

THESIS/PROJECT WEB PORTAL



Nirjana Barua (C201208)

Naima Fardous (C201217)

**INTERNATIONAL ISLAMIC UNIVERSITY CHITTAGONG
(IIUC)**

THESIS/ PROJECT WEB PORTAL

Nirjana Barua (C201208)

Naima Fardous (C201217)

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**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING (CSE)
INTERNATIONAL ISLAMIC UNIVERSITY CHITTAGONG (IIUC)
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2024**

DECLARATION

We hereby declare that the work in this project is our own except for quotations and summaries which have been duly acknowledged.

25 NOVEMBER, 2024

Nirjana Barua
(C201208)

Naima Fardous
(C201217)

SUPERVISOR'S DECLARATION

We hereby declare that we have read this project and in my opinion this project is sufficient in terms of scope and quality for the award of the degree of B. Sc. in Computer Science & Engineering.

25 NOVEMBER, 2024

Mohammed Safiullah
Assistant Professor, Dept.of CSE, IIUC

DECLARATION OF THESIS / PROJECT REPORT AND COPYRIGHT

THESIS/ PROJECT WEB PORTAL

AUTHORS

SL NO.	AUTHOR'S NAME	STUDENT ID	SIGNATURE
1	Nirjana Barua	C201208	
2	Naima Fardous	C201217	
NAME OF SUPERVISOR: Mohammed Safiullah			
SIGNATURE OF SUPERVISOR:			

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ABSTRACT

The Thesis/Project Web Portal is designed to simplify how universities manage academic thesis/projects. It streamlines key processes such as submitting proposals, securing approvals from supervisors and boards, and completing pre-defense and final defense stages. The system also helps with document organization and keeps project details easily accessible.

This portal encourages better collaboration between students, supervisors, and administrators, ensuring smooth communication and timely project completion. Its user-friendly interface makes it simple to navigate, and the system is built to adapt and scale based on future needs.

Security measures, like controlled access, protect user information and project data. Clear roles and permissions are in place to make responsibilities straightforward and organized.

By reducing administrative burden and promoting teamwork, this system reshapes how thesis/projects are handled at universities. Future plans include adding mobile access and AI-based features to suggest project ideas and enhance the overall experience.

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CHAPTER 1: INTRODUCTION

1.1 Research Background

Creating an online system for managing thesis/projects is essential in today's busy academic world. With multiple projects happening at the same time, institutions need tools that make thesis/project management easier, encourage teamwork, and lead to better outcomes. Older management systems often can't keep up with these demands, causing delays and communication issues.

The Agile approach offers a solution to these challenges by focusing on breaking down work into smaller parts, getting regular feedback, and fostering teamwork. Agile allows teams to adapt quickly when requirements change, keeping everyone informed and making it easier to achieve successful results.

Using a modular design approach also supports better scalability and flexibility in online project systems. By building the system in separate, smaller sections, each part can be developed and updated independently. This setup works well with Agile because it lets teams work on different sections of a project without waiting on each other, speeding up progress.

Practices like frequent testing and fast release processes further strengthen Agile and modular systems by automatically checking and updating the website. These practices help make sure changes are error-free, keeping the system up-to-date and reliable.

Together, Agile, modular design, and automated testing make a strong framework for an online thesis project system. This combination improves collaboration, makes the system adaptable, and supports ongoing improvements, helping academic teams meet their project goals more efficiently.

1.2 Problem Statement

In universities, managing thesis and project work can be challenging for both students and faculty. Many colleges still use old systems, which can lead to confusion, miscommunication, and delays in submitting projects.

Current ways of tracking thesis progress and managing project goals often lack clarity and efficiency. This makes it hard for students and advisors to stay on top of deadlines and objectives. Also, without a single platform for sharing documents, giving feedback, and managing resources, the process can become stressful for everyone involved.

This project will create a simple and clear system for managing university thesis and project work. The system will improve communication, make project statuses easy to track, and include tools for better resource management. This approach aims to improve the academic experience, encourage teamwork, and ensure students complete their projects on time.

1.3 Motivation

Effective thesis and project management is essential for academic success, yet many universities still use outdated methods that create inefficiencies and communication gaps. Students often struggle with unclear guidelines, missed deadlines, and limited support. This project management system aims to address these issues by providing a unified platform for students and instructors to communicate easily. By simplifying project tracking, enhancing communication, and improving access to resources, the system will foster a more organized and supportive academic environment. Ultimately, this system seeks to empower students to complete their projects successfully and enrich their overall educational experience.

1.4 Objective of Project

The main goal of this project is to create a complete thesis and project management system that improves the efficiency and effectiveness of administrative processes within higher education institutions. The specific objectives include:

- **Streamline Project Workflow:** Build an easy-to-use platform that supports the planning, execution, and tracking of thesis and project activities for both students and faculty.
- **Enhance Communication:** Add features for real-time communication and feedback between students and advisors, encouraging better collaboration.
- **Track Progress and Milestones:** Develop tools for monitoring project progress, deadlines, and milestones to ensure timely completion of academic work.
- **Centralize Resources:** Provide a single location for storing project documents and resources, making them accessible to everyone involved.
- **Improve Accountability:** Set up a system for clearly defining expectations and responsibilities, helping students stay on track with project deadlines and deliverables.
- **Facilitate Reporting:** Enable easy creation of progress reports for both students and faculty, increasing transparency and oversight in project management.

By meeting these goals, this project aims to enhance educational outcomes and improve the overall effectiveness of higher education institutions.

1.5 Scope of Project

This project management system for university thesis and project management will cover the following key areas:

- **User Roles:** The system will include multiple user roles—students, academic supervisors, and administrative staff—each with specific functions and access levels.
- **Project Planning:** It will provide tools for students to set project objectives, timelines, and milestones to support effective planning from the start.
- **Collaboration Features:** Communication tools such as file sharing will enable better collaboration between students and supervisors.
- **Progress Tracking:** A dashboard will let users monitor project status, track deadlines, and view progress using tools.
- **Document Management:** Users will have access to a centralized storage space for all project-related documents, enabling easy access and secure storage.

- **Reporting and Analytics:** The system will allow for progress reports for students and faculty, providing insights into project timelines and completion rates.
- **Integration:** The system will be designed to integrate with existing university systems, such as learning management systems and student information systems.
- **Mobile Access:** The platform will be mobile-friendly, allowing users to manage projects on the go.

This system will be focused solely on academic thesis and project management, excluding areas such as finance management or non-academic project tracking.

CHAPTER 2: LITERATURE REVIEW

As universities shift towards digital transformation, the adoption of project management systems or thesis/project portal tailored to academic needs has become increasingly essential. These systems streamline various processes, enhancing efficiency in managing student projects, particularly for thesis and capstone projects. Studies highlight that project management platforms specifically designed for academic institutions can improve student engagement, faculty oversight, and administrative coordination by digitizing and centralizing project workflows [1].

Research shows that effective thesis and project management systems address the challenges posed by traditional paper-based workflows, such as delayed feedback, administrative inefficiencies, and miscommunication between students, supervisors, and administrators [2]. According to a study on thesis management systems, digital platforms can streamline the project lifecycle, from proposal submission to final defense, by offering tools for tracking progress, sharing resources, and scheduling milestone reviews [3]. These tools enable a structured approach that fosters student accountability and provides faculty with real-time insights into each student's progress.

One critical finding in the literature is the importance of customizing project management systems to suit the unique needs of different user groups, such as students, faculty, and administrators. A study by Wang et al. (2020) emphasizes that customization is essential in

academic settings where diverse departments and project types exist [4]. By incorporating role-specific features and customizable interfaces, project management systems can maximize usability and relevance for each user group. Customizable dashboards, for example, allow users to prioritize relevant information, improving decision-making and overall system efficiency [5].

Feedback mechanisms within project management systems play a pivotal role in maintaining continuous communication between students and faculty. Research underscores that structured feedback loops not only improve project quality but also foster a culture of mentorship and support within academic institutions [6]. Studies suggest that systems with integrated feedback tools enable supervisors to provide timely responses, reducing the time lag often associated with project evaluations [7]. Such features contribute to a smoother workflow, as students can address feedback promptly, thereby accelerating project progression.

Automation in project management systems has been shown to significantly reduce administrative burdens on faculty and enhance workflow efficiency. According to a study by Chen et al. (2019), automation of repetitive tasks—such as assignment tracking, reminder notifications, and proposal status updates—can mitigate human error and free up faculty time for more meaningful engagement with students [8]. Automated features, such as project tracking and status alerts, ensure that users are consistently informed of critical milestones and deadlines, contributing to better project oversight.

An essential feature highlighted in the literature is the seamless integration of project management systems with existing Learning Management Systems (LMS) and university administrative tools [9]. This integration supports data interoperability, allowing academic departments to consolidate student records, grading systems, and attendance data into one platform. Research shows that integration improves data accuracy and facilitates better resource allocation and planning across departments [10]. Institutions that integrate project management systems with their LMS and other digital tools report increased collaboration and enhanced data sharing, benefiting both students and faculty [11].

The role of data analytics in project management systems is also extensively discussed in recent studies. Advanced analytics tools embedded within these systems can provide valuable insights, such as identifying students at risk of underperformance and enabling proactive

interventions by faculty [12]. By analyzing patterns in student submissions, project completion rates, and faculty feedback, data-driven project management systems allow institutions to make informed decisions that can enhance student success rates and overall academic performance [13].

Despite the potential benefits, research indicates that effective adoption of project management systems requires proper user training and support. User training programs are essential to ensure that students and faculty can navigate new digital platforms with ease [14]. Studies suggest that without adequate training, users may underutilize the system's features, resulting in limited adoption and engagement [15]. Thus, training sessions and ongoing technical support are necessary components of a successful implementation strategy.

