“CENTRALIZED PAYMENT PORTAL FOR COLLEGE APPLICATION”

Submitted in partial fulfillment of the requirements of the degree

B.Tech.

Computer Engineering

By

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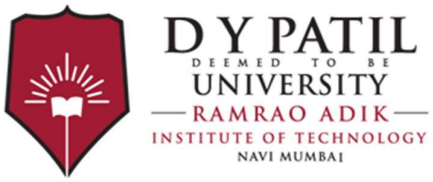

Department of Computer Engineering
Ramrao Adik Institute of Technology,
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(Under the ambit of D. Y. Patil Deemed to be University)

November 2021

Ramrao Adik Institute of Technology
(Under the ambit of D. Y. Patil Deemed to be University)
Dr. D. Y. Patil Vidyanagar, Sector 7, Nerul, Navi Mumbai 400 706.

Certificate

This is to certify that, the Mini Project – I entitled

"CENTRALIZED PAYMENT PORTAL FOR COLLEGE APPLICATION"

is a bona fide work done by

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Simardeep Lamba 22CE1072

and is submitted in the partial fulfillment of the requirement for the degree of

B. Tech. in Computer Engineering
to the
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Supervisor

Shital Patil

Dr. Siuli Das	Dr. A. V. Vidhate	Dr. Mukesh Patil
Mini Project Coordinator	Head of Department	Principal

Mini Project - I Approval

This Mini Project - I entitled **"CENTRALIZED PAYMENT PORTAL FOR COLLEGE APPLICATION"** by **Deeptanshu Lal 22CE1285, Krish Pradeshi 22CE1232 ,Simardeep Lamba 22CE1072** is approved in the partial fulfillment of the requirement for the degree of **B. Tech. in Computer Engineering**

Examiners

1……
(Internal Examiner Name & Sign)

2……
(External Examiner name & Sign)

Date:04/11/2023

Place: Nerul

Abstract

The "Centralized Payment Portal for College Applications" project aimed to simplify the payment process for college application fees by creating a single, user-friendly platform. Through research and iterative development, the project focused on designing a secure and efficient portal for students to pay fees.

The methodology involved researching existing systems, user preferences, and the development of a secure, intuitive payment portal. Iterative design stages incorporated user feedback to ensure a reliable and scalable system.

The achieved outcome is a comprehensive payment solution that simplifies the application process for students and administrators by providing a centralized platform for fee payments.

Contents

Chapter 1

Introduction

In the landscape of college applications, the process often presents an array of challenges, notably concerning the payment of fees. These challenges are deeply rooted in real-time observations, revealing a myriad of issues faced by students and applicants alike. Most notably, the absence of a unified and streamlined system for fee submission stands as a significant obstacle, adding unnecessary complexities to an already demanding college application process. This, in turn, results in students facing the daunting task of managing payments, leading to skipped classes and extended waiting times during the registration phase.

The manifold issues encountered during the college application process stem primarily from the decentralized nature of fee payments. With students applying to multiple colleges, each institution often employs distinct payment systems, intensifying the burden on applicants. The lack of a consolidated approach complicates an already intricate process, further exacerbated by the necessity of physical presence for payment, leading to time inefficiencies and absenteeism.

This project seeks to confront and rectify the specific challenges inherent in the current college application fee payment process. Central to its aim are the following core objectives:

Enhancing Fee Payment Convenience: The primary focus is to create a system that simplifies and consolidates the often-fragmented fee payment processes across multiple colleges. The aim is to afford students a more seamless and efficient payment experience.

Ensuring Security and Reliability: Building a secure and user-friendly platform is imperative. The project endeavors to establish a robust, reliable, and secure environment for payment transactions to safeguard the sensitive financial information of applicants.

Improving Efficiency and User Experience: The ultimate goal is to streamline the overall college application process by centralizing fee payments. Creating a user-centric and efficient system aims to reduce the stress and complexities faced by applicants during this critical phase.

The identified challenges and inefficiencies in college fee payments serve as the cornerstone of this project's motivation. It propels the pursuit of an effective solution to simplify and streamline this crucial aspect of the application procedure, striving to alleviate the burdens placed on students and enhance the overall experience.

Real-time observations and practical experiences form the bedrock of this project's inception. Witnessing firsthand the struggles and complexities faced by students during the college application fee payment process has been the driving force behind this initiative. Interviews, surveys, and testimonials from applicants have unveiled the intricate challenges they encounter when dealing with disparate payment systems across multiple colleges.

These experiences shed light on the impact of such challenges, indicating not only time inefficiencies but also the mental and emotional strain on applicants. The project's motivation stems from the genuine desire to alleviate these challenges and streamline a process that has, for too long, added unnecessary stress to an already demanding phase of students' lives.

The project operates with a student-centric approach, placing the enhancement of the applicant experience at its core. The ultimate aim is to create a more user-friendly, efficient, and stress-free process that streamlines the payment component of college applications. By doing so, the project strives to provide a smoother, more efficient journey for students navigating the crucial college application phase.

