ScholarSync

A Project Report

Submitted by

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in partial fulfilment for the award of the degree

of

TY (Computer Science and Engineering)

Under the guidance of

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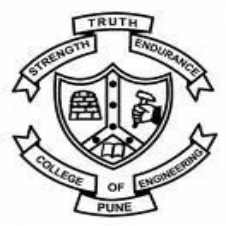
College of Engineering, Pune



DEPARTMENT OF COMPUTER ENGINEERING,

COEP Technological University

May, 2011

DEPARTMENT OF COMPUTER ENGINEERING,

COEP Technological University

CERTIFICATE

Certified that this project, titled "ScholarSync" has been successfully completed by

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and is approved for the fulfilment of the requirements of "Software Engineering Mini Project Stage "

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Project Guide

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Abstract

Solar-Sync represents an innovative platform engineered to revolutionize the intricate processes involved in managing research papers within educational settings. Serving as a dynamic nexus, Solar-Sync caters to the nuanced requirements of both educators and students, orchestrating a harmonious ecosystem for the seamless exchange and evaluation of academic endeavors.

Within this framework, teachers wield a suite of tools empowering them to curate and disseminate research papers, exercise discernment in vetting student applications, and exert authority in determining the status of these applications. Concurrently, students are equipped with an array of features facilitating informed exploration of available research opportunities, streamlined submission of applications for projects aligning with their interests, and transparent monitoring of the lifecycle of their applications.

Committed to fostering user satisfaction, Solar-Sync places paramount emphasis on intuitive user interfaces and optimized user experiences, thereby fostering a collaborative and productive environment conducive to scholarly pursuits. With its intricate architecture interlinking diverse databases, a robust web server infrastructure, and intuitively crafted user interfaces, Solar-Sync stands poised to redefine the landscape of academic research management, promising heightened efficiency and enhanced collaboration across educational institutions.

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Synopsis

1.1 Project Title

ScholarSync

1.1.1 Internal Guide

Dr. Tanuja R P

1.1.2 Problem Statement

Despite the technological advancements in educational settings, the management of research papers remains a convoluted process fraught with inefficiencies and barriers. Current systems often lack centralized platforms tailored to the specific needs of educators and students, leading to fragmented workflows, communication gaps, and administrative burdens. In this context, there is a pressing need for a comprehensive solution that empowers stakeholders with intuitive tools for collaboration and evaluation, and fosters a conducive environment for scholarly pursuits. Thus, the overarching problem is the absence of a unified platform that effectively addresses the diverse requirements of teachers and students in managing the lifecycle of research papers within educational institutions.

Chapter 2

Problem Definition and scope

2.1 Problem Definition

2.1.1 Goals and objectives

Goal and Objectives:

- Goals
  - Create a centralized platform: Develop a centralized platform that facilitates the management of research papers, catering to the distinct needs of both teachers and students within educational institutions.
  - Improve user experience: Prioritize user experience by designing user-friendly interfaces and implementing features that promote ease of navigation, accessibility, and transparency.
- Objectives
  - **Authentication System:** Implement a secure authentication system that allows both teachers and students to login securely, ensuring confidentiality of user credentials and protecting sensitive data.

- **User Interface Design:** Design intuitive and user-friendly interfaces for both teachers and students, enabling easy navigation and seamless interaction with the platform's features.
- **Database Architecture:** Enable teachers to upload, manage, and disseminate research papers effectively, providing features for categorization, version control, and document storage.
- **Scalability:** Design the system with scalability in mind, allowing for future expansion and accommodating an increasing number of users, research papers, and applications without compromising performance.
- **Security Measures:** Implement robust security measures to safeguard the platform against unauthorized access, data breaches, and malicious activities, ensuring the integrity and confidentiality of user data.
- **Testing:** Conduct thorough testing and debugging to identify and address any issues or bugs in the system, ensuring its reliability, stability, and functionality under various scenarios.

2.1.2 Statement of scope

- **Target Products:** Educational institutions, including teachers and students at all levels, seeking a streamlined platform for managing research papers and applications efficiently.
- **Target Audience:** Solar-Sync, a web-based platform designed to cater to the needs of teachers and students by providing intuitive interfaces, secure authentication, and robust functionalities for paper management, application handling, and collaboration in academic research endeavors.

2.2 Software context

The project will utilize the MERN stack, consisting of React for the frontend and Node.js for the backend, with MongoDB serving as the database storage solution.

React, a popular JavaScript library, will be employed to develop the user interface of the software, ensuring a dynamic and interactive experience for users. Node.js, on the other hand, will handle the backend operations, managing server-side logic and facilitating communication between the frontend and the database.

MongoDB, a NoSQL database, will be utilized to store and manage the vast amounts of data related to stocks, transactions, and user information. Its flexibility and scalability make it an ideal choice for storing and retrieving data in real-time, ensuring efficient performance for the software platform. By leveraging the MERN stack, the project aims to deliver a modern, efficient, and scalable solution for traders to buy, sell, and analyze stocks, providing a seamless user experience and robust functionality.

2.3 Major Constraints

- **Client-side constraints**
  - **Offline users:** Users not being logged in to the application.
  - **Synchronization of Data:** We need to ensure the consistency of client-side and server-side data and ensure they are synchronized.
- **Data processing**

- **Optimization of performance:**We must prioritize minimizing delays resulting from concurrent execution of our order matching algorithm on the backend.

2.4 Outcome

The primary outcome of the Stock Exchange Platform project is the successful development of a comprehensive web application that enables traders to analyse, execute buy and sell orders of stocks swiftly with complete transparency. Key components of the outcome include:

- **Enhanced Collaboration:** Solar-Sync fosters enhanced collaboration between teachers and students by providing a centralized platform for research paper management. This promotes communication, transparency, and mutual understanding, leading to more productive academic collaborations.
- **Improved Research Opportunities:** By providing students with easy access to available research opportunities and facilitating the application process, Solar-Sync expands the scope for student involvement in academic research. This leads to increased engagement, learning opportunities, and skill development among students.
- **Data-Driven Insights:** Solar-Sync's robust database architecture enables the collection and analysis of data related to research papers, applications, and user interactions. This provides valuable insights into trends, preferences, and performance metrics, which can inform future decision-making and resource allocation.
- **Enhanced User Experience:** Solar-Sync prioritizes user experience by providing intuitive interfaces, seamless navigation, and responsive support. This results in increased user satisfaction, adoption, and retention, contributing to a positive overall experience for teachers and students alike.

2.5 Applications

- **Research Paper Management:** Solar-Sync facilitates uploading, categorization, and tracking of research papers for teachers, while enabling students to browse, apply, and monitor their applications.
- **Authentication System:** Secure login/register functionality for both teachers and students ensures access control and data security.
- **Intuitive User Interfaces:** User-friendly interfaces promote easy navigation and seamless interaction with the platform.
- **Database Management:** Well-structured databases organize data for efficient storage and retrieval, enhancing platform performance.
- **Application Handling:** Streamlined process allows teachers to review applications and students to track their status, ensuring transparency and accountability.
- **Scalability and Security:** Leveraging the MERN stack, Solar-Sync ensures scalability and robust security measures to protect user data.
- **Documentation and Support:** Comprehensive documentation and ongoing support enhance user experience and facilitate effective platform utilization.

2.6 Software Resources Required

1. **Database Management System (DBMS):** A non relational database management system (RDBMS) such as MongoDB is required to store and manage the users and stocks related data.
2. **Web Framework:** A web framework is necessary for developing the backend logic of the Stock Exchange Platform Application

3. **Programming Languages:** Programming languages such as JavaScript and scripting languages like HTML, CSS, are essential for developing different components of the project, including backend logic, frontend interfaces, and database queries.

4. **Version Control System:** Version control software such as Git is necessary for managing the application's source code, tracking changes, and collaborating with team members.

Safety and Security Requirements:

- **Data Privacy:** Ensure that user login credentials, personal information, and transaction details are securely stored and encrypted to prevent unauthorized access or data breaches.
- **Input Validation:** Implement input validation ensure that user inputs are safe and free from malicious inputs.
- **Content Integrity:** Verify the integrity of scraped content to ensure that prices and product information obtained from external websites are accurate and reliable, minimizing the risk of misleading or fraudulent data.

2.6.1 Design Constraints

- **Data Acquisition**
  - **Website Structure and Changes:** Solar-Sync must adapt to variations in website layouts and data formats.
  - **Volume of Data:** Efficient handling of a large volume of research papers and application data.

  - **Ethical Data Handling:** Compliance with ethical guidelines and data privacy regulations during data acquisition.

- **User Authentication**
  - **Secure Login/Register Process:** Ensuring the security of user credentials during authentication.
  - **Session Management:** Secure management of user sessions to prevent unauthorized access.