In conclusion, the literature supports the development of specialized thesis/project portal or thesis and project management systems for higher education institutions. By focusing on user-centered design, customization, automation, integration, and data analytics, such systems can significantly enhance the efficiency and effectiveness of project management. A well-implemented project management system can facilitate collaboration, improve communication, and support data-driven decision-making, ultimately benefiting students, faculty, and university administrators. As technology continues to advance, these systems offer an evolving platform for optimizing academic project workflows and contributing to a more streamlined educational experience.

CHAPTER 3: PROJECT CONCEPT AND VISION

3.1 Concept

This project management system aims to create a user-friendly digital platform to manage university thesis and project activities efficiently. The system will simplify project planning, tracking, and collaboration for students, faculty advisers, and university staff.

- **User Roles and Access:** The system will support different user types, including students, faculty advisers, and administrative staff, each with customized access and features to meet their needs.
- **Project Planning and Tracking:** Users can monitor progress through visual dashboards, with deadlines to keep everyone on track and organized.
- **Collaboration Tools:** Built-in communication tools, like discussion boards, will make it easy for students and faculty to work together and stay connected.
- **Document Management:** A centralized storage system will let users upload, save, and manage project-related files, ensuring easy access and version control.
- **Commenting Features:** The system will allow users to give and receive feedback on project drafts, improving the development of projects and academic writing.
- **Analytics and Reporting:** Advanced analytics will provide insights into project performance, helping users identify areas for improvement. The system will also generate progress reports for students and faculty.
- **Integration with Existing Systems:** The system will connect to current university platforms, like Learning Management Systems (LMS) and student information systems, for a smoother user experience.
- **User Training and Support:** Comprehensive training will be provided to ensure users can navigate the system confidently and make the most of its features.

The main goal of this project management system is to make thesis and project management easier, reducing administrative tasks and enhancing communication between students and faculty. By providing a user-friendly platform with feedback and analytics tools, this system aims to improve project success and overall academic performance.

3.2 Vision

Our goal is to create a user-friendly project management system that transforms how university students and professors handle thesis and project workflows. We aim to foster a collaborative, efficient, and transparent academic environment to enhance the quality of work and improve the educational experience.

We envision a system that empowers students with simple, accessible tools that support them at every project stage—from planning to submission. By providing customizable dashboards, progress tracking, and real-time collaboration features, we hope to encourage students to take ownership of their projects, building accountability and engagement.

For faculty advisers, we aim to offer a clear view of project progress, enabling them to provide timely feedback and support. With analytics and reporting tools, faculty can track student performance and identify projects needing extra support, allowing for proactive mentoring and a stronger mentor-student connection.

Additionally, we plan to integrate this project management system with existing university platforms, such as Learning Management Systems (LMS) and student information systems. This integration will offer a unified view of student progress while reducing administrative tasks, allowing faculty to focus on teaching and guiding students.

We also value feedback from users and are committed to involving both students and faculty in the system's design and development. By aligning with their needs and expectations, we aim to maximize user satisfaction and adoption.

In short, our mission is to cultivate a culture of academic excellence and innovation. We believe that by providing students with the tools and support they need, we can improve project completion rates and outcomes. This project management system will serve as a driving force to elevate the academic experience, empowering students to reach their full potential.

CHAPTER 4: DEVELOPMENT APPROACH

4.1 Methodology

In developing the online-based thesis project management system for our university, we will adopt the Agile methodology to enable a flexible and iterative development process. This approach is particularly suited to the dynamic nature of academic projects, where requirements may evolve over time. Agile emphasizes collaboration, adaptability, and continuous improvement, ensuring that the system aligns with the needs of its users—students, supervisors, and administrators.

The project will be divided into manageable iterations called *sprints*, each lasting two to four weeks. These sprints will allow us to focus on incremental improvements, delivering functional components that provide immediate value. Sprint planning sessions will help prioritize tasks based on user feedback and project goals, ensuring that the team remains aligned on objectives and responsibilities.

To maintain open communication and resolve challenges swiftly, daily meetings will be held. These sessions will provide team members with an opportunity to share updates, discuss obstacles, and collaboratively find solutions. This routine fosters accountability and teamwork, helping maintain momentum throughout the project.

At the conclusion of each sprint, we will conduct sprint reviews to demonstrate completed features, gathering valuable feedback to refine the system further. Additionally, sprint retrospectives will be held to reflect on successes and identify areas for improvement, ensuring a continuous enhancement of our processes and team dynamics.

This iterative approach allows the system to evolve in tandem with user expectations and feedback, creating a platform that is not only user-friendly but also capable of addressing the unique challenges faced by students and faculty. By remaining responsive to feedback and introducing new functionality based on real-world use, we aim to build a robust, high-quality project management system.

The Agile methodology will serve as a foundation for collaboration and innovation, enabling us to create a solution that supports academic excellence and strengthens the connection within the university community.

4.2 Team Collaboration and Communication

Strong collaboration and effective communication are essential to developing a successful thesis project management system for our university. As a small team, we will embrace the Agile methodology to ensure we work closely together, sharing ideas and responsibilities to achieve the project's goals.

To stay aligned and maintain progress, we will hold regular discussions to review tasks, address challenges, and set clear objectives. We will also use tools like project management software, shared documents, and communication platforms to ensure smooth information flow and real-time updates.

This approach encourages open dialogue and makes the most of each team member's strengths and input. By fostering this collaborative dynamic, we aim to develop a robust and efficient project management system that effectively meets the needs of the university community.

4.3 Continuous Integration and Deployment with GitHub

To improve the development of the university thesis/project management system, we adopt a streamlined approach for testing and deploying code changes using GitHub. Although we are performing manual testing, this approach will help us ensure that updates and new features are implemented smoothly and efficiently.

Each time we commit new code, we manually test the functionality to check for any issues and make sure everything works as expected. This helped us maintain high-quality code and allow us to quickly spot and fix potential problems. Even though testing is done manually, we will still use GitHub to manage the code workflow, enabling smooth transitions between staging and production environments.

By adopting this method, we create a process of rapid development and feedback, helping us adjust to user needs and evolving requirements quickly. In the end, this approach helped us develop a reliable and flexible system that meets the needs of both students and faculty.

4.4 Tools and Techniques

4.4.1 IDE (Visual Studio Code): For the development of the university thesis and project management system, we selected Visual Studio Code (VS Code) as our primary code editor. VS Code is lightweight yet powerful, making it an excellent choice for managing the different aspects of the system, such as thesis submissions, student profiles, and supervisor interactions.

Its flexibility and customizable extensions enhance our workflow, while seamless Git integration helps us collaborate effectively as a team. With an intuitive interface, VS Code streamlines the development process, ensuring smooth progress from start to finish.

4.4.2 Frontend Tools and Techniques: The development of the online based university thesis and project management system's frontend was powered by a range of robust tools and technologies, designed to create a responsive, intuitive, and user-friendly platform. Key technologies include React, Tailwind CSS, react-awesome-reveal, react-router-dom, SweetAlert2, SweetAlert2-react-content, Daisy UI, match-sorter, and sort-by, among others.

These tools were carefully selected to ensure an efficient development process, improve the overall user experience, and handle dynamic data seamlessly. Together, they helped us build a modern and effective platform that meets the needs of both students and faculty.

- **React:** As the core library for building the user interface, React allows us to create dynamic and interactive components that respond to user input in real-time. It enables a modular and efficient approach to developing the platform, making it easy to manage complex features like student profiles, thesis submissions, and admin functions.
- **Tailwind CSS:** This utility-first CSS framework enables rapid and flexible styling of the frontend. With Tailwind, we can quickly customize the design, ensuring the platform is not only functional but also visually appealing and responsive across devices.
- **react-awesome-reveal:** This animation library adds a layer of smooth, eye-catching animations to the platform. It helps bring the site to life by adding dynamic transitions when users interact with elements, making the interface feel more engaging and responsive.

- **react-router-dom:** This tool enables navigation between different pages and components of the system. It makes it easy for users to seamlessly move from one section of the platform to another, such as from student profiles to thesis submission pages, without reloading the entire page.
- **SweetAlert2 and sweetalert2-react-content:** These libraries provide beautiful, customizable pop-up alerts and notifications. They help us deliver important messages to users, like form submission success or error warnings, in a way that's both visually appealing and easy to understand.
- **Daisy UI:** A component library built on top of Tailwind CSS, Daisy UI provides ready-to-use UI components such as buttons, cards, and modals. It allows us to quickly implement a clean and consistent design across the platform, enhancing the user experience while saving time on custom styling.
- **match-sorter:** This library is used to enhance the search functionality within the platform. It helps us sort and filter dynamic data (like thesis titles) quickly and efficiently, making it easier for users to find what they need.
- **sort-by:** Similar to match-sorter, sort-by is used to organize data in a specified order. It allows us to sort information, such as project submission dates or thesis titles, based on user preferences, ensuring a more tailored and organized experience for the users.

4.4.3 Backend tools and techniques: The backend of the online-based university thesis and project management system is developed using JavaScript, along with a set of robust technologies to ensure scalability, security, and long-term maintainability. JavaScript's flexibility, combined with static typing, helps minimize runtime errors and keeps the codebase manageable as the system expands. Below is a breakdown of the key tools and technologies used for the backend:

- **CORS (Cross-Origin Resource Sharing):** CORS is used to manage requests between the frontend and backend, especially when they're hosted on different domains. In the case of the university thesis/project management system, CORS ensures that the frontend can safely communicate with the backend, enabling smooth data exchanges while maintaining security.
- **dotenv:** dotenv helps manage environment variables in the project, such as database connection strings and API keys, by loading them from a `.env` file into the

application. This way, sensitive information is kept secure and separate from the codebase, making it easier to maintain and deploy across different environments.

