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Ministry of Education  
Taibah University  
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(قسم الطالبات)

# **InternLink**

## **Graduation Project (1)**

**by**

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**A project submitted in partial fulfilment of the requirements for  
the degree of Bachelor of Science (Computer Science)**

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**1<sup>st</sup> Semester - Academic Year 1446 (2024)**

# Abstract

The journey from student to professional is shaped by one key moment: the internship, where knowledge meets experience. Yet going through this phase, full of new challenges and options, can be tough and overwhelming for students. Our system, "internLink," aims to streamline this critical phase by connecting students, companies, and professors through an easy-to-use and well-organized interface. With features for progress tracking, task management, and communication, it transforms the complex internship process into a clear, guided pathway. Students explore opportunities, companies find emerging talent, and professors guide the next generation of professionals. All within a reliable and connected environment. More than just a platform, it's a bridge that turns learning into achievement.

**Keywords** Internship; Web application; InternLink; Supervisor

# **Acknowledgement**

First and foremost, we thank Allah for leading us through this journey and giving us all the blessings and strength that helped us complete the project. We would like to sincerely express our gratitude and appreciation to our graduation project supervisor, Dr. Najwa Alharbi, for her guidance, support, and encouragement, which kept us motivated and focused on reaching our goals. We would also like to thank our family members and friends for their support, faith, and prayers during this journey.

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# List of Abbreviations

|      |                               |
|------|-------------------------------|
| CSS  | Cascading Style Sheets        |
| ERD  | Entity Relationship Diagram   |
| GPS  | Global Positioning Scale      |
| HR   | Human Resources               |
| HTML | Hyper Text Mark Up Language   |
| JVM  | Java Virtual Machine          |
| MVC  | Model View Controller         |
| PHP  | Hypertext Preprocessor        |
| SOA  | Service Oriented Architecture |
| SUS  | System Usability Scale        |
| UI   | User Interface                |
| UML  | Unified Modeling Language     |

# **Chapter 1: Introduction**

## **1.1 Introduction**

Internship programs are short-term work experiences that companies offer to allow students to gain experience in their disciplines. These programs are considered essential links between academic education and real work environments. Internship programs prepare students for careers by improving their skills and developing their professional networks. Additionally, faculty members benefit from supervising students in these programs, as they can explore new research opportunities and build connections with industry experts. However, managing internship programs involves difficulties that can affect students and organizations, often as a result of reliance on manual management. These challenges may include ineffective communication, losing important documents, and time-consuming administrative tasks. This project aims to build an internship management system to overcome these challenges.

## **1.2 Problem Definition**

Many universities require students to complete an internship program as part of their graduation requirements. This is because these programs provide students with the opportunity to gain practical experience in their field; however, some activities may detract students from the primary goals of them. These activities include completing paperwork, shuttling between the company and university to submit reports, searching for internship opportunities using different websites or even in person, and communicating with supervisors using multiple tools. Faculty supervisors also face difficulties while they supervise students, such as tracking students' progress and managing a large number of student reports often submitted manually. Our goal is to solve these challenges by building a unified internship management system that will combine all activities in a single system.

## **1.3 Project Objectives**

In this project, we aim to build a web application to automate the processes associated with the management of internships, we define our objectives as follows:

- To enhance communication among students, faculty supervisors, and company supervisor

- To facilitate the process of searching for internship opportunities for students
- To allow the HR managers to announce available internship opportunities and easily review applications.

## 1.4 Project Scope

The outcome of this project is a web application to streamline the process of internship experience for students of Taibah university. The users of the system are students, faculty supervisors, company supervisors, and HR managers. It helps students to find internships, communicate with supervisors, and submit reports. It will also help faculty to supervise the students by reviewing submitted reports. Company supervisors use the system to assign tasks and monitor students' progress, while HR managers can announce new internship opportunities and manage applications seamlessly. While the system will automate core functions, it will not replace in-person evaluations or hands-on internship tasks, as these remain essential to the internship experience.