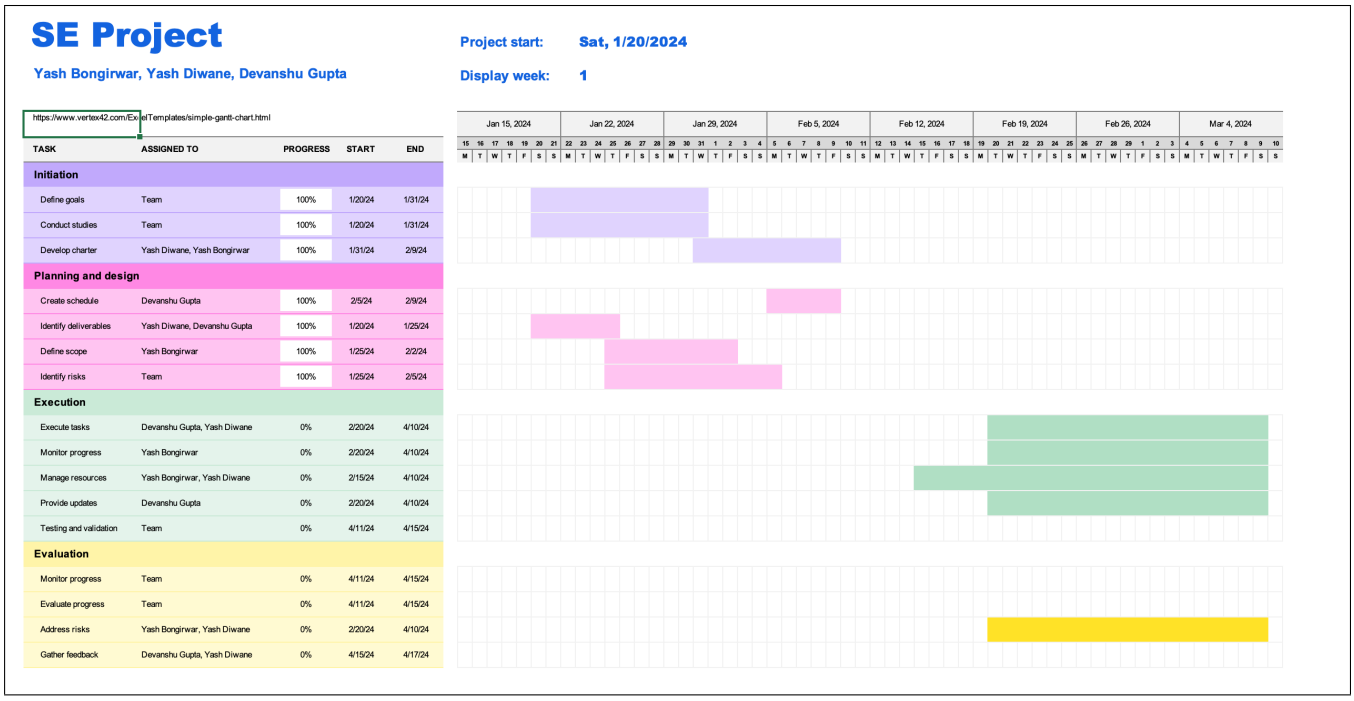
- **Data Processing**
  - **Optimization of Performance:** Efficient processing and retrieval of data to maintain optimal performance.

Chapter 3

Project Plan

3.1 Project Schedule

3.1.1 Gantt Chart



TASK	ASSIGNED TO	PROGRESS	START	END
Initiation				
Define goals	Team	100%	1/20/24	1/31/24
Conduct studies	Team	100%	1/20/24	1/31/24
Develop charter	Yash Diwane, Yash Bongirwar	100%	1/31/24	2/9/24
Planning and design				
Create schedule	Devanshu Gupta	100%	2/5/24	2/9/24
Identify deliverables	Yash Diwane, Devanshu Gupta	100%	1/20/24	1/25/24
Define scope	Yash Bongirwar	100%	1/25/24	2/2/24
Identify risks	Team	100%	1/25/24	2/5/24
Execution				
Execute tasks	Devanshu Gupta, Yash Diwane	0%	2/20/24	4/10/24
Monitor progress	Yash Bongirwar	0%	2/20/24	4/10/24
Manage resources	Yash Bongirwar, Yash Diwane	0%	2/15/24	4/10/24
Provide updates	Devanshu Gupta	0%	2/20/24	4/10/24
Testing and validation	Team	0%	4/11/24	4/15/24
Evaluation				
Monitor progress	Team	0%	4/11/24	4/15/24
Evaluate progress	Team	0%	4/11/24	4/15/24
Address risks	Yash Bongirwar, Yash Diwane	0%	2/20/24	4/10/24
Gather feedback	Devanshu Gupta, Yash Diwane	0%	4/15/24	4/17/24