- **Express:** Express is the framework that powers the backend of the system, handling routes and HTTP requests. It simplifies the creation of APIs and ensures the system can efficiently manage user data, interactions, and authentication.
- **MongoDB:** MongoDB is the database used to store all the data for the system, such as student profiles, thesis details, and submission statuses. As a NoSQL database, it stores information in a flexible, JSON-like format, making it well-suited for handling the dynamic and constantly changing data typically associated with academic projects.
- **Multer:** Multer is used to handle file uploads, like thesis documents, project files, or student profile pictures. This tool allows the backend to receive, process, and securely store large files sent from the frontend, ensuring smooth file management within the system.
- **Firebase:** Firebase is employed for user authentication, allowing students and faculty to log in securely using methods like email/password or third-party authentication (like Google). This service simplifies user management and access control, ensuring that only authorized users can interact with sensitive data and features.

4.5 Entity Relationship Diagram (ERD)

The MongoDB schema diagram offers a visual map of how data is organized within the Thesis Management System. It illustrates the key entities like Admin, Student, Instructor, Board, and Thesis, and how they interact with each other. This diagram highlights the relationships and structure of the system, making it easier to understand how different parts of the platform connect and work together. It shows how each entity plays a role in the overall process, from student submissions to supervisor evaluations and board assessments.

Admin: Central figure overseeing the entire system, managing students, instructors, boards, and theses. Admin ensures a smooth workflow by finalizing supervisor allocations, creating boards, managing announcements, and monitoring submission statuses and feedback.

- **Student:** Represents individuals submitting thesis or projects. Students create accounts, form teams, select supervisors, and submit proposals and defense documents. They interact closely with instructors and the system throughout the process.
- **Instructor:** Serves as a supervisor for student thesis and projects. Instructors provide feedback on proposals, supervise submissions, and participate in evaluation boards as chairpersons or members, ensuring academic quality.
- **Board:** Committees that evaluate proposals, pre-defense, and final defense submissions. Boards are created by the admin and consist of instructors. Each board decides whether a thesis/project progresses to the next phase based on thorough reviews.
- **Thesis:** Tracks the entire thesis or project lifecycle, linking students, instructors, and boards. It maintains details such as team information, supervisor feedback, submission files, and evaluation outcomes at each stage.

This diagram offers an organized view of how the system's entities—students, instructors, admin, boards, and theses—are interconnected, facilitating the thesis/project management process.

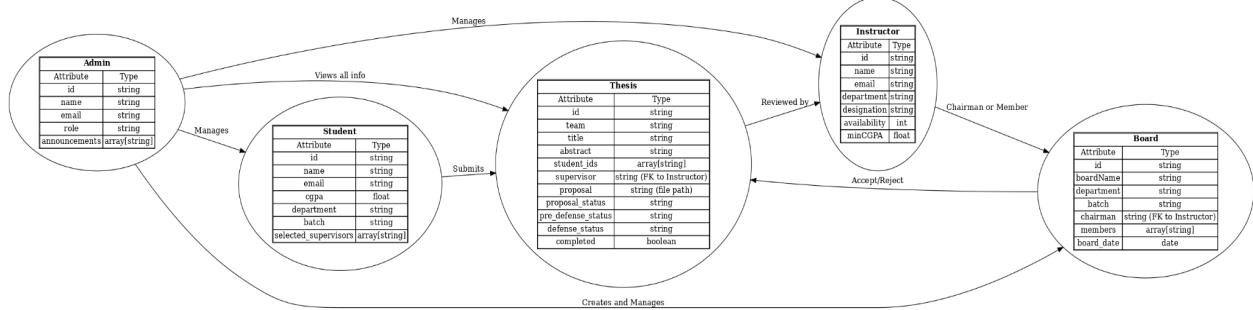


Fig. 4.5: Entity Relationship Diagram (ERD) of Thesis/ Project Portal

4.6 Data Flow Diagram (DFD)

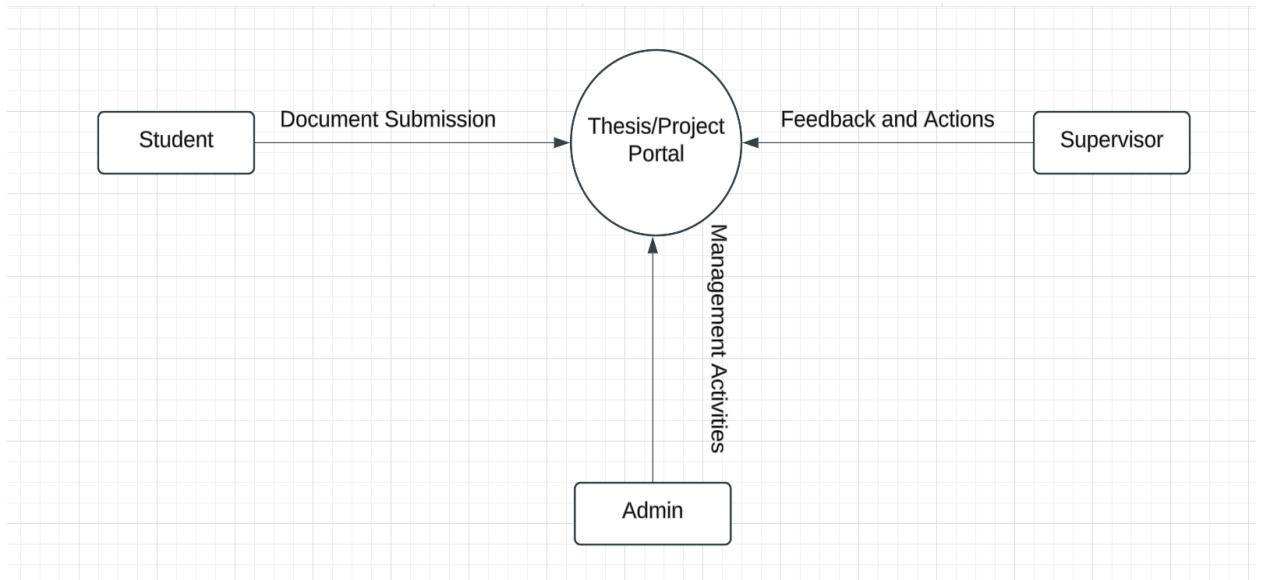


Fig. 4.6.1: Level 0 Data Flow Diagram of Thesis/ Project Portal

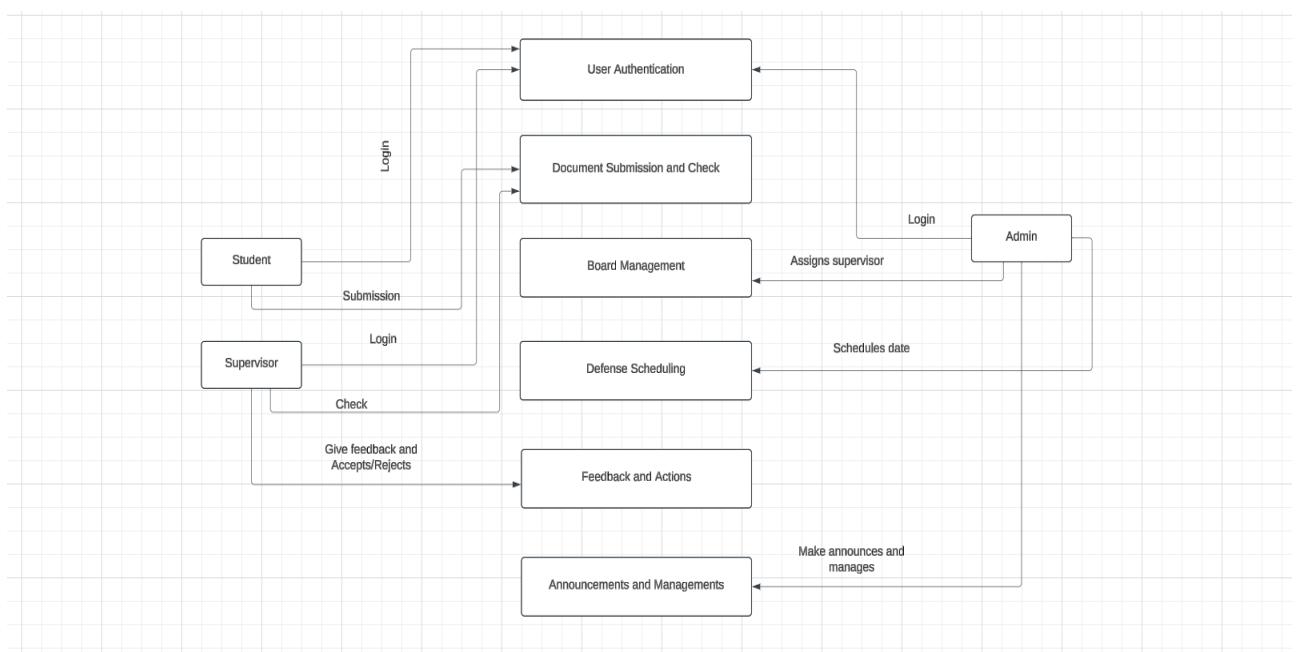


Fig. 4.6.2: Level 1 Data Flow Diagram of Thesis/ Project Portal

CHAPTER 5: FEATURES

5.1 Student Features

The user interface (UI) and navigation of the application are designed to be simple and easy to use, making it accessible to everyone. The layout is clear and visually appealing, with a focus on helping students quickly find the tools they need.