The identified challenges and observed inefficiencies serve as a clarion call for the project's inception. The primary motivation driving this endeavor is the creation of a system that simplifies and streamlines the cumbersome and often daunting fee payment process in college applications.

Certainly! Continuing from the previous points, let's delve into the broader educational impact and the significance of resolving these challenges:

The challenges within college application processes ripple beyond individual students, impacting the broader educational landscape. The inefficiencies and complexities surrounding fee payments not only burden applicants but also affect the administrative and academic aspects of educational institutions.

Administrative units of colleges often grapple with managing multiple, disparate payment systems, leading to increased operational complexity and inefficiencies. Moreover, the necessity for physical presence for fee submission extends administrative workload, creating an additional layer of logistical challenges during peak admission periods. Simplifying and centralizing fee payments can significantly alleviate administrative burdens and streamline internal processes.

Beyond the administrative scope, the academic well-being of students is also affected. Extended waiting times during registration, caused by convoluted payment processes, lead to increased absenteeism, disrupting the academic schedules of students. Addressing these challenges within the application phase can contribute to a more seamless transition for students into their academic journey, ensuring a conducive learning environment from the outset.

Addressing the challenges inherent in college application fee payments is crucial for fostering an environment that nurtures educational progress and growth. By simplifying and centralizing fee payments, the project aims to create a more conducive and student-friendly educational ecosystem.

Solving these challenges has implications far beyond the mere transactional aspects of fee payments. It sets the stage for a more efficient, user-centric approach that supports not only the students but also the overall educational institutions. Enhancing this crucial aspect of the application process can pave the way for a smoother transition, reduce disruptions, and set the stage for a more positive academic journey for future generations of students.

Chapter 2

Literature Survey

An in-depth exploration of the existing systems reveals a diverse array of features encompassing methods for fee submission, user interfaces, security measures, and overall user experiences. However, while these systems offer various functionalities, a noticeable drawback surfaces prominently across these platforms—the absence of an automated process.

The lack of automation is a substantial deficiency, contributing to a cumbersome and inefficient payment process for students. Specifically, the absence of streamlined automation results in undue stress and uncertainties during the crucial phase of academic pursuits, where the management of diverse fees becomes an intricate and time-consuming task for applicants.

These prevailing systems, though functional, fail to incorporate automated processes that could significantly alleviate the burden on students. Instead of a seamless payment process, the absence of automation creates a convoluted maze, burdening students with manual and time-consuming tasks.

Exploring Existing Features and Deficiencies:

Various existing systems in the realm of college application fee payments boast an assortment of features. These encompass multiple payment methods, ranging from online portals to physical payment centers. While these methods offer diversity, they often lack a harmonized approach. The fragmented nature of these systems contributes to the complexities faced by applicants.

Additionally, user interfaces across these platforms exhibit different levels of sophistication. Some are user-friendly and intuitive, while others lack the necessary simplicity, further adding to the challenges faced by applicants. The varying degrees of security measures implemented in these systems are also noteworthy. While some platforms have robust security protocols, others lack the stringent measures necessary to safeguard sensitive financial information.

The overarching deficiency that these systems share is the absence of an automated approach. Without an automated system in place, the burden falls on applicants to manually manage various fees for multiple colleges. This absence of automation leads to stress, uncertainties, and delays in the payment process, significantly impacting the efficiency of the application phase.

Impact on Students and Improvements Needed:

The consequences of these deficiencies are far-reaching, directly impacting the mental and academic well-being of students. The absence of automation contributes to undue stress, making the application phase far more burdensome and time-consuming than necessary. The lack of a streamlined, automated process disrupts the flow of academic pursuits, leading to missed classes, extended waiting times, and increased complexities for applicants.

To mitigate these challenges, the integration of automated features is pivotal. Implementing an automated system would significantly ease the burden on applicants, transforming the cumbersome payment process into a seamless and stress-free experience.

Challenges Faced Due to Absence of Automation:

The absence of automation within the existing systems creates a significant hindrance for students navigating the college application fee payment process. Specifically, the manual management of diverse fees across multiple colleges results in a maze of complexities and time-consuming tasks. This not only adds stress and uncertainties but also directly impacts the time and energy students could otherwise dedicate to their academic pursuits.

Moreover, the lack of automation amplifies the challenges faced during peak application periods, where the manual processing of payments not only causes delays but also extends the administrative workload for both students and institutions. Such inefficiencies create a ripple effect, affecting not only the applicants but also the administrative units managing these intricate payment systems.

Potential Solutions and Recommendations:

Incorporating automation within these systems stands as a fundamental solution to the prevalent deficiencies. A unified, automated system that consolidates fee payments across multiple colleges is imperative. Automation not only simplifies the process but also significantly enhances the efficiency and user experience during the critical application phase.