Figure 3.1: Gantt Chart

3.2 Data flow diagrams

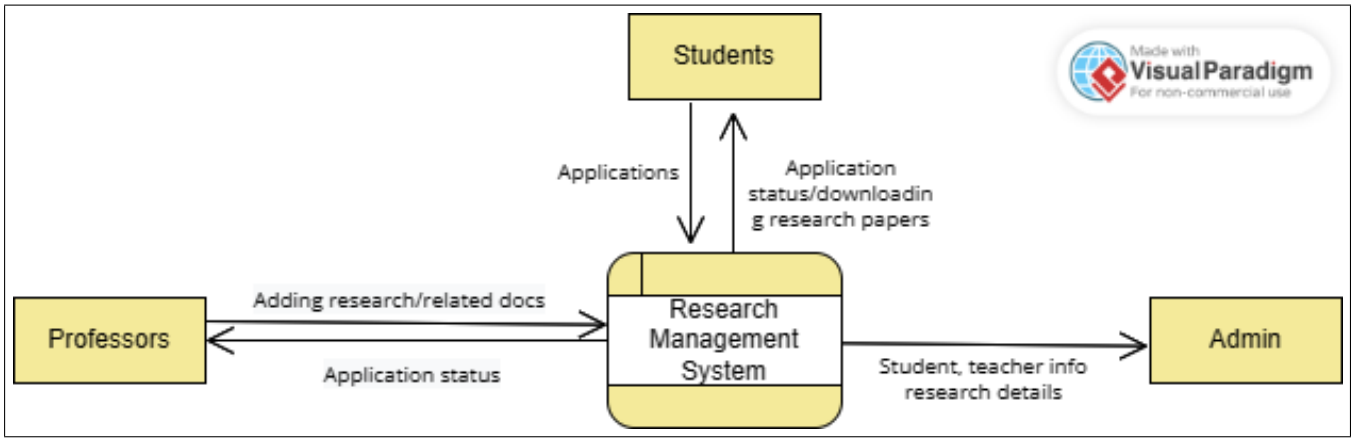


Figure 3.2: DFD Level 0

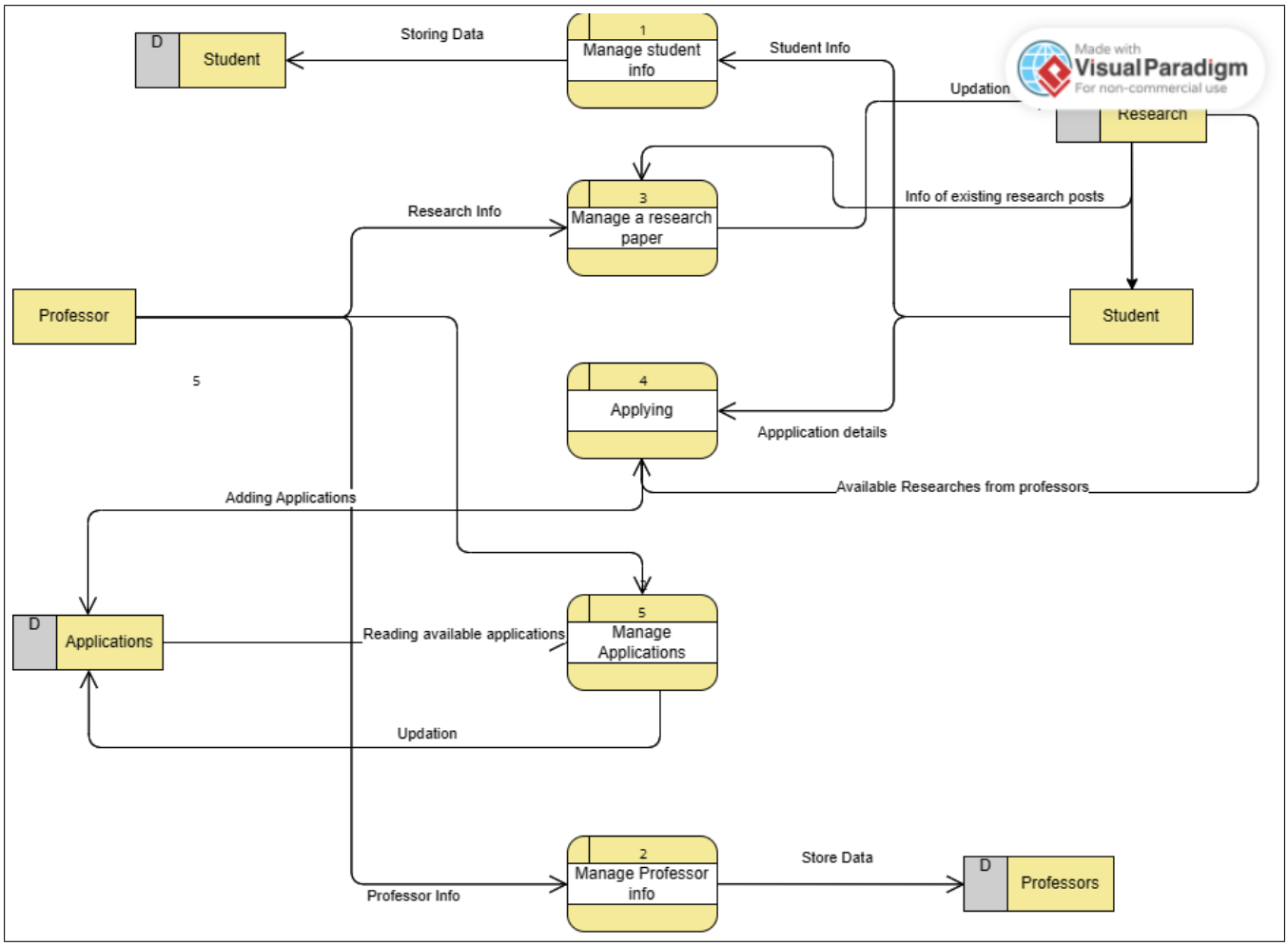


Figure 3.3: DFD Level 1

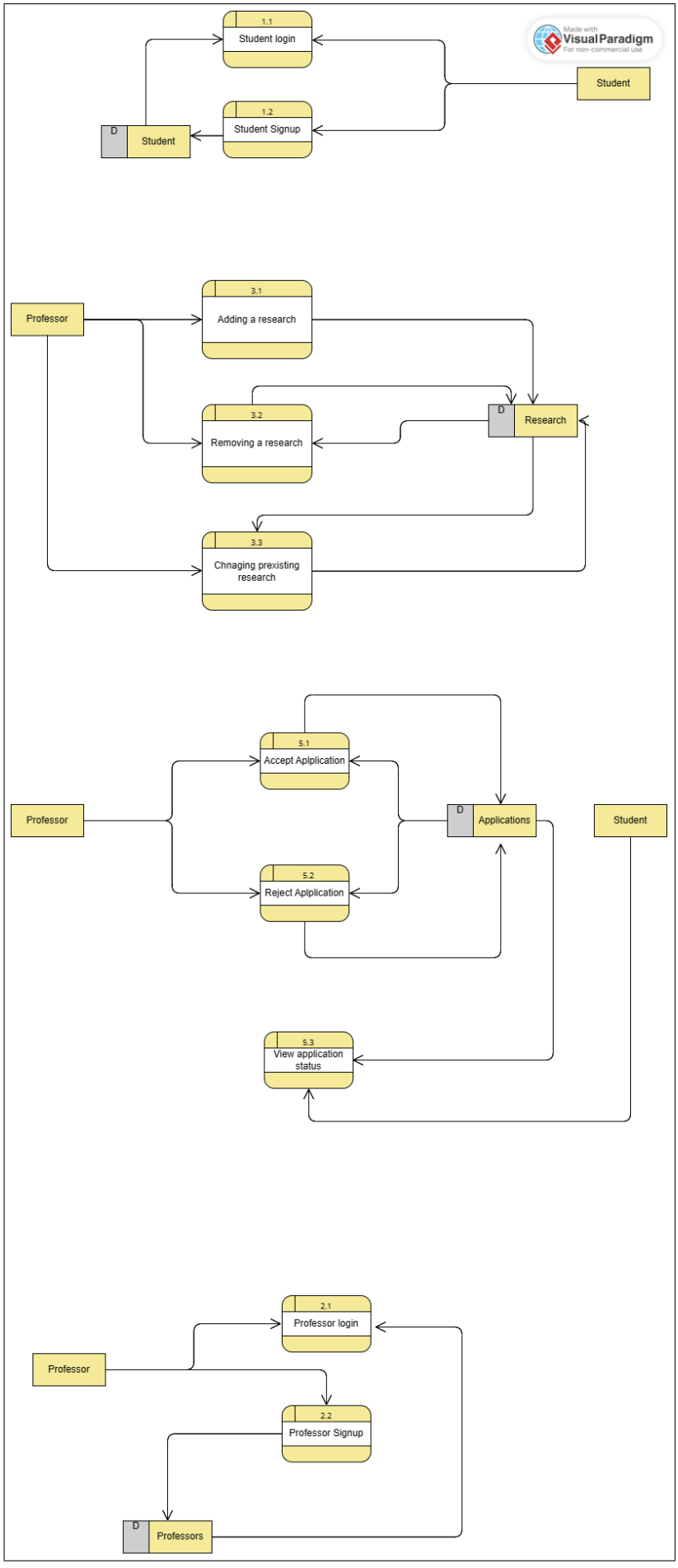


Figure 3.4: DFD Level 12

Chapter 4

Software Requirement Specification

4.1 Introduction

The Solar-Sync Software Requirements Specification (SRS) document outlines the functional and non-functional requirements for the development of a comprehensive online platform designed to facilitate research paper management within educational institutions. This document serves as a guide for the development team, stakeholders, and users involved in the creation, implementation, and maintenance of the Solar-Sync platform.

4.1.1 Purpose

The purpose of the project is to develop a centralized platform for teachers and students to efficiently manage the lifecycle of research papers, including submission, review, and status tracking. Solar-Sync aims to streamline the research paper management process, enhance collaboration between teachers and students, and provide a user-friendly interface for accessing and interacting with research paper-related information. By offering a seamless and intuitive user experience, the project seeks to empower users to engage in academic research effectively and contribute to the advancement of knowledge within

educational institutions.

4.1.2 Project Scope

Solar-Sync aims to provide teachers with functionalities for uploading, categorizing, and managing research papers, while allowing students to browse available research opportunities, submit applications, and track the status of their applications. The platform will include features for secure authentication, intuitive user interfaces, database management, application handling, and scalability to accommodate future growth. Additionally, Solar-Sync will offer educational resources and collaboration tools to foster academic research and innovation within educational institutions. Overall, the scope of the project encompasses the development of a comprehensive platform that supports the research paper management needs of teachers and students, promotes collaboration and knowledge sharing, and enhances the academic experience within educational institutions.

4.1.3 References

- Mavroudis, Vasilios, and Hayden Melton. "Libra: Fair order-matching for electronic financial exchanges." Proceedings of the 1st ACM Conference on Advances in Financial Technologies. 2019.
- https://corporatefinanceinstitute.com/resources/career-map/sell-side/capital-markets/matching-c

4.1.4 Overview

The remaining sections of this document provide a general description, including characteristics of the users of this project, the product's hardware, and the functional and data requirements of the product. General description of the project is discussed in section 2 of this document. Section 3 gives the functional requirements, data requirements and

constraints and assumptions made while designing the Stock Exchange platform. It also gives the user viewpoint of product. Section 3 also gives the specific requirements of the product. Section 3 also discusses the external interface requirements and gives detailed description of functional requirements. Section 4 is for supporting information.

4.2 Overall Description

This document contains the problem statement that the current system is facing which is hampering the growth opportunities of the company. It further contains a list of the stakeholders and users of the proposed solution. It also illustrates the needs and wants of the stakeholders that were identified in the brainstorming exercise as part of the requirements workshop. It further lists and briefly describes the major features and a brief description of each of the proposed system.

The following SRS contains the detail product perspective from our users. It provides the detail product functions of SEP with user characteristics permitted constraints, assumptions and dependencies and requirements subsets.

4.3 Specific Requirements

4.3.1 Login / Signup and Recovery

- The system shall allow users to create an account by providing their email address and choosing a password.
- Upon submission of the registration form, the system shall verify the validity of the email address by sending a verification link to the provided email.
- The system shall provide an option for users to log in using their Google account credentials.

- In the event that a user forgets their password, The user shall initiate the password reset process by providing their registered email address and the the system shall send a password reset link to the provided email.

4.3.2 User Dashboard

- Display student profiles with relevant information such as name, ID, and academic program.
- Showcase newly available research opportunities for students to explore and apply.
- Provide updates and access to ongoing research projects for both students and teachers.
- Include options for users to navigate to other sections like editing profile settings or logging out.

4.3.3 User Profile

- The system shall display user personal information like name, email, etc.
- The system shall display user ongoing resesrach and apllication status

4.3.4 Adding Research

- Teachers can upload new research projects onto the platform.
- Each research entry should include details such as title, description, requirements, and duration.
- Teachers may also specify the number of students they are looking to recruit for each research project.

- Once added, the research projects become visible to students who can then apply to participate.
- Teachers have the ability to review and manage applications received for their research projects.

4.3.5 Application Status

- Students can view the status of their research applications on the platform.
- Application statuses may include "Pending," "Accepted," or "Rejected."
- Teachers have the authority to update the status of applications based on their review process.
- Notifications are sent to students when their application status changes.
- Students can also see comments or feedback provided by teachers regarding their applications.

4.3.6 Accepting or Rejecting Research Applications

- Teachers have the authority to accept or reject research applications submitted by students.
- Upon reviewing an application, teachers can choose to accept or reject it based on various criteria such as qualifications, availability, and project fit.
- Accepted applications are notified to students, allowing them to proceed with the research project.
- Rejected applications are also communicated to students along with any feedback or reasons provided by the teacher.

- Teachers may provide additional comments or instructions along with their decision to accept or reject an application.

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- Rejected applications are also communicated to students along with any feedback or reasons provided by the teacher.
- Teachers may provide additional comments or instructions along with their decision to accept or reject an application.

4.4 Reliability Availability

4.4.1 Back-end Internal Computers

The backend of our project, built on the MERN stack, serves as the foundation for managing data, logic, and functionality. Utilizing Node.js as the runtime environment, it facilitates server-side operations. Express.js, a lightweight web application framework for Node.js, streamlines routing and middleware integration, ensuring efficient handling of HTTP requests. MongoDB, a NoSQL database, stores and organizes data in a flexible, schema-less format, accommodating dynamic data structures. Together, these components enable seamless data retrieval, manipulation, and storage, supporting the robust

and scalable operation of our web application backend.

4.4.2 Internet Service Provider

The system assumes that the user has reasonably good internet connection so that the buy / sell operations on the stock can be performed reliably.

4.5 On-line User Documentation and Help System Requirements

- As the product is Stock Trading Platform, On-line help system becomes a critical component of the system which shall provide –
- The FAQ page will be there to help user solve common issues and navigate through the system easily.
- There will be another Guidelines page which will have information about various components of the system and how to use it.

4.6 Legal, Copyright, and Other Notices

When developing a stock trading algorithm or any software application, it's important to consider legal and copyright notices to protect your intellectual property and communicate important information to users.

4.6.1 Copyright Notice

- Include a Copyright Statement: There will be LICENSE / README file in the codebase has will contain information about the Copyright license used for the project.

- Specify the Copyright Holder: It would be clearly stated on the website the entity or individuals holding the copyright, i.e our project group.
- Include the Year of Publication: Any updation in the user agreement or the license will also be displayed to the user.

4.6.2 License:

We have chosen to use MIT License for our project as we want our project to be open-source. Moreover, making code freely available to the public ensures that no misuse of data is being carried out without the knowledge of the user.

4.6.3 User Agreement:

- Terms of Service/User Agreement: User will be displayed with the terms of Service / User agreement at the time of sign up and only then sign up option will be enabled. Outline user responsibilities, acceptable use, and any restrictions.
- Privacy Policy: If your application collects user data, include a privacy policy outlining how user data is collected, used, and protected.