## 1.5 Project Timeline

The roadmap of our project is shown in the figure 1-1

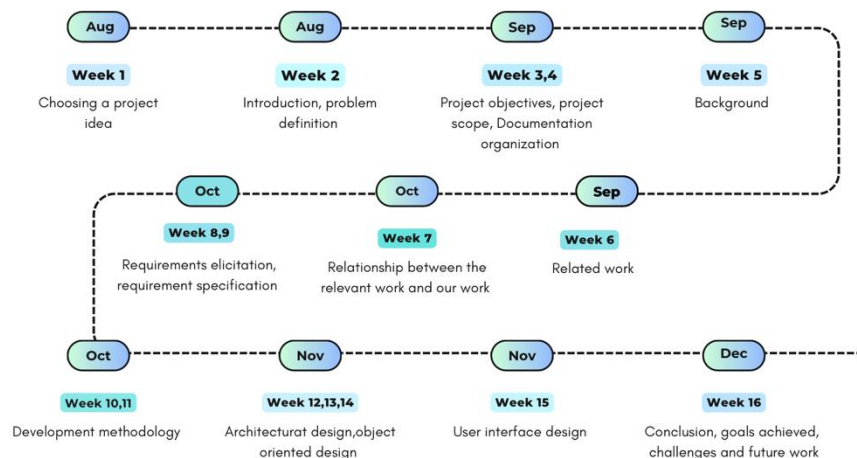


Figure 1- 1 Project timeline

## **1.6 Document Organization**

This project consists of five chapters. This chapter introduced the proposed system and discussed the project's objectives, scope, and timeline of the project. Chapter 2 will outline system techniques, review related work, and compare it to our project. Chapter 3 will focus on requirements specification using the use case diagram. Chapter 4 will describe system architectural design and analysis models for system representation. Chapter 5 will present a conclusion of the work, along with the proposed future work.

# **Chapter 2: Literature Review**

## **2.1 Introduction**

This chapter is organized as follows, section 2.2 discusses the background, which covers the main concepts and technologies required to build our project. Section 2.3 reviews several research papers related to our work and compares the similarities and differences between them. Finally, section 2.4 summarizes this chapter.

## **2.2 Background**

This section contains essential definitions and main topics that form the basis of our work. It provides a foundational understanding of internships, web applications, and the technologies involved in frontend and backend development.

### **2.2.1 Internship**

Internships are defined as programs that create a real work environment where students can enhance the skills and knowledge they have gained through hands-on experience (Januszewski, Grzeszczak, 2021)

Previous studies have recognized the importance of internships across a wide range of disciplines. They highlighted the impact of internships on students' academic performance and personal development. For instance, (Wolinsky-Nahmias ,Auerbach, 2022) used a survey to assess the benefits of internships and found that, as a result of the internship experience, students gained knowledge and skills, which improved their college learning experience and strengthened their employment opportunities. Similarly, (Weible, 2009) found that internships help students to make decisions in realistic situations and speed up their professional growth. With universities increasingly recognizing the value of internships, these programs are now considered an integral part of career and professional preparation for students, as they provide valuable work-related experience (Anjum, 2020).

### **2.2.2 Web Application**

Web applications refer to applications accessed via Web browser over a network and developed using browser-supported languages. For execution, Web applications depend on

Web browsers and include many familiar applications such as online retail sales, online auctions, and webmail (Al-Fedaghi, 2011).

### 2.2.2.1 Web Development Techniques

- **Frontend Development**

The frontend is the interface that users see and use to interact with the application, such as list, forms, etc. Certain tools and programming languages are used to design such frontend web interfaces: (Abdullah, Zeki, 2014)

- **HTML (Hyper Text Mark Up Language):**

Is the language used to create web page documents. It defines text elements that make up documents like headings, paragraphs, links, images, and forms, providing both organization and basic information for web pages.