The inclusion of automated reminders, user-friendly interfaces, and a centralized platform could transform the current convoluted maze into a streamlined and stress-free payment process for applicants.

Chapter 3

Proposed System

The developed system involved meticulous research, iterative design, and implementation strategies aimed at simplifying fee submissions for students. Initially, extensive research was conducted to understand the intricacies of to pinpoint their limitations, particularly the absence of automation. This laid the foundation for the methodology that primarily focused on creating a seamless, automated payment process.

3.1 Problem Statement

The proposed system presents a centralized payment portal specifically designed to address the challenges prevalent in the existing landscape of college application fee payments. Aiming to streamline the cumbersome process faced by students, our system offers a user-centric, secure, and efficient platform.

3.2 Proposed methodology / Techniques

1. Architecture Design and Customization

The system's architecture was meticulously designed using a layered model consisting of presentation, application, and database layers. Customizations within these layers were focused on improving user interaction and data flow. The presentation layer, utilizing Handlebars (hbs), was fine-tuned to dynamically generate content, ensuring a more responsive and interactive user interface. The application layer, incorporating Node.js and Express.js, underwent specific modifications to handle transaction flows efficiently and manage server-side logic. These alterations were pivotal in addressing user requirements for a more user-friendly payment process.

Database Connectivity:

The system's architecture cantered on seamless database connectivity, leveraging Node.js for efficient data handling and management. Utilizing the inherent capabilities of Node.js, data transactions and interactions with the MySQL database were optimized, ensuring a responsive and reliable platform for users to process their payments.

User Verification:

Tailored user verification protocols were established to ensure secure and authenticated user access. Node.js facilitated the implementation of user authentication methods, ensuring that only authorized users could access and perform transactions within the system. The emphasis on user verification aimed to provide a secure and controlled environment for payment processing.

Integration of PDFKit for Document Generation:

The integration of PDFKit allowed for the efficient generation and manipulation of PDF documents, facilitating the creation of receipts and essential transaction documents for users. This customization addressed the need for comprehensive documentation and provided users with clear records of their payment transactions.

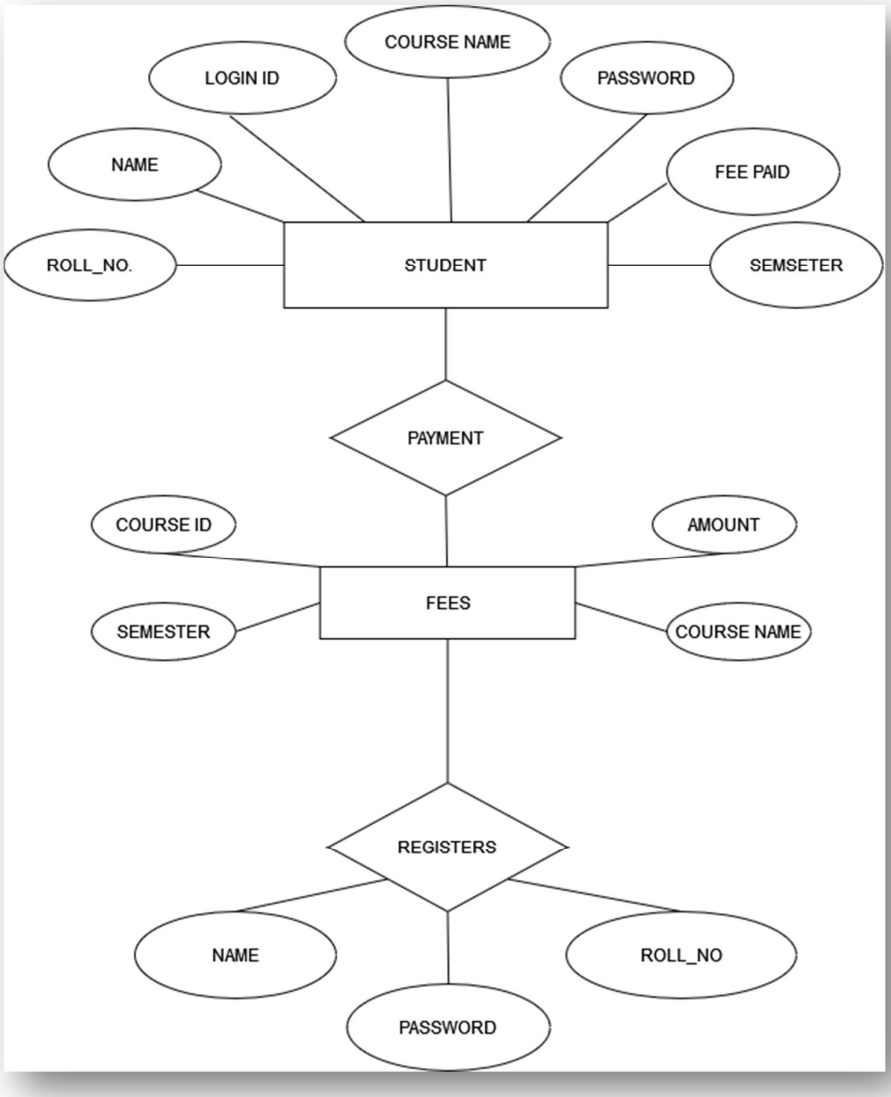


Fig.3.1 Entity Relation Model

3.3 System Design

The architecture of the system was meticulously engineered to adhere to principles of modularity, scalability, and security. Employing a robust layered architecture model, the design encompasses distinct tiers for presentation, application logic, and data storage layers.