Chapter 5

Detailed Design Document

5.1 Component Design

5.1.1 Class Diagram

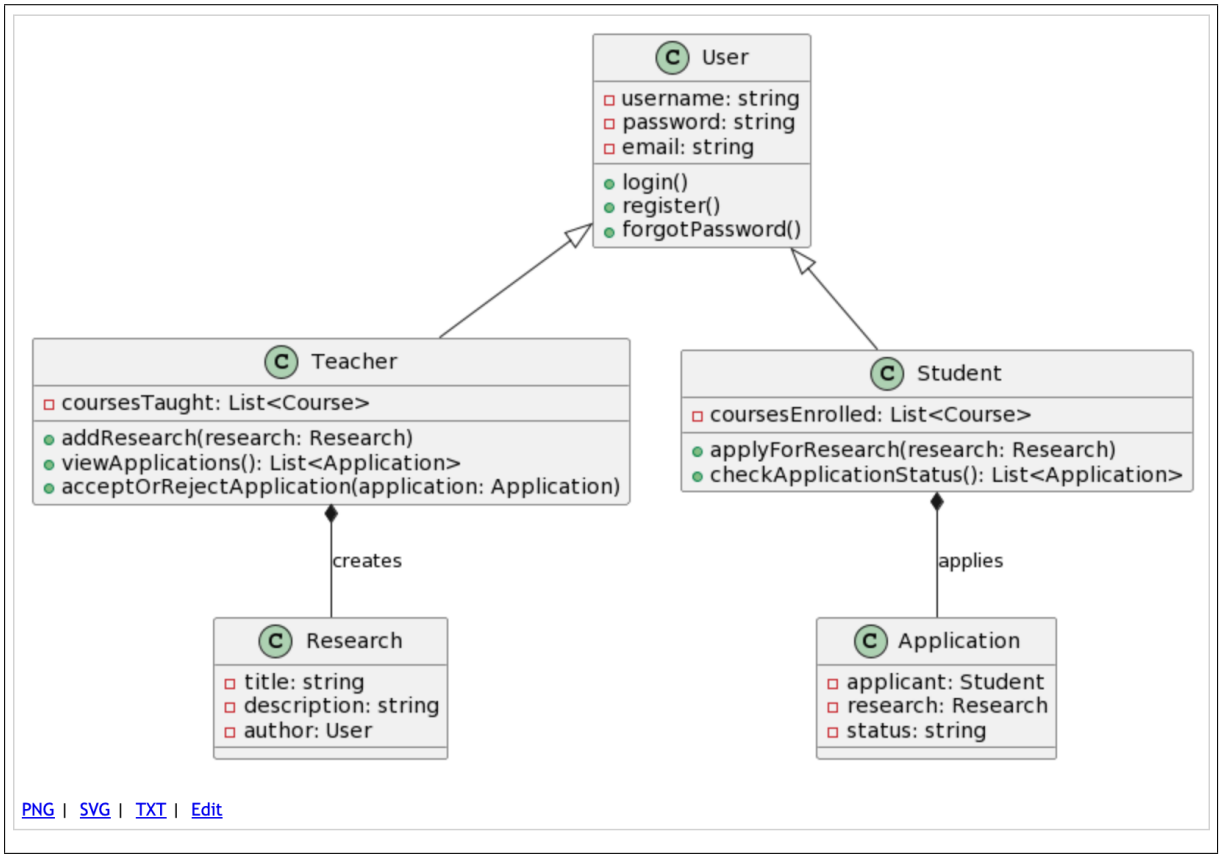

Figure 5.1: Class Diagram

5.1.2 Use Case Diagram (UCD)

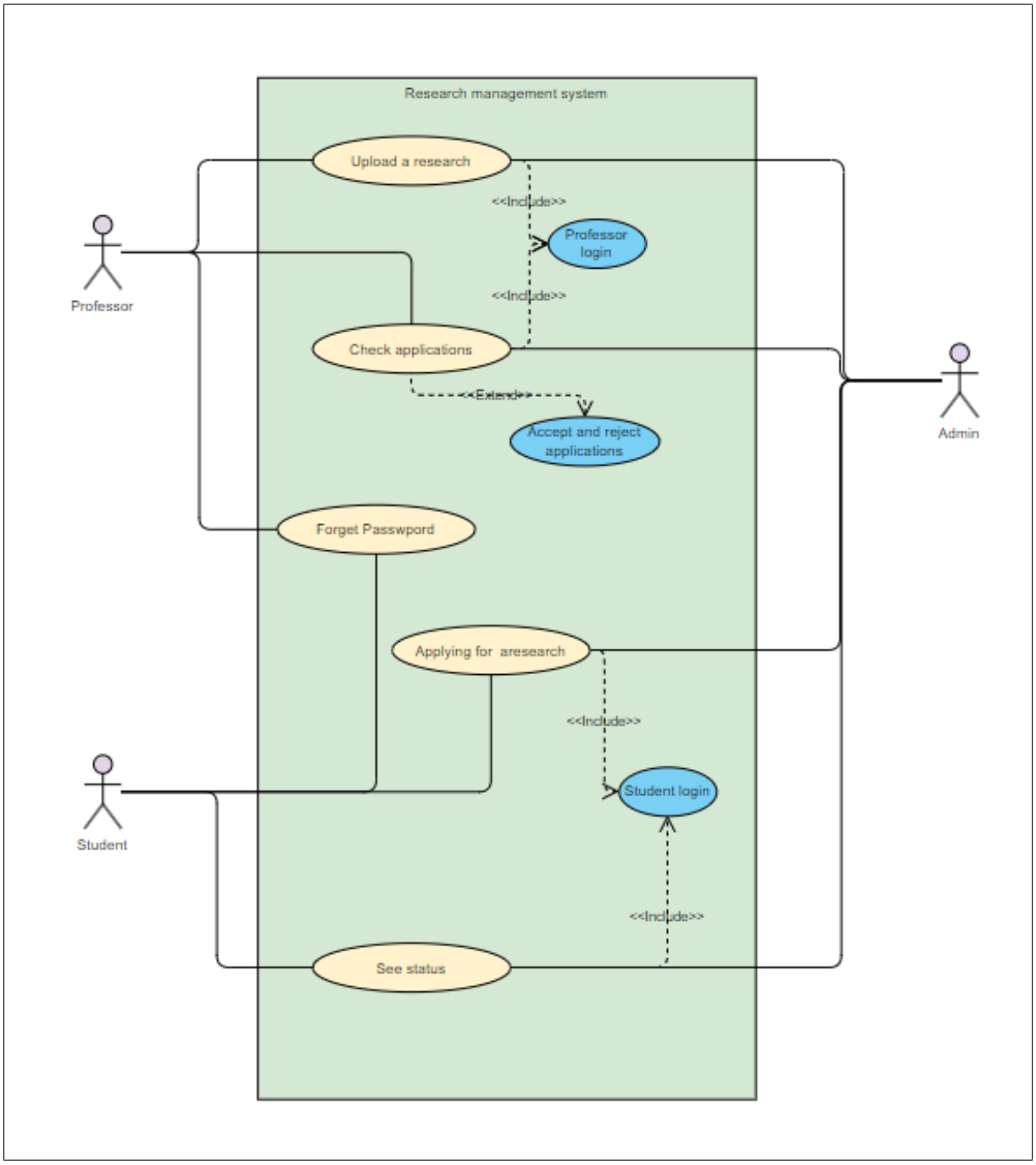

Figure 5.2: Use case diagram

5.1.3 Sequence Diagram

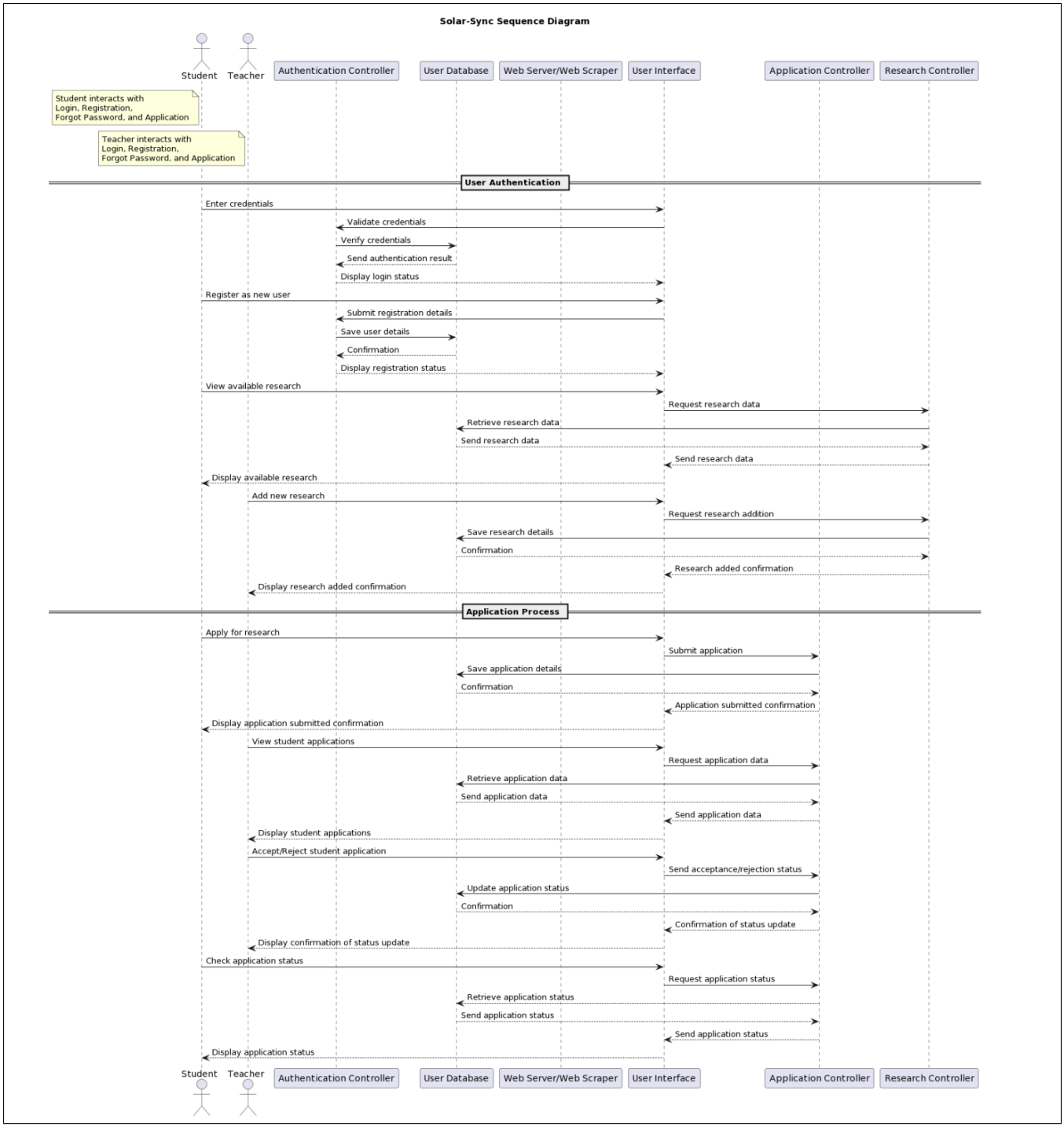

Figure 5.3: Sequence Diagram

5.1.4 Activity Diagram

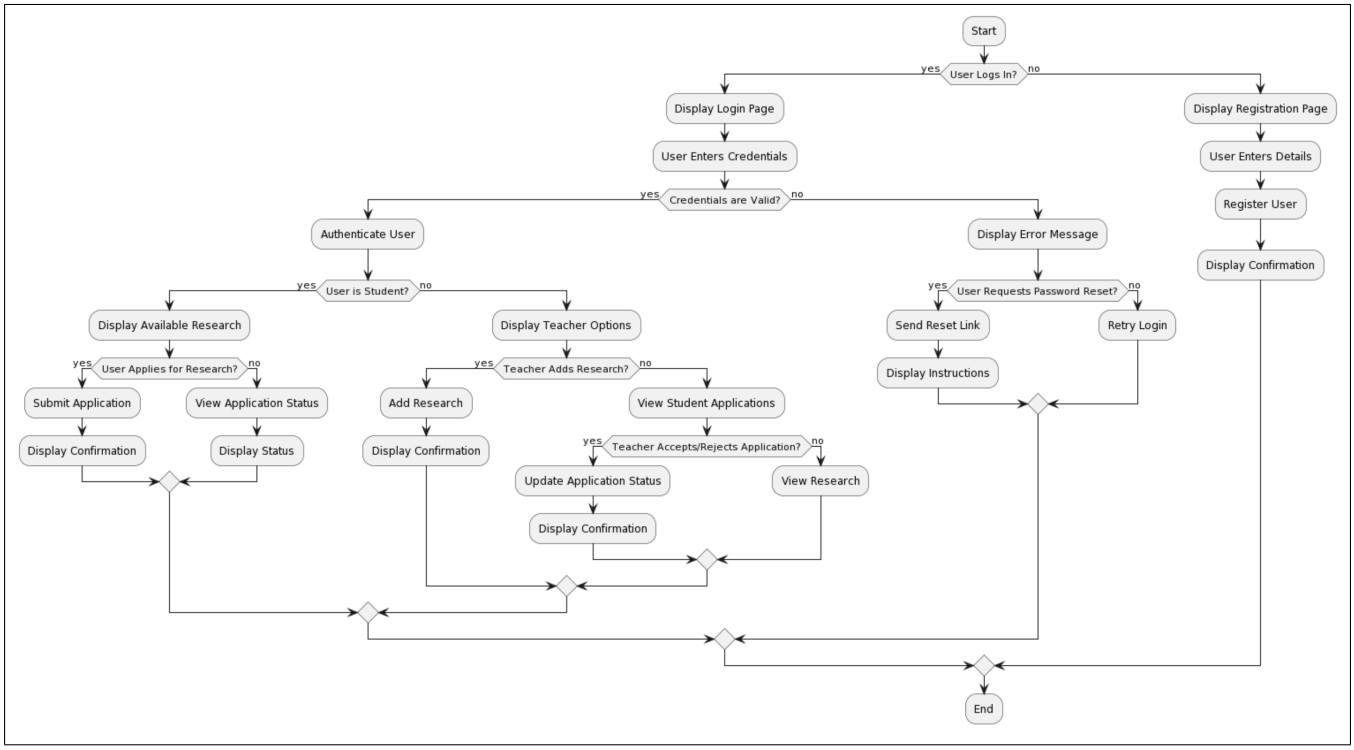

Figure 5.4: Activity Diagram

5.1.5 Component Diagram

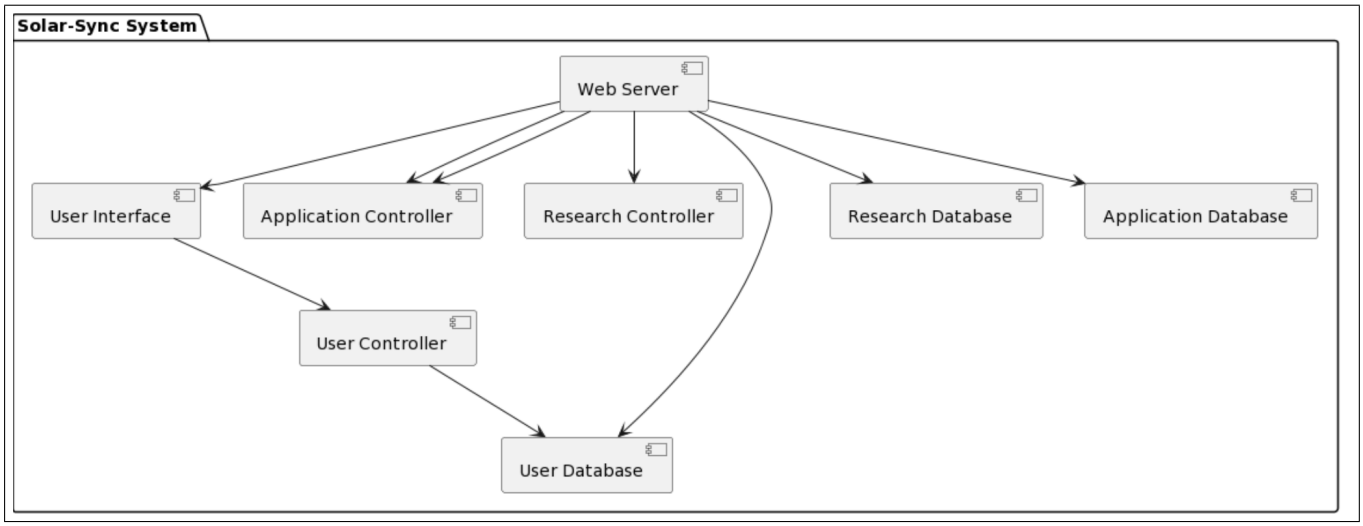

Figure 5.5: Component Diagram

5.1.6 Deployment Diagram