- **CSS (cascading style sheets):**

Cascade Style Sheets (CSS) is a powerful language used to style web pages by specifying how content is displayed, including fonts, colors, background images, line spacing, and page layout. It works with HTML by applying style rules to specific elements. There are three ways to apply styles: an external stylesheet which is a separate document that contains several style rules, an embedded stylesheet that is written within an HTML document, and an inline stylesheet that is written directly into individual elements on the page. (Robbines, 2018)

- **JavaScript:**

JavaScript is a scripting language used to add interactivity and behaviors to web pages. It runs on the user's machine instead of the server, allowing for dynamic and responsive interfaces that enhance the user experience. JavaScript can be embedded directly in an HTML document or linked from an external file. (Robbines, 2018)

- **Backend Development**

Back-end development refers to the server-side of web development where the logic, database, and server-side scripting are all managed (Elakiya,2023)

- **Databases:**

A database is a structured collection of related data that is designed for a specific purpose. Unlike random data, a database is logically designed to meet the needs of particular users and

applications. Database creation and maintenance can be done manually or automatically, depending on the size of the website. Common database management systems include MySQL, which is widely used due to its efficiency and scalability. (Elmasri, 2015)

- **Java:**

Java is a general-purpose programming language that is simple, portable, and robust . Java is platform-independent, allowing applications to run seamlessly on any system with a Java Virtual Machine (JVM). It is object-oriented, secure, and supports multithreading for high-performance applications. Java is used in many ways, including web programming, standalone applications, server-side applications, and mobile development. (Liang, 2015)

## **2.3 Related Work**

In this section, a review of systems providing similar services to our system is presented.

### **2.3.1 Review of Relevant Work**

A considerable number of studies have focused on developing systems to automate the internship manual processes in universities. The main objective of those systems is to eliminate the manual tasks traditionally associated with internship management. These systems commonly share several features, including user-friendly interfaces and efficient monitoring tools.

(Alsolais, 2022) aimed to build a system that is designed to address challenges faced by students in the medical field specifically, such as difficulty in finding appropriate internship placements that match their field of study. The system's backend is powered by Hypertext preprocessor (PHP), to allow dynamic interaction between users and the system while handling server-side tasks like database management and session control. To support data storage and retrieval, including student profiles and internship opportunities, the system utilizes MySQL database. On the frontend, Bootstrap, CSS, and JavaScript were used to enhance the user experience. One key feature of the system is the generation of final grade ratings and summary reports for students who complete their internship programs. Despite the system's strengths, one limitation is its focus on medical colleges, which restricts its applicability to other disciplines.

(Pocan, 2021) proposed a web-based internship management system to focus on optimizing the process involved in managing student internships. The tools used in this system include JQuery, Javascript, and CSS on the frontend to enhance the user interface. On the backend, PHP was used along with MySQL for database management, with phpMyAdmin used as a third-party tool to handle the administration of MySQL over the Web. To evaluate the system's usability, the System Usability Scale (SUS) was employed, providing a quick and reliable measure of user satisfaction and effectiveness. The main functions of the system include document management, which allows students to upload, and track required documents. One limitation of the system is that it doesn't allow assigning tasks to students, leaving students unsure of their responsibilities.

(Chaurasia, 2023) Developed a student internship placement management system that aims to improve the internship processes by automating registration, matching, and tracking tools. The system was built using the Model-View-Controller (MVC) architectural pattern. This approach divides the application into three key components: the model, which represents the data and business logic, the view, which presents the data to the user, and the controller, which processes user input and updates the model and view as needed. On the backend, the system was built using Python combined with the Django framework—a high-level Python web framework that encourages rapid development and clean design—and MySQL for database management. Additionally, Python libraries like Pandas, NumPy, and Matplotlib were used for data analysis and visualization. The system incorporates a matching algorithm to assist students in finding opportunities that fit their academic background, abilities, and interests.

(Castro, 2024) developed a mobile-based internship monitoring system; the application runs on Android mobile devices. The key feature of the application is the implementation of a progress tracking algorithm with a GPS locator that verifies the student's location throughout the internship hours. The implementation of this technology to track the daily record of trainees has proven to be very effective. This feature accurately records the geographical location of the interns, ensuring their presence at the designated training location. Increase accountability and provide supervisors with real-time data for effective monitoring of interns' compliance with their schedules. One drawback of the system is that it only works on Android devices.



## Chapter 2: Literature Review

This means users on other platforms won't be able to access it, which could make it less convenient for a wider audience.