- **Student Login:** Students can easily log in to their accounts using their GSuite credentials to access their project details.
- **View and Edit Information:** After logging in, students can view and update their personal information, such as contact details, research interests, and academic progress.
- **Task Assignment:** Students can break their projects into smaller tasks, submitting them step by step: starting with the proposal, then moving on to pre-defense, and finally defense. Each submission must be approved by the supervisor and board before progressing to the next stage, ensuring a structured workflow.
- **Document Upload and Management:** Students can upload important documents, like research papers, proposals, and progress reports. The system keeps track of all documents to ensure nothing is lost.
- **Progress Tracking:** In the progress section, students can view their submitted reports, approval status from their supervisor and board, and any feedback provided by the supervisor and board, helping them stay informed about their project's status.
- **Collaboration Tools:** Students can create their own teams within the project, allowing them to collaborate and work together. Any team member can submit work on behalf of the group.
- **Supervisor Selection:** Students can select multiple potential supervisors based on their CGPA and areas of interest. The system will allow them to choose supervisors, and the admin will then confirm the selection based on supervisor availability and slot allocation.
- **Feedback Mechanism:** Students can receive feedback from their supervisors and board on their task submissions, allowing them to improve their work.

This setup ensures students can easily manage their projects, stay organized, collaborate effectively with their supervisors and board, and get the guidance they need from selected supervisors.

5.2 Supervisor Features

- **Project Monitoring:** Supervisors have access to assigned student projects, allowing them to oversee each project's status and monitor progress across various phases.
- **Task Evaluation and Feedback:** Supervisors can assess student-submitted tasks and give instant feedback within the platform, fostering timely guidance.
- **File Access and Annotations:** Supervisors can review all documents uploaded by students, with tools to add comments and suggest improvements directly on the files.
- **Approval Processes:** Supervisors manage and authorize project proposals, updates, and final submissions, ensuring alignment with academic standards and requirements.

5.3 Admin Features

- **Account Management:** Admins can oversee and manage user accounts for students, supervisors, and other personnel.
- **Permission Control:** Admins assign specific roles and permissions to users, ensuring each user has the appropriate access level. This includes roles for students, supervisors, board members, and other admins with customized privileges.
- **Board Setup and Coordination:** Admins can create review boards and select members to serve on each board. These boards are responsible for overseeing and evaluating projects or theses, ensuring adherence to academic standards throughout each project phase.
- **Project Tracking:** In addition to assigned supervisors, other admins can access and monitor the progress of any project or thesis within the system, providing comprehensive oversight and support.

- **Analytics and Reporting:** Admins have access to detailed analytics on system usage, project completion rates, and user engagement, supporting informed decision-making and enhancing system effectiveness.
- **System Support and Upkeep:** Admins provide ongoing technical support and maintenance, ensuring smooth operation of the system and timely resolution of user issues.
- **Compliance and Data Security:** The system upholds university policies and data protection regulations, securing sensitive information and maintaining compliance with legal standards.

CHAPTER 6: DESIGN AND IMPLEMENTATION

6.1 Introduction

The design framework of the Thesis/Project portal sets up the basic technical infrastructure necessary to ensure a secure, efficient, and user-centric experience for students, instructors, and administrators in the process of the thesis/project. In this manner, by detailing the architecture, data management protocols, organization of components, and user engagement strategies, this design converts the functional requirements into a comprehensive technical blueprint. The system creates a strong platform where students can submit their proposals, instructors can give their feedback, and administrators can manage the whole process—in a single place—creating a really smooth and effective thesis/project management system.

6.2 Tools and Techniques

6.2.1 Architectural Style

The portal utilizes a three-tier architectural framework, which comprises the frontend, backend, and database components. The frontend was constructed using React, offering a responsive and dynamic user interface; in contrast, the backend was developed with Node.js and Express, overseeing application logic and processing requests between the client and the MongoDB database. This delineation of layers promotes modularity and enhances the ease of

maintenance. By isolating each layer, the system becomes more manageable, flexible to adapt to future needs, and efficient in processing simultaneous requests, which is so critical for a frequently utilized academic portal.

6.2.2 Components and Modules

The Thesis/Project portal is developed based on a component approach, where individual modules addressed the requirements of each user type:

- **Student Module:** It facilitates student registration, supervisor selection, and the submission of their works. A personal dashboard provides students with a clear timeline, task reminders, and status updates on the submission done by them. Private routes are well accessed to ensure that sensitive operations are safe and role-oriented.
- **Instructor Module:** Allows instructors to view student submissions, give feedback, and grade the assignments. Instructors could also see all assigned students, monitor their progress, and contact them directly through the portal.
- **Admin Module:** This is the admin-only module that allows overseeing the whole thesis/project process, from setting deadlines for proposals, pre-defense, and defense to managing supervisor assignments, publishing proposals, pre-defense, and defense schedules, etc. The Admin Dashboard aggregates system metrics in real time, showing user activity, submission counts, and pending actions for efficient management, etc.

The system has been modularized to make maintenance easier, and access control by user role is implemented to enhance both security and usability.

6.2.3 Data Management

MongoDB is employed for database management, with separate collections for students, instructors, and admin data. This NoSQL database supports flexible data models, ideal for storing documents like user profiles, submission records, and feedback. Data retrieval is optimized for speed, as efficient access patterns are essential to handle real-time data requirements, such as supervisor assignments and proposal status updates. Effective data indexing and query optimization are implemented to support the system's needs and reduce latency, enhancing user experience.

6.2.4 User Interface (UI) Design

The user interface of the Thesis/Project portal is built using React and is styled with Tailwind CSS to ensure responsiveness on all types of devices. Its UI design focuses on friendly navigation and accessibility:

- **Dashboard Views:** Each user role has a defined dashboard with key information summarized.
- **Role-Based Navigation:** The interface dynamically adjusts based on the logged-in user's role, showing only the relevant features and controls. This role-based approach helps streamline user interaction by removing unnecessary elements and improving overall usability.
- **Accessible Design:** Following accessibility standards, the UI is intuitive to all users, including those with limited technical experience, to ensure that information and functionalities are easily accessible through different devices and screen sizes.

6.2.5 Security

Security is one of the major aspects of user data protection and earning trust within the system. This will be achieved through role-based access, where only authorized users can access sensitive information. Passwords shall be securely stored to prevent unauthorized access. Input validation techniques shall be used to guard against possible attacks, and regular security audits shall be carried out to ensure the resilience of the system against emerging threats.

6.2.6 Error Handling and Logging

Robust error handling and logging mechanisms are integrated to quickly identify, diagnose, and resolve issues. Error-handling middleware in Express monitors the backend for potential failures, while logging systems track performance metrics and errors. These logs allow the team to address issues promptly and ensure smooth operation, minimizing disruptions and maintaining high availability.

6.2.7 Testing and Quality Assurance

A varied mix of testing methodologies is applied across the development lifecycle to ensure reliability. Unit tests are in place to validate the functionality of discrete components, while integration tests ensure the interactions between different modules. End-to-end tests emulate real user flows to ensure core functionality works as expected. The quality of the code is maintained with tools like Prettier and ESLint, which ensure the codebase is polished and consistent.

6.2.8 Documentation

Comprehensive documentation covers the system's architecture, components, and API endpoints. Tools like Swagger and internal wikis provide detailed instructions for each part of the system, supporting current development and simplifying future maintenance. Documentation is also essential for onboarding new developers and assisting in system expansion as new requirements emerge.

6.2.9 User Experience (UX) Design

The UX design is oriented toward intuitive navigation and easy access to information for all users—submitters of proposals, reviewers of feedback, and managers of deadlines. The design has been centered on usability, with clear prompts and logical workflows that lower complexity and increase user satisfaction through every step of the thesis process.

Screenshots

The screenshot shows the homepage of the Thesis Project Hub. At the top, there is a purple header bar with the university's logo, navigation links (Home, Supervisors, Submissions, Research), and user authentication buttons (Login, SignUp). Below the header is a large image of a modern university building with a prominent dome and minaret. To the right of the image, the text "THEESIS PROJECT HUB" is displayed in bold, followed by the tagline "Effortless Submission for Your Academic Research". Below this are two buttons: "Explore Thesis/Projects" and "Submit Your Thesis/Projects". The main content area is divided into three sections: "Why Choose Our Thesis Portal", "Thesis Guidelines", and "Start Your Submission". Each section contains descriptive text and small icons.

SINCE 1995

About

Welcome to the Thesis & Project Portal—your companion on the journey from idea to accomplishment. Here, we turn complex academic processes into a seamless online experience, guiding you from the selection of a supervisor to the final stages of defense. Our platform is designed to empower students, providing the tools and support needed to bring their research to life.

With a few clicks, connect with expert supervisors, submit proposals, track your progress, and prepare for your pre-defense and final defense sessions—all in one place. Whether you're navigating through feedback or submitting crucial documents, we ensure a smooth, organized, and stress-free experience. Let us help you turn your vision into reality, guiding you toward academic success, every step of the way.