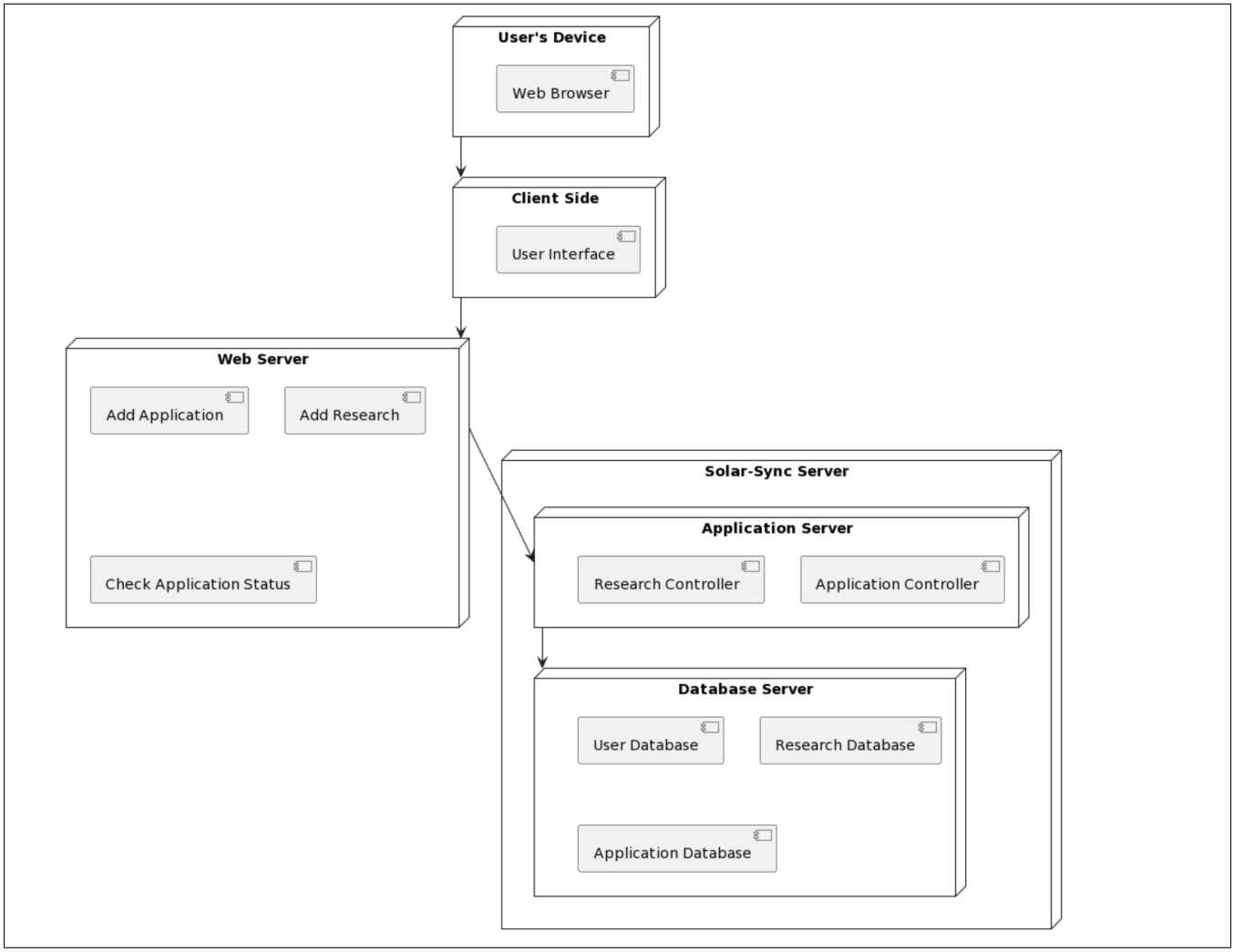

Figure 5.6: Deployment Diagram

5.2 Navigation Flow

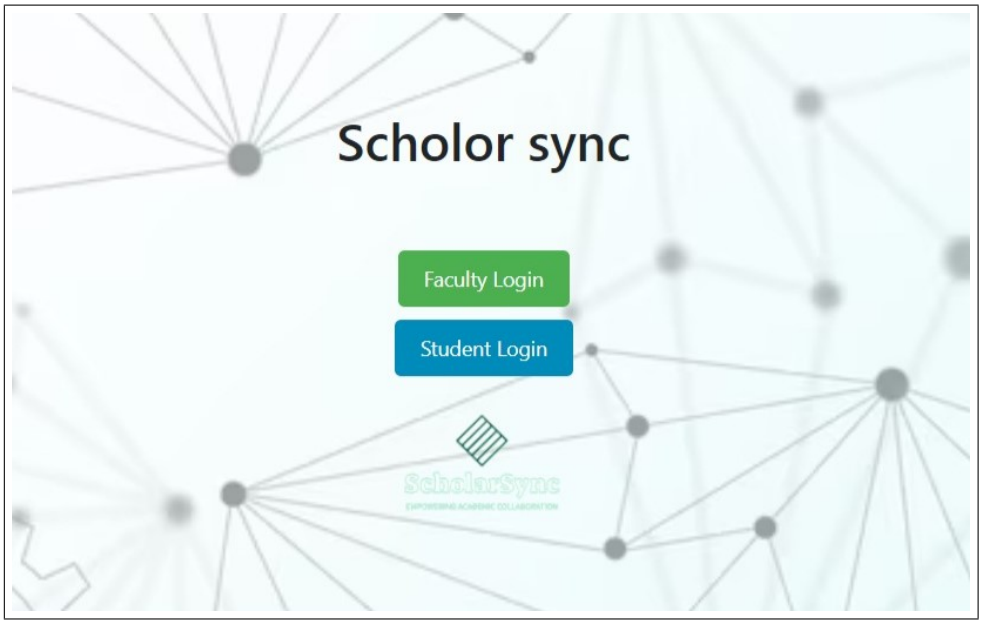

Figure 5.7: landing page

5.2.1 Student Interface

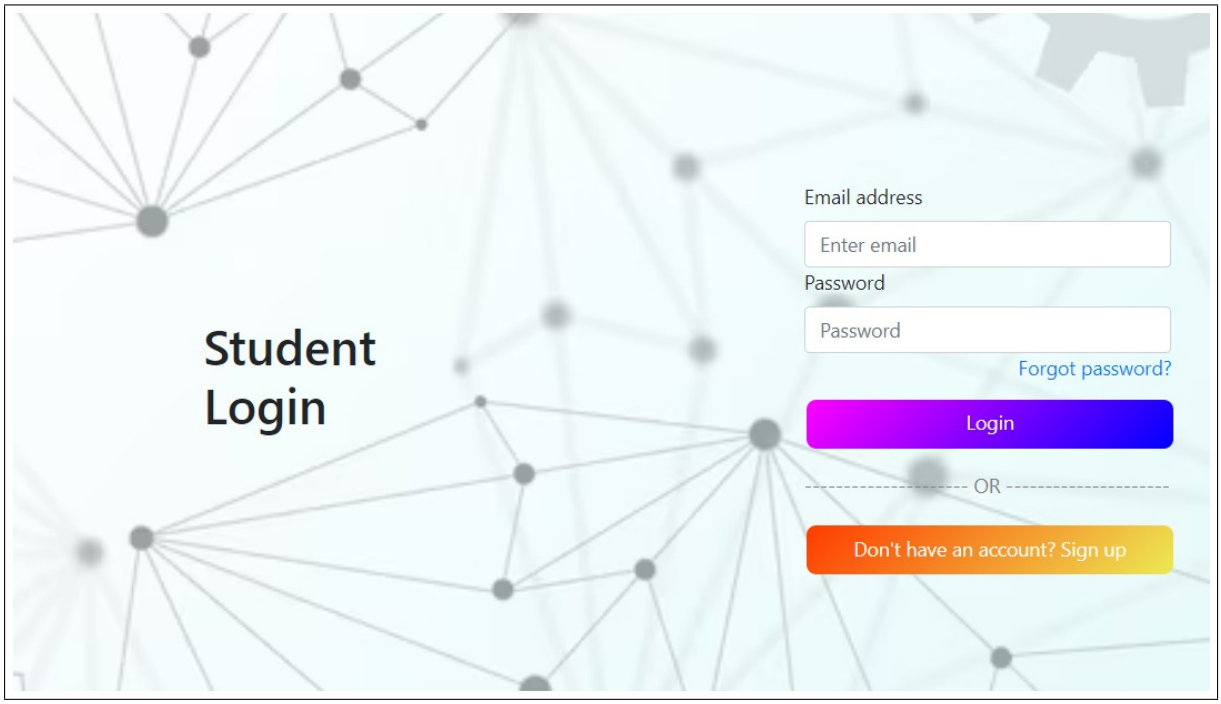

Figure 5.8: Student Login

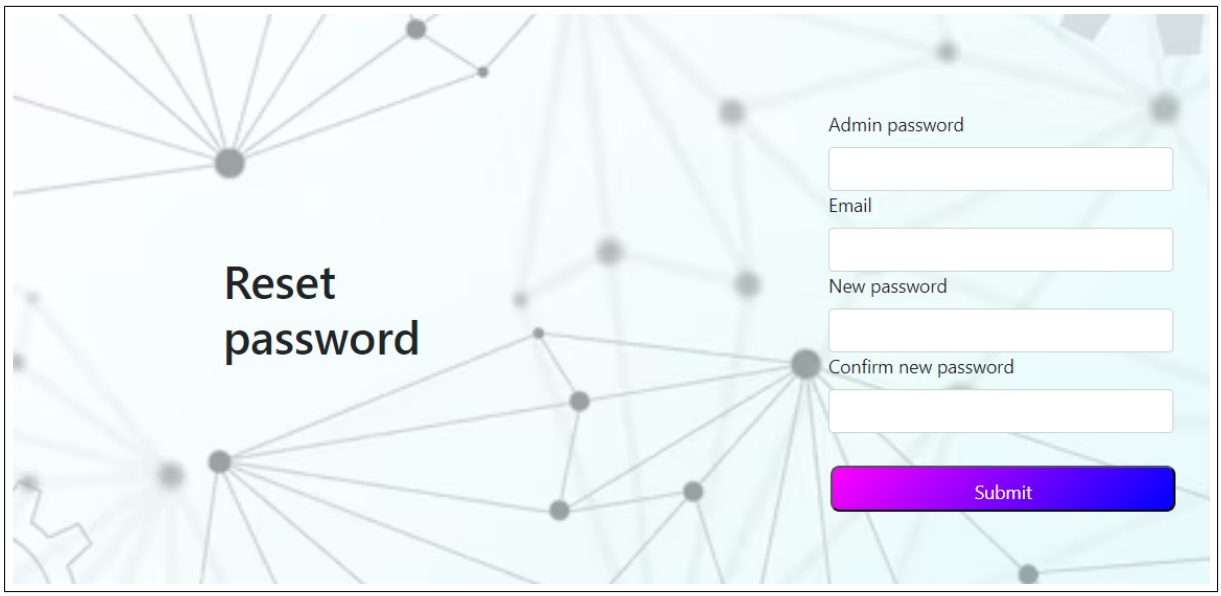

Figure 5.9: Reset Password

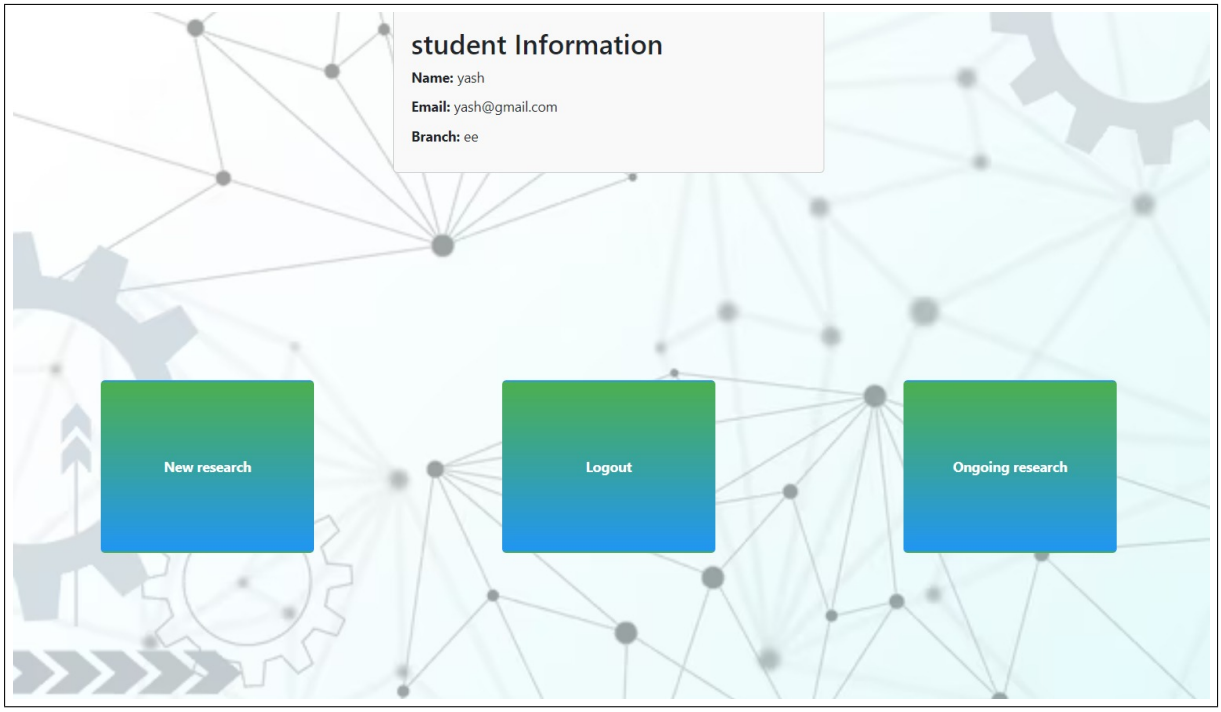

Figure 5.10: Student Dashboard

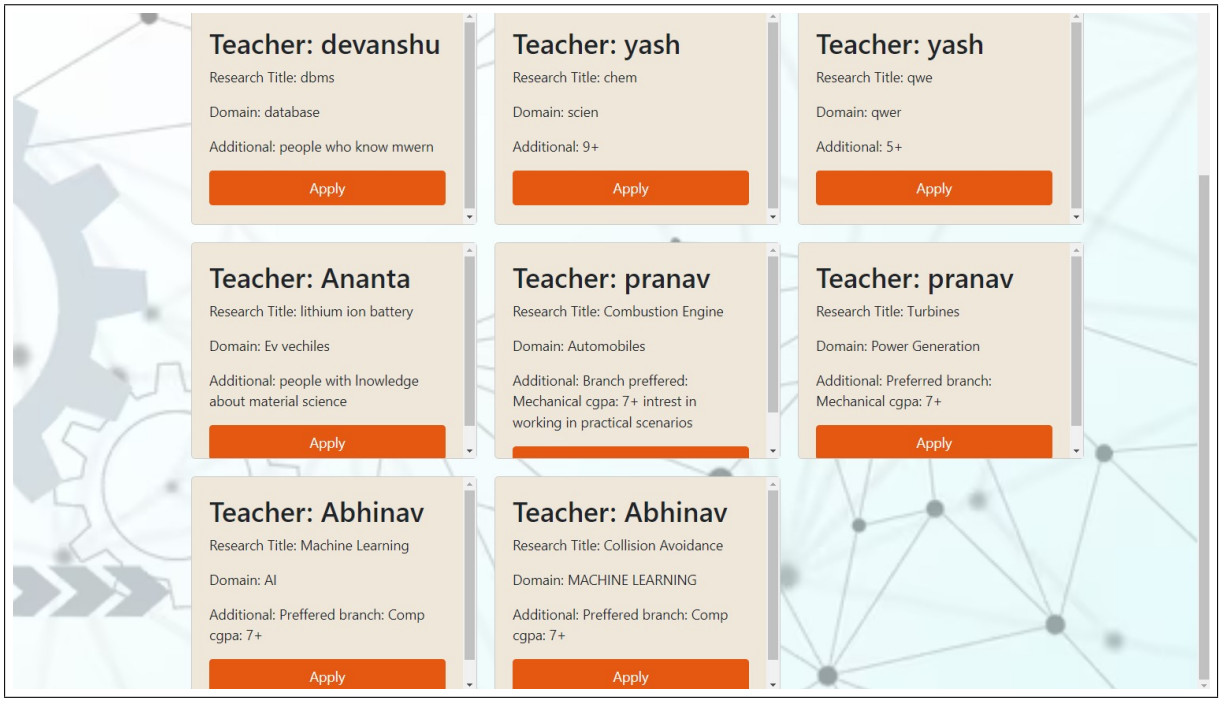

Figure 5.11: Available Researches

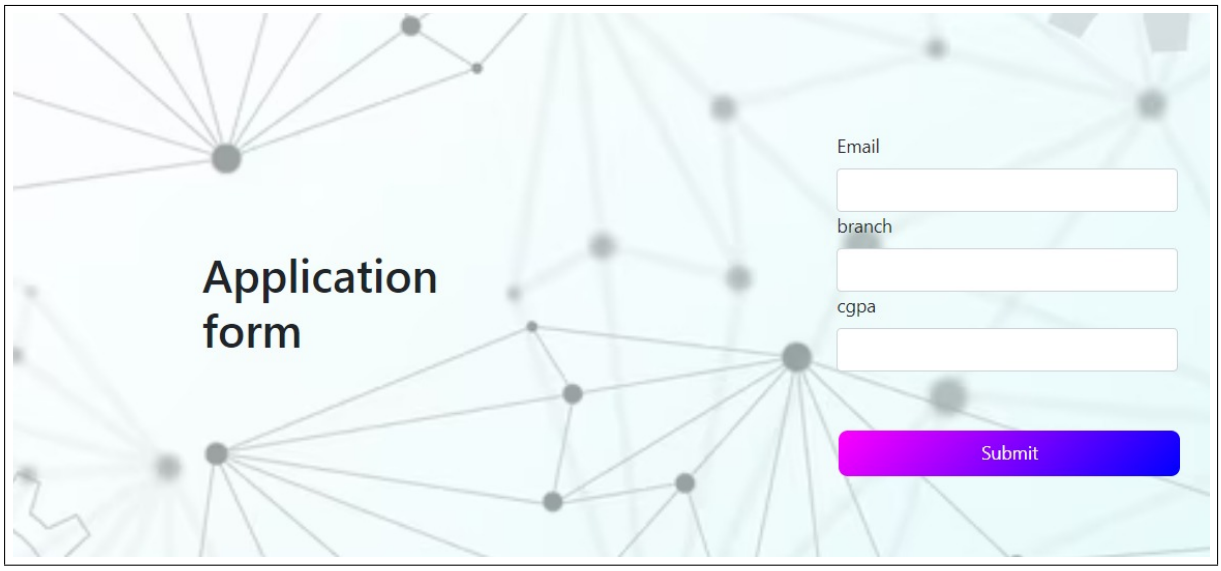

Figure 5.12: Application Form

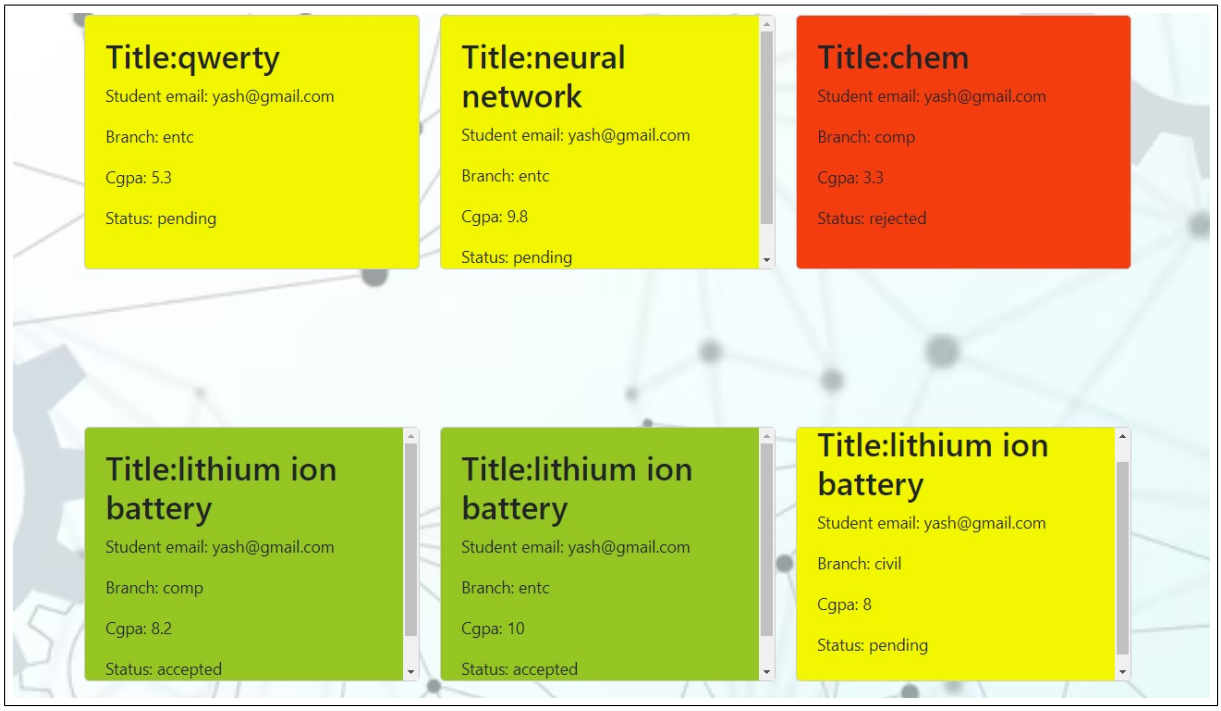