(Chopvitayakun, 2015) aimed at developing a mobile application for internship program management with the cloud computing framework. A cloud computing framework is defined as a wide range of cloud components, such as processing elements, data centers, storage, and networking. The primary goal is to replace traditional local or university databases with a flexible, cost-effective, and efficient cloud system. The system was designed using Service-Oriented Architecture (SOA), with the services built and deployed using Microsoft Azure's cloud platform. This cloud-based approach provides access to real-time data and ensures that the application can be used across different devices and locations, enhancing its usability for all users. While cloud computing generally supports scalability, scaling the system to a large number of users could lead to performance bottlenecks or high latency.

### 2.3.2 Relationship Between the Relevant Work and Our Own Work

Table 2-1 demonstrates the relationship between our system and the existing systems.

Table 2- 1 Relationship between our work and other works

| Features                | (Castro, 2024)                      | (Chaurasis, 2023)                   | (Pocaaan, 2021)                     | (Alsolais, 2022)                    | (Chopvitayakun, 2015)               | Our work                            |
|-------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Communication tools     |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> |
| Notification            |                                     | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Report uploading        | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> |
| Task assignment         | <input checked="" type="checkbox"/> |                                     |                                     |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| Tracking of application |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> |
| GPS locator             | <input checked="" type="checkbox"/> |                                     |                                     |                                     |                                     |                                     |
| Search internships      |                                     | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |                                     | <input checked="" type="checkbox"/> |
| Filter internships      |                                     |                                     |                                     |                                     |                                     | <input checked="" type="checkbox"/> |

## 2.4 Summary

In this chapter, we discussed background information and explained the key concepts that form the basis of our project. Then, we reviewed research and systems related to our project. Finally, we illustrated the relationship between those systems and our system.

# Chapter 3: System Analysis

## 3.1 Introduction

In this chapter, we present an analysis of technical aspects of our proposed system. Section 3.2 discusses the system's functional and non-functional requirements as well as domain requirements. Section 3.3 discusses defining requirements using use cases and use case descriptions. Section 3.4 discusses the developmental methodology we use for developing the software. Section 3.5 summarizes the information obtained during this chapter.

## 3.2 Requirements elicitation

Requirements elicitation is the process of identifying the functional and non-functional requirements of a system. It is achieved through communication between developers and users. It focuses on describing the scope of the system from the user's perspective to ensure a clear understanding of what the system should provide (Bruegge , Dutoit, 2009). To gather requirements for our system, we used a questionnaire and organized brainstorming sessions, both of which are common techniques of requirement elicitation. In this section we analyze the questionnaire and define functional and non-functional requirements as well as the user requirements.

### 3.2.1 Questionnaire:

In this section, we conducted a questionnaire to better understand the challenges faced by students during internships and gather requirements for the proposed system. The findings will guide the development of features that align with students' actual needs, ensuring that the system's solutions are both relevant and impactful. Some of the questions and responses are included in appendix A and appendix B for further reference and details.

In the survey, we provided a list of possible problems students might face when searching for internship opportunities. As shown in the figure below (Figure 3-1) ,the most common problem, highlighted by 66.9% of respondents, was not knowing when applications open, which makes it difficult for students to plan and apply on time. Additionally, 51.4% of respondents said that geographical restrictions limited their options. Another challenge

reported by 40.1% of respondents was the lack of response from companies. Finally, 34.5% of respondents found the application process too lengthy, making it difficult to keep up with multiple opportunities.