Announcement

THESIS DATE

12/10/2024

My Progress



About us Supervisors Submissions Previous Thesis



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Fig 6.2.1: Landing page

SL	Title	Area of Research	Type	Supervisor	Year of Completion	Department	Details	Document
1	AI-Based Diagnostics for Healthcare	Artificial Intelligence	Thesis	Dr. Mohammad Aman Ullah	2024	CSE	View	Download
2	Blockchain Solutions in Supply Chain	Blockchain	Project	Dr. Afreen Chowdhury	2023	BBA	View	Download
3	E-Learning Platform with Gamification	Education Technology	Project	Dr. Nusrat Jahan	2024	Library & Information Science	View	Download
4	Smart City Traffic Management System	Smart Cities	Thesis	Dr. Mahfuzur Rahman	2024	CE	View	Download
5	Renewable Energy Forecasting using Machine Learning	Renewable Energy	Project	Dr. Rafiq Islam	2023	EEE	View	Download
6	Telemedicine Solutions for Remote Areas	Healthcare Technology	Thesis	Dr. Shahinur Rahman	2023	Pharmacy	View	Download
7	Secure E-Commerce Application	Cybersecurity	Project	Dr. Rashed Ahmed	2024	BBA	View	Download

Previous | Page 1 of 1 | Next

About us | Supervisors | Submissions | Previous Thesis

Twitter | YouTube | Facebook | Instagram

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Fig 6.2.2: All Research Page

The screenshot shows a web-based research management system. At the top, there is a purple header bar with the university logo on the left, followed by navigation links: Home, Supervisors, Submissions, Research, Login, and SignUp. Below the header is a search bar containing the text "AI-Based Diagnostics for Healthcare". To the right of the search bar are three buttons: a pink magnifying glass icon, a purple "CSE" button, and a purple "Thesis" button. The main content area displays a table with one row of data. The columns are labeled: SL, Title, Area of Research, Type, Supervisor, Year of Completion, Department, Details, and Document. The single row of data corresponds to the search term, with the following details: SL=1, Title="AI-Based Diagnostics for Healthcare", Area of Research="Artificial Intelligence", Type="Thesis", Supervisor="Dr. Mohammad Aman Ullah", Year of Completion="2024", Department="CSE", and two buttons under Details: "View" and "Download". Below the table are three small buttons: Previous, Page 1 of 1, and Next.

Fig 6.2.3: Search for an Individual Research

This screenshot shows the detailed view of the research project "AI-Based Diagnostics for Healthcare" from the previous figure. The page has a dark grey background. At the top, it features the university logo, navigation links (Home, Supervisors, Submissions, Research, Login, SignUp), and a search bar with the same search term. Below the search bar is a large white modal window. The modal title is "AI-Based Diagnostics for Healthcare". Inside the modal, the abstract is displayed: "Abstract: This study explores AI models to diagnose diseases with improved accuracy, utilizing deep learning on medical imaging datasets." Below the abstract are several metadata fields: "Student ID: C201241,C201242", "Name: Saimoon Saki,Muksana Akter", "Supervisor: Dr. Mohammad Aman Ullah", and "Completion Date: 2024". At the bottom of the modal is a blue "Close" button. To the right of the modal, there is a vertical sidebar with the heading "Document" and a "Download" button.

Fig 6.2.4: View the Details of the Research

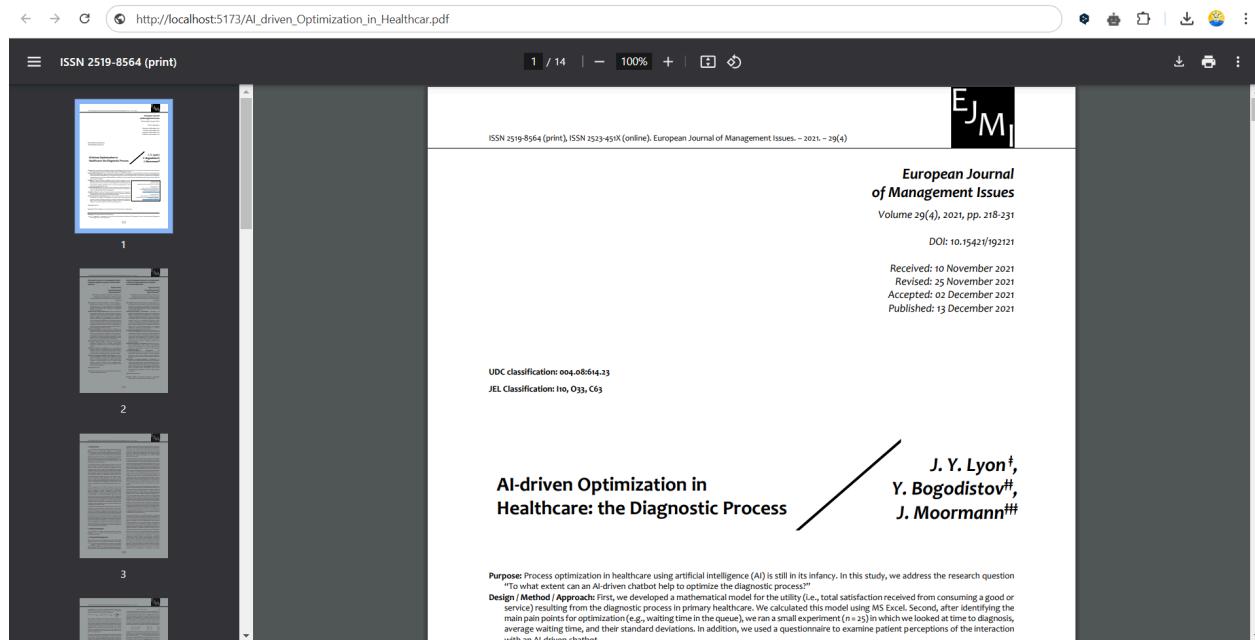


Fig 6.2.5: View the Thesis Paper

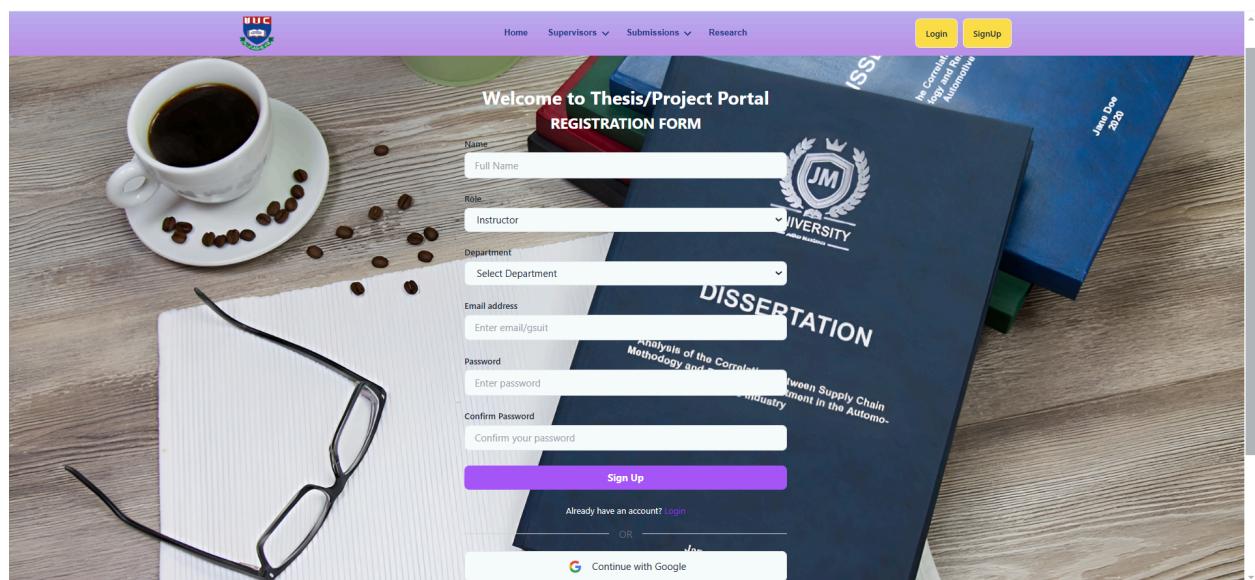


Fig 6.2.6: SignUp Page for Instructor

Welcome to Thesis/Project Portal

REGISTRATION FORM

Name:

Role: Student

Student ID: e.g., C201208

Student CGPA:

Batch:

Department: Select Department

Email address: Enter email/gmail

Password: Enter password

Confirm Password: Confirm your password

Sign Up

Already have an account? [Login](#)

JM UNIVERSITY

DISERTATION

Analyse of the Correlation Between Supply Chain and Investment in the Automotive Industry

Jane Doe 2020

Fig 6.2.7: SignUp Page for Student

Home Supervisors Submissions Research

Thesis/Project Portal

LOGIN FORM

Email address: Username@site.com

Password: Enter password

Login

Forgot password? [Sign Up](#)

OR

Continue with Google

JM UNIVERSITY

DISERTATION

Analyse of the Correlation Between Supply Chain and Investment in the Automotive Industry

Jane Doe 2020

Fig 6.2.8: Login Page

The screenshot shows a user interface for a student profile. On the left, there is a sidebar with a purple header containing the text "Personal Details". Below the header are five menu items: "Edit Profile", "My Team", "Selected Board", and "My Progress". The main content area on the right displays a circular profile picture of a cartoon character wearing a pink bunny costume. Below the picture, the text "Student Profile" is centered. Underneath this, several pieces of information are listed in a vertical stack: "Name: Nirjana Barua", "Student ID: C201208", "Gender: Female", "Email: c201208@ugrad.iu.ac.bd", "Address: Chawkbazar", "Department: CSE", and "Date of Birth: 27-07-2000".

Fig 6.2.9: Student Profile

The screenshot shows a user interface for editing a profile. On the left, there is a sidebar with a purple header containing the text "Personal Details". Below the header are five menu items: "Edit Profile", "My Team", "Selected Board", and "My Progress". The main content area on the right features a large white card. At the top of the card is a circular profile picture of a cartoon character wearing a pink bunny costume, with a blue plus sign button to its right. Below the picture, the text "Edit Profile" is centered. The card contains four input fields: "Name: Nirjana Barua", "Phone Number: 01877616102", "Address: Chawkbazar", and a "Save Changes" button at the bottom.