Presentation Layer:
The user interface (UI) is constructed using HTML, CSS, and JavaScript, ensuring a responsive and intuitive design. Leveraging Handlebars (hbs) for templating, the presentation layer dynamically generates content for users, offering a seamless experience while navigating the payment portal.

Application Layer:
Node.js and Express.js form the core of the application layer, managing server-side logic and handling client requests. This layer encompasses the business logic of the payment process, including transaction handling, fee calculation, and user authentication.

Database Layer:
MySQL, a robust relational database management system, houses and organizes the system's data securely. It efficiently stores transaction records, user profiles, and payment details, ensuring data integrity and accessibility.

User Interface (UI) Optimization:
The UI emphasizes simplicity and intuitive navigation, offering students a user-friendly and efficient payment process. Clear and concise interfaces guide users through fee submissions, providing a hassle-free experience.

This meticulously crafted architecture aligns with industry standards, ensuring a robust, scalable, and secure platform for students to manage their college application fee payments effectively.

3.4 Details of Hardware and Software Requirements

The development of the proposed centralized payment portal for college applications utilized a range of technologies and tools to ensure a robust and efficient system. The primary technologies employed in this project include:

- **JavaScript**: Leveraged for both front-end and back-end development to enhance the interactivity and functionality of the portal.
- **MySQL:** Utilized as the relational database management system to store and manage data securely.
- **HTML and CSS:** Employed for creating the user interface, ensuring a responsive and visually appealing design for students accessing the portal.
- **Node.js and Express:** Utilized for server-side scripting, enabling the creation of scalable and high-performance web applications.
- **JSON (JavaScript Object Notation) Parser:** Utilized for data transmission between the server and the client, ensuring seamless communication and data exchange.
- **Axios:** Integrated to handle HTTP requests and manage data transfer between the front-end and back-end systems efficiently.
- **CORS (Cross-Origin Resource Sharing):** Implemented for managing cross-origin requests, ensuring secure and controlled data flow between different domains.
- **Handlebars (.hbs):** Utilized as a templating engine to generate dynamic HTML content, facilitating the presentation of data across the platform.
- **PDFKit:** Integrated for generating and manipulating PDF documents, facilitating the creation of receipts and essential documents for users' payment transactions.

These technologies were carefully selected to address specific project requirements, focusing on security, scalability, and a user-friendly interface to streamline the college application fee payment process for students.

Chapter 4

Results and Discussion

This section provides an overview of the project outcomes, including screenshots and key results derived from the implementation of the centralized payment portal for college applications.