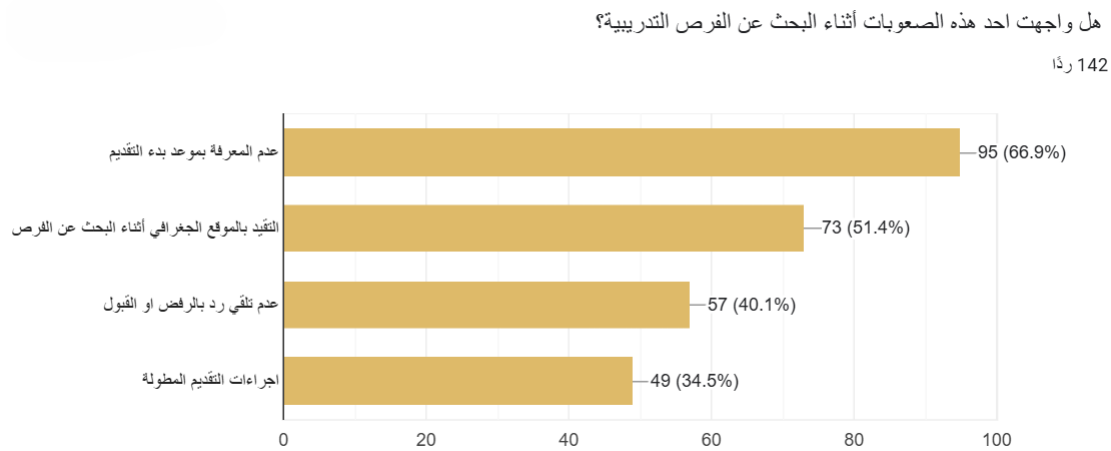


Figure 3- 1 The result of question 1 in the survey

Another problem mentioned in the survey was communication with supervisors. As shown in figure 3-2, 80.3% of respondents (114 participants) strongly agreed they faced challenges in communicating with their supervisors, while 19.7% (28 participants) agreed. This suggests the need for effective communication methods.

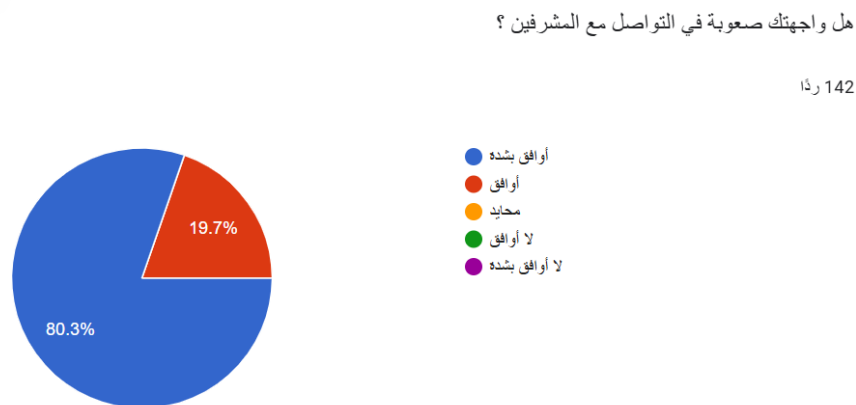


Figure 3- 2 The result of question 2 in the survey

Unclear responsibilities emerged as another problem, with 61.6% of participants (85) strongly agreeing and 23.2% agreeing that understanding assigned tasks was problematic.

## Chapter 3: System Analysis

While 15% were neutral or disagreed, the majority of participants emphasized this problem. As seen in figure 3-3.

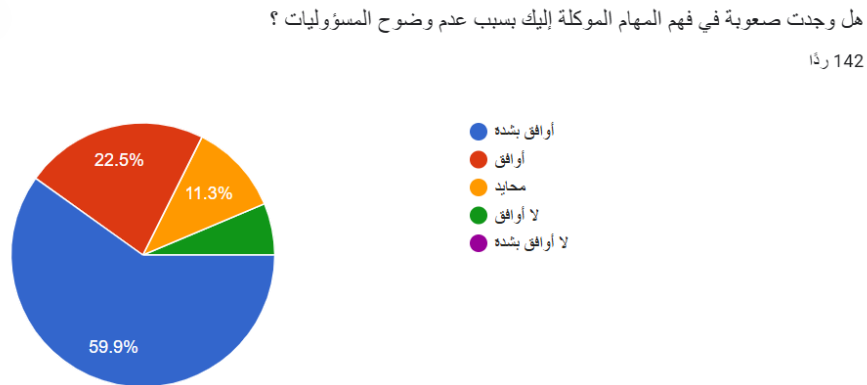


Figure 3- 3 The result of question 3 in survey

Finally, 88% of respondents strongly agreed, and 12% agreed that an internship management system would help solve the identified problems. This shows strong support for the idea and confidence that such a system can address the challenges in managing internships. As depicted in figure 3-4