Fig 6.2.10: Edit Profile

The screenshot shows a user interface for an instructor profile. On the left, there is a sidebar with a purple header containing the text "Personal Details". Below the header are three buttons: "Edit Profile" (highlighted in blue), "View Board", and "Student Works". The main content area features a circular profile picture of a person standing next to a chalkboard. Below the picture, the text "Instructor Profile" is displayed. Underneath this, there are five horizontal lines, each containing a piece of profile information: "Name: Mohammed Safiullah", "Designation: Assistant Professor", "Qualification: B.Sc. in CSE KU, M.Sc. IIUC", "Department: CSE", and "Email: safiullah@gmail.com". At the bottom of the main content area, there is another line of text: "Phone Number: 01711304565".

Fig 6.2.11: Instructor Profile

The screenshot shows a user interface for editing an instructor profile. On the left, there is a sidebar with a purple header containing the text "Personal Details". Below the header are three buttons: "Edit Profile" (highlighted in blue), "View Board", and "Student Works". The main content area features a circular profile picture of a person standing next to a chalkboard, with a blue plus sign icon to its right. Below the picture, the text "Edit Profile" is displayed. There are four input fields: "Name" (containing "Mohammed Safiullah"), "Phone Number" (containing "01711304565"), "Email" (containing "safiullah@gmail.com"), and a "Save Changes" button at the bottom.

Fig 6.2.12: Edit Instructor Profile

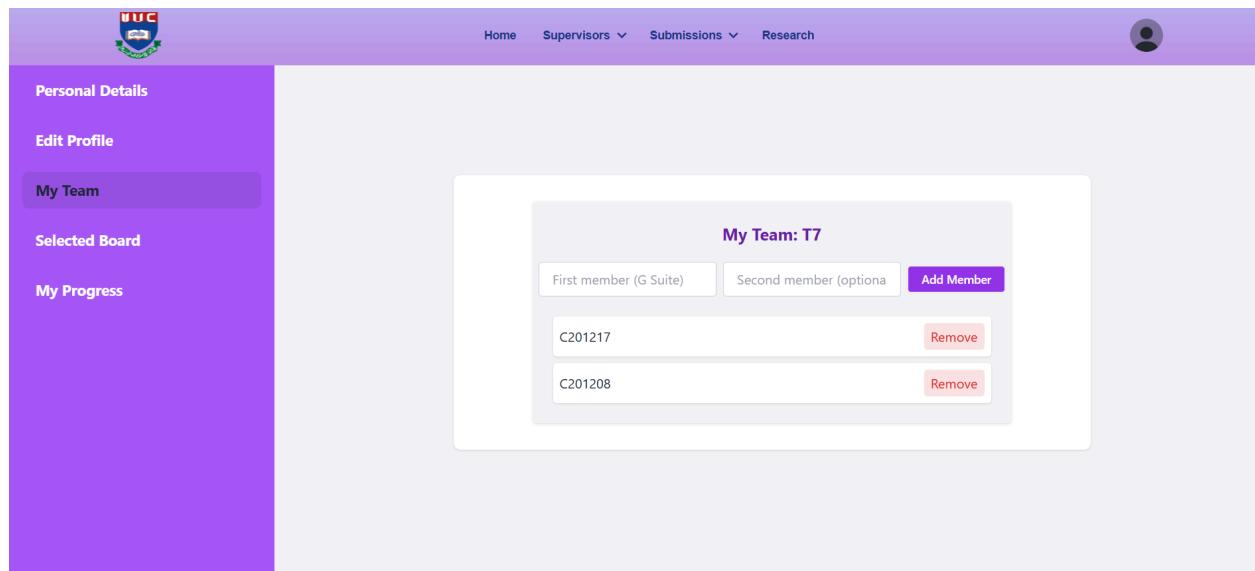


Fig 6.2.13: Create a Team

The screenshot shows the NJC portal interface. At the top is a purple header bar with the NJC logo, 'Home', 'Supervisors', 'Submissions', 'Research', and a user icon. Below this is a section titled 'SUPERVISORS LIST' featuring a table with columns: SL, Name, Department, Email, Phone, and Status. Two rows of data are shown:

SL	Name	Department	Email	Phone	Status
1	Mohammed Safiullah	CSE	safiullah@gmail.com	01711304565	Select
2	Mahadi Hassan	CSE	mahadi_cse@yahoo.com	01957719040	Select

Fig 6.2.14: Select Supervisor

The screenshot shows a purple-themed web application interface. At the top, there is a navigation bar with links for Home, Supervisors, Submissions, Research, and a user profile icon. Below the navigation bar, a central content area features a white card titled "My Supervisor". Inside the card, the following information is displayed:

Name: Mohammed Safiullah
Designation: Assistant Professor
Qualification: B.Sc. in CSE KU, M.Sc. IIUC
Department: CSE
Phone: 01711304565
Email: safiullah@gmail.com

At the bottom of the page, there is a footer bar with links for About us, Supervisors, Submissions, Previous Thesis, and social media icons for Twitter, YouTube, Facebook, and Instagram.

Fig 6.2.15: My Supervisor

The screenshot shows a proposal submission status page. The title "Project/Thesis Proposal" is at the top. Below it, a yellow box displays the status "Pending". The proposal details are listed in a grey box:

Team : T7
Type: Project
Title: Online Based Thesis/Proposal Management System
Abstract: An Online-Based Thesis/Proposal Management System streamlines the submission, review, and tracking process for academic thesis and proposals in a centralized platform.
Area of Research: Web Development
Supervisor:
Proposal : [View](#)

Fig 6.2.16: Proposal Submission

Project/Thesis Proposal

Team Name
T7

Type
Project

Title
Online Based Thesis/Proposal Management System

Abstract
An Online-Based Thesis/Proposal Management System streamlines the submission, review, and tracking process for academic thesis and proposals in a centralized platform.

Area of Research
Web Development

Upload Proposal Report(pdf)
Choose File: Proposal.pdf

Submit Proposal



Edit Profile

View Board

Student Works

conclusions are well-supported.

Team : T7

Type : Project

Title : Online Based Thesis/Proposal Management System

Student ID : C201217, C201208

Student Name: Naima Fardous, Nirjana Barua

Proposal	Proposal Status	Proposal Feedback	Pre Defense	Pre Defense Status	P C F
Proposal	Accept	Reject	No Feedback	Not Submitted	N F

Fig 6.2.17: Student Works (Instructor Panel)

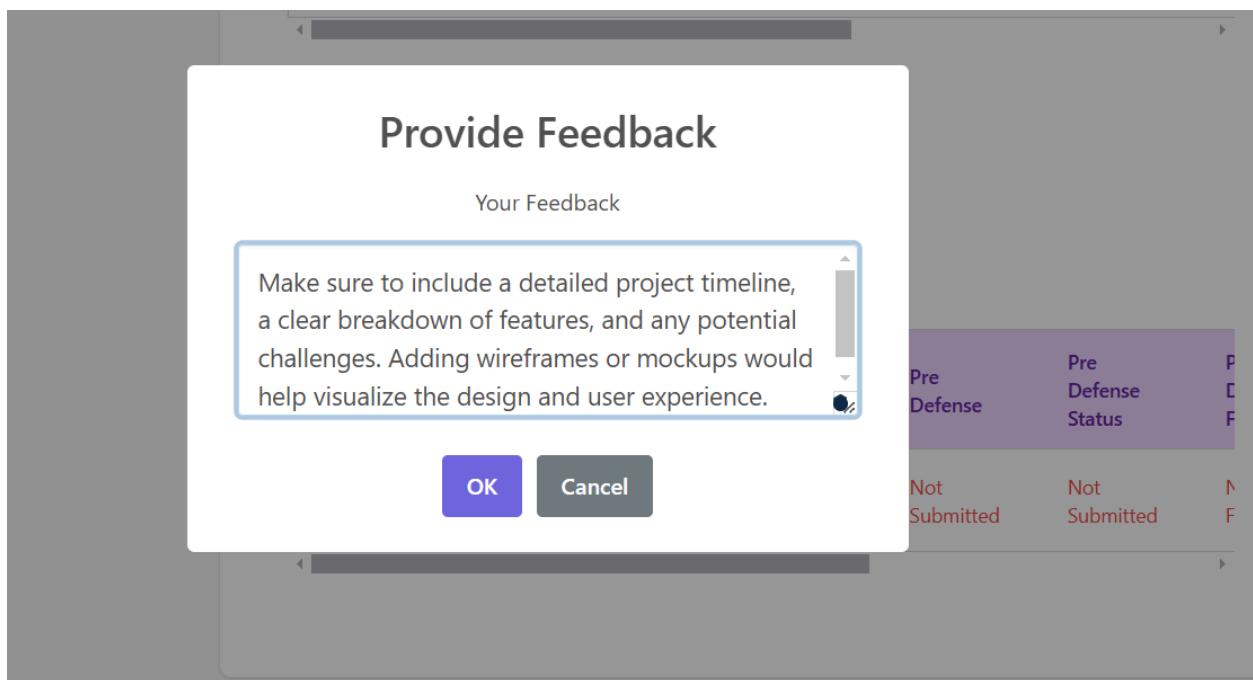


Fig 6.2.18: Supervisor's feedback on proposal rejection, outlining necessary modifications.

A screenshot of a web-based proposal submission form. The header includes the university logo and navigation links for Home, Supervisors, Submissions, and Research. The main form area has a title "Project/Thesis Proposal" and a message: "Your previous proposal has been rejected. Please submit again." It contains fields for Team Name (T7), Type (Project), Title (Online Based Thesis/Proposal Management System), Abstract (describing the system as streamlining submission, review, and tracking for academic theses and proposals), Area of Research (Web Development), and an Upload Proposal Report(pdf) field (containing "Choose File | Proposal.pdf"). A "Submit Proposal" button is at the bottom. The footer includes links for About us, Supervisors, Submissions, Previous Thesis, and social media icons (Twitter, YouTube, Facebook, Instagram). Copyright information at the bottom states: "Copyright © 2024 - All rights reserved by International Islamic University Chittagong".