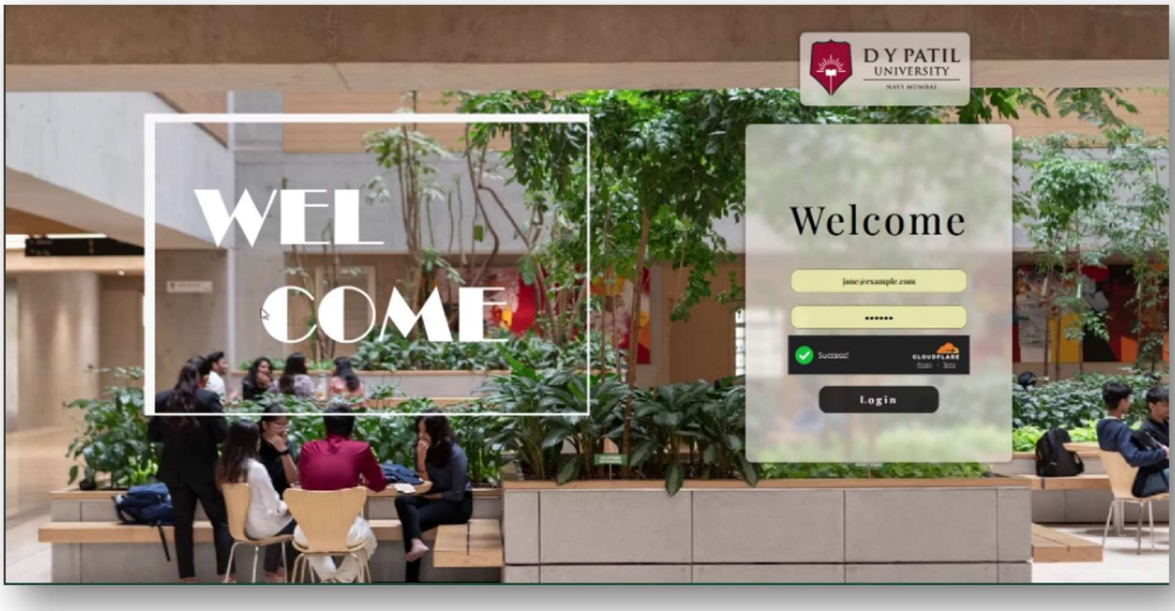


Fig.4.1 Login Page

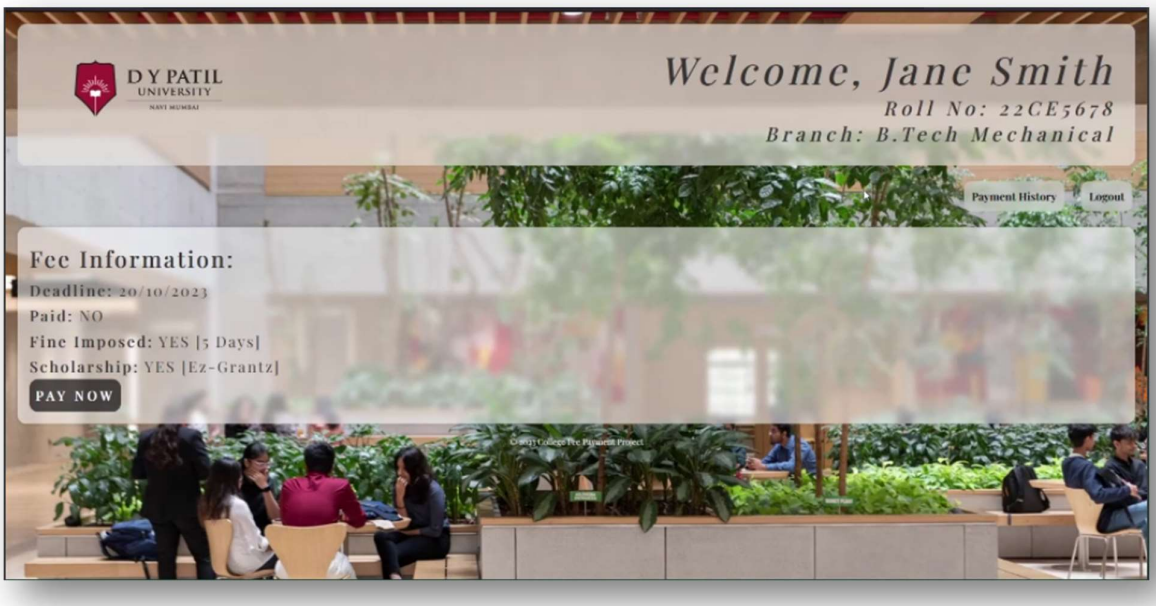


Fig.4.2 User Page

