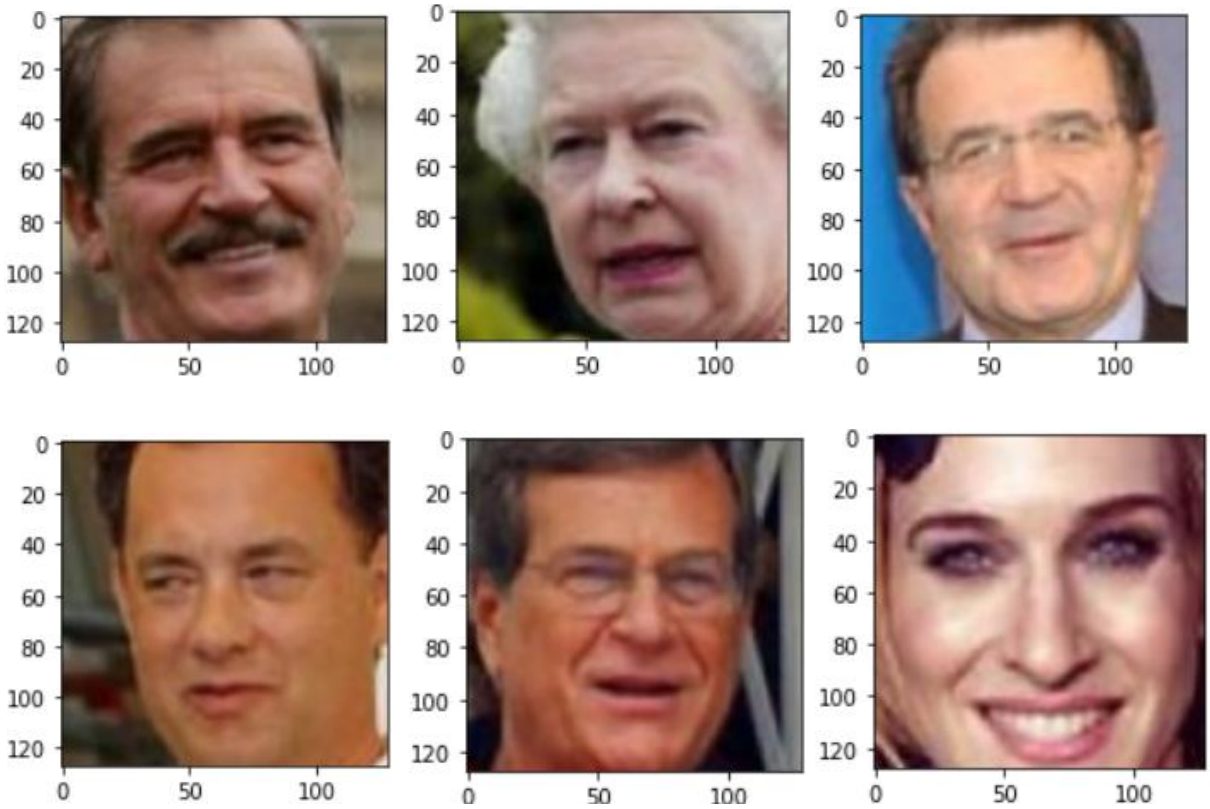
4.1.1 Data Collection:

We trained our model on a subset of the Extracted faces data set, which we first describe. We then provide details with respect to verification and one-shot performance. The dataset contains 1324 different individuals, with 2-50 images per person.

The images are of size (128,128,3) and are encoded in RGB (Red, Green, Blue).

Each folder and image are named with a number, i.e., 0.jpg, 1.jpg

Length of training list: 1191 Length of the testing list: 133



4.2 Data Processing:

The preprocess_input function takes an image as input and returns a NumPy array that is in the format expected by the Xception model.

We use the train and test list to create triplets of (anchor, positive, negative) face data, where positive is the same person and negative is a different person than an anchor.

Number of training triplets: 9996 Number of testing triplets: 1235

Here is the sample for the triplet:

4.3 Model selection:

These are the basic operations involved in Face Recognition system:

Face Detection: It's the first and most essential step in face recognition.

We use the single shot detector (SSD) as a detection model for detecting the face from the captured image Either single or multi-face.

The second step is the Face Recognition model. It is less reliable, and the accuracy rate is still not up to the mark. Extensive work on Face Recognition has been done, but still, it is not up to the mark from an implementation point of view

We used for this task Convolution Siamese neural network (CNN + Siamese Network) that gets the similarity between the input image inside the database and the input image.

We use a pretrained model (Xception) using the last 27 layers and connected using 2 fully connected layers.

4.4 Model Training:

We train our model on the dataset Forword and backward with 30 epochs.

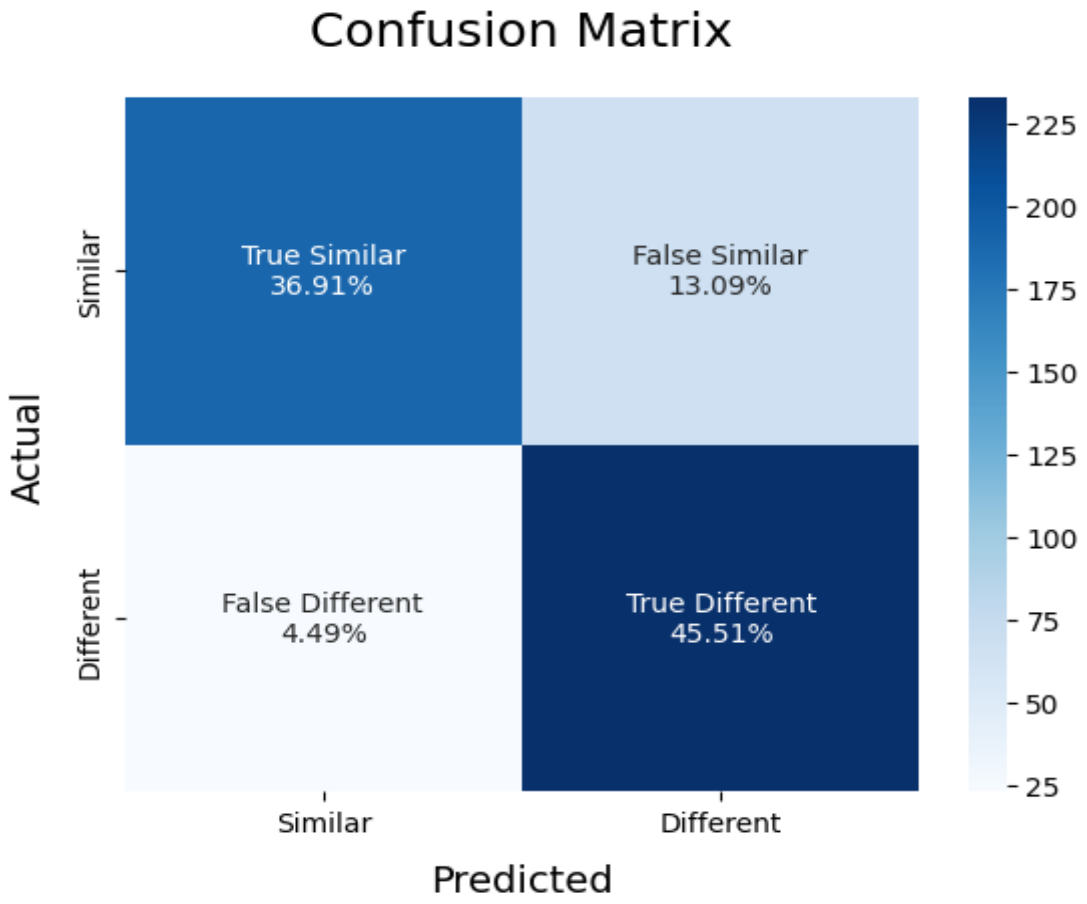
We choose the triplet loss which compares three samples: an anchor sample, a positive sample, and a negative sample.

The weights to use for the model is ‘ImageNet’ which will load the pre-trained weights for all networks that were trained on the ImageNet dataset.

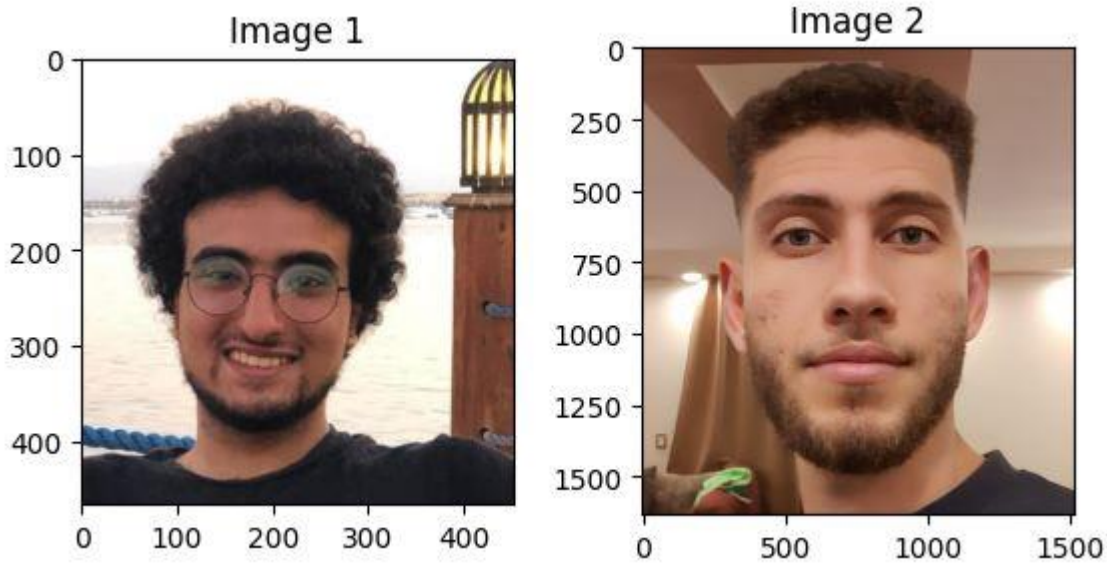
4.5 Model evaluation:

We get the accuracy of the model :92%

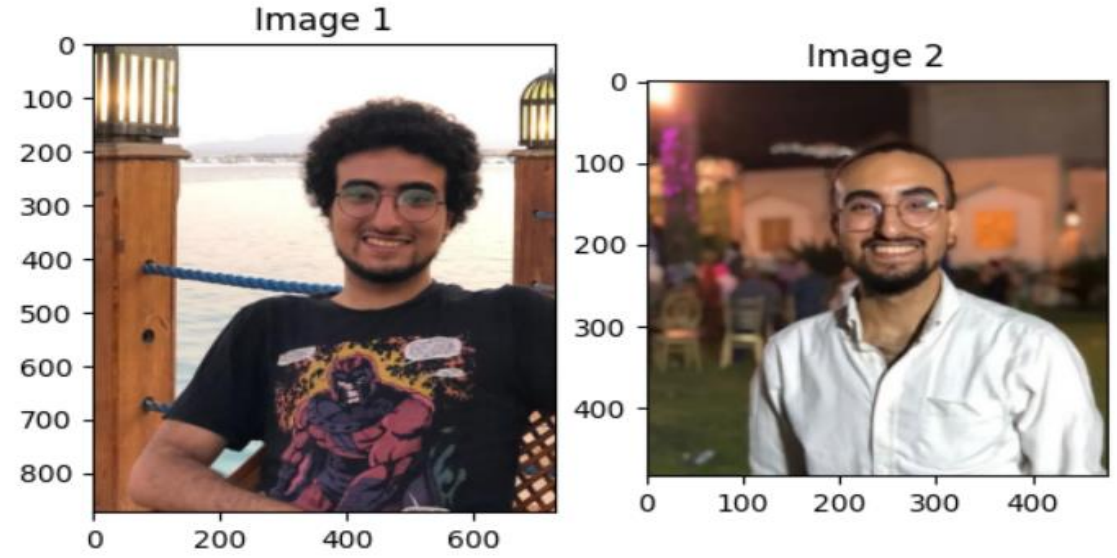
We test 994 sample and



Here is some of test the model for external image:




```
[1.7836026]
The images belong to different persons.
```




```
[1.187881]
The images belong to the same person.
```

4.6 Proposed model:

4.6.1 For face detection:

HAAR cascade:

The HAAR cascade is a simple and efficient model that is based on Haar features. Haar features are small rectangular features that are used to detect faces in images. The HAAR cascade works by first detecting large features, such as eyes and noses. If these features are detected, the cascade then proceeds to detect smaller features, such as the mouth and chin. The HAAR cascade is a fast and the less accurate model.

Faster R-CNN:

Faster R-CNN is a more complex model than the HAAR cascade. Faster R-CNN uses a region proposal network (RPN) to generate candidate regions for face detection. The RPN is then used to classify each candidate region as a face or non-face. R-CNN is more accurate than the HAAR cascade or CNN, but it is also more computationally expensive, R-CNN does not have the high speed as SSD.

SSD:

The model uses a set of anchor boxes, which are predefined bounding boxes at different scales and aspect ratios that cover the range of face locations and sizes.

The model predicts offsets and confidence scores for each anchor box, which are used to generate final bounding boxes around detected faces,he is accurate as same as RNN, it saves a lot of time.

SSD model produces predictions at different scales from the feature maps of different scales and explicitly separates predictions by aspect ratio.

4.6.2 For face recognition:

Xception:

It is a modification of the Inception CNN architecture that uses depthwise separable convolutions instead of traditional convolutions.

Depth wise separable convolutions are a type of convolution that performs two operations in one: a depth wise convolution and a pointwise convolution. The depth wise convolution operates on each channel of the input feature map independently, while the pointwise convolution operates on all channels of the input feature map together.

This makes depthwise separable convolutions more efficient than traditional convolutions, as they require fewer parameters and computations. Additionally, depthwise separable convolutions are more effective at learning spatial features than traditional convolutions.

Xception has been shown to achieve state-of-the-art results on a variety of computer vision tasks, including image classification, object detection, and segmentation.

FaceNet:

Deep CNN architecture is known for its simplicity and accuracy.

Computationally expensive: FaceNet utilizes a deep neural network architecture with a large number of parameters, making it computationally intensive and requiring significant computational resources.

Training data requirements: FaceNet typically requires a large amount of labeled training data to achieve optimal performance, which can be challenging to obtain in certain scenarios.

Sensitivity to variations: FaceNet may be sensitive to variations in pose, lighting conditions, and occlusions, which can affect its performance in real-world scenarios.

VGG:

Large model size: VGG models have a relatively enormous number of layers and parameters, resulting in a larger model size. This can make it challenging to deploy the model on resource-constrained devices or in applications with limited storage capacity.

Limited receptive field: VGG models utilize small kernel sizes (3x3) in each convolutional layer, which limits their ability to capture larger spatial context and global features.

DeepFace:

Training data bias: DeepFace has been trained on a large-scale dataset that may introduce biases present in the data, leading to potential limitations in recognizing faces from diverse demographics or underrepresented groups.

Lack of interpretability: DeepFace's deep neural network architecture is complex, making it difficult to interpret and understand the learned representations and decision-making processes.

Eigenfaces:

is a simple and effective face recognition algorithm used in many applications. However, it is important to be aware of its limitations, such as its sensitivity to poses and expression.

LBPH:

LBPH is more robust to pose and expression variations than Eigenfaces. However, it is not as accurate as deep learning algorithms.

4.7 Deep learning in detail:

As you make an attendance system, we use a face recognition deep learning model, that takes two model face detection and face recognition model.

Attendance takes place by taking the image of one or more people to take the attendance by verify in the image in the images in database.

Face detection is to detect the faces in the image, face recognition is to ask who is in that image.

- Face detection model detects and localizes the face in the input image.

  The SSD model architecture used is based on a deep convolutional neural network (CNN) with multiple layers that process the input image to extract features at various levels of abstraction.

  The model uses a set of anchor boxes, which are predefined bounding boxes at different scales and aspect ratios that cover the range of possible face locations and sizes.

  The model predicts offsets and confidence scores for each anchor box, which are used to generate final bounding boxes around detected faces.

  iterates over the detected faces and selects the first one with a confidence score above a certain threshold.

  The selected face is then cropped from the input image and resized to a fixed output size of (128, 128).

  The SSD model detects objects in a single pass, which means it saves a lot of time. But at the same time, the SSD model also has amazing accuracy in its detection.

  The VGG-16 network is used as the backbone for feature extraction. Only the layers from Conv1_1 to Pool5 are retained, and all other layers are removed. The backbone network captures hierarchical features from the input image.

  The fully connected layers fc6 and fc7 in VGG-16 are converted to convolution layers (Conv_fc6 and Conv_fc7) by subsampling the parameters. After Conv_fc6 and Conv_fc7, four additional convolution layers are added: Conv6_1, Conv6_2,

Conv7_1, and Conv7_2. These convolution layers extract more complex features from the backbone network.

L2 normalization is applied to the feature maps of Conv3_3, Conv4_3, and Conv5_3 to scale the norms of the features to 20. This normalization helps in handling feature maps with different scales and improves detection accuracy.

Deconvolution layers are used to expand the high-level feature maps to match the dimensions of the low-level feature maps. This expansion allows the integration of large-scale context information, which helps improve the detection accuracy. The high-level feature maps are summed with the corresponding low-level feature maps in an element-wise manner.

Six feature layers are used as detection layers after the deconvolution operation (D1, D2, D3, D4, D5, and D6). These detection layers predict the locations and sizes of faces. Each detection layer is followed by a convolution layer with a kernel size of 3×33×3 to generate the final detection results. The detection layers have different scales and are associated with different scales of anchor boxes.

For each anchor box, the detection layers predict four offsets related to its coordinates (for localization) and C+1 scores for classification. The number of labels, C, depends on the detection layer, with $C \geq 1$ for the D1 detection layer (using a max-out background strategy) and C=1 for other detection layers.

It uses the feature pyramid network to make better detection.

The feature pyramid network store first appeared with high resolution but having poor semantic value unlike the in Forword that reduce the resolution with rich semantic value.

We take the last layer in each level and compute elementwise operation with the deconvolution layer to get the detector layer to make multiscale for each level you make this operation.

- Face recognition solve the problem Laking of data by using technique called one-shot learning.

  We have two Approach for classifying images first one using multi-class classification and the other One-shot learning.

  One-shot learning is a machine learning technique that aims to recognize or classify objects based on a single example or a small number of examples. Unlike traditional machine learning approaches that require enormous amounts of labeled data for training, one-shot learning focuses on learning from limited information.

  We use the Siamese convolution neural network that helps in technique one-shot learning as this is used in 2 embedding architecture and connecting with similarity layer.

  The input image to the architecture must be size 128*128*3 where the number 3 refer to the image must be 3 color channels (RGB) not gray scale.

  The embedding initialized weight by ‘image net’.

  The embedding architecture contains filters 3*3 and 1*1 convolution layer to extract features from the input image.

  1x1 convolutions are primarily used for dimensionality reduction. reduce number of channels in feature map without loss any information, that help to learn complex features.

3x3 convolutions are primarily used for feature extraction. This is because they can be used to learn more complex features from the input data. This can be useful for tasks such as image classification and object detection.

The embedding uses depthwise separable convolutions instead of regular convolutions. Depthwise separable convolutions are a type of convolution that divides the convolution operation into two steps: a depthwise convolution and a pointwise convolution. The depthwise convolution operates on each input channel independently, while the pointwise convolution operates on all of the output channels together. This makes depthwise separable convolutions faster and more efficient than regular convolutions, while still maintaining accuracy.

Each of which contains a depthwise separable convolution followed by an average pooling layer, which will apply global average pooling to the output of the model.

The modules are stacked together in a residual connection fashion, which means that the output of each module is added to the input of the next module. This helps improve the network's accuracy by preventing information loss during convolution operations.

The architecture is connected with 2 fully connected layers 512 then 256 which produces a 1-D tensor of shape.

Each fully connected layer has a normalization layer to normalize the output from them.

The basic idea behind triplet loss is to compare three samples: an anchor sample, a positive sample, and a negative sample. The anchor sample is the reference point, the positive sample is a sample that should be more similar to the anchor, and the negative sample is a sample that should be dissimilar to the anchor.