Fig 6.2.19: Resubmitted proposal after addressing supervisor's feedback and required modifications.

Team : T7

Type : Project

Title : Online Based Thesis/Proposal Management System

Student ID : C201217, C201208

Student Name: Naima Fardous, Nirjana Barua

Proposal	Proposal Status	Proposal Feedback	Pre Defense	Pre Defense Status	Pre Defense Feedback
Proposal	Accepted	Great Work	Not Submitted	Not Submitted	No Feedback

Project/Thesis Proposal

Accepted

Team : T7

Type: Project

Title: Online Based Thesis/Proposal Management System

Abstract: An Online-Based Thesis/Proposal Management System streamlines the submission, review, and tracking process for academic thesis and proposals in a centralized platform.

Area of Research: Web Development

Supervisor: Mohammed Safiullah

Proposal : [View](#)

Fig 6.2.20: Accepted Proposal

Add Board

Board Name:

Department:

Batch:

Chairman:

Member 1:

Member 2:

Save **Cancel**

Add Board

Board	Members	Department	Batch	Thesis/Project
Board 1	Chairman: Sabrina Akter Member : Farjana Tasnim Member : Shefayatuj Johara Chowdhury	CSE	50	Select
Board 2	Chairman: Dr. Mohammad Aman Ullah Member : Mohammed Safiullah Member : Mahadi Hassan	CSE	50	Select

Manage Board

Add Board

Board	Members	Department	Batch	Thesis/Project
Board 1	Chairman: Sabrina Akter Member : Farjana Tasnim Member : Shefayatuj Johara Chowdhury	CSE	50	Select
Board 2	Chairman: Dr. Mohammad Aman Ullah Member : Mohammed Safiullah Member : Mahadi Hassan	CSE	50	Select

Fig 6.2.21: Create a Board by Admin

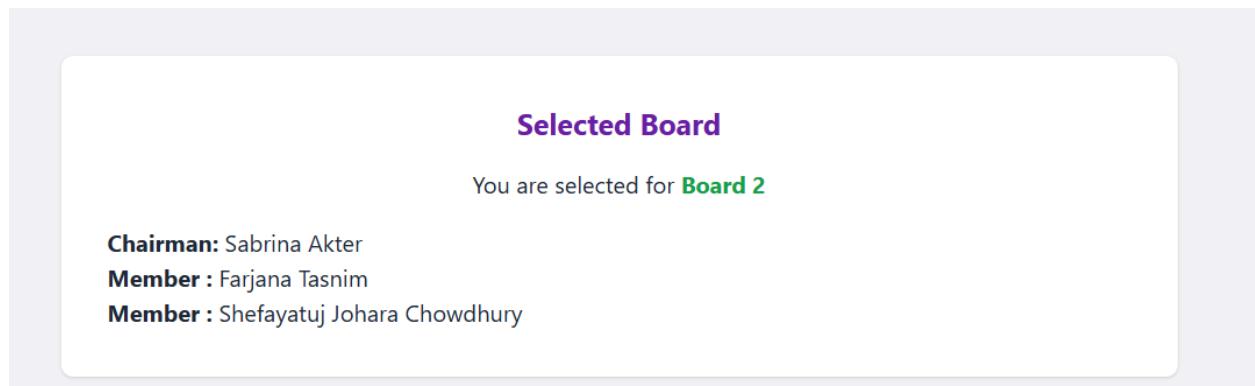


Fig 6.2.22: Show Selected Board for Proposal (Student Panel).

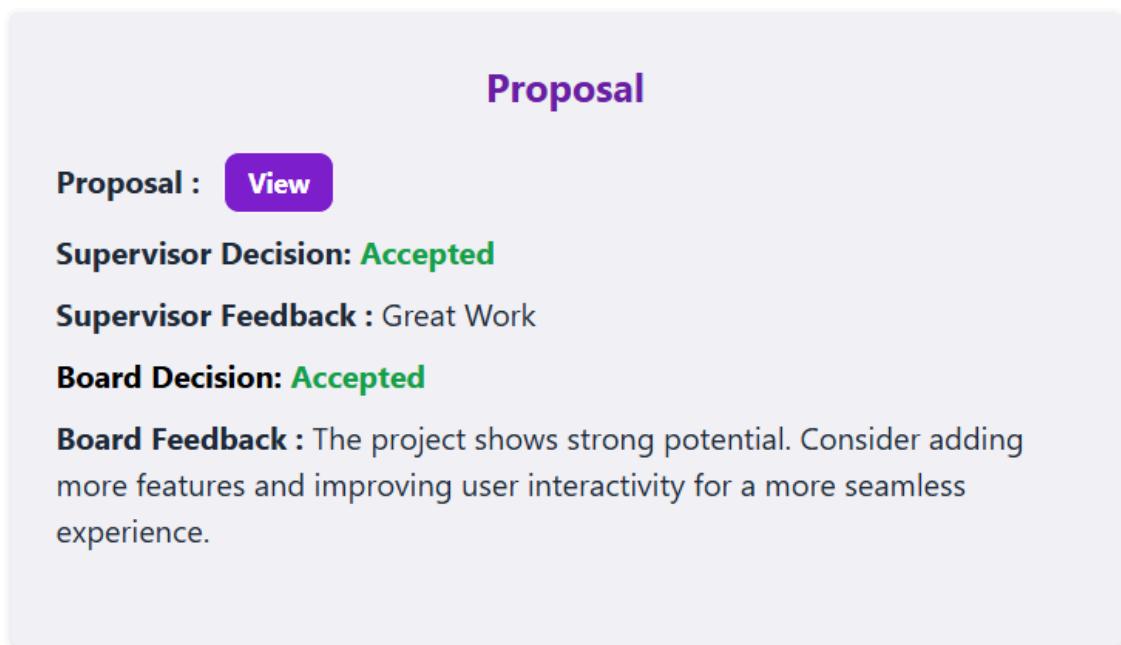


Fig 6.2.23: My Project Progress (Student Panel)

Pre Defence

Team : T7

Type: Project

Title: Online Based Thesis/Proposal Management System

Supervisor: Mohammed Safiullah

Proposal Feedback: Great Work

Pre-Defence Report :

Upload Pre-Defence Report (PDF)

Choose File Thesis_Project_Automation_System .pdf

Submit Report

Pre Defence

Pending

Team : T7

Type: Project

Title: Online Based Thesis/Proposal Management System

Supervisor: Mohammed Safiullah

Proposal Feedback: Great Work

Pre-Defence Report :

View

Fig 6.2.24: Pre Defence Report Submission

Team : T7

Type : Project

Title : Online Based Thesis/Proposal Management System

Student ID : C201217, C201208

Student Name: Naima Fardous, Nirjana Barua

posal dback	Pre Defense	Pre Defense Status	Pre Defense Feedback	Defense	Defense Status	D F
at rk	Pre Defense	Accepted	Good work	Not Submitted	Not Submitted	N F

Pre Defence

Accepted

Team : T7

Type: Project

Title: Online Based Thesis/Proposal Management System

Supervisor: Mohammed Safiullah

Proposal Feedback: Great Work

Pre-Defence Report : [View](#)

Fig 6.2.25: Accepted Pre Defence Report (Student Panel)

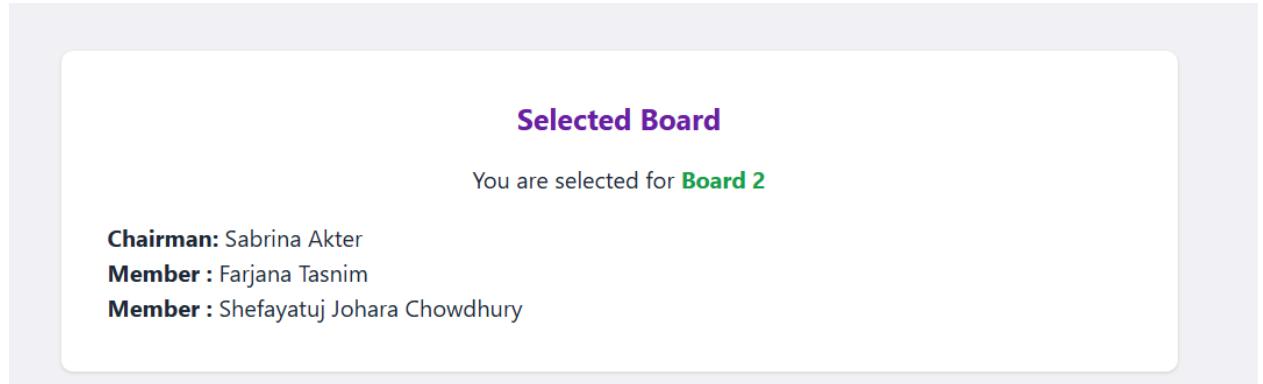


Fig 6.2.26: Show Selected Board for Pre Defence (Student Panel).