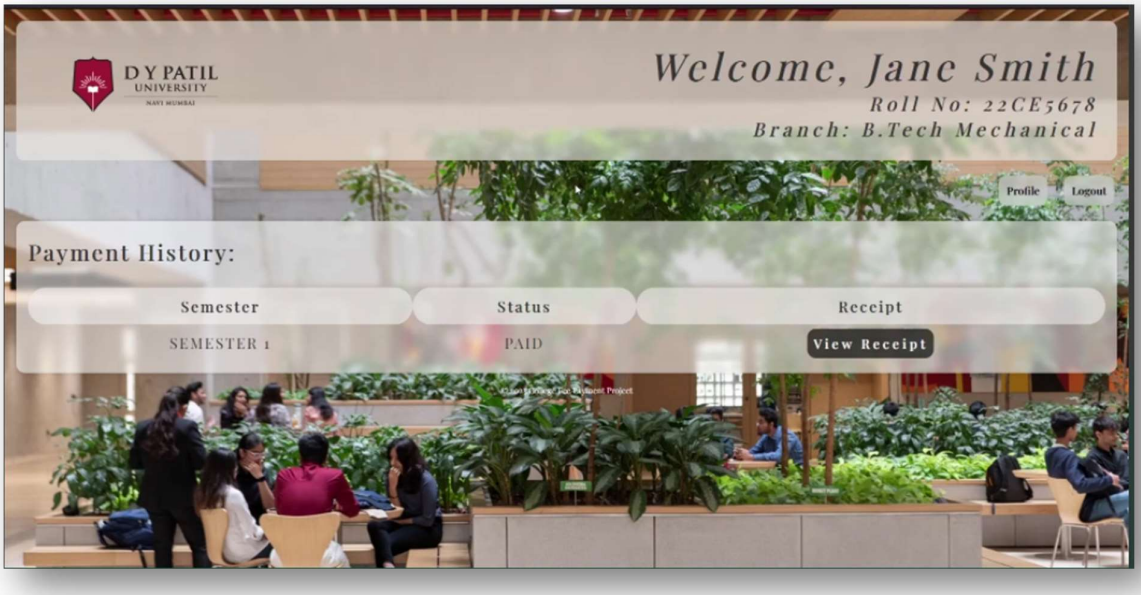


Fig.4.3 Payment History Page

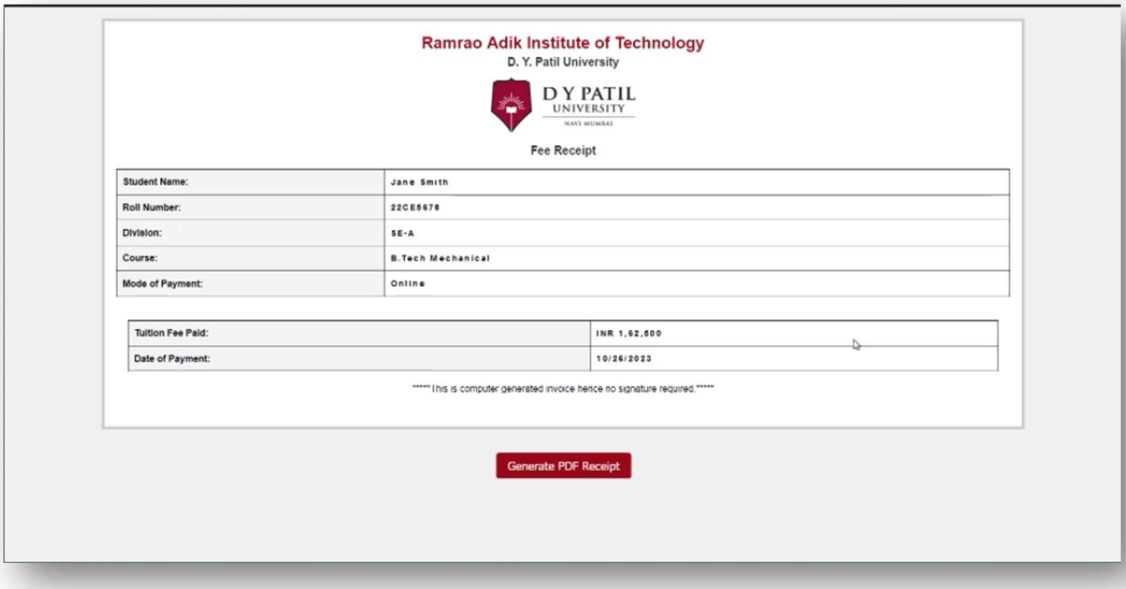
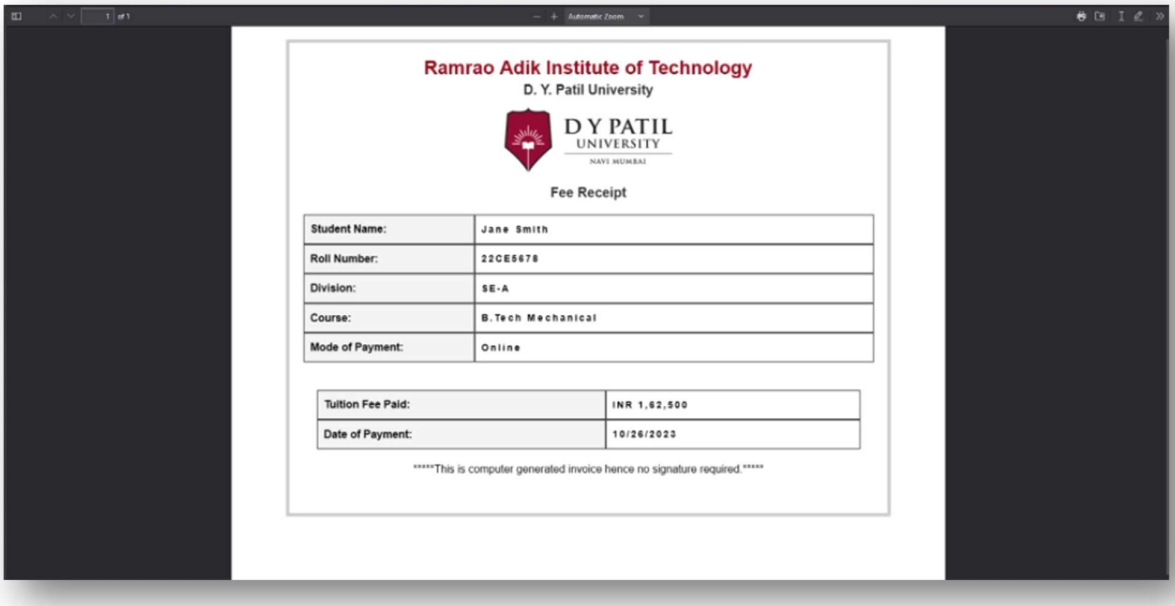