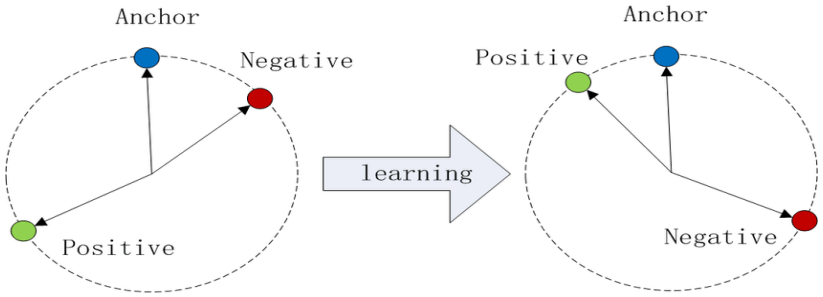
L = max (d (a, p) - d (a, n) + margin, 0)

where:

d (a, p) represents the distance between the anchor (a) and the positive sample (p) in the embedding space.

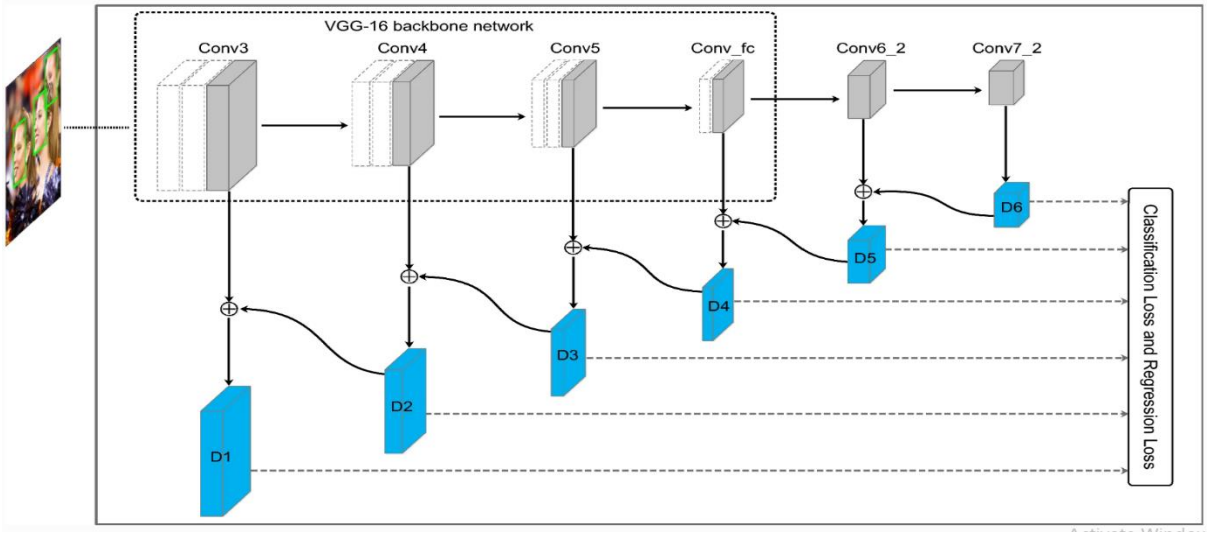
d (a, n) represents the distance between the anchor (a) and the negative sample (n) in the embedding space.

margin is a hyperparameter that specifies a minimum desired separation between the positive and negative distances. It ensures a margin of difference between the positive and negative pairs.



4.8 The model overviews

4.8.1 Object detection model



we retain the layers from Conv1_1 to Pool5 in the VGG-16 network and remove all other layers. Then, we add several auxiliary structures, i.e., the additional convolution layers, the normalization layers, the deconvolution layers, and the detection layers, to adapt the backbone network for the purpose of face detection.

The additional convolution layers are used to increase the feature map size and improve the detection accuracy for small faces.

The normalization layers are used to normalize the features and improve the stability of the training process.

The deconvolution layers are used to unsampled the features and integrate large-scale context information.

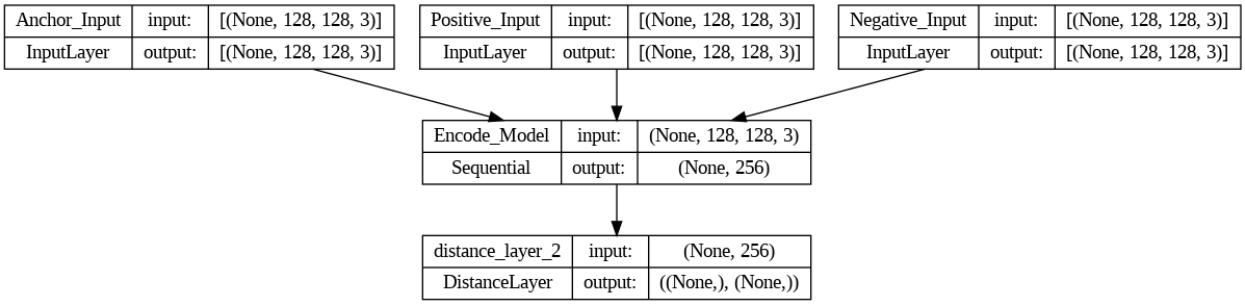
The detection layers(D1,D2,.) are used to predict the locations and sizes of faces.

The detection layers are arranged at multiple scales and aspect ratios to cover a wide range of possible face sizes and shapes. For each anchor, the SSD predicts

four offsets related to its coordinates and C+1 scores for classification, where C denotes the number of classes.

The offsets are used to adjust the coordinates of the anchor to the actual location of the face. The scores are used to determine the probability that the anchor contains a face of a particular class.

4.8.2 face recognition model:



The encode model:

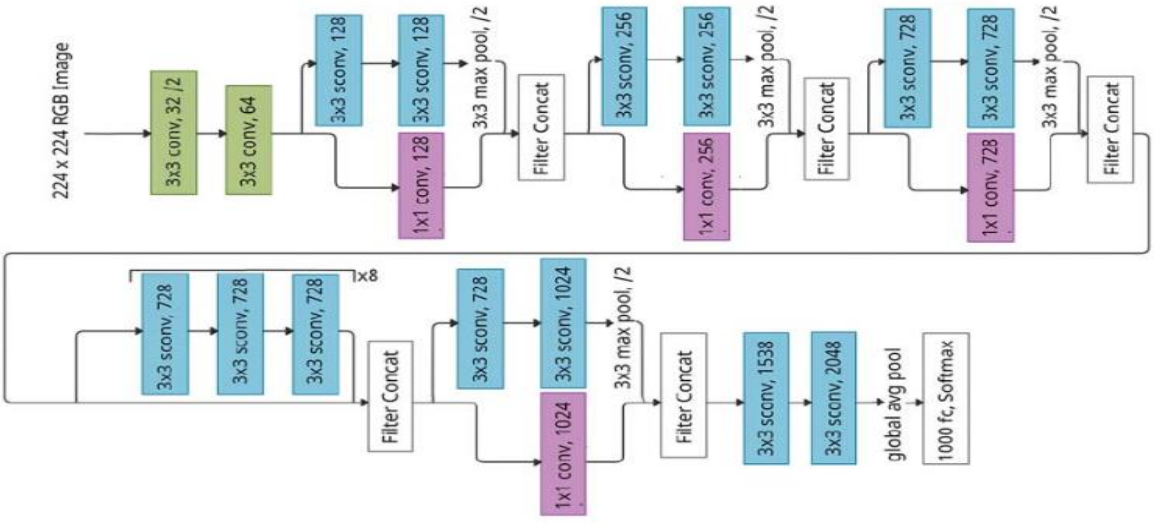
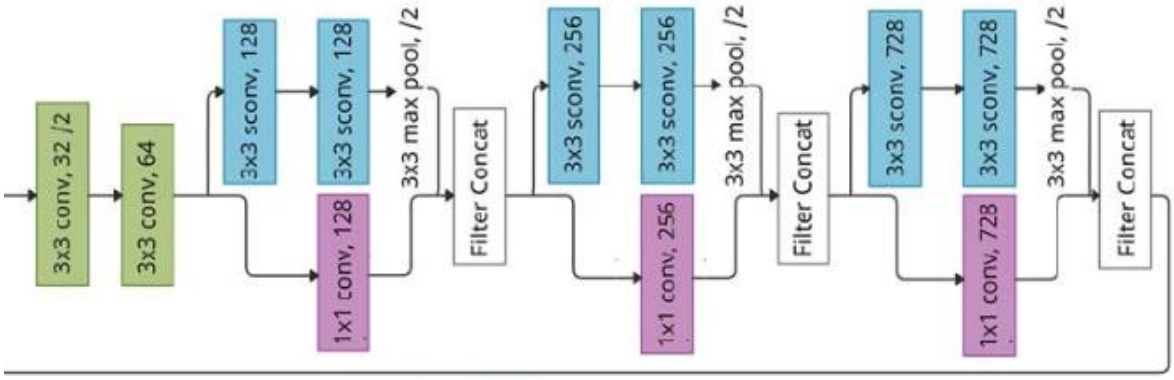
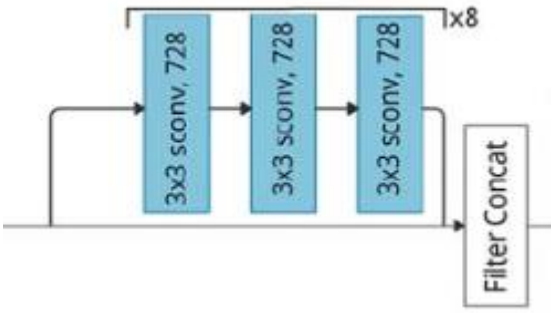


Figure 2: Architecture of the Xception deep CNN model

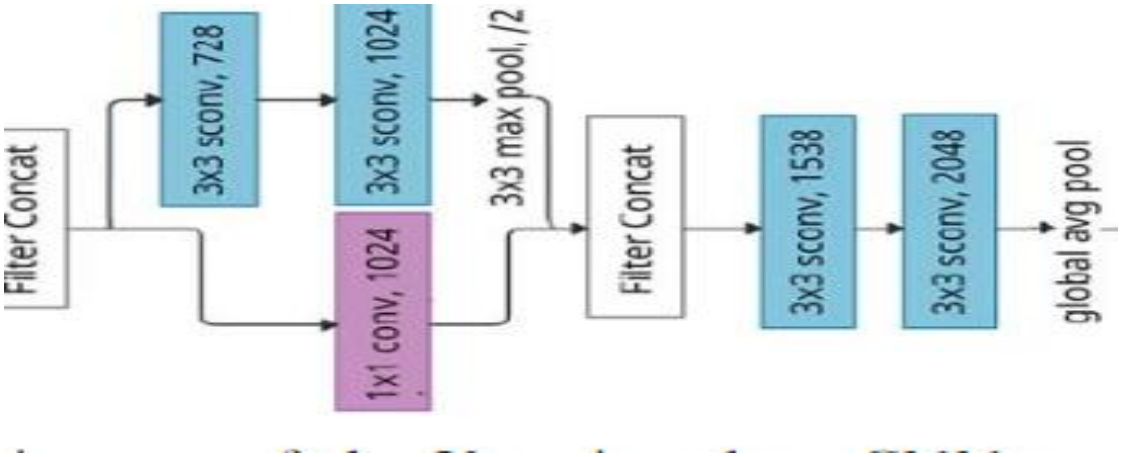
In the Xception model we freeze the first 41 layer and use the last 27 layer



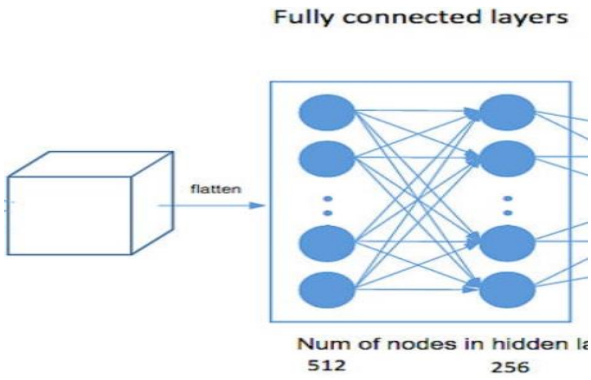
Entry Flow: This is the initial part of the network responsible for extracting low-level features from the input image. It consists of a series of convolutional layers, including depthwise separable convolutions. The goal is to capture local information efficiently.



Middle Flow: This part of the network is composed of multiple residual blocks stacked together. Each residual block consists of several depthwise separable convolutions, which help in preserving and propagating useful information through skip connections. The skip connections aid in gradient flow and enable the model to learn more effectively.



Exit Flow: The Exit Flow refines the features obtained from the Middle Flow and performs global average pooling. It further reduces the dimensionality of the feature maps.



After freeze the last layer of pretrained model we use flatten layer

Flatten: flattens the output of the previous layer, converting it from a 2D tensor into a 1D tensor. The output shape is (None, 2048), which means it has 2048 elements.

This is a fully connected (dense) layer with 512 units. It takes the flattened input and produces a tensor of shape (None, 512). The number of parameters in this layer is 1,049,088.

Add Batch Normalization layer performs batch normalization on the inputs. It helps in normalizing the activations of the previous layer, making the training process more stable. The output shape remains the same as the input, (None, 512).

Another fully connected layer with 256 units. It takes the output of the previous layer and produces a tensor of shape (None, 256). The number of parameters in this layer is 131,328.

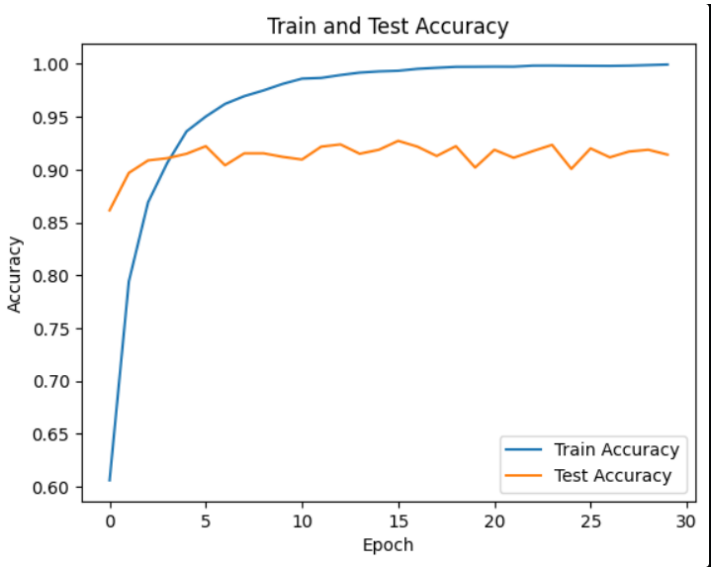
Lambda layer represents a lambda layer, which allows you to define and apply custom operations to the input data. The specific operation performed by this lambda layer is not provided in the model summary.

Chapter 5: Implementation, Experimental Setup, & Results

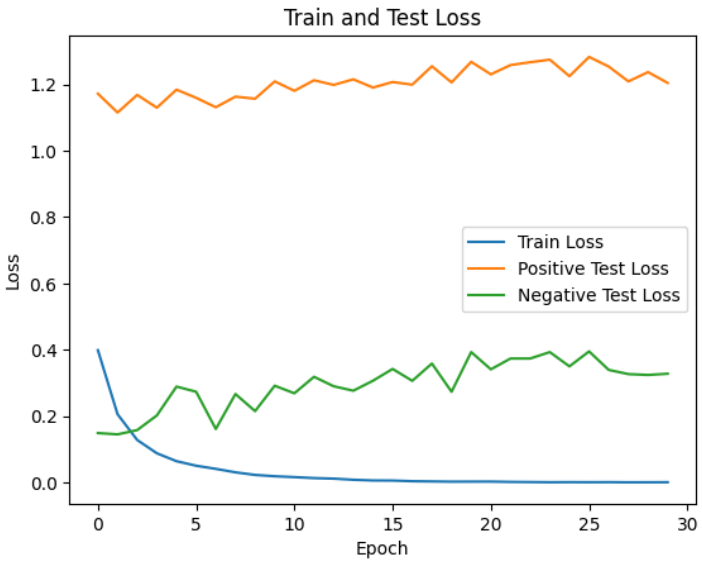
5.1 The training and loss curve:

The Trian accuracy of the model face recognition: 99%

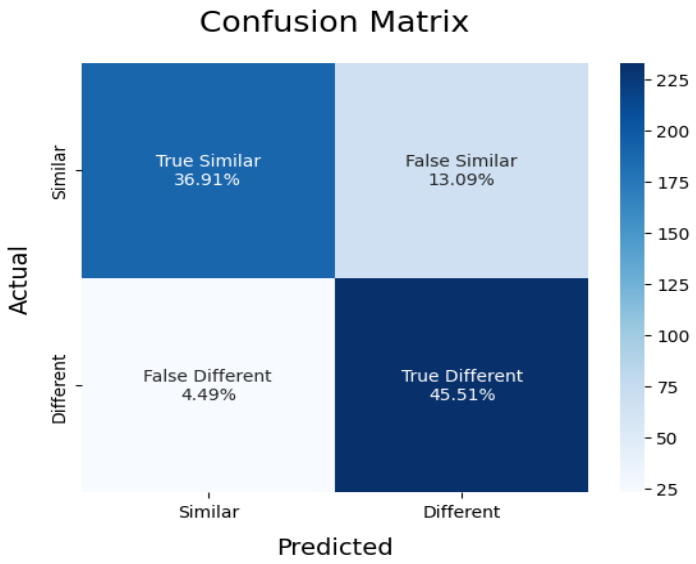
the test accuracy of the model face recognition: 92%



The loss of the test positive and the test negative are suitable for its solution.



5.2 the confusion matrix:



5.3 The discussion:

various challenges and issues in face recognition algorithms and highlights different areas of research and development to address these challenges. Here is a breakdown of the main points:

Cross Factor Face Recognition: This involves dealing with variations in pose, age, and makeup in face recognition. Techniques such as frontalization, generative probabilistic models, and matching makeup and non-makeup faces are used to address these challenges.

Heterogeneous Face Recognition: This deals with recognizing faces across different modalities such as near infrared and visual spectrum images, low-resolution images, and photo sketches. Approaches like matching visible and near-infrared images, deep learning for low-resolution faces, and image-to-image translation for photo-sketch matching are mentioned.

Single or Multiple Media Face Recognition: This category includes low-shot face recognition, template-based face recognition, and video face recognition. Approaches like training data enlargement, feature learning, similarity comparison, max pooling, and video face representation are used to improve performance in these scenarios.

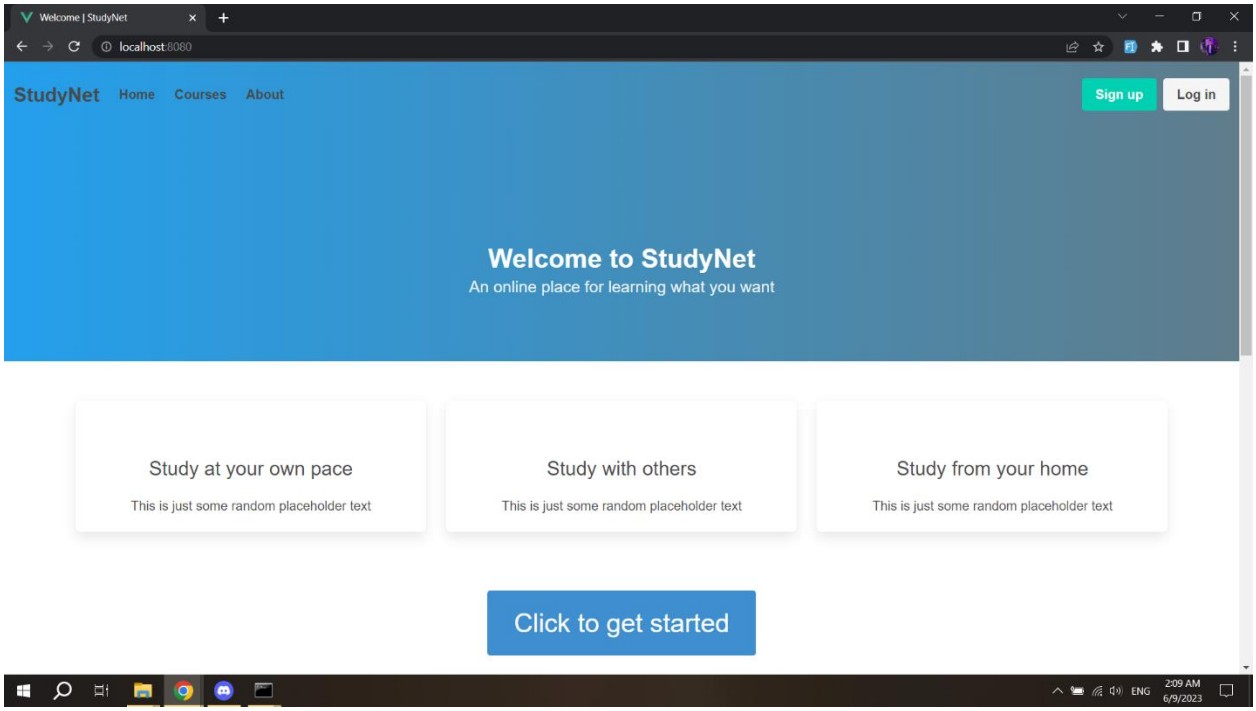
Industry-Based Face Recognition: This focuses on specific applications and challenges in face recognition, such as 3D face recognition, partial face

recognition, face anti-spoofing, and mobile device-based face recognition. Methods like 3D data synthesis, deep feature extraction, arbitrary-size face patches, anti-spoofing techniques, and lightweight recognition for mobile devices are mentioned.