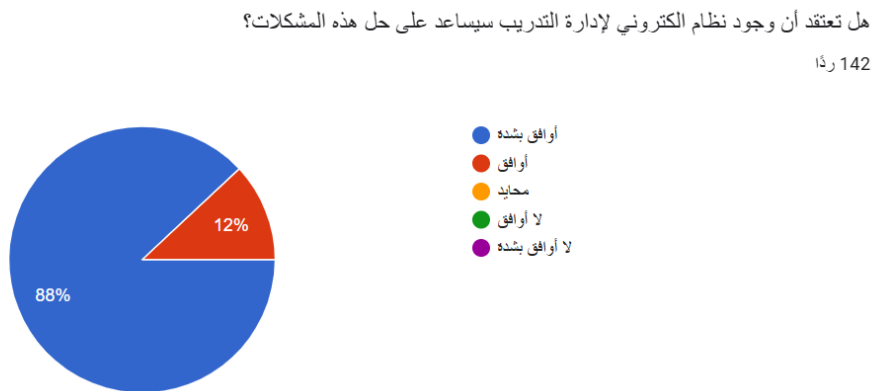


Figure 3- 4 The results of question 4 in survey

### 3.2.2 Functional requirements

The functional requirements are defined as the services the system provides for users. We categorize the functions based on actor types into four categories: student requirements, faculty supervisor requirements, company supervisor requirements, and HR manager requirements.

**Student Requirements:**

- The students should be able to create an account using email and password.
- The students should be able to log in to the system using their university email and password.
- The students should be able to search for internship opportunities.
- The students should be able to apply for internship opportunities.
- The students should be able to track their application status.
- The students should be able to modify their profile information.
- The students should be able to view their tasks.
- The students should be able to perform their tasks.
- The students should be able to submit reports.
- The students should be able to communicate with their supervisors.
- The students should be able to logout.

**Faculty supervisor:**

- The faculty supervisor should be able to create an account using email and password.
- The faculty supervisor must be able to login to the system using their email and password.
- The faculty supervisor must be able to add students.
- The faculty supervisor must be able to view students' information.
- The faculty supervisor must be able to view reports.
- The faculty supervisor must be able to communicate with students and company supervisor.
- The faculty supervisor must be able to log out.

### **Company supervisor**

- The company supervisor should be able to create an account using email and password.
- The company supervisor must be able to log in using email and password.
- The company supervisor must be able to communicate with students and faculty supervisors.
- The company supervisor must be able to assign tasks for students.
- The company supervisor must be able to view reports submitted by students.
- The company supervisor must be able to verify reports submitted by students.
- The company supervisor must be able to view students' task progress.
- The company supervisor must be able to view students' information.

### **HR manager**

- The HR manger should be able to create an account using email and password.
- The HR manger should be able to log in using email and password.
- The HR manger should be able to announce internship opportunities.
- The HR manger should be able to view applications.
- The HR manger should be able to accept or reject applications.
- The HR manger should be able to assign a supervisor to a list of students.
- The HR manger should be able to log out

### **3.2.3 Non-Functional Requirements**

Non-functional requirements are used to describe the constraints on the services of the system.

- Useability: The user interface must be simple, clear, and easy to use. Allowing users to access key functions within a few simple steps

- **Performance:** The system should respond in less than 30 seconds. And it should be able to handle a large number of users, especially during peak times e.g., application deadlines
- **Availability:** The system should be accessible to users at any time without interruptions
- **Security:** The system should prevent unauthorized access.
- **Maintainability:** The system should be able to support coming updates and improvements.

### 3.2.4 Domain Requirements

To be able to use the system, there are a few requirements:

- Users should have stable internet connection to access the system.
- Each user must have valid login credentials to access their respective account.

## 3.3 Requirements specification

A use case diagram can be used to represent the specification of the requirements. A use case diagram is a scenario-based technique in UML that describes the functionality of the system and interaction between the system and actors.

### 3.3.1 Use Case Diagram

Figure 3-5 illustrates the use case of our system.





Figure 3- 5 Use Case diagram for internLink

### 3.3.2 Use Case Description

The following tables provide a detailed description of use cases in the system, including participating actors, description, flow of events, entry and exit conditions and exceptions.