Fig.4.4 Fee Receipt Page



Ramrao Adik Institute of Technology

D. Y. Patil University

D Y PATIL UNIVERSITY
NAVI MUMBAI

Fee Receipt

Student Name:	Jane Smith
Roll Number:	22CE5678
Division:	SE-A
Course:	B.Tech Mechanical
Mode of Payment:	Online

Tuition Fee Paid:	INR 1,62,500
Date of Payment:	10/26/2023

*****This is computer generated invoice hence no signature required.*****

Fig.4.5 Fee Receipt PDF

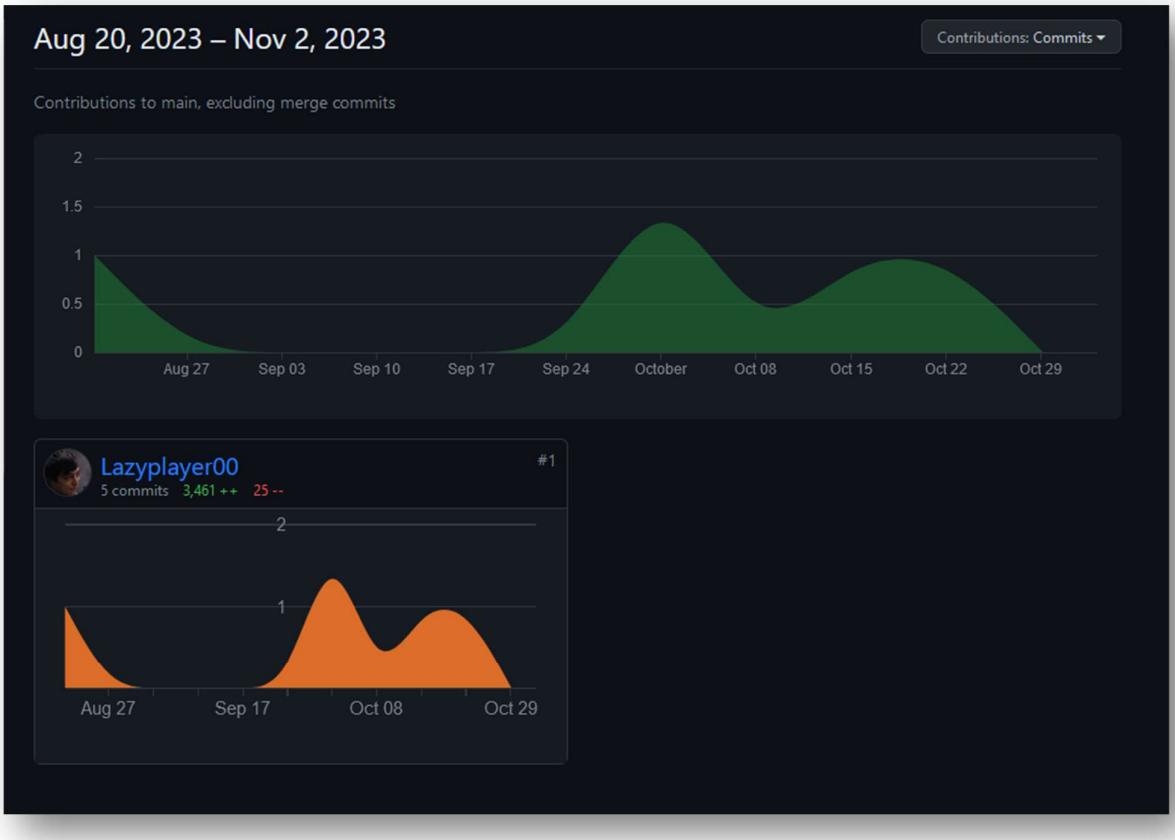


Fig.4.6 GitHub Contribution Page

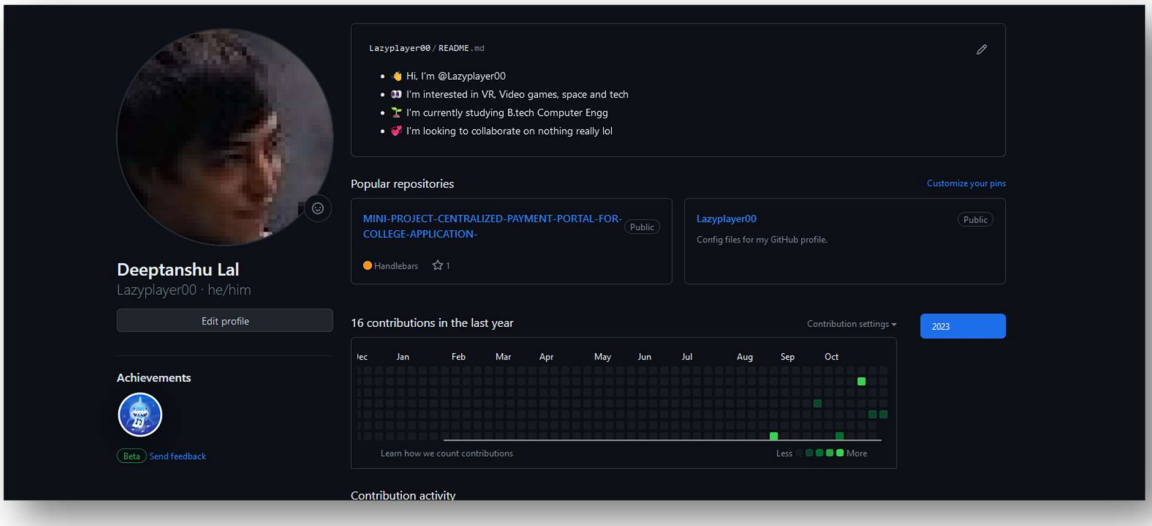


Fig.4.7 GitHub Page of Deeptanshu Lal

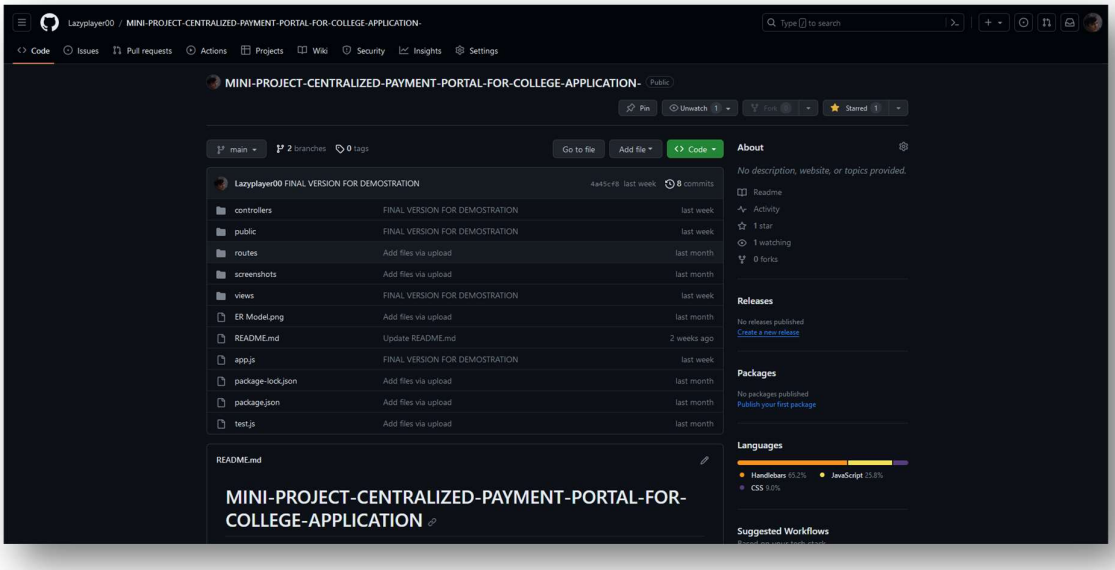


Fig.4.8 GitHub Repository Page

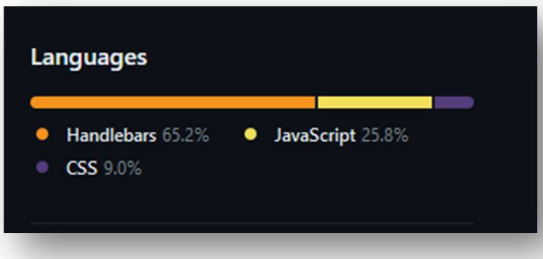


Fig.4.9 GitHub Contribution Page

Chapter 5

Conclusion and Future Work

5.1 Project Purpose and Achievement

Our goal was to simplify how students pay college application fees by creating a single, easy-to-use payment platform. We've succeeded in achieving this goal. Our new payment system makes it much simpler for students to handle their application fees. By combining all payments into one user-friendly platform, we've fixed the issues present in older systems, making the application fee process more straightforward and less stressful.

5.2 Future Scope

There's more we can do. We can add features like personalized notifications for payment deadlines and expand payment options. There's also a chance to use this system in other parts of education or in different fields that need better, more straightforward payment systems.

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Appendices

Weekly Progress Report

ACKNOWLEDGEMENT

We take this opportunity to express my profound gratitude and deep regards to my guide **Shital Patil** for his/her exemplary guidance, monitoring and constant encouragement throughout the completion of this report. We are truly grateful to his/her efforts to improve my understanding towards various concepts and technical skills required in our project. The blessing, help and guidance given by her time to time shall carry us a long way in the journey of life on which we are about to embark.

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