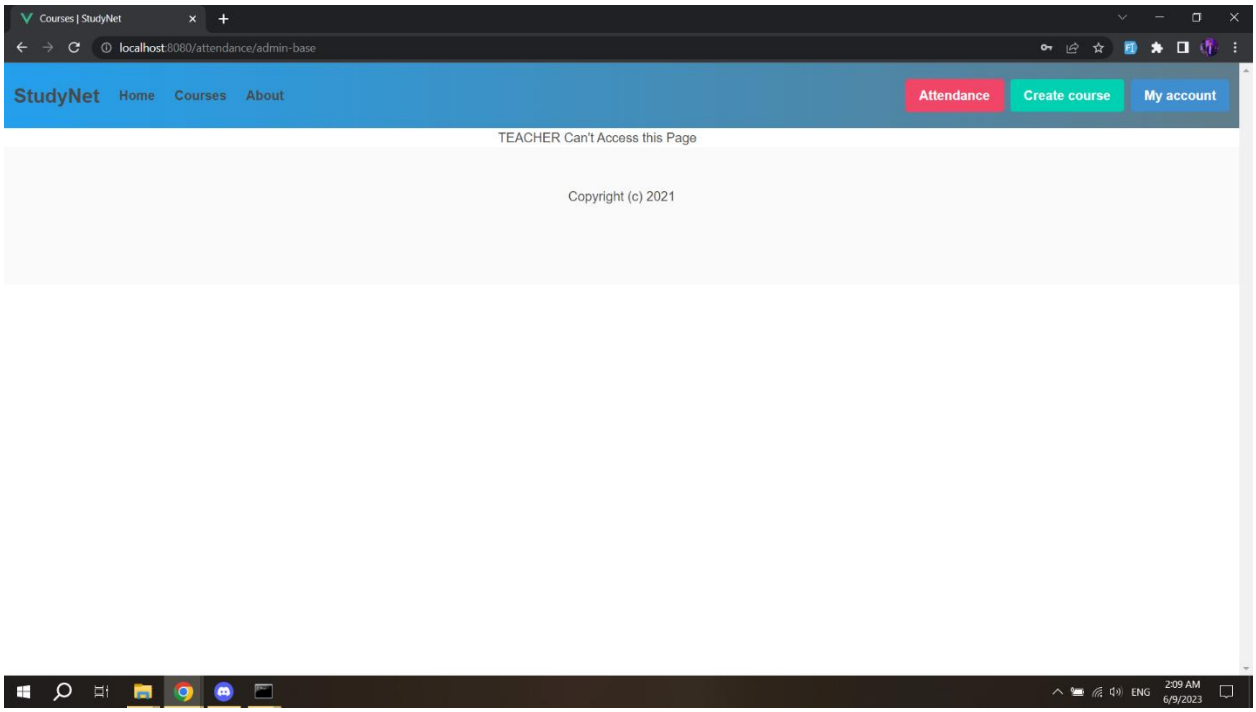
Covariates and CNNs (Convolutional Neural Network): Convolutional Neural Networks (CNNs) are widely used in deep face recognition systems. The passage mentions the impact of various covariates (e.g., image quality factors, model characteristics) on CNN performance. Factors like noise, blur, missing pixels, and brightness are found to significantly affect performance, while changes in contrast and compression artifacts have a lesser impact. Computation strategies for descriptors and colour information are not found to have a significant effect on performance.

Chapter 6: User Interface

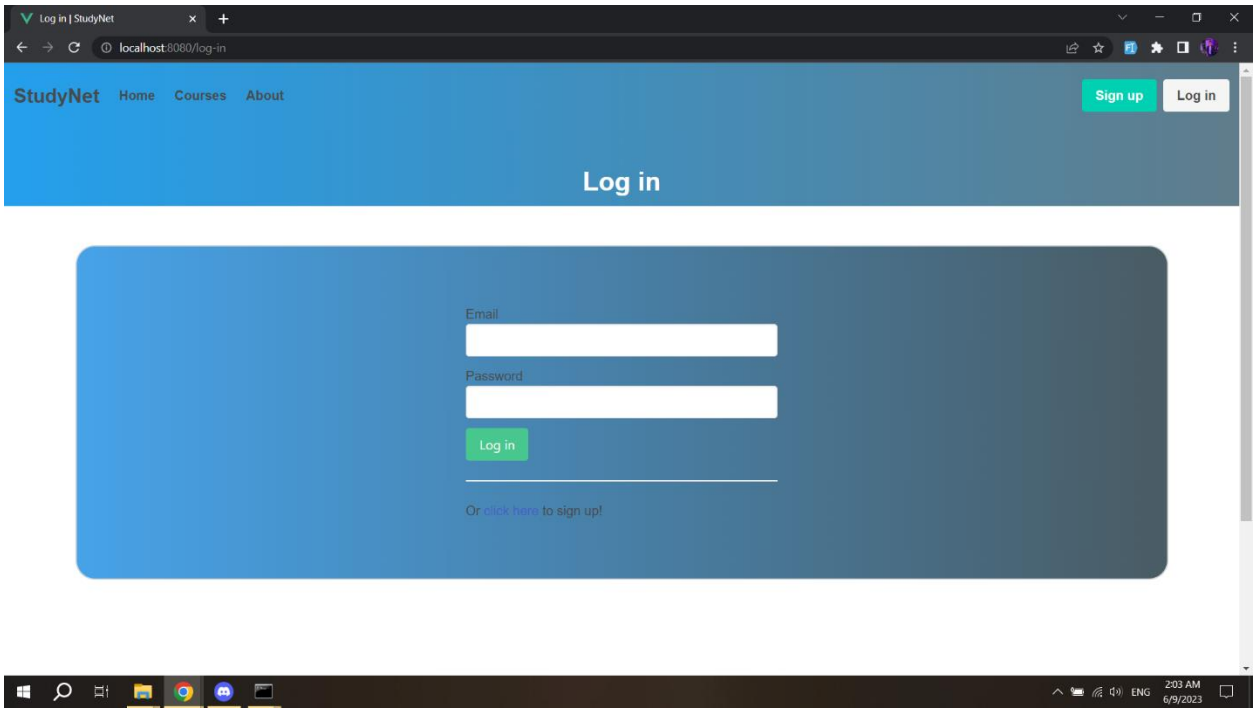
Home view without authorization:

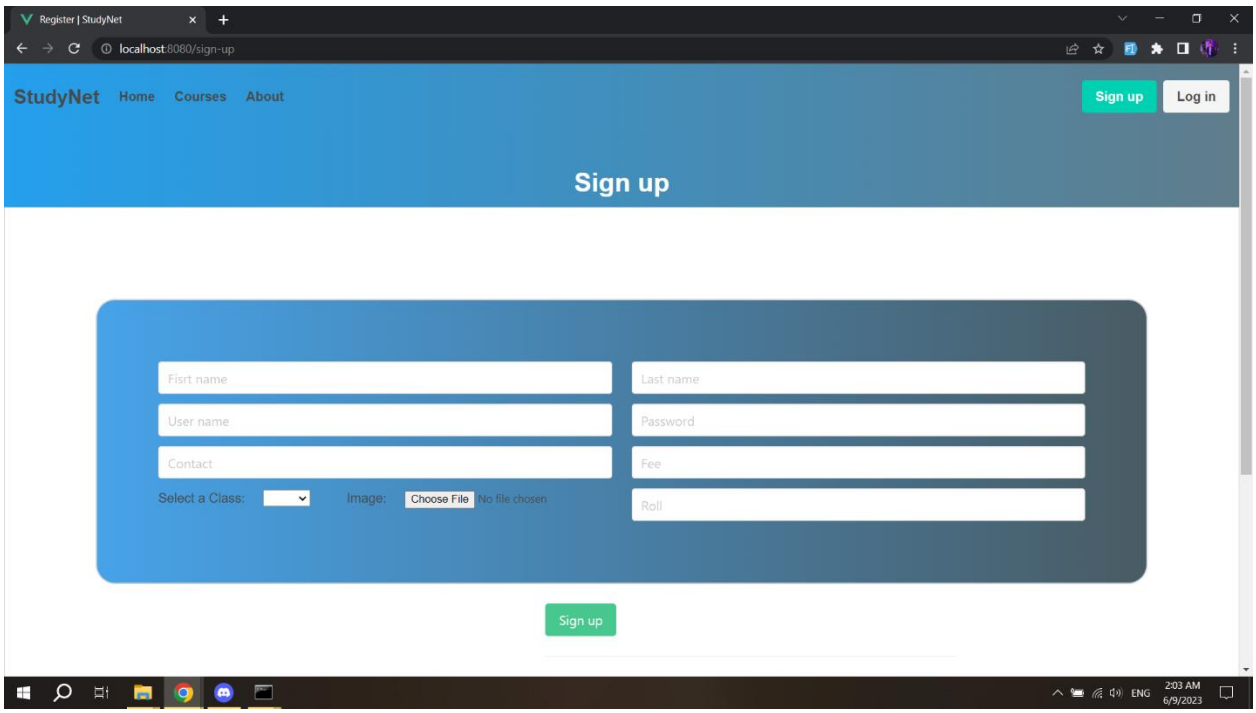


Cant acces page with out authorization:

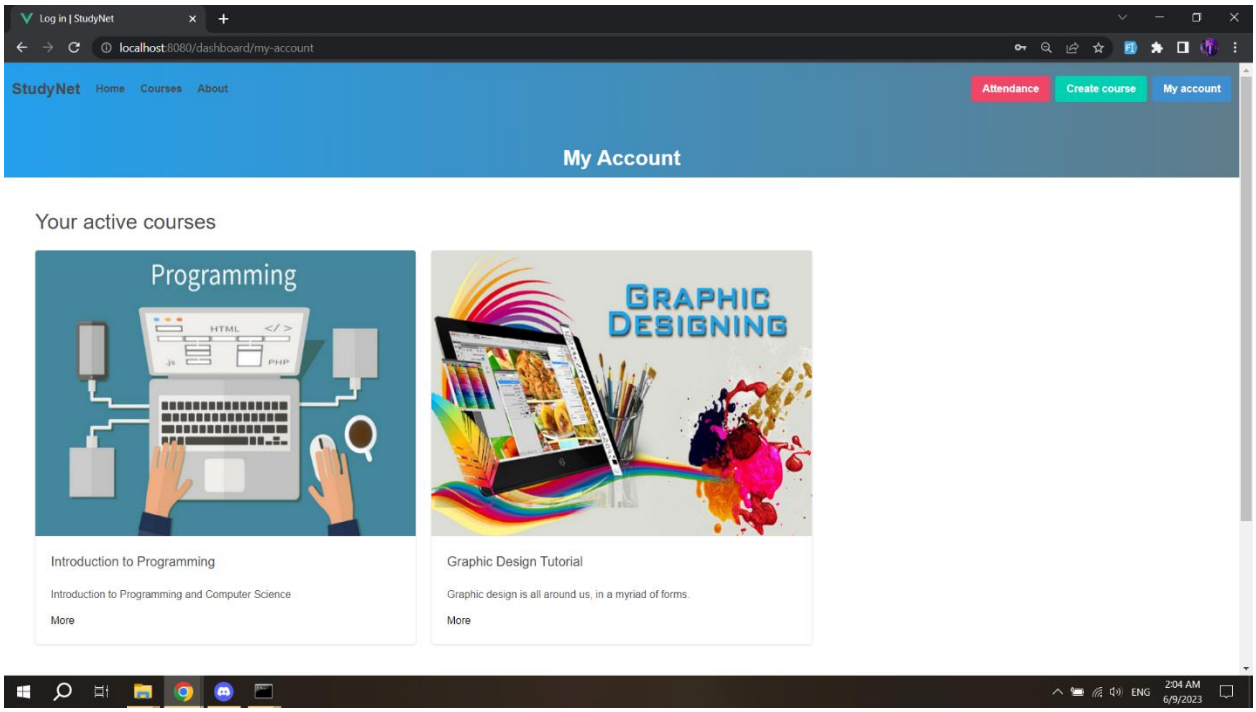


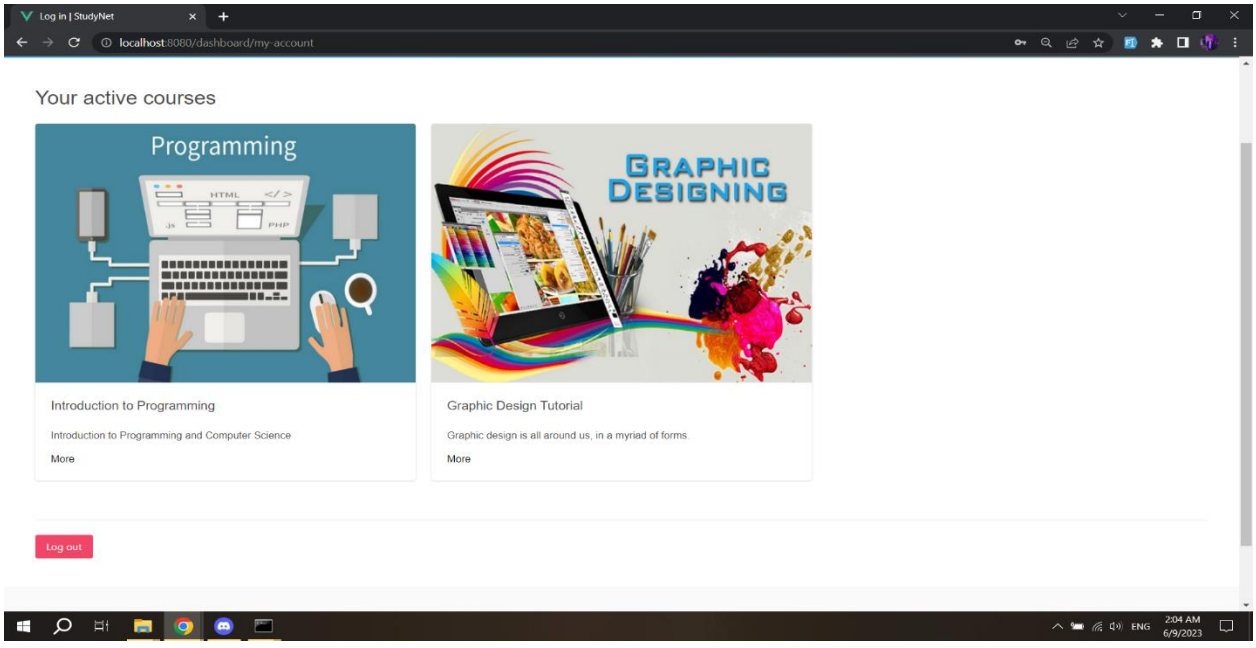
Login and Sign Up View:



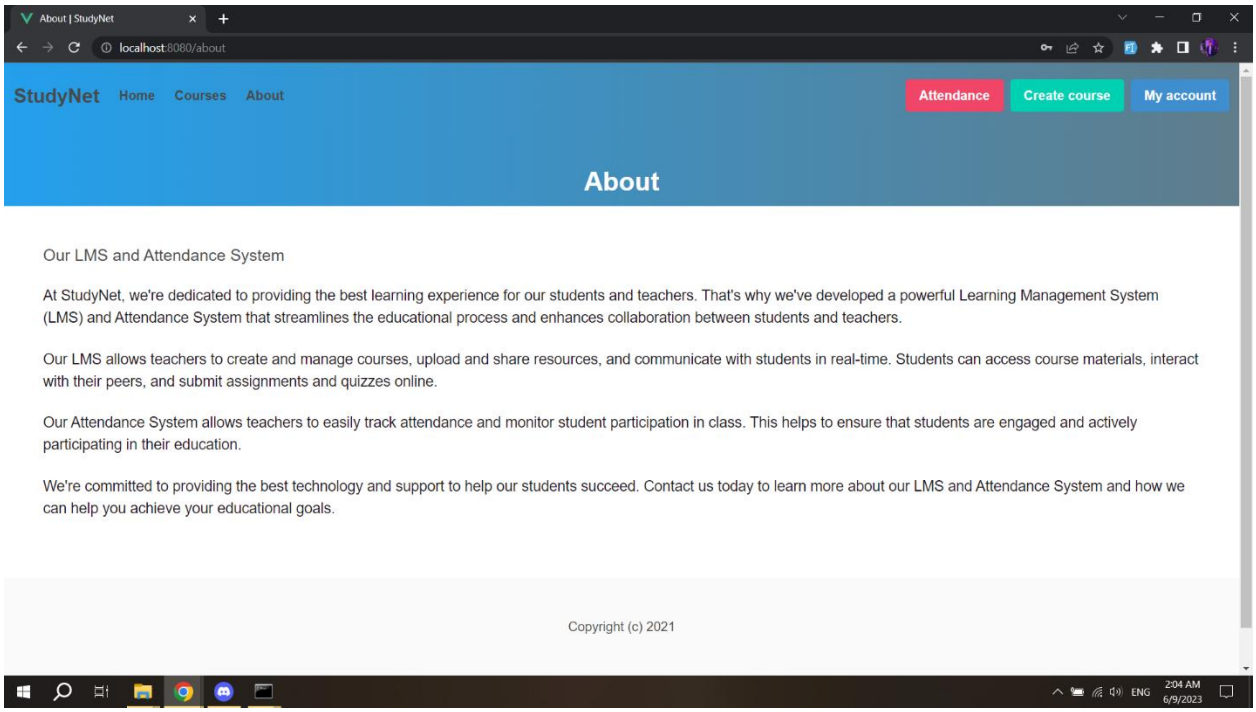


My Account View:

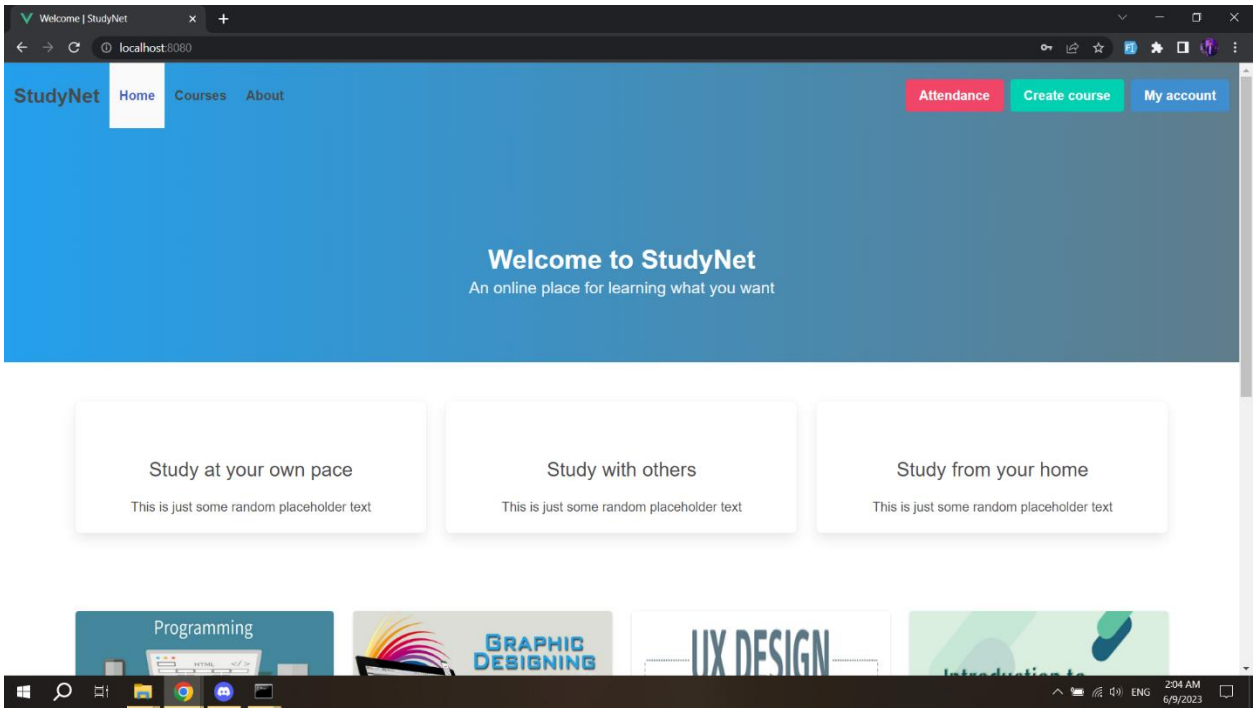


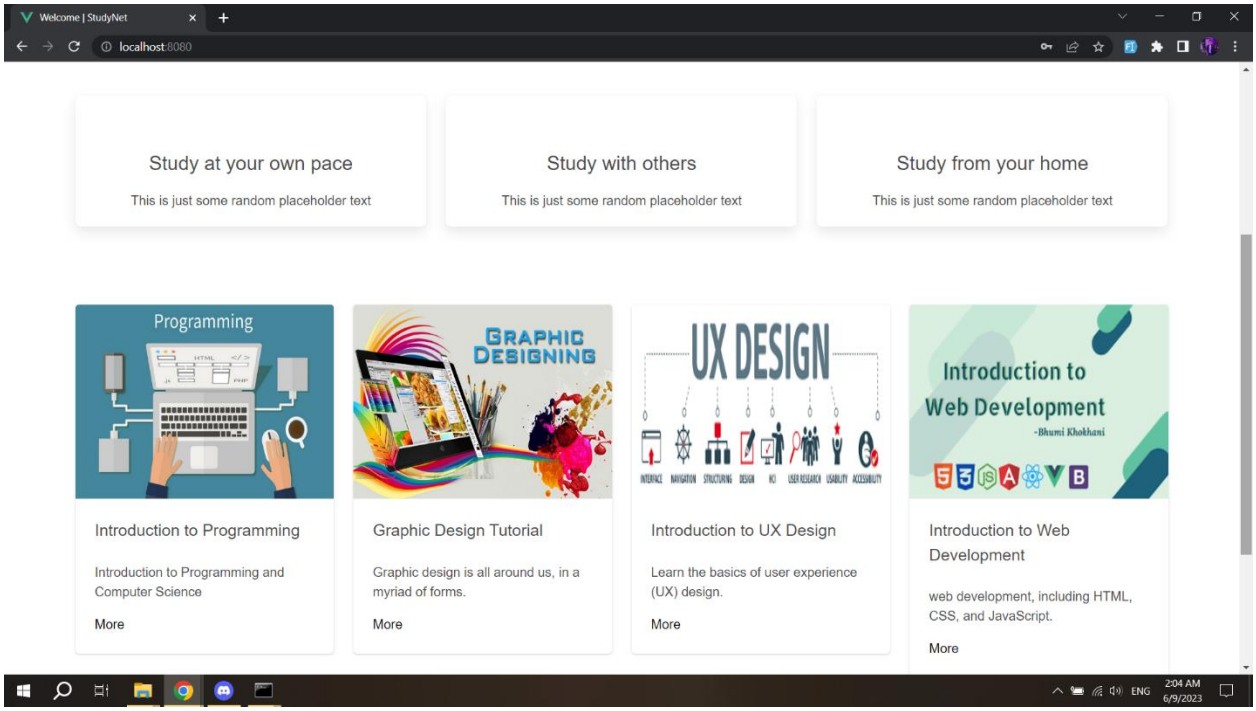


About view:

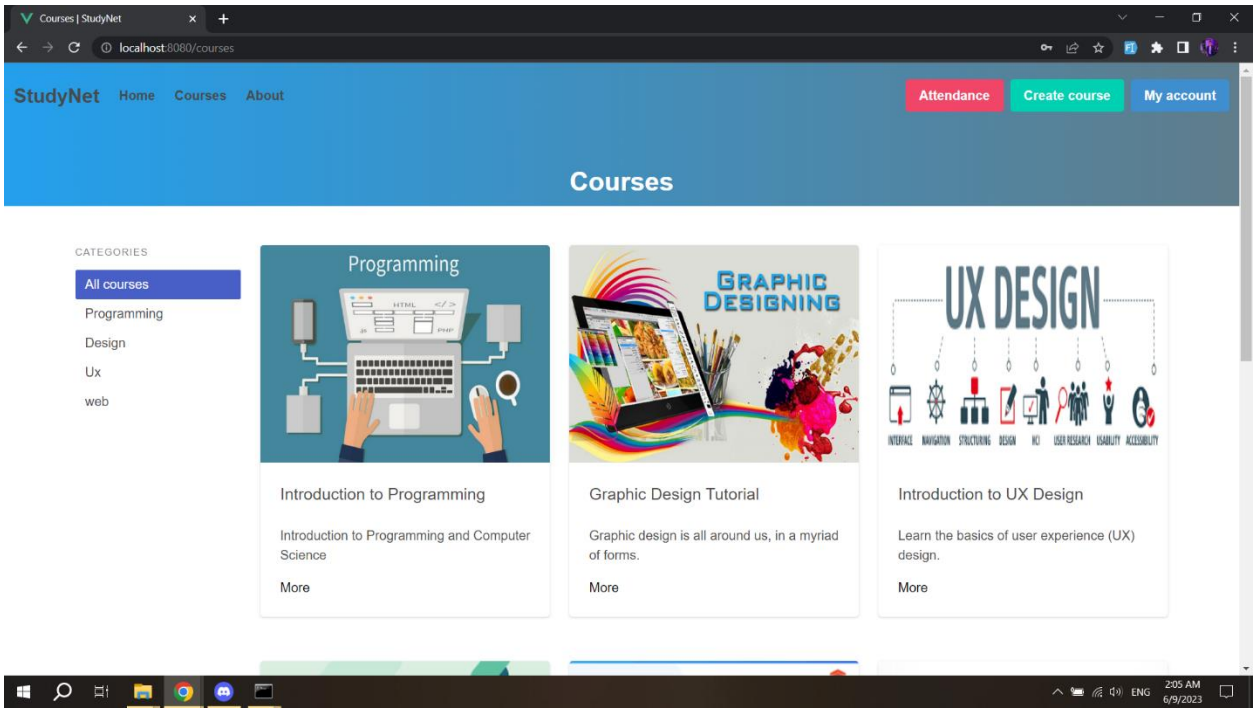

About | StudyNet
localhost:8080/about
StudyNet
Home
Courses
About
Attendance
Create course
My account
About
Our LMS and Attendance System
At StudyNet, we're dedicated to providing the best learning experience for our students and teachers. That's why we've developed a powerful Learning Management System (LMS) and Attendance System that streamlines the educational process and enhances collaboration between students and teachers.
Our LMS allows teachers to create and manage courses, upload and share resources, and communicate with students in real-time. Students can access course materials, interact with their peers, and submit assignments and quizzes online.
Our Attendance System allows teachers to easily track attendance and monitor student participation in class. This helps to ensure that students are engaged and actively participating in their education.
We're committed to providing the best technology and support to help our students succeed. Contact us today to learn more about our LMS and Attendance System and how we can help you achieve your educational goals.
Copyright (c) 2021
ENG
2:04 AM
6/9/2023

Home View:

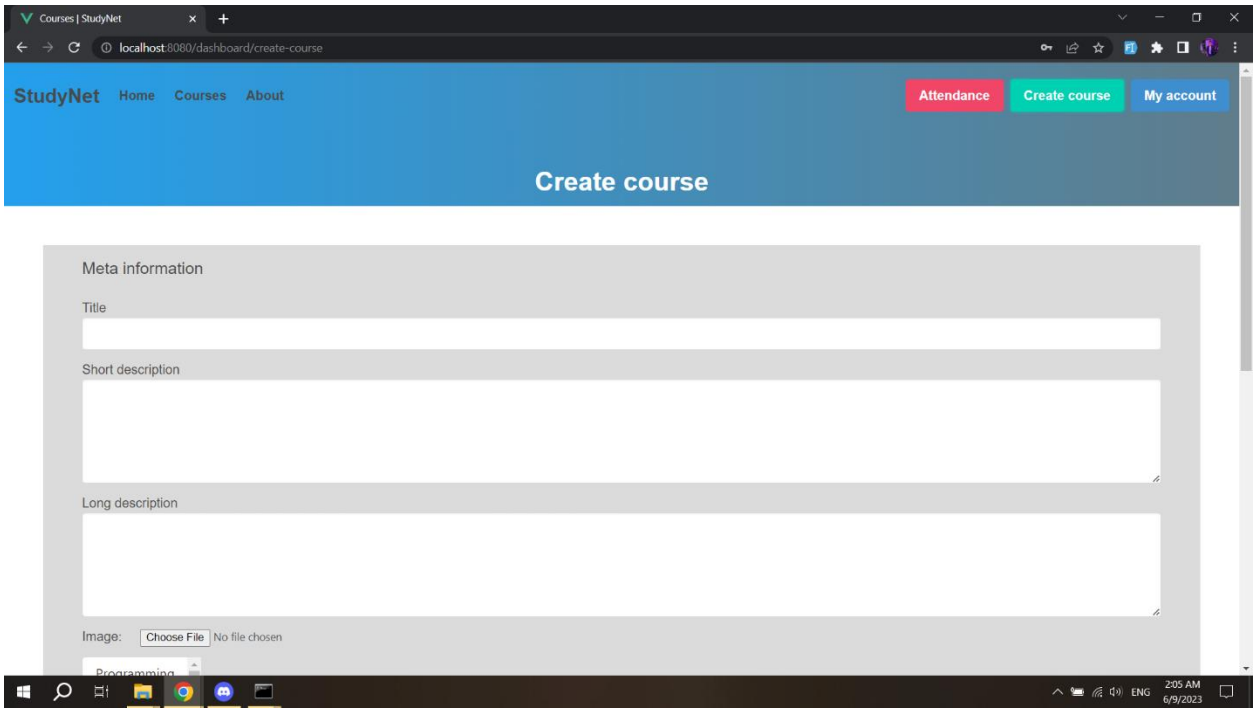

Welcome | StudyNet
localhost:8080
StudyNet
Home
Courses
About
Attendance
Create course
My account
Welcome to StudyNet
An online place for learning what you want
Study at your own pace
This is just some random placeholder text
Study with others
This is just some random placeholder text
Study from your home
This is just some random placeholder text
Programming
GRAPHIC DESIGNING
UX DESIGN
ENG
2:04 AM
6/9/2023

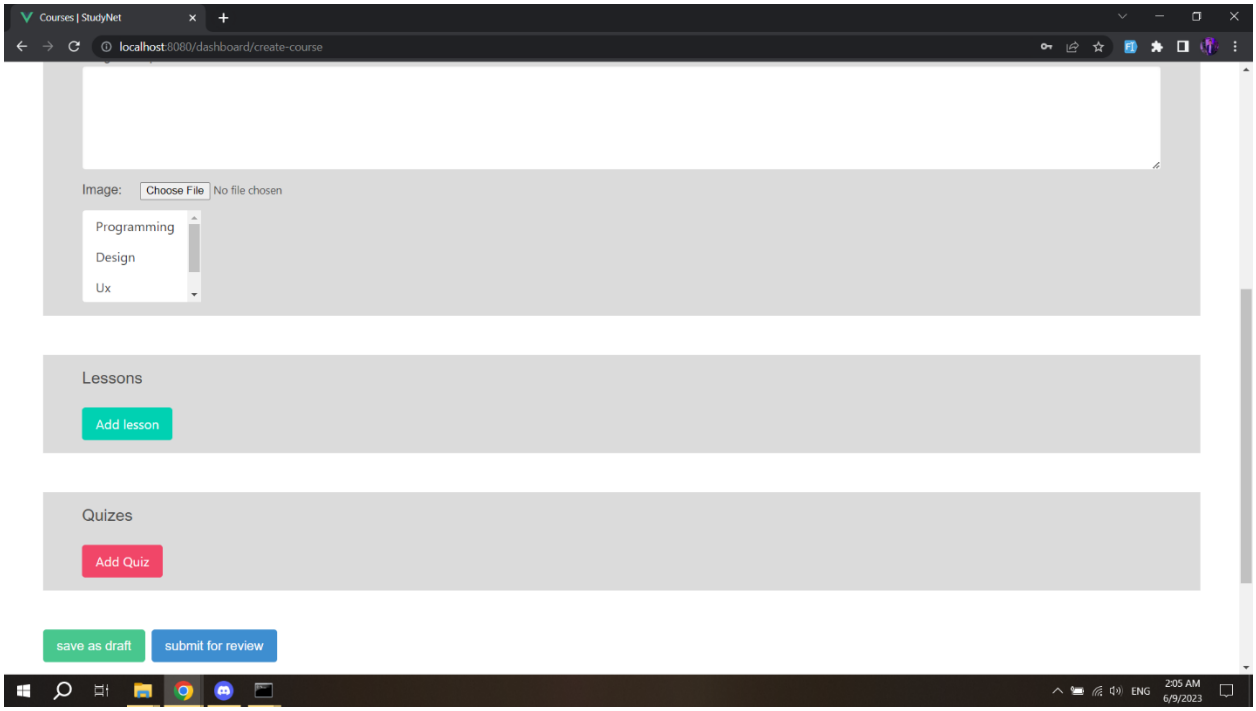

Welcome | StudyNet
localhost:8080
Study at your own pace
This is just some random placeholder text
Study with others
This is just some random placeholder text
Study from your home
This is just some random placeholder text
Programming
GRAPHIC DESIGNING
UX DESIGN
Introduction to Web Development
-Bhumi Khokhani
Introduction to Programming
Introduction to Programming and Computer Science
More
Graphic Design Tutorial
Graphic design is all around us, in a myriad of forms.
More
Introduction to UX Design
Learn the basics of user experience (UX) design.
More
Introduction to Web Development
web development, including HTML, CSS, and JavaScript.
More
ENG
2:04 AM
6/9/2023

Courses View:

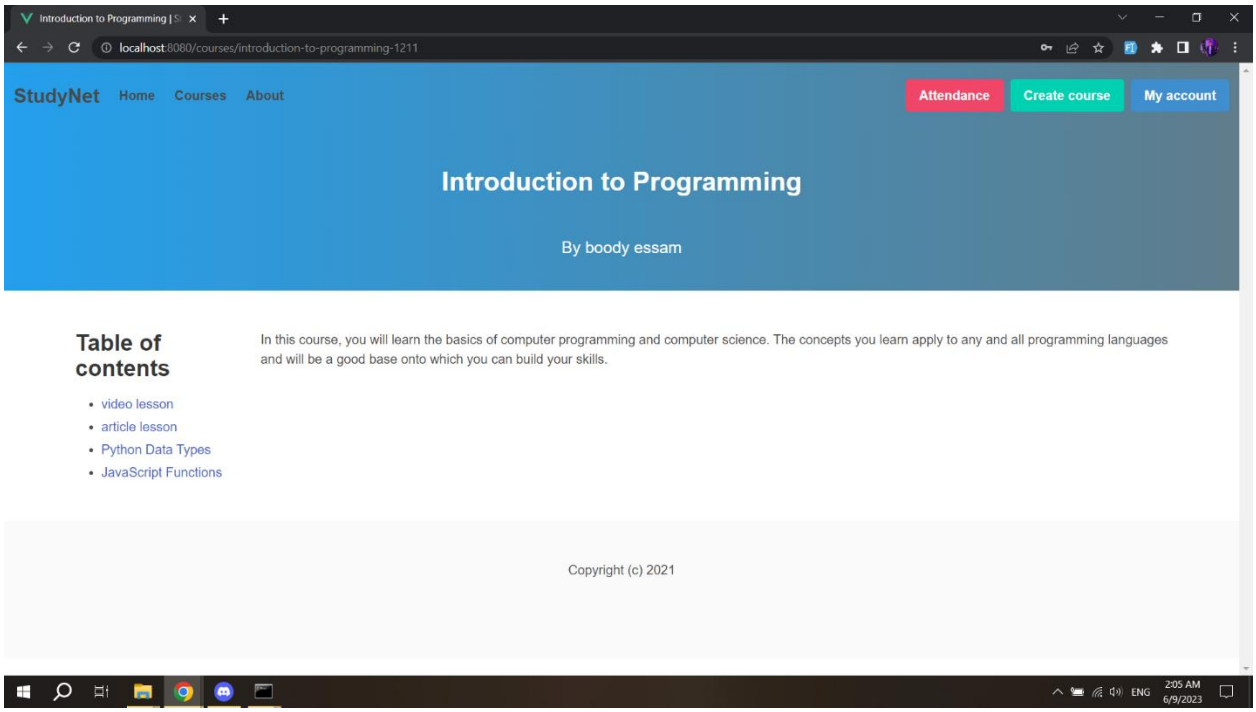


Create courses view:

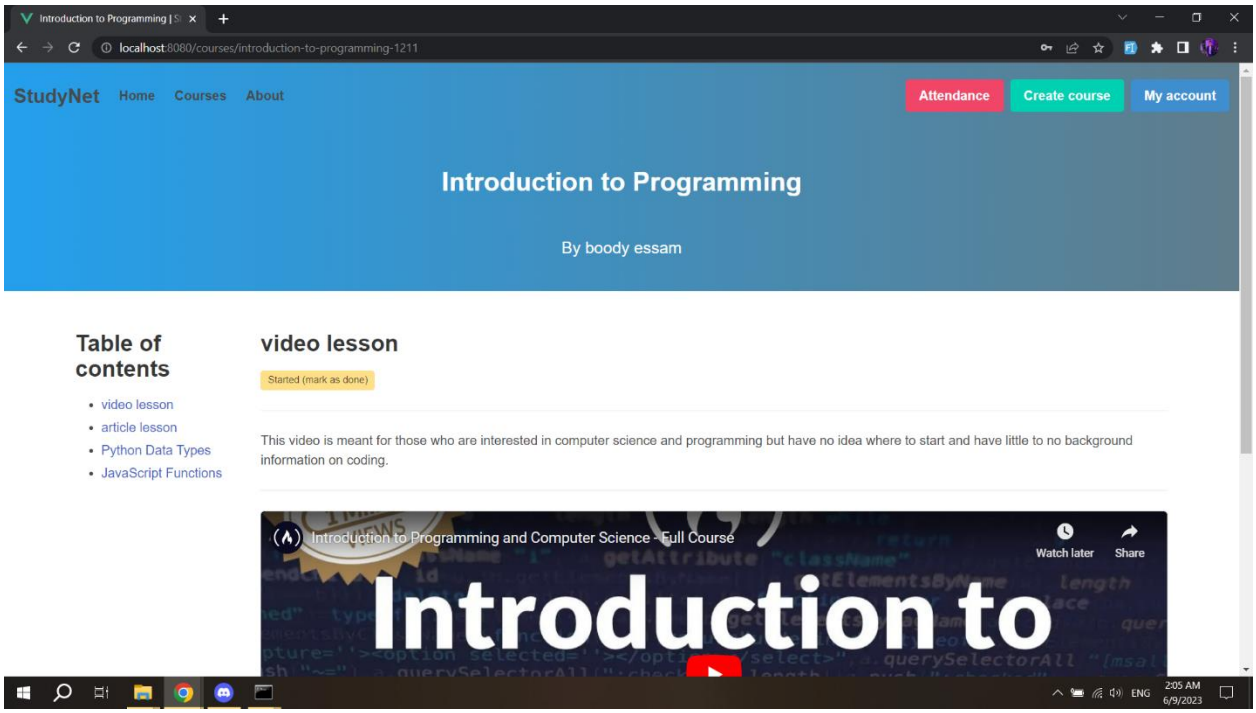




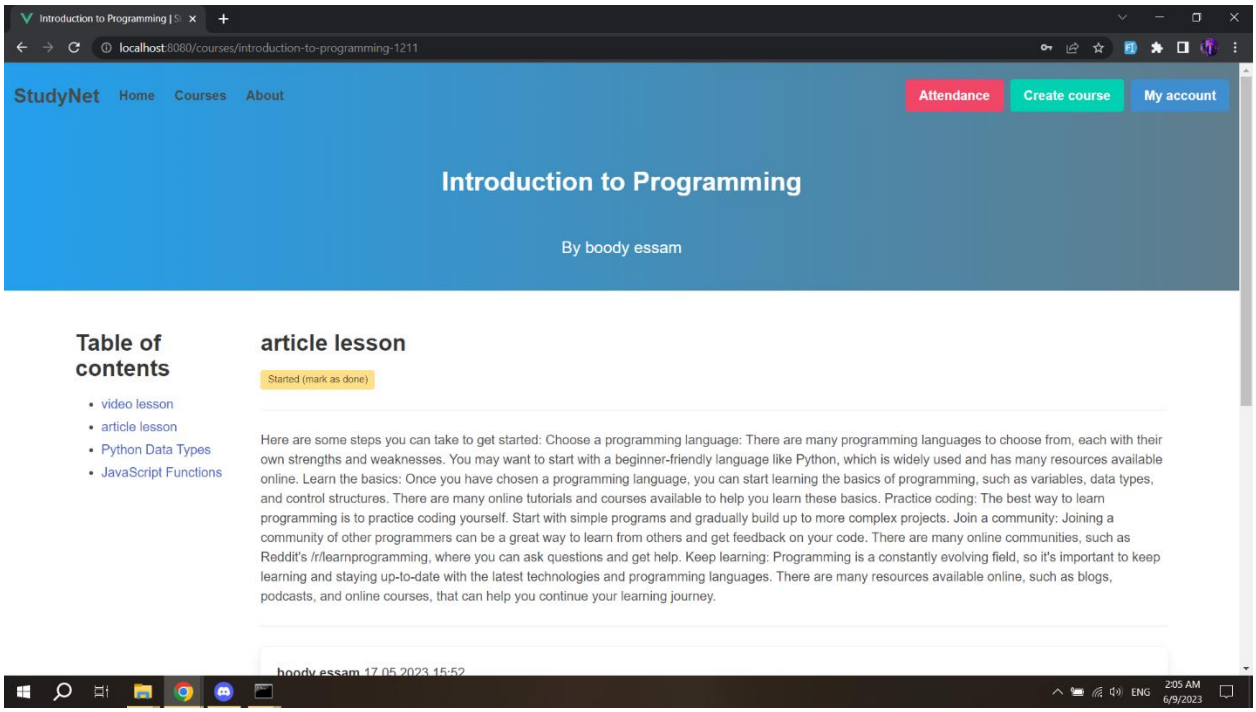
Course details view:



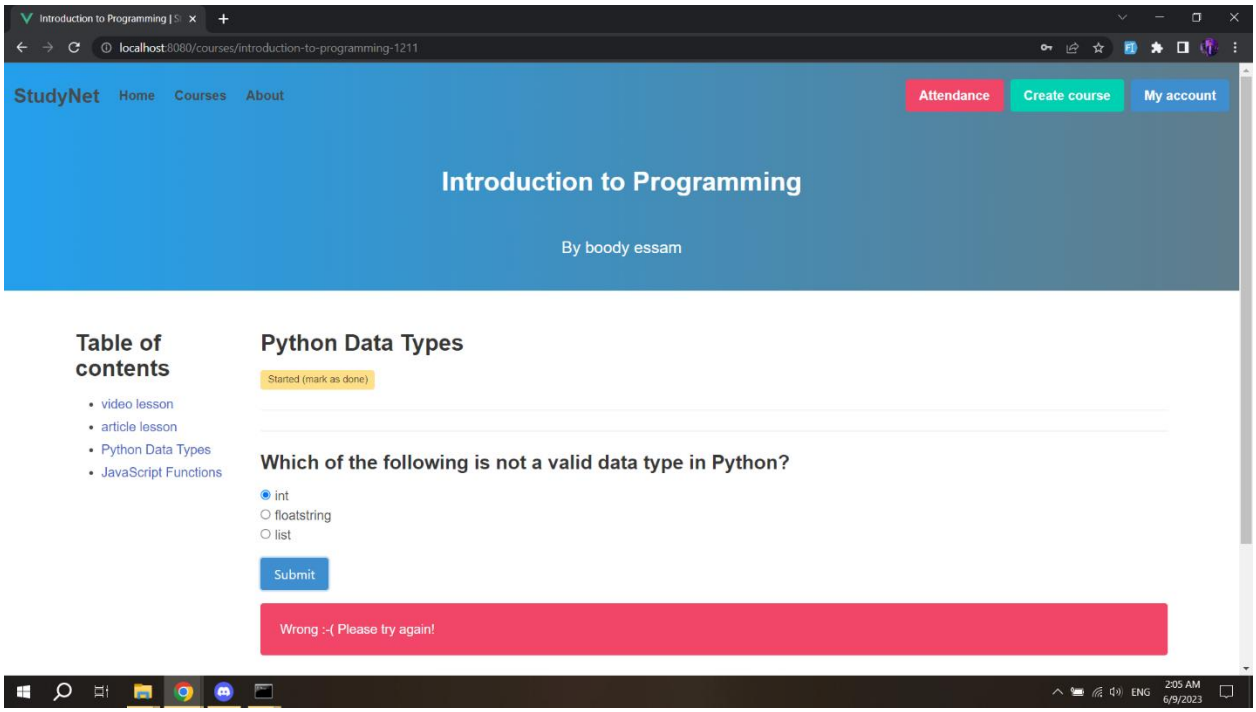
lesson with video view:



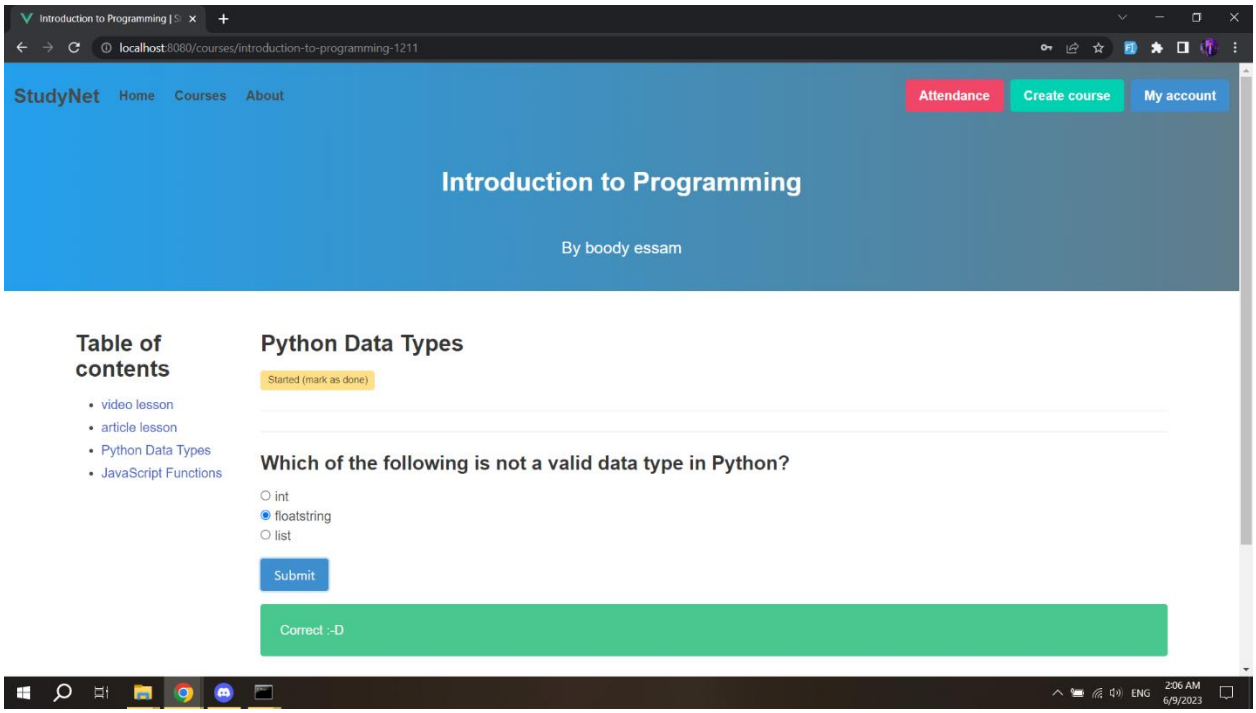
Lesson with article view:



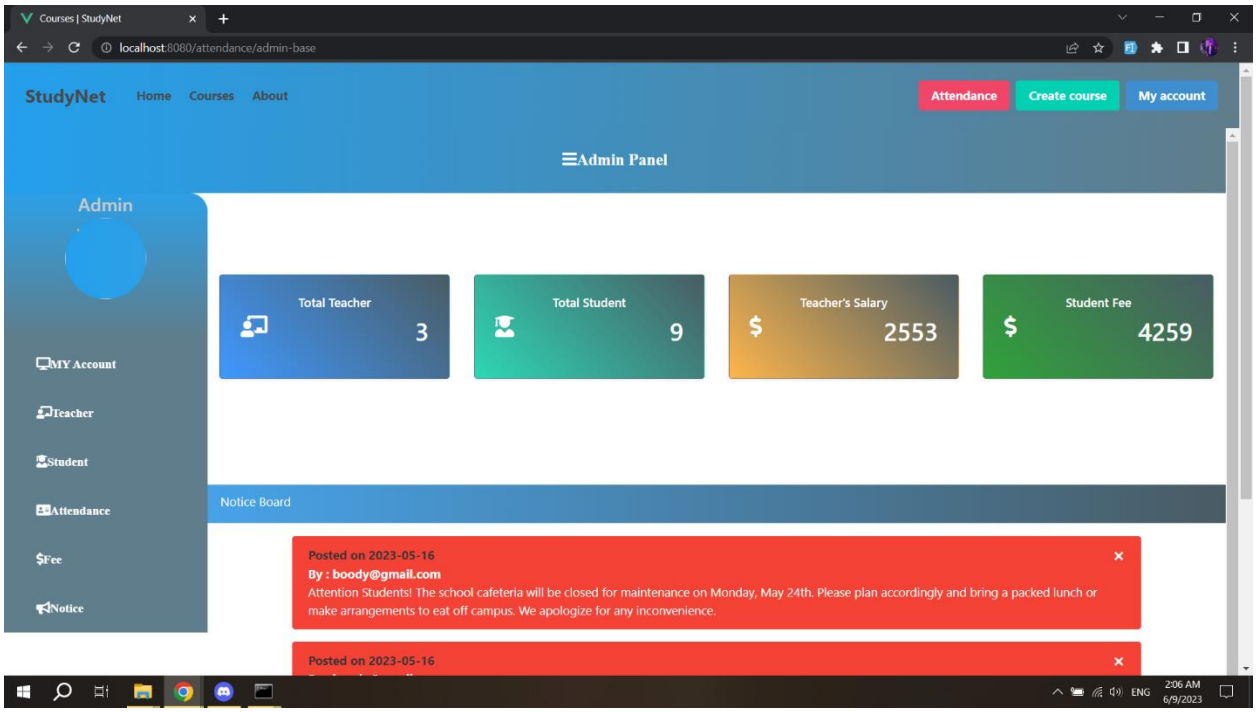
Qiuze view: (wrong answer)



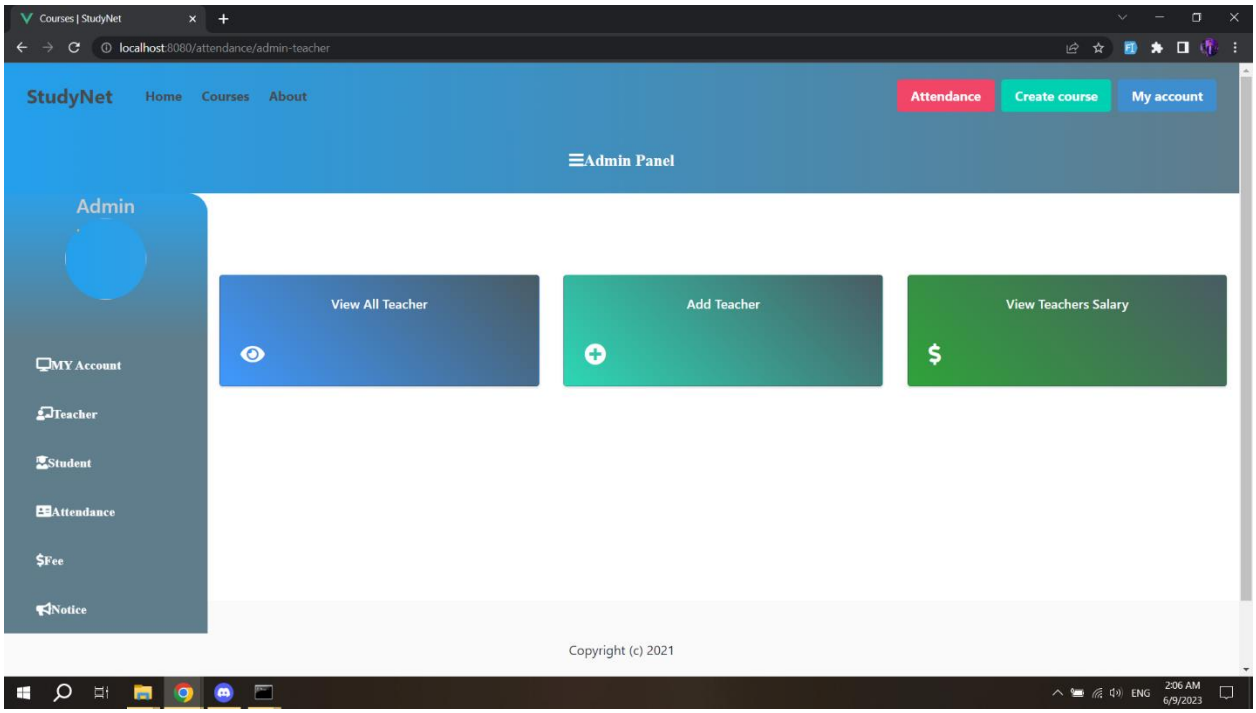
Quize view: (right answer)



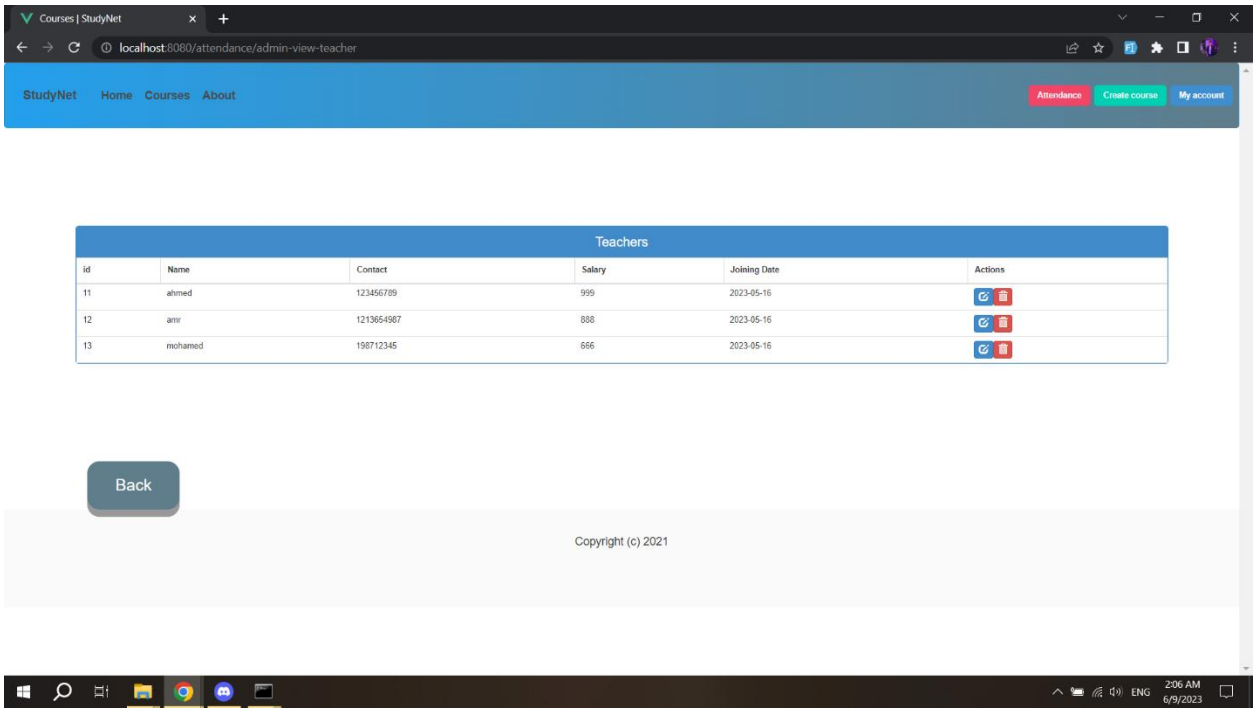
Admin dashboard view:



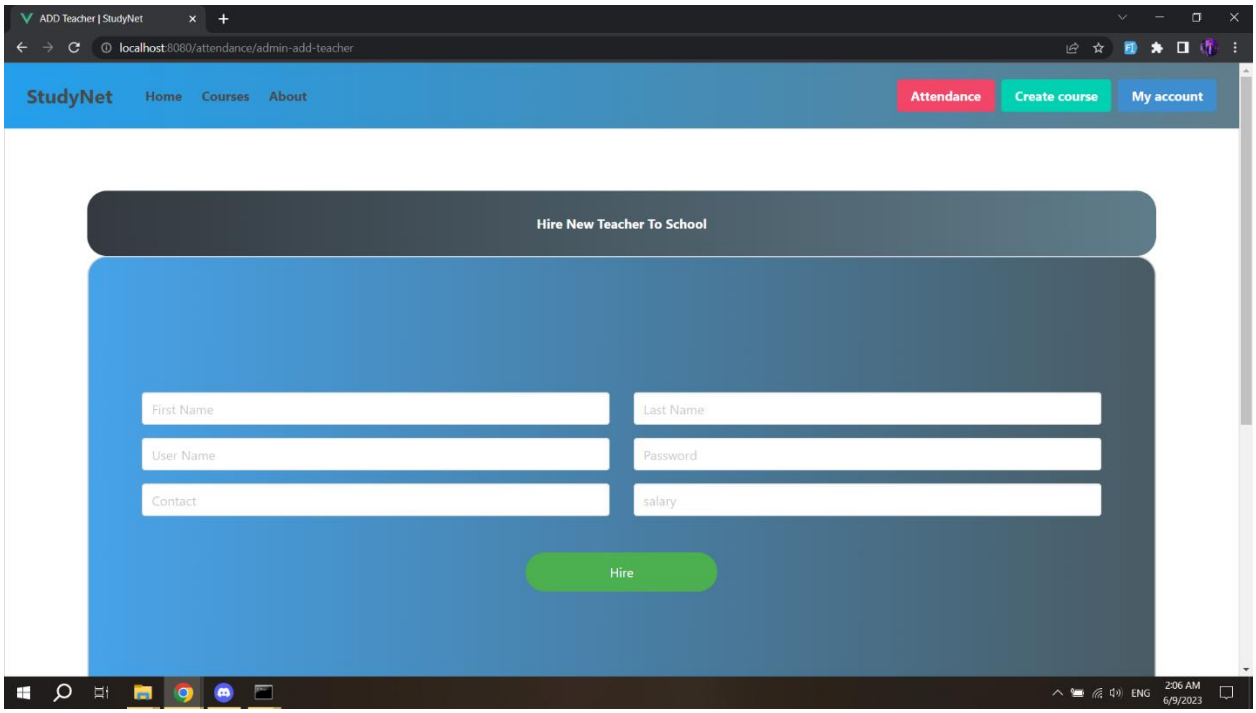
Admin manage teacher view:



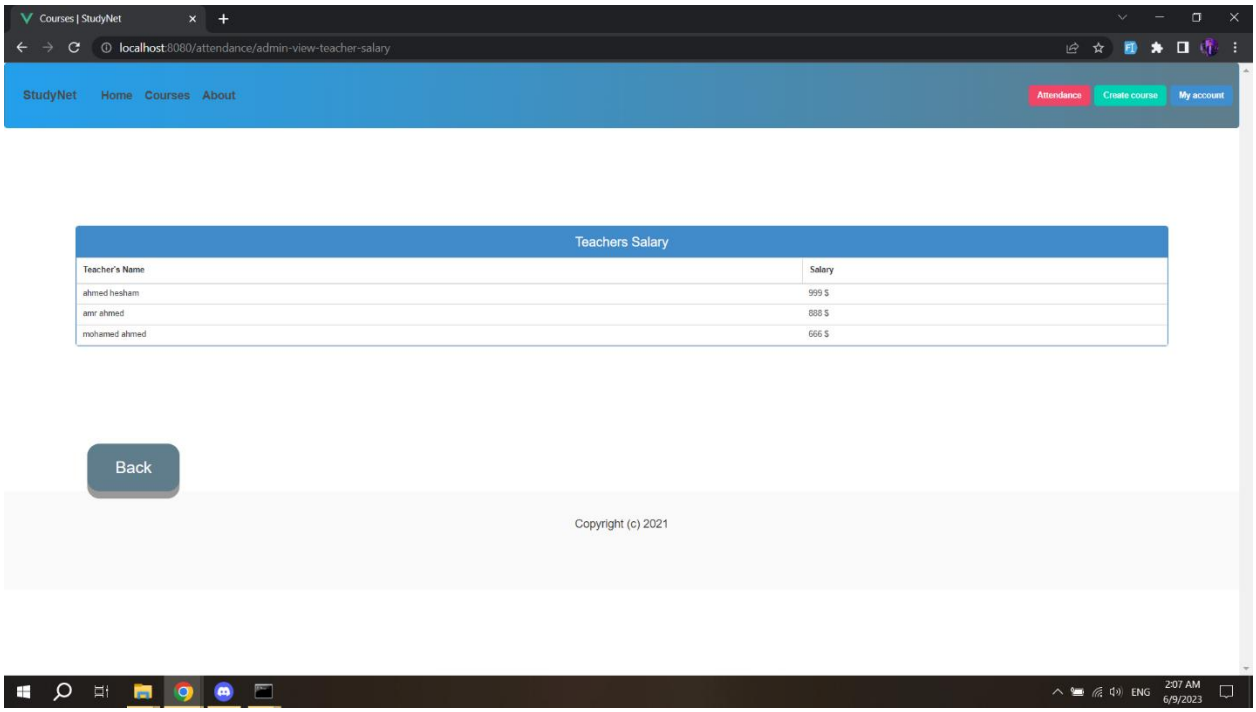
Admin view all teacher view: (update or delete)



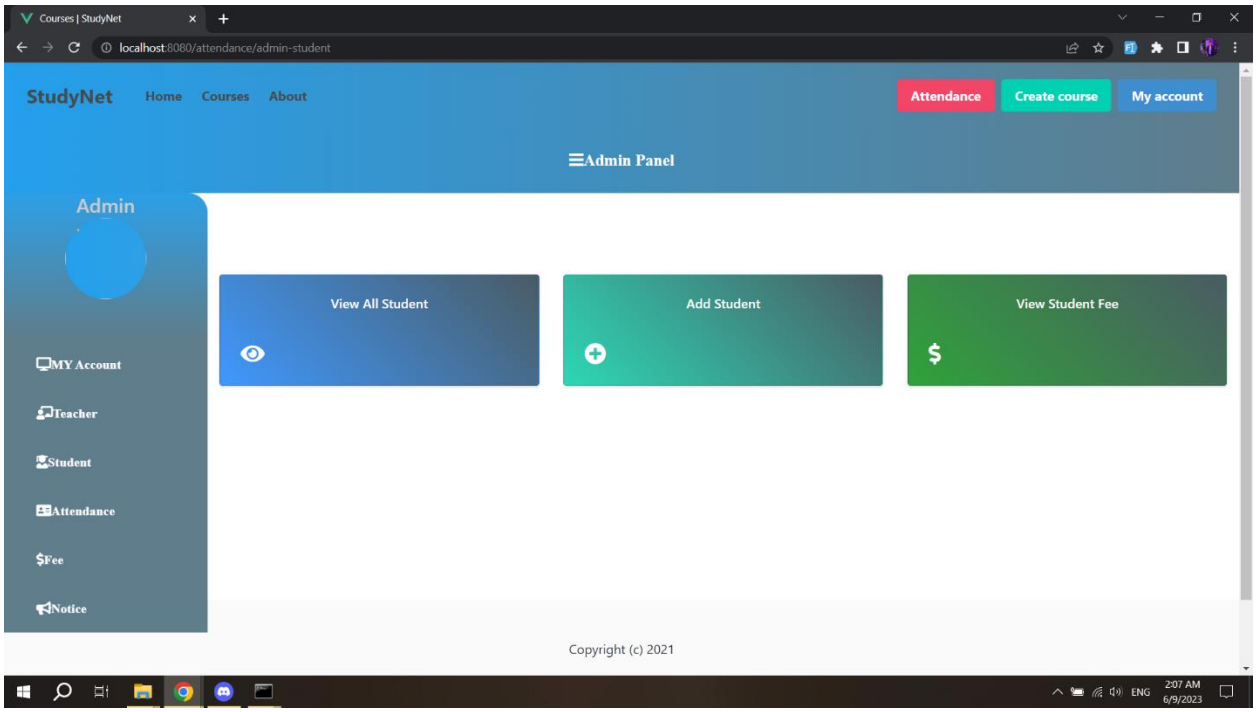
Admin add new teacher view:



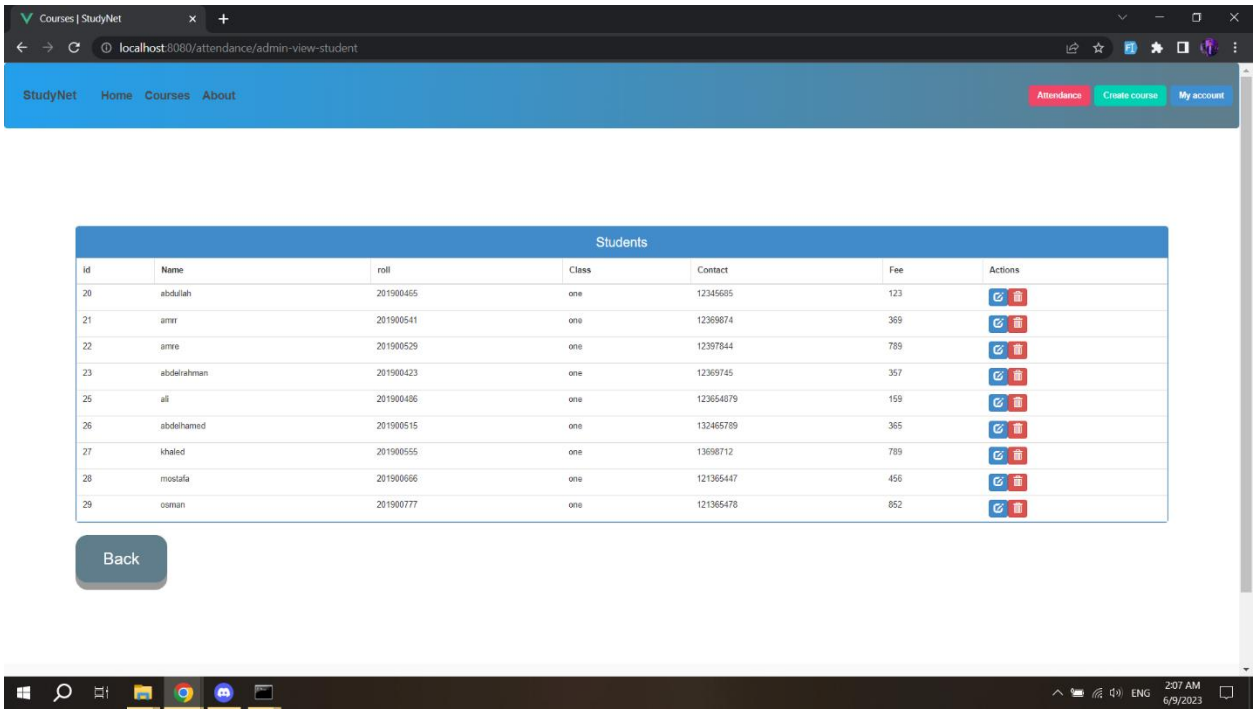
Admin view all teacher salary:



Admin manage students view:



Admin view all teachers: (update or delete)



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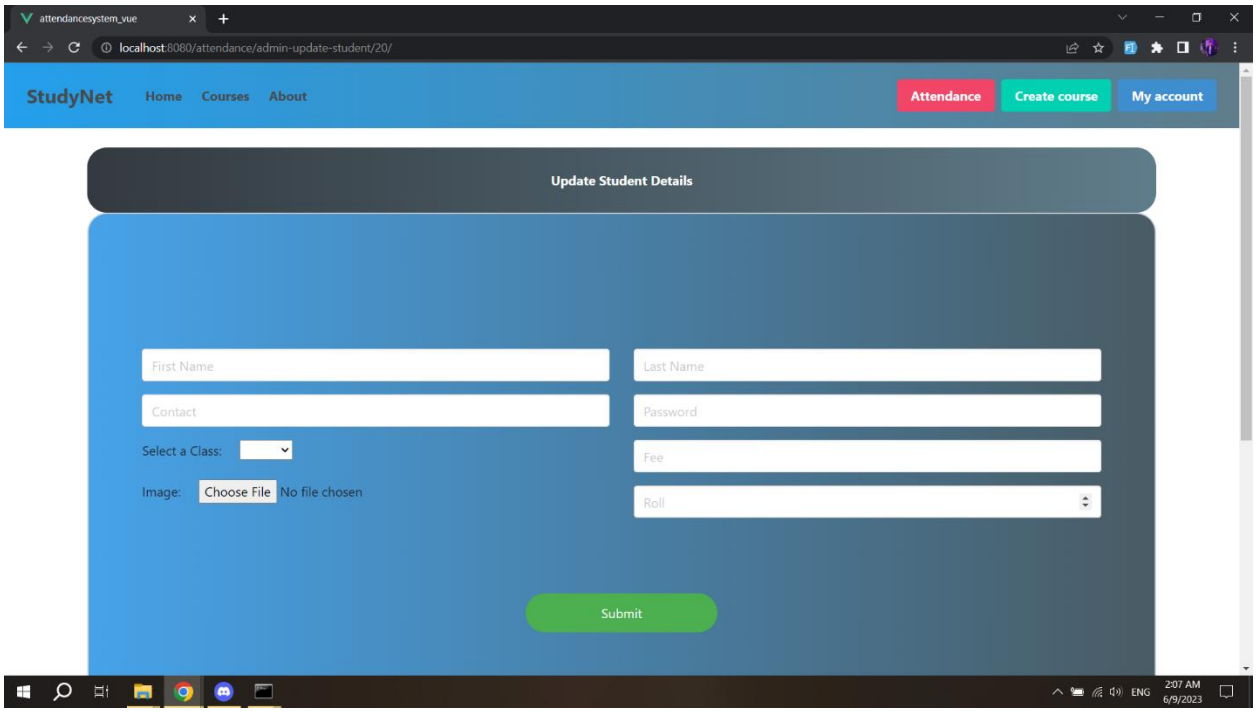
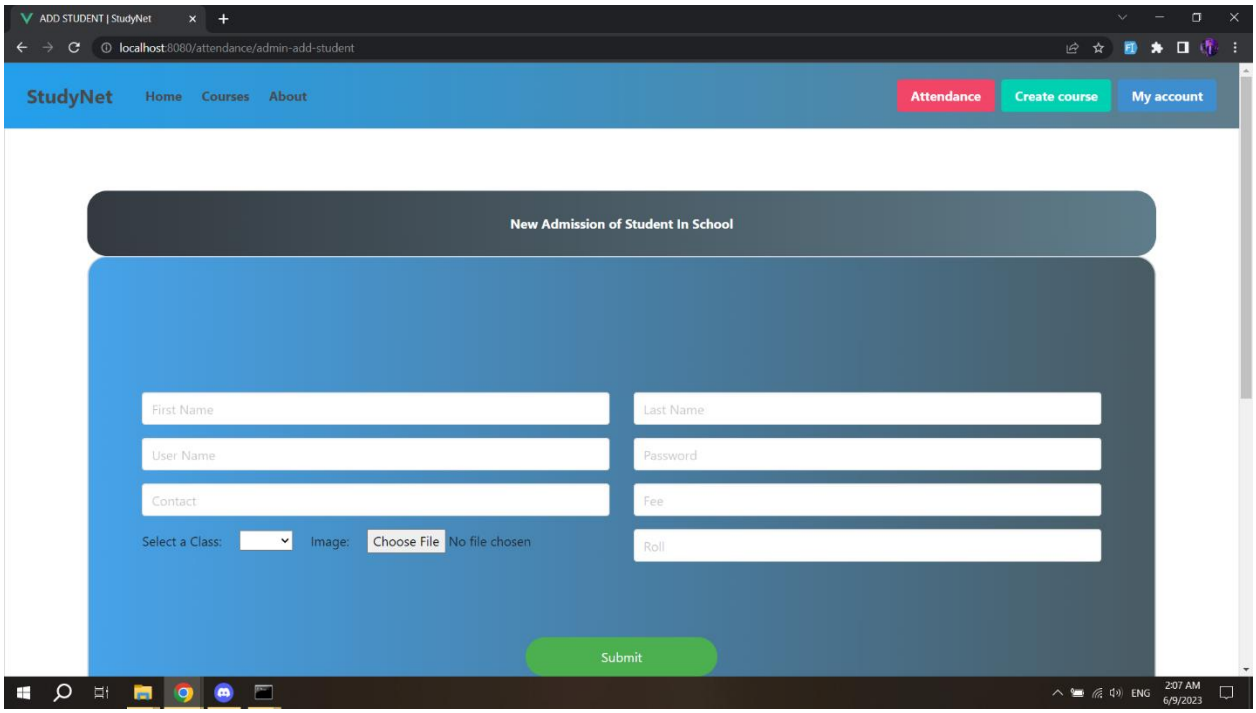
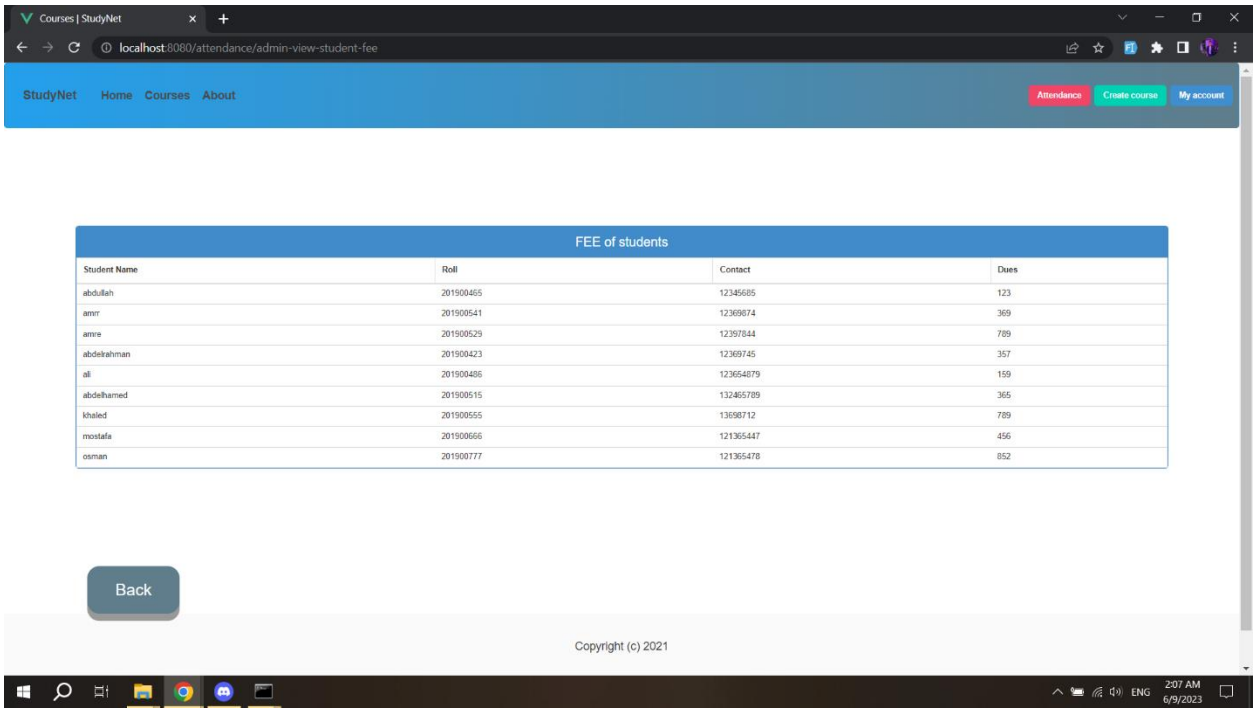


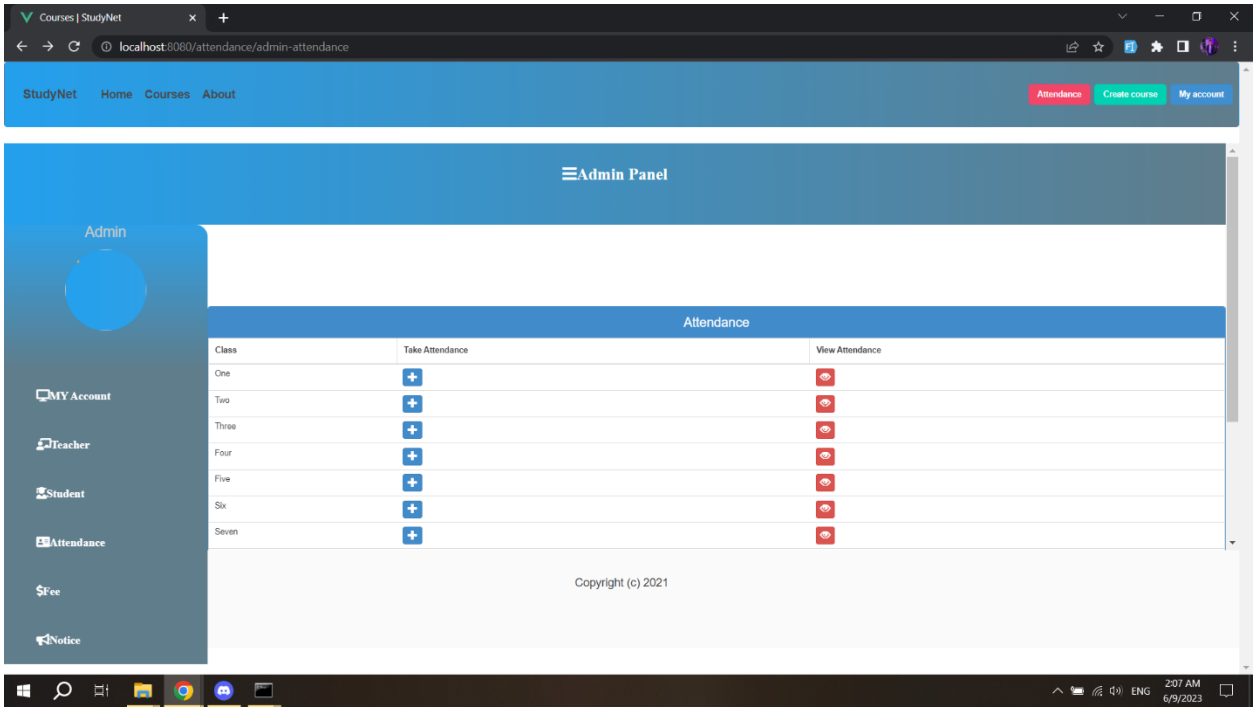
Admin add new student view:



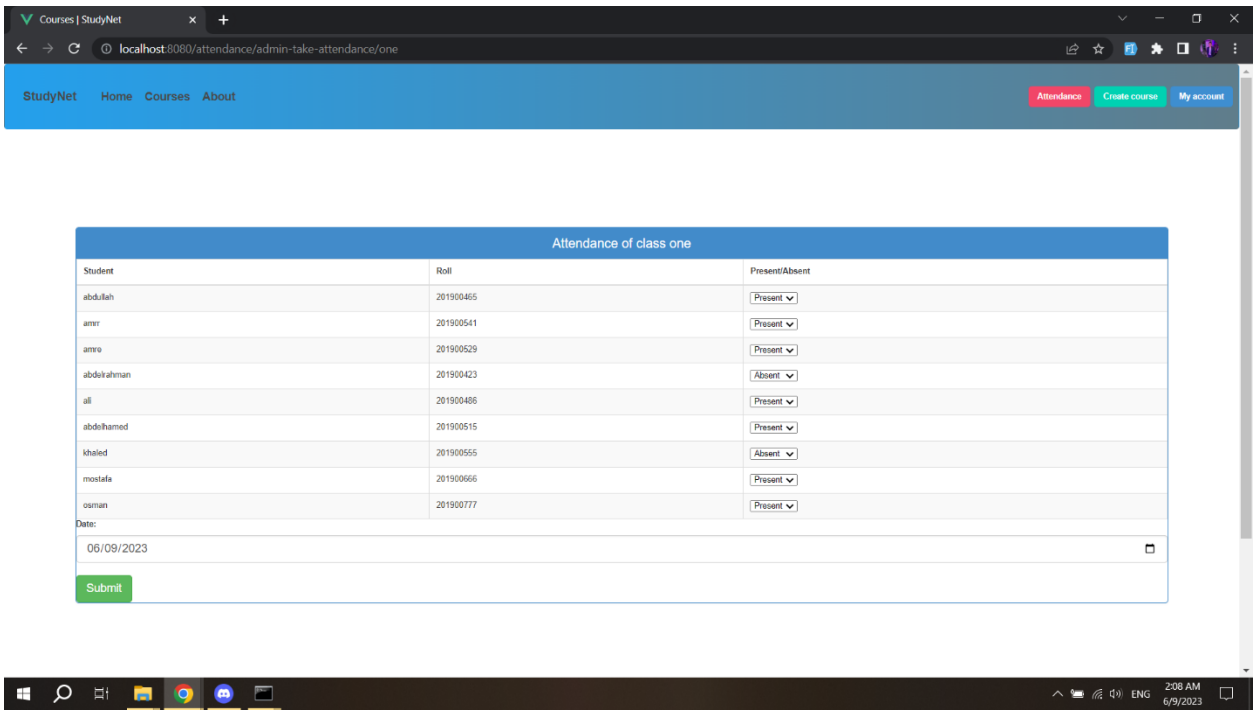
Admin view all students fees:



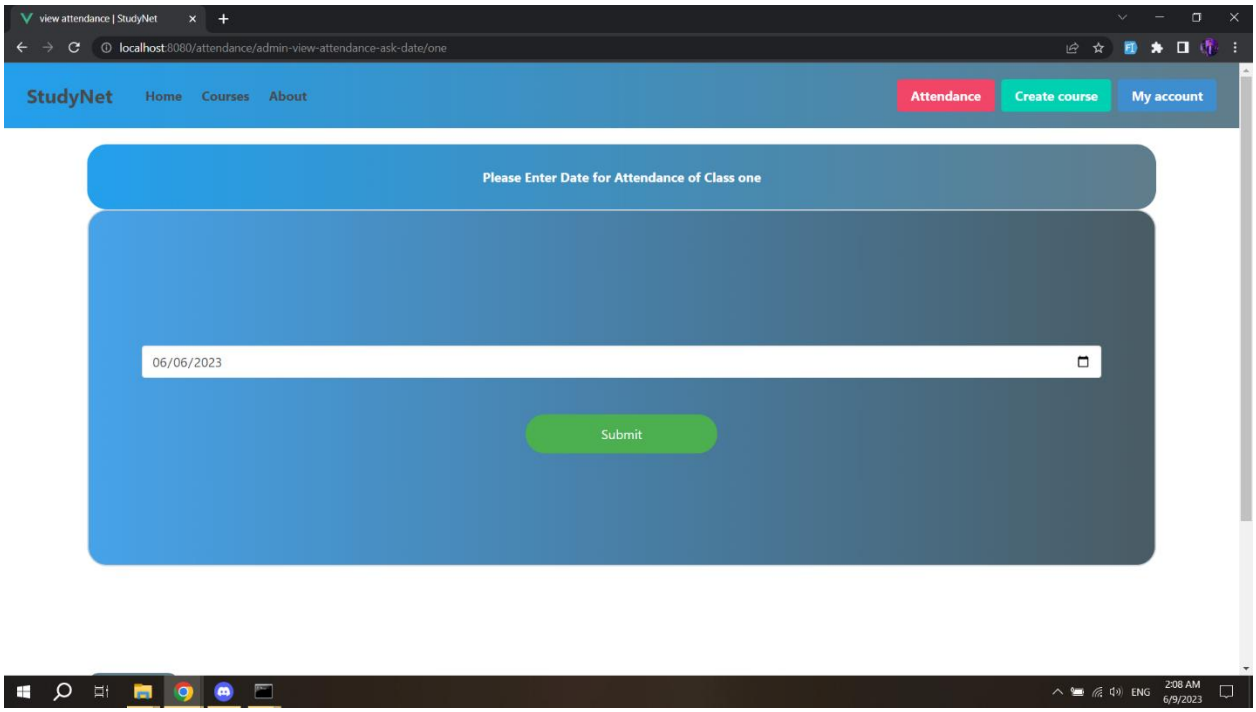
Admin manage attendance view: (take attendance or view attendance)



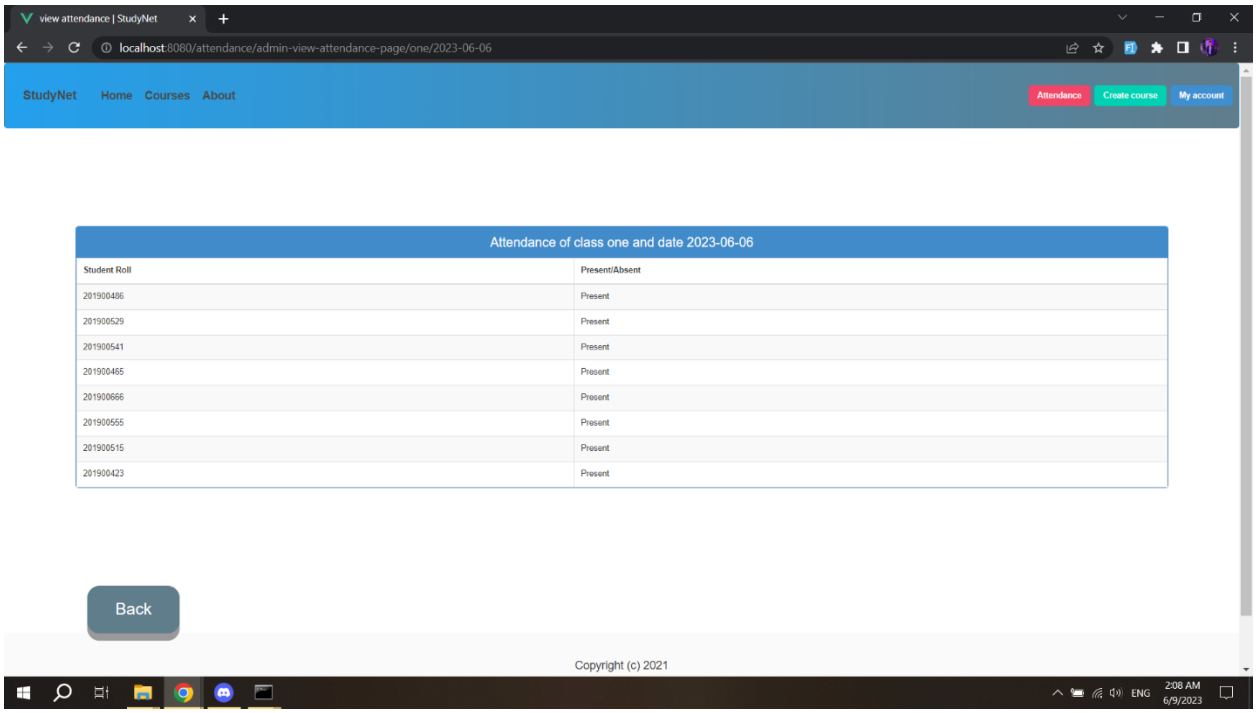
Admin take attendnace: (manualy)



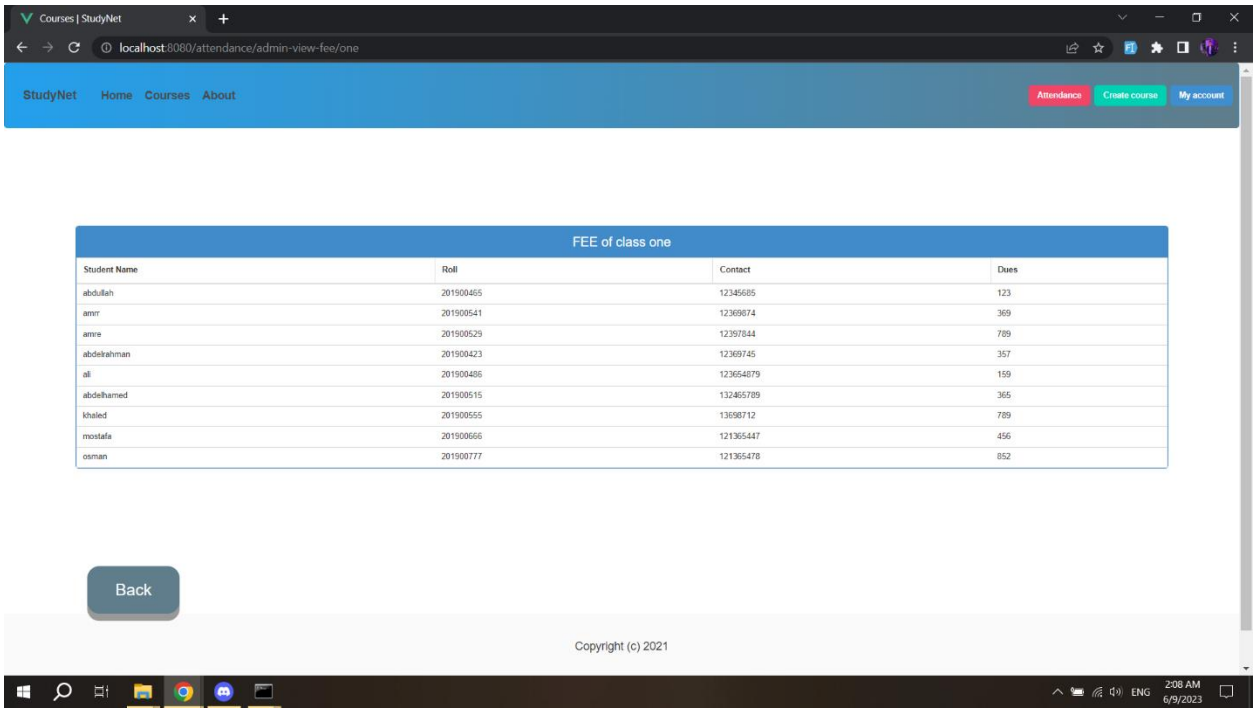
Admin ask date for attendance:



Admin view attendance of spicific date:



Admin view fees of spicific class:



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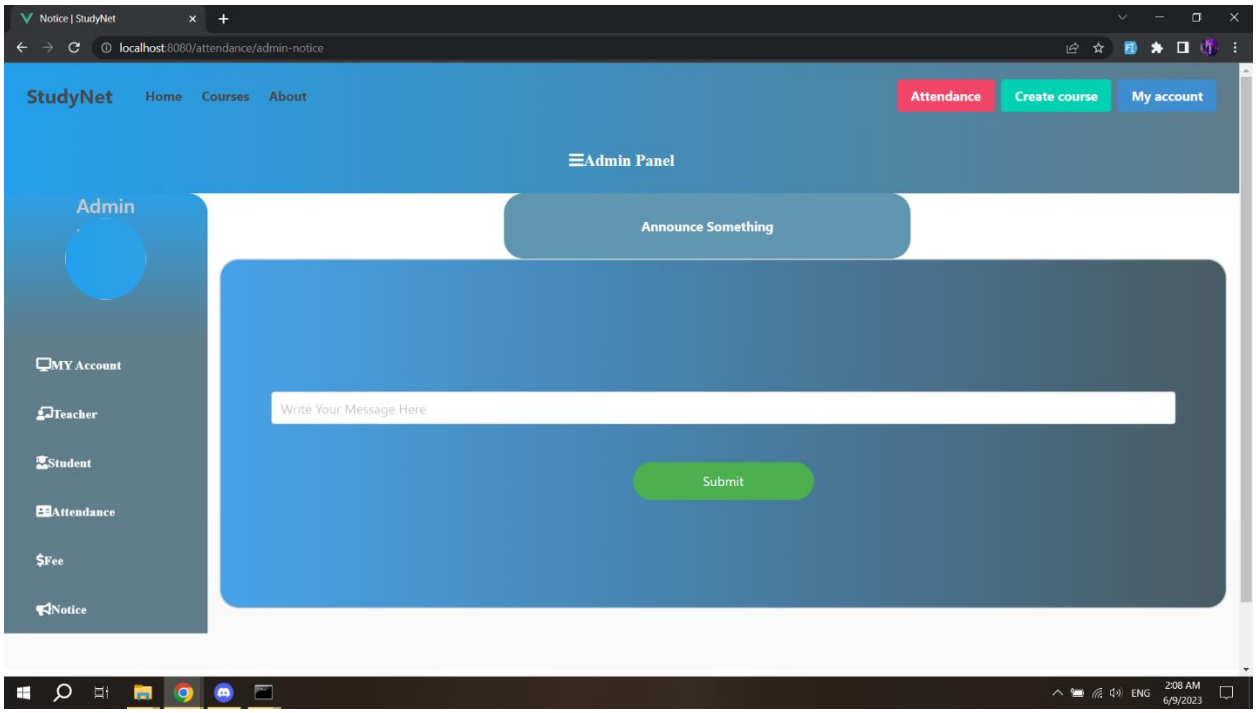
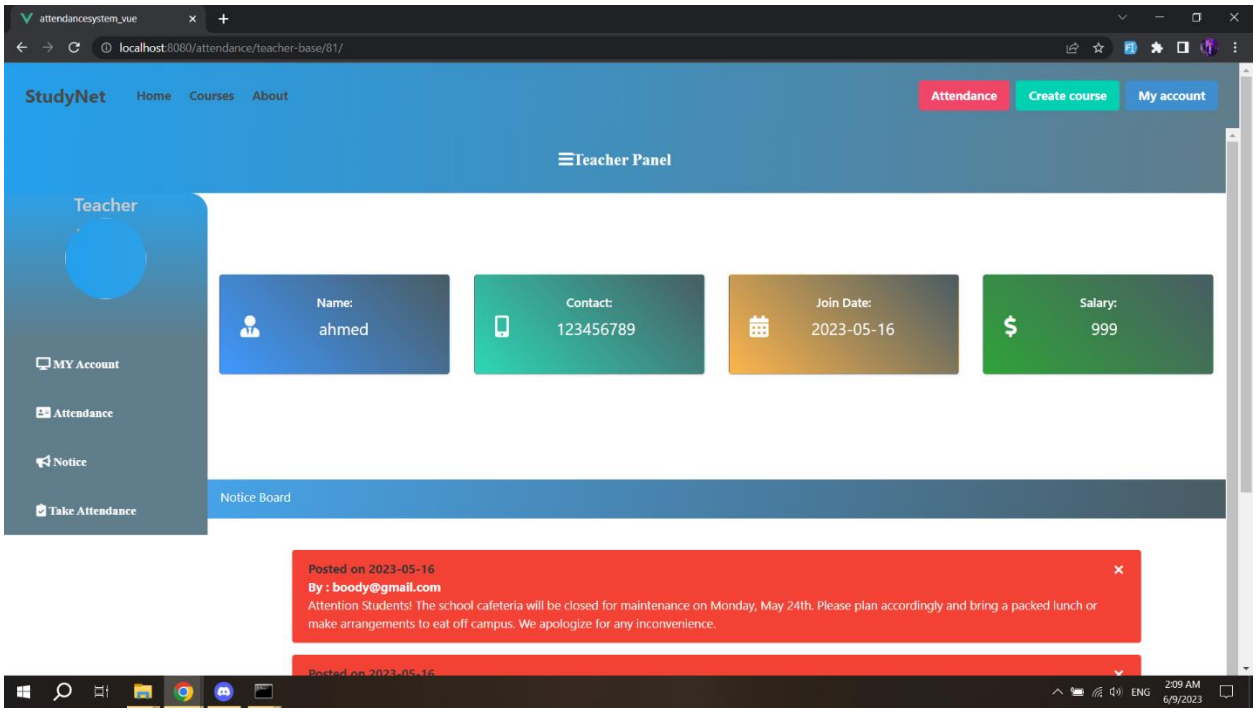
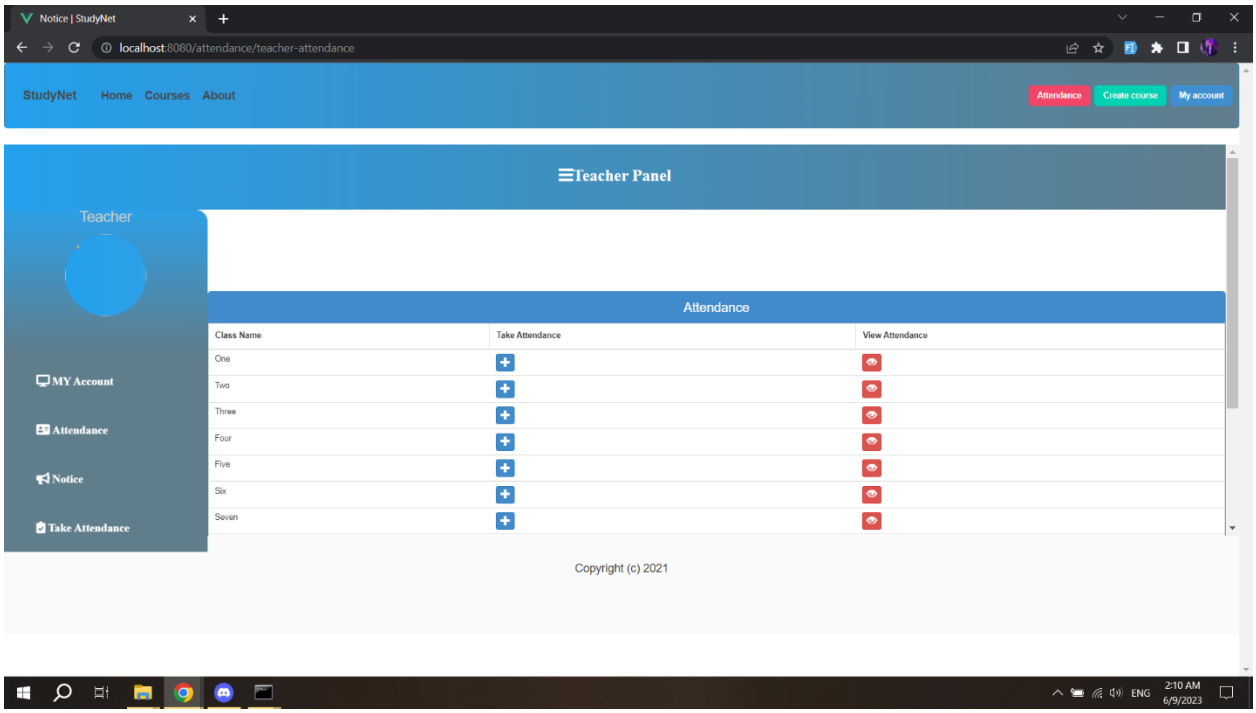


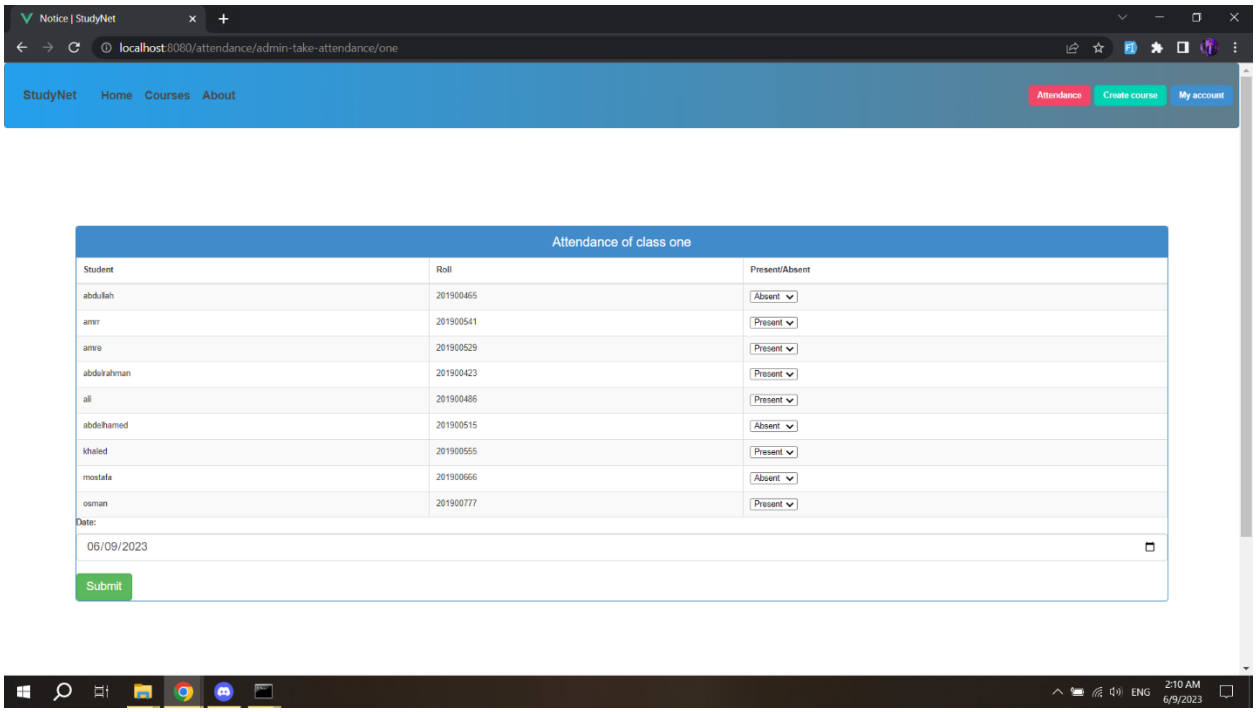
Teacher dashboard:



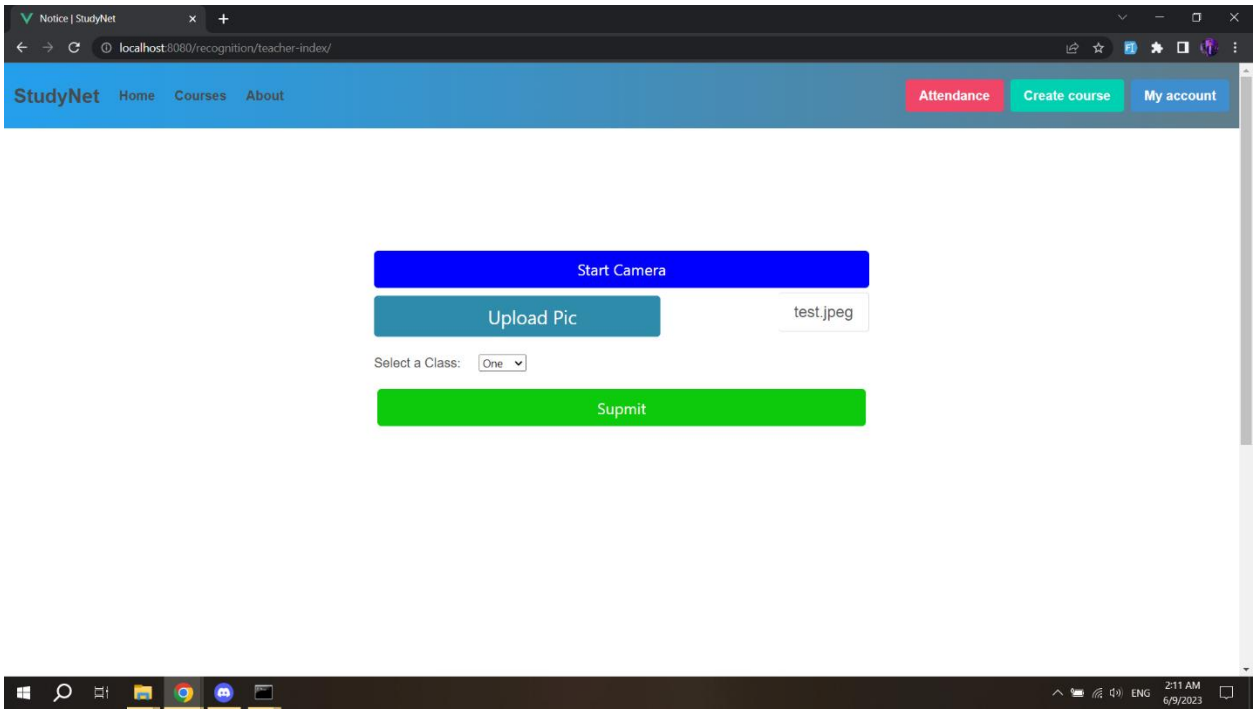
Teacher manage attendnace: (take attendnace or view attendnace)



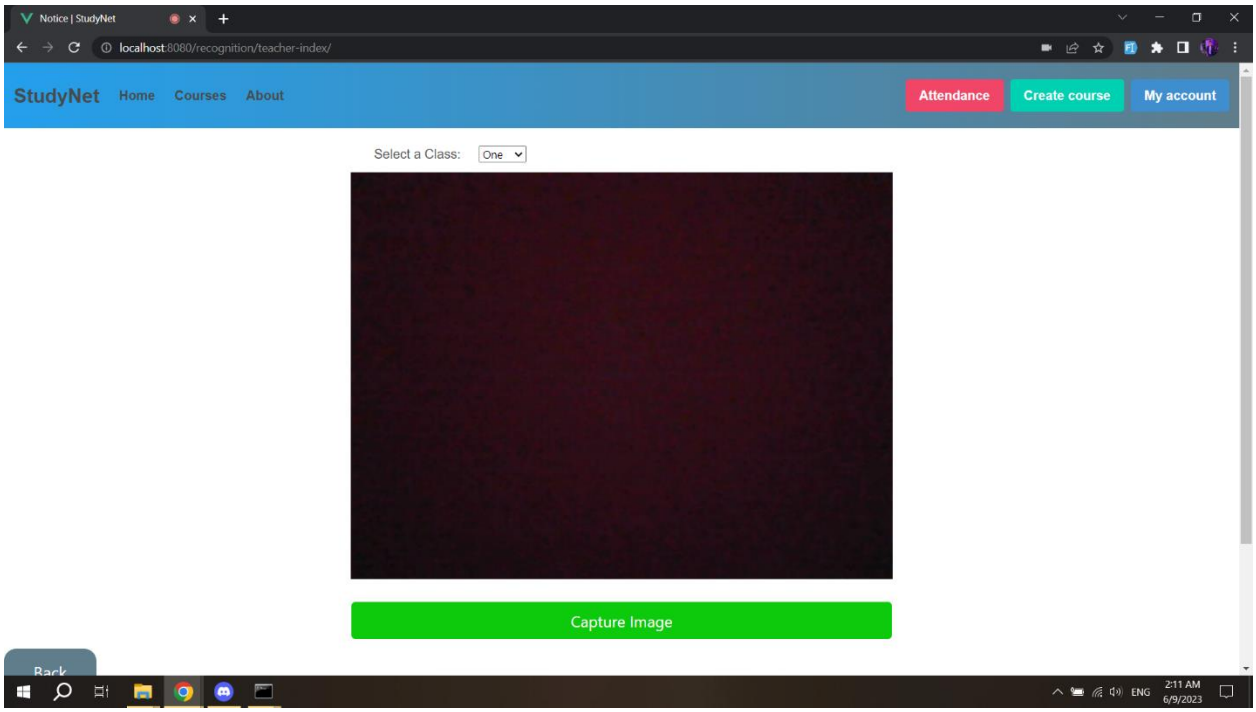
Teacher take attendnace manually:



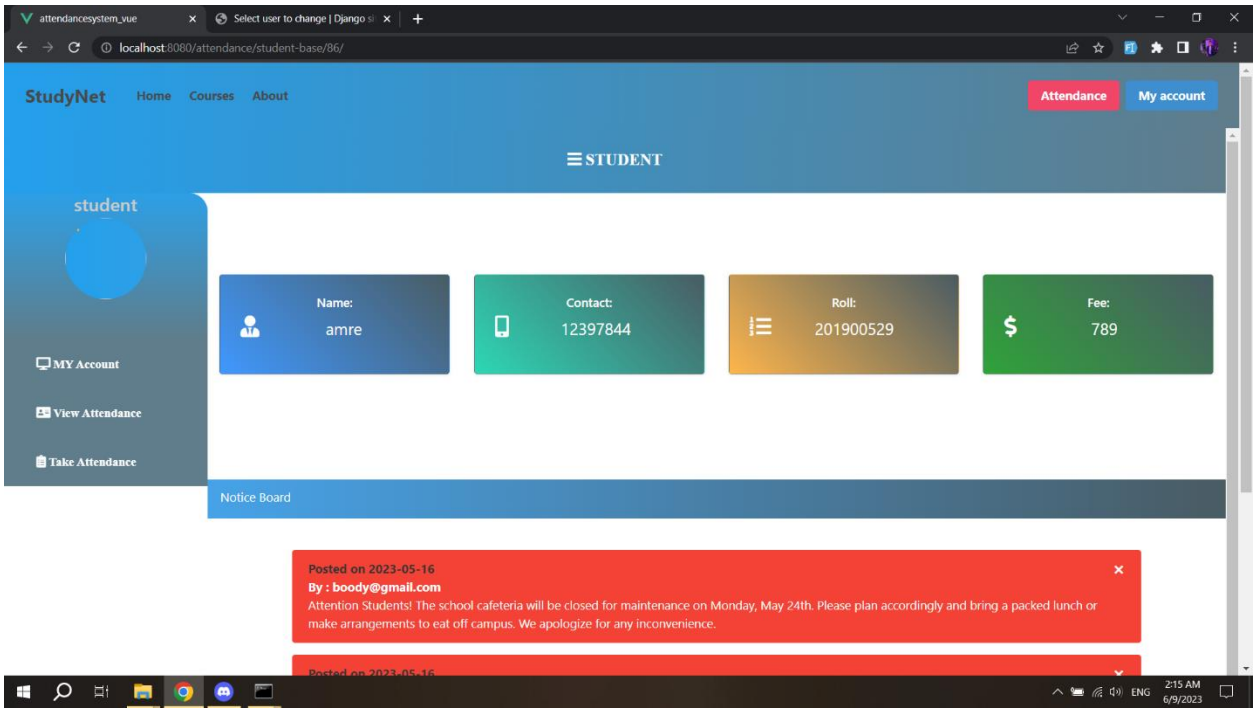
Teacher take attendnace via upload:



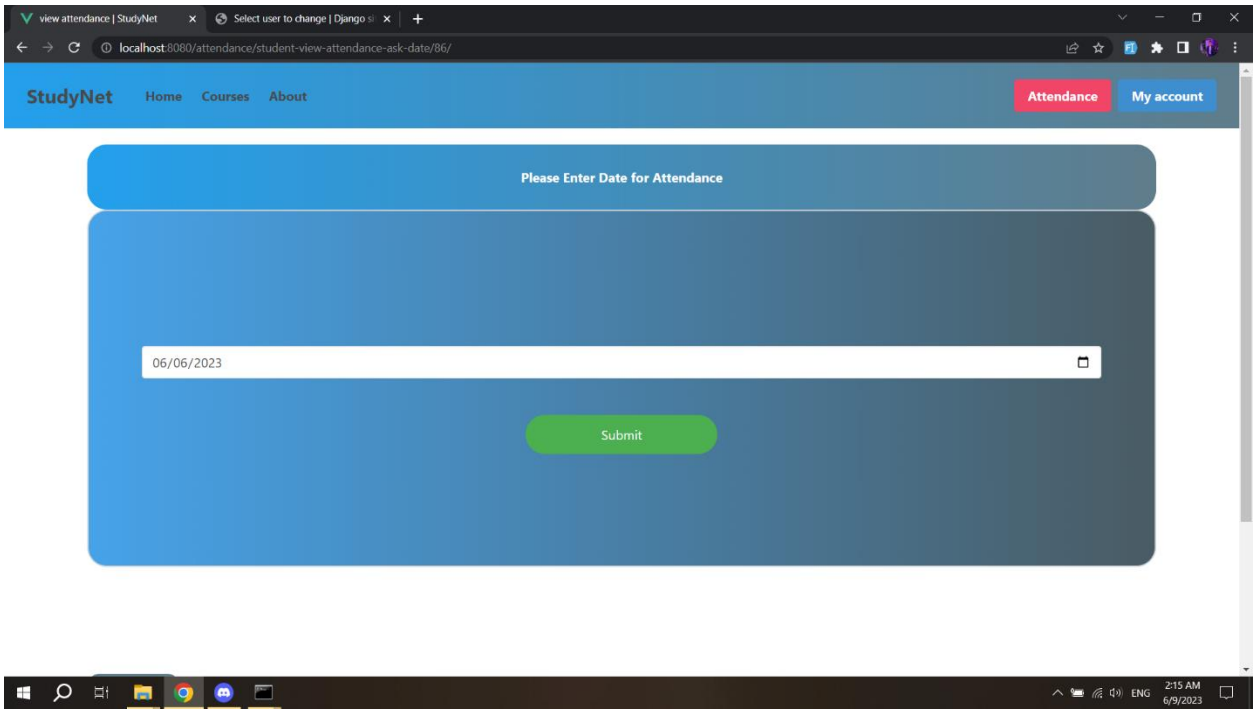
Teacher take attendnace via Capture:



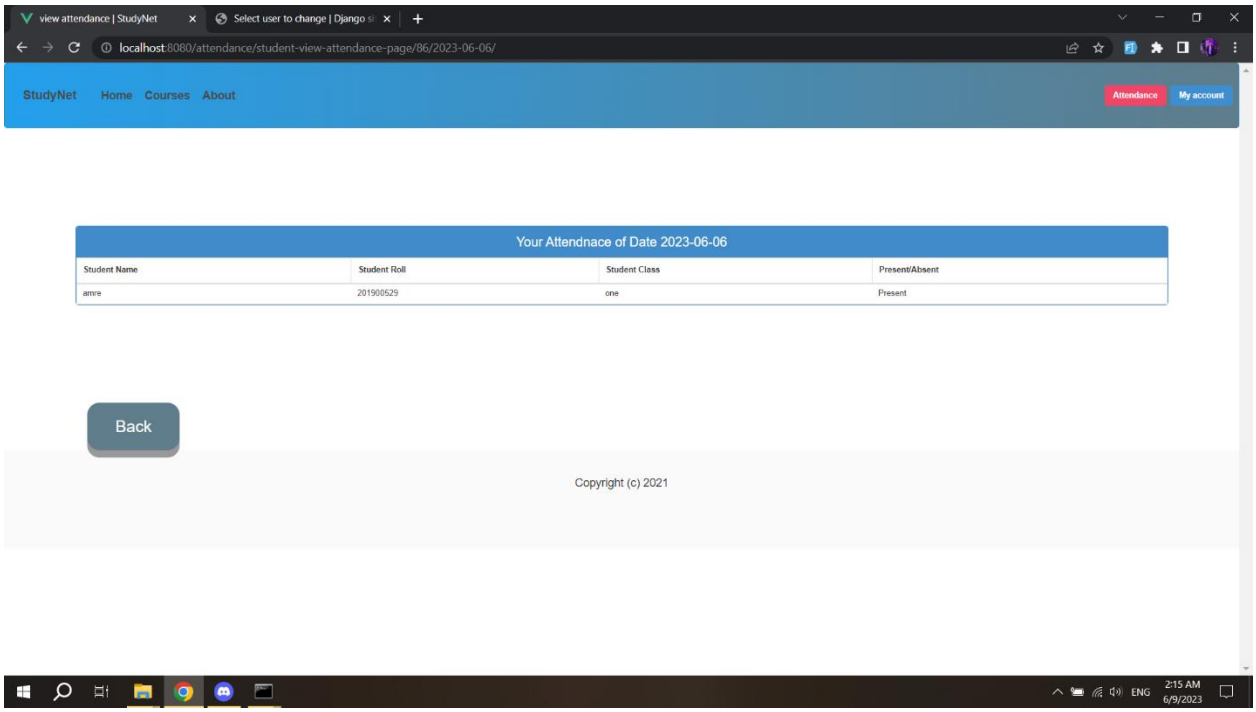
Student dashboard:



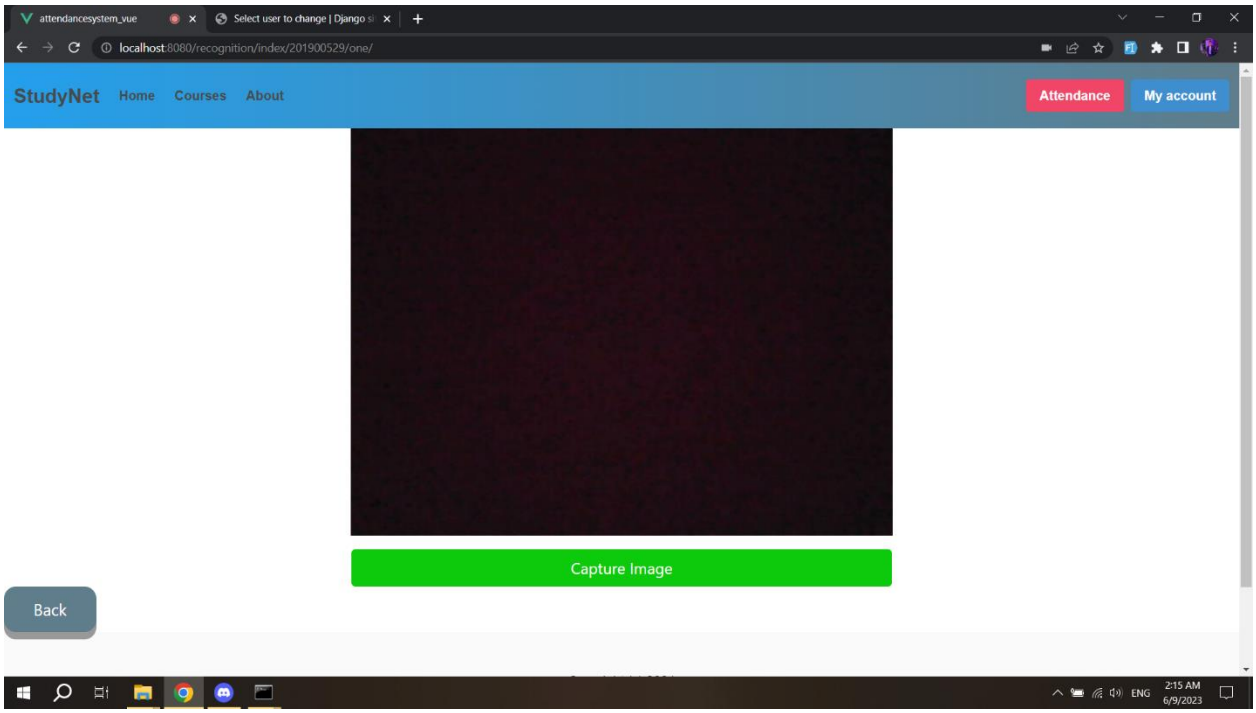
Student ask date for attendance:



Student view attendance of asked date:



Student take attendnace with face recognition:



Chapter 7: Conclusion and Future

7.1 Overview:

The education system is one of the most important systems in now days and detecting its problem and improving its capability and functionality is an important goal to make the system more accurate and more usable. the technology now is playing an important role in solve our problem without the need of interact manually only by technology we can produce smarter solutions and, in our problem, here it’s the best decision to achieve the proposed goal

7.2 Conclusion

The main problem that this project done for is to end the suffering of using manually attendance system that may be confusing because the number of students is more growing and the time that the teacher takes to record attendance to the system and the unethical attendance by some of the student. we used deep learning to beat this issue by making digital attendance system by face recognition and detection Used by teacher and student in different ways

The teacher uses the attendance system by attaching a photo of the student in an offline lecture and the system will detect faces and recognizes to each student by comparing his photo to the database and make a report of the attendance to rate each student

The student uses the attendance system if he is in an online lecture by livestream camera to recognize his face directly and send his attendance to the database and then to the teacher to make the report this way is to ensure that attendance taken in ethical way.

The digital attendance system based on deep learning methodologies using simese model to face recognition and cv2 caffe model to multi face detection.

they take a preprocessed photos and train on it to learn how to make difference between photos and decide if this is the student or not.

This is the main idea of the project and the education web page is for covering it and make reason to use it

7.3 Futures

1-A portable fingerprint device has been developed that may be circulated among students to allow them to lay their finger on the sensor during lecture time without the intervention of the instructor. This technology ensures that attendance is recorded in an error-free manner.

2- voice recognition for student who cannot share their photos to the system then the voice is the solution of this problem to take an attendance

جامعة حلوان
كلية الحاسبات والذكاء الإصطناعي
قسم علوم الحاسب

نظام تعليم
مع التعرف على الوجوه والكشف على الحضور

رسالة مشروع تخرج مقدمة من :

[عبدالرحمن عصام الدين محمد محمد محمد مغازي (201900423)]

[عبدالله فتحي سيد محمد عليوه (201900465)]

[علي حسن علي هريدي (201900486)]

[عمر عبد الحميد سيد عبد الحميد (201900515)]

[عمر محمد عبدالرحمن سالم (201900529)]

[عمرو محمد شامي حمزة (201900541)]

رسالة مقدمة ضمن متطلبات الحصول على درجة البكالوريوس في الحاسبات والذكاء الإصطناعي،
كلية الحاسبات والذكاء الإصطناعي، جامعة حلوان ،بقسم علوم الحاسب

تحت إشراف:

(د أحمد هشام)

2023 يونيو / حزيران