Figure 5.13: Applied Researches

Figure 5.14: Application Form

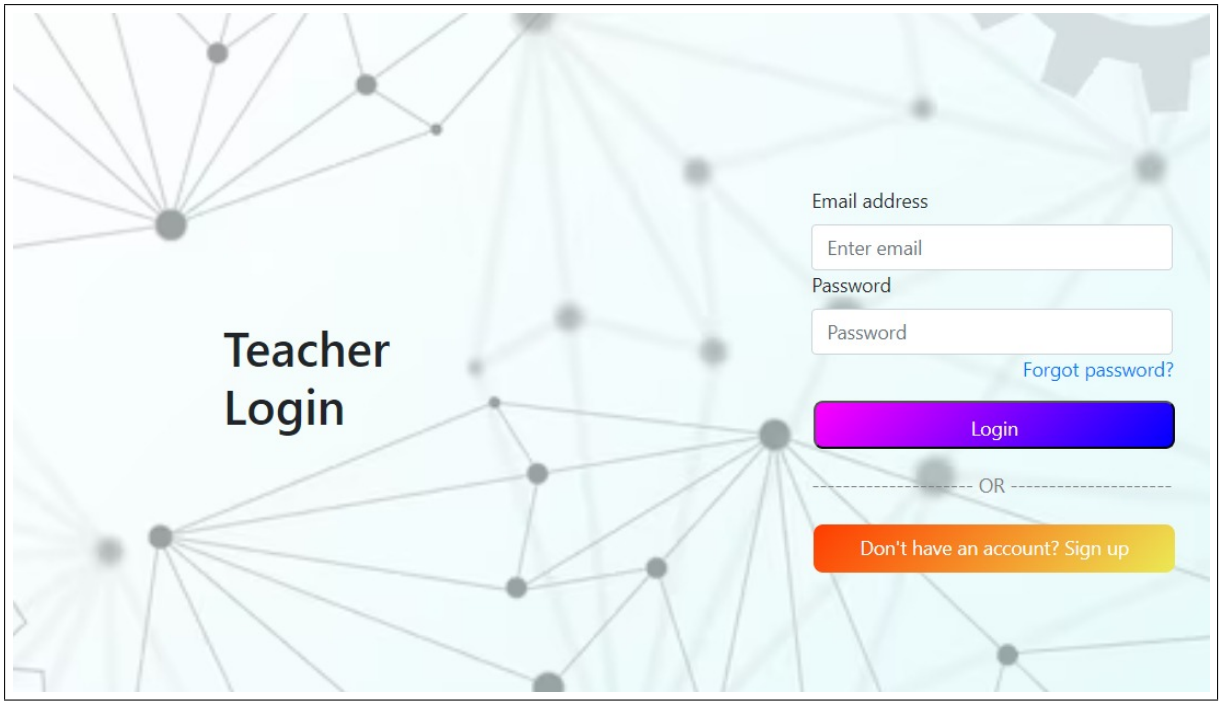

Figure 5.15: Faculty Login

5.2.2 Faculty Interface

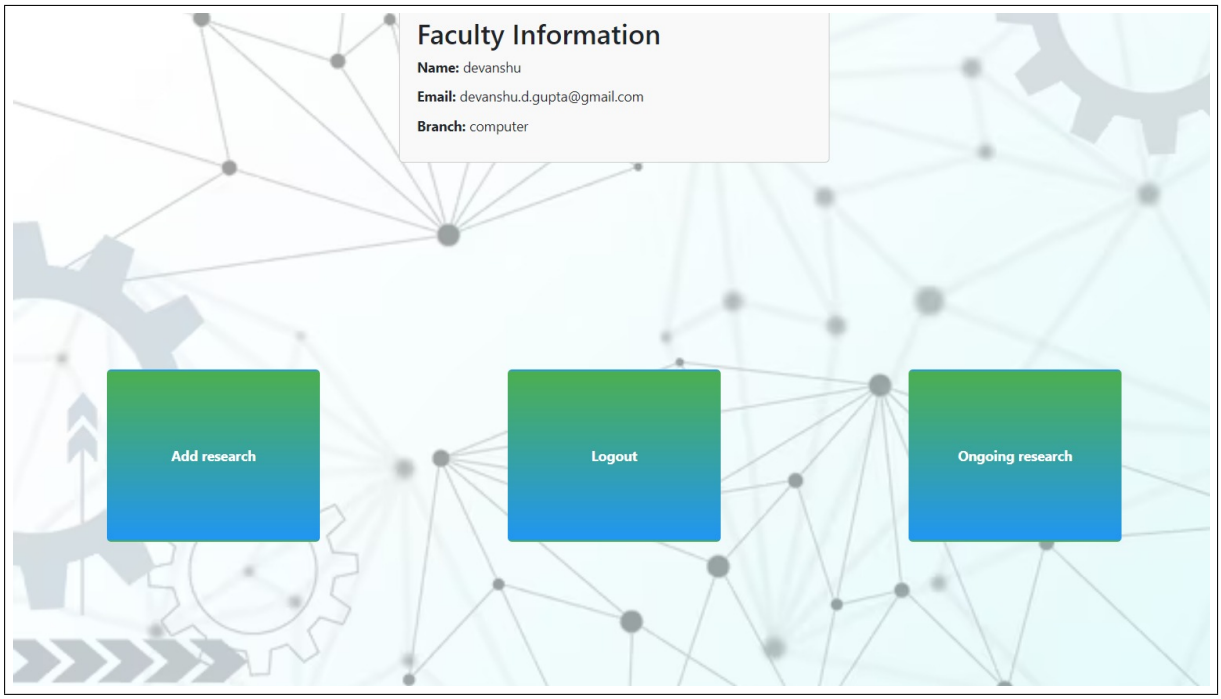

Figure 5.16: Faculty Dashboard

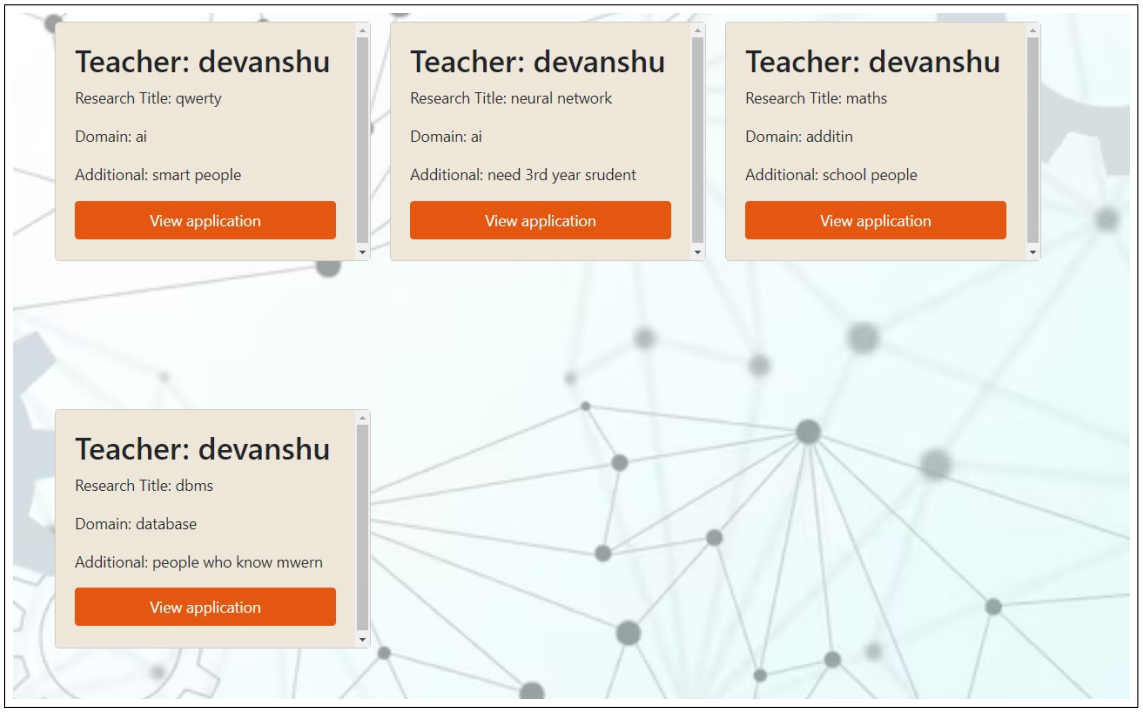

Figure 5.17: Ongoing Researches

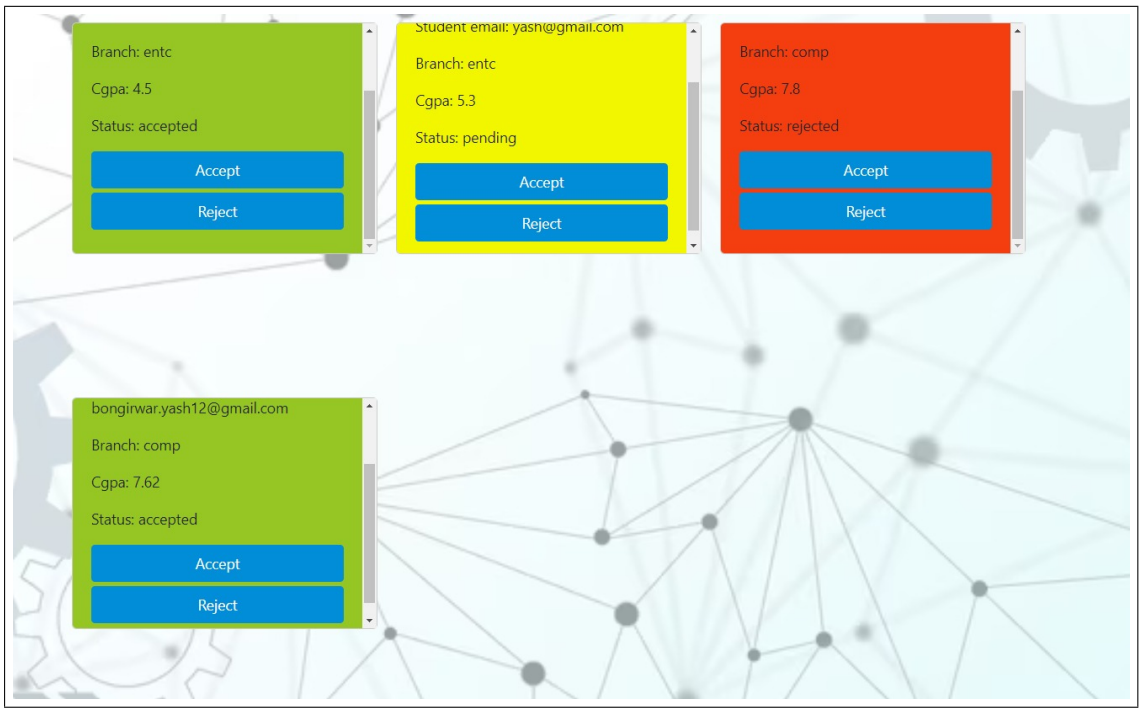

Figure 5.18: View Applications

Chapter 6

Summary and Conclusion

In conclusion, the development of the Solar-Sync platform marks a significant achievement in the realm of research paper management within educational institutions. By leveraging the MERN stack technology, Solar-Sync offers a comprehensive solution tailored to streamline the research paper lifecycle, enhance collaboration between teachers and students, and provide a user-friendly interface for accessing and managing research-related information. Through features such as secure authentication, intuitive user interfaces, database management, and application handling, Solar-Sync empowers users to engage in academic research effectively and contribute to the advancement of knowledge within educational institutions.

The implementation of Solar-Sync's features, including student information display, new research opportunities, ongoing research projects, and logout options, underscores its commitment to meeting the diverse needs of users within the educational landscape. Moreover, Solar-Sync's integration of educational resources and collaboration tools fosters academic research and innovation, further enhancing the academic experience for students and teachers alike.

Overall, the successful development and deployment of Solar-Sync represent a milestone in promoting academic research and collaboration within educational institutions.