Table 3- 1 Search internship use case

|                             |  |
|-----------------------------|--|
| <b>Use case name</b>        | <b>Search internship</b>   |
| <b>Participating actors</b> | Student  |
| <b>Description</b>          | Student can search from different internship opportunities provided by companies   |
| <b>Entry condition</b>      | Student is logged in and has selected search page  |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The student opens internship opportunities page</li> <li>2. The system displays available opportunities</li> <li>3. Student searches or filters opportunities by (location, duration, major)</li> <li>4. The system displays internships that match the selected filters.</li> </ol> |
| <b>Exit condition</b>       | The student has viewed available opportunities successfully.   |
| <b>Exceptions</b>           | The system displays a message indicating that no results were found. If the search doesn't match any opportunity.  |

Table 3- 2 Apply for internship use case.

|                             |   |
|-----------------------------|---|
| <b>Use case name</b>        | <b>Apply for internship</b>   |
| <b>Participating actors</b> | Students  |
| <b>Description</b>          | Student can apply for internships that meets their needs  |
| <b>Entry condition</b>      | Student is logged in and has found an internship to apply for.  |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The student clicks on the apply button for a selected internship</li> <li>2. System displays application form</li> <li>3. The student fills application form and clicks submit</li> <li>4. System displays a message indicating successful application</li> </ol> |
| <b>Exit condition</b>       | The student has successfully applied for the internship.  |
| <b>Exceptions</b>           | system displays error message if the student didn't fill all required fields.   |

Table 3- 3 Track status use case

|                             |  |
|-----------------------------|--|
| <b>Use case name</b>        | <b>Track status</b>  |
| <b>Participating actors</b> | Students   |
| <b>Description</b>          | Student can view the status of submitted internship applications (pending, accepted, rejected) .   |
| <b>Entry condition</b>      | Student is logged in and has applied for an internship.  |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The student opens track application status page</li> <li>3. System displays the status of student's application</li> </ol> |
| <b>Exit condition</b>       | The student has viewed the application status successfully.  |
| <b>Exceptions</b>           | the system displays an error message if student hadn't applied for any internship before   |

Table 3- 4 Modify information use case

|                             |   |
|-----------------------------|---|
| <b>Use case name</b>        | <b>Modify Information</b>   |
| <b>Participating Actors</b> | Student   |
| <b>Description</b>          | Students can modify their personal information such name, email, profile picture, address.  |
| <b>Entry Condition</b>      | student is logged-in to the system and navigates to the profile setting   |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The student clicks on their profile picture in the top bar.</li> <li>2. System displays the current profile information of the student</li> <li>3. The student updates any information as needed</li> <li>4. Students submit the changes by clicking "Save" button</li> <li>5. System saves the updated information.</li> </ol> |
| <b>Exit Condition</b>       | The student profile information has been updated successfully   |
| <b>Exceptions</b>           | If an error occurs during the save, the system displays an error message.   |

Table 3- 5 View task use case

|                             |   |
|-----------------------------|---|
| <b>Use case name</b>        | <b>View Task</b>  |
| <b>Participating Actors</b> | Student   |
| <b>Description</b>          | The system allows the student to view the tasks to be performed   |
| <b>Entry Condition</b>      | Student is logged in the system, and a task has already been assigned to the student by supervisor  |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The student selects task page</li> <li>2. System displays a list of tasks, including basic information such as task name, due date, and status</li> </ol> |
| <b>Exit Condition</b>       | The student has viewed assigned tasks successfully  |
| <b>Exceptions</b>           | None.   |

Table 3- 6 Perform task use case

|                             |  |
|-----------------------------|--|
| <b>Use case name</b>        | <b>Perform task</b>  |
| <b>Participating Actors</b> | Student  |
| <b>Description</b>          | The student can complete the task assigned by supervisor.  |
| <b>Entry Condition</b>      | Student is logged-in the system and has viewed the task details  |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The student selects the task page and selects a specific task to perform</li> <li>2. The student performs the task</li> <li>3. The student checks the box once the task is done</li> </ol> |
| <b>Exit Condition</b>       | The student has completed the task successfully  |
| <b>Exceptions</b>           | None.  |