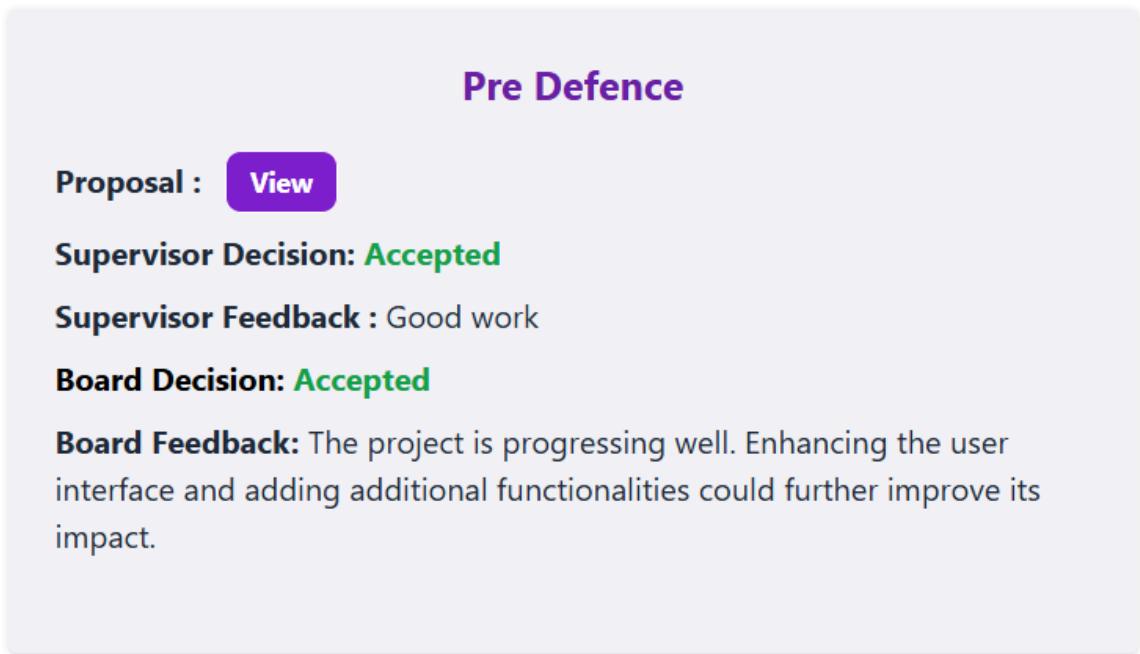


Fig 6.2.27: Show My Pre-Defense Progress (Student Panel).

Defence

Pending

Team : T7

Type: Project

Title: Online Based Thesis/Proposal Management System

Supervisor: Mohammed Safiullah

Pre Defence Feedback: Good work

Defence Report: [View](#)

Fig 6.2.28: Defence Report Submission (Student Panel).

Team : T7

Type : Project

Title : Online Based Thesis/Proposal Management System

Student ID : C201217, C201208

Student Name: Naima Fardous, Nirjana Barua

Pre Defense	Pre Defense Status	Pre Defense Feedback	Defense	Defense Status	Defense Feedback
Pre Defense	Accepted	Good work	Defense	Accepted	Nice Work

Defence

Accepted

Team : T7
Type: Project
Title: Online Based Thesis/Proposal Management System
Supervisor: Mohammed Safiullah
Pre Defence Feedback: Good work
Defence Report : [View](#)

Fig 6.2.29: Accepted Defence Report (Student Panel)

Selected Board

You are selected for **Board 3**

Chairman: Dr. Mohammad Aman Ullah
Member : Mohammed Safiullah
Member : Mahadi Hassan

Fig 6.2.30: Show Selected Board for Defence (Student Panel).

Defence

Defence : View

Supervisor Decision: Accepted

Supervisor Feedback : Nice Work

Board Decision: Accepted

Board Feedback: The project is progressing well. Enhancing the user interface and adding additional functionalities could further improve its impact.

Fig 6.2.31: Show My Defence Progress (Student Panel).

CHAPTER 7: TESTING & MAINTENANCE

The success of our Thesis/Project portal depends heavily on its reliability, security, and responsiveness in supporting the university's thesis processes. To achieve this, our approach to testing and maintenance emphasizes thorough quality assurance, continuous monitoring, and robust security measures. This section outlines the methods used to test and maintain the portal's functionality and integrity over time.

7.1 Functional Testing

Functional testing is conducted to validate that each feature and function of the portal behaves as expected. This involves several stages:

- **Unit Testing:** Unit tests are performed on individual components, both on the frontend (React) and backend (Node.js, Express). Each functional unit, such as the login form, data-fetching functions, and supervisor selection components, is tested independently to ensure that it operates as intended. Testing each unit in isolation allows us to catch and address small issues early in the development process.
- **Integration Testing:** Once individual components pass unit tests, they are integrated and tested together to ensure seamless data flow and interaction across the application. For instance, integration testing is performed on user registration and login functions to ensure that data flows securely between the frontend and backend, with proper storage and retrieval in MongoDB. Similarly, role-based access controls (student, instructor, admin) are validated to confirm that only authorized users can access private routes and role-specific features.
- **User Authentication Testing:** Authentication testing covers both login and registration flows. For students and instructors, the integration with G Suite account logins is tested to ensure that only verified university accounts can register. In addition, user sessions are validated to check that data remains secure and consistent throughout each session. For admins, the MongoDB-based authentication process is rigorously tested to verify that credentials are stored and validated securely.

7.2 Non-Functional Testing

Non-functional testing ensures that the portal is efficient, secure, and user-friendly. This includes:

- **Performance Testing:** The portal is tested under simulated load conditions to measure response times, particularly for features like data retrieval, form submissions, and file uploads. This is crucial during peak periods, such as proposal submission deadlines or defense dates, when multiple users may access the portal simultaneously. Techniques such as load testing and stress testing are used to ensure that the portal maintains acceptable performance under high traffic.
- **Security Testing:** Given the sensitive nature of academic data and user credentials, security is a top priority. Security tests are performed to identify vulnerabilities in the system. This includes testing the private routes to ensure only authorized users can

access specific pages. These tests help secure sensitive information, including student and instructor data, login credentials, and academic submissions.

- **Usability Testing:** User experience is a key factor in the success of the portal. Usability tests involve testing the portal's user interface across different devices and screen sizes to ensure that it is intuitive and accessible for all users, regardless of technical skill level. Feedback from students, instructors, and admins is gathered to improve the ease of navigation, allowing users to quickly access relevant sections like supervisor selection, proposal submission, and feedback viewing.

7.3 Maintenance

After deployment, ongoing maintenance is essential to keep the portal running smoothly and to adapt to evolving needs. Maintenance includes the following aspects:

- **Bug Fixes and Feature Updates:** As users interact with the portal, any bugs or usability issues they encounter are logged and addressed. This feedback loop enables the development team to resolve issues promptly, enhancing the user experience. Additionally, updates are released periodically to add new features or improve existing functionality, in response to changing requirements or user feedback.
- **Data Backup and Recovery:** The portal's MongoDB database is backed up regularly to protect against data loss. This is particularly important for preserving critical data like student records, supervisor assignments, and proposal submissions. A recovery plan is in place to restore data quickly in the event of a system failure, ensuring that students and instructors experience minimal disruption.
- **Continuous Monitoring and Security Audits:** Continuous monitoring tools are implemented to track the portal's performance and detect anomalies, such as sudden spikes in traffic or unusual access patterns, which could indicate security threats. Regular security audits are conducted to review and reinforce security measures, especially around data access and storage. Monitoring and security audits enable proactive issue resolution, maintaining system stability and protecting against vulnerabilities.
- **Documentation and Version Control:** Maintenance documentation is maintained to track changes, updates, and known issues within the portal. This includes

documenting each version update, feature change, and bug fix. Documentation ensures that maintenance activities are well-coordinated and that knowledge of the system's structure is preserved, which is crucial for troubleshooting and future development. Git version control is used to manage code changes, allowing the team to roll back to previous versions if needed.

Through these comprehensive testing and maintenance practices, the Thesis/Project portal is designed to offer a dependable and secure experience for all its users, facilitating a smooth, transparent process for university thesis projects. These efforts ensure that the portal remains efficient, secure, and adaptable as it grows to meet the academic needs of the university community.

CHAPTER 8: CONCLUSION AND FUTURE WORKS

8.1 Conclusion

The Thesis/Project portal developed for our university represents a significant step toward digitizing and streamlining the thesis submission and evaluation process. By centralizing the workflow for students, instructors, and administrators, the portal enhances accessibility, reduces paperwork, and fosters efficient collaboration across roles. Key functionalities, such as supervisor selection, proposal submissions, and role-based access, enable students and instructors to participate fully in the thesis process, while administrators maintain oversight and control.

The comprehensive use of modern web technologies—React for a responsive frontend, Node.js and Express for robust backend operations, and MongoDB for scalable data management—ensures that the platform is both user-friendly and capable of handling high-volume academic data. Authentication and private routing enhance security, protecting sensitive information and allowing users to access appropriate features based on their role. Through rigorous testing and ongoing maintenance plans, the portal is designed to remain reliable and adaptable, meeting the needs of the university community.

8.2 Future Works

While the portal fulfills the core requirements, several future improvements could further optimize its functionality and scalability:

1. **Enhanced Data Security and Encryption:** As the portal grows and handles increasingly sensitive data, implementing advanced data security measures like data encryption and multi-factor authentication could bolster security, protecting user data against potential threats.
2. **Automated Notifications and Reminders:** Adding an automated notification system would allow the portal to send reminders for important dates, such as proposal deadlines, pre-defense, and defense submissions. Notifications can be customized for each user role, keeping students, instructors, and admins updated on upcoming tasks.
3. **Mobile Application Development:** To improve accessibility, especially for students and instructors, developing a mobile application could be a valuable addition. A mobile app would allow users to access the portal's features on the go, promoting greater convenience and real-time engagement.
4. **Analytics and Reporting Features:** Introducing analytical tools within the portal could allow admins to monitor trends, such as the number of proposals submitted, success rates, and supervisor workload distribution. These insights could help optimize processes and resource allocation.
5. **User Feedback and Continuous Improvement:** Establishing a feedback system where users can report issues or suggest improvements would enable the portal to evolve based on real-world usage and user experience, making it even more effective over time.

In conclusion, the Thesis/Project portal has laid the groundwork for a streamlined, digital approach to managing thesis workflows within the university. By continually adapting to emerging requirements and technology, the portal can serve as a long-term asset to the university, fostering a seamless and efficient thesis process for all participants.

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