Table 3- 7 Submit reports use case

|                             |  |
|-----------------------------|--|
| <b>Use case name</b>        | <b>Submit Reports</b>  |
| <b>Participating Actors</b> | Student  |
| <b>Description</b>          | The system allows a student to submit required reports   |
| <b>Entry Condition</b>      | student is logged-in the system and has an ongoing internship  |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The student clicks on the report section.</li> <li>2. The student uploads the report file</li> <li>3. The system displays "The report has been sent successfully" message</li> </ol> |
| <b>Exit Condition</b>       | The report has been submitted  |
| <b>Exceptions</b>           | None.  |

Table 3- 8 Communicate with supervisor use case

|                             |   |
|-----------------------------|---|
| <b>Use case name</b>        | <b>Communicate</b>  |
| <b>Participating Actors</b> | Student, Faculty supervisor, Company supervisor   |
| <b>Description</b>          | The system allows users to communicate with each other for sharing feedback guidance and updates.   |
| <b>Entry Condition</b>      | User is logged in and there is an ongoing internship involving the student under the supervision of the faculty supervisor and company supervisor   |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The user opens the message section.</li> <li>2. System lists associated users only</li> <li>3. The user selects a user to communicate with</li> </ol> |
| <b>Exit Condition</b>       | The message is sent to the supervisor successfully.   |
| <b>Exceptions</b>           | None.   |

Table 3- 9 Add student use case

|                             |   |
|-----------------------------|---|
| <b>Use case name</b>        | <b>Add students</b>   |
| <b>Participating actors</b> | Faculty supervisor  |
| <b>Description</b>          | Faculty supervisor can add students under their supervision   |
| <b>Entry condition</b>      | Faculty supervisor is logged in   |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The faculty supervisor selects students information section.</li> <li>2. The faculty supervisor enters the student email and clicks add.</li> <li>3. System adds the student to the list of faculty supervisor</li> </ol> |
| <b>Exit condition</b>       | The student is added successfully.  |
| <b>Exceptions</b>           | The system display error message if the email is not associated with a student in the system  |

Table 3- 10 View student information use case

|                             |  |
|-----------------------------|--|
| <b>Use case name</b>        | <b>View Student Information</b>  |
| <b>Participating Actors</b> | Faculty Supervisor, Company supervisor   |
| <b>Description</b>          | The user can view information about the student, their ID, the name of the student's supervisor, and their email.  |
| <b>Entry Conditions</b>     | The user is logged in to the system and has added at least one student.  |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The user selects "View Students".</li> <li>2. System displays list of students</li> <li>3. The use selects a specific student.</li> <li>4. System displays student information.</li> </ol> |
| <b>Exit Conditions</b>      | The user has viewed the student's information successfully.  |

Table 3- 11 View reports use case

|                             |   |
|-----------------------------|---|
| <b>Use case name</b>        | <b>View Reports</b>   |
| <b>Participating Actors</b> | Faculty supervisor, Company supervisor  |
| <b>Description</b>          | The system allows supervisors to view the reports submitted by students.  |
| <b>Entry Condition</b>      | Supervisor is logged-in to the system and students report has been submitted.   |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. The user clicks on the “Students Report ”section.</li> <li>2. The user selects the student report.</li> <li>3. The system displays the student report for the user to read</li> </ol> |
| <b>Exit Condition</b>       | User has viewed the report successfully.  |

Table 3- 12 Assign task use case

|                             |   |
|-----------------------------|---|
| <b>Use case name:</b>       | <b>Assign tasks</b>   |
| <b>Participating Actors</b> | The company supervisor  |
| <b>Description</b>          | Company supervisor can assign task for student within the system.   |
| <b>Entry Condition</b>      | supervisor must be logged in to the system, The supervisor must have a list of students to assign tasks to them.  |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The supervisor selects the task management section.</li> <li>2. The supervisor enters task details</li> <li>3. The supervisor clicks the "Assign " button.</li> </ol> |
| <b>Exit Condition</b>       | The task is successfully assigned to the students, and students receive a notification about the assigned task via email.   |
| <b>Exception</b>            | None.   |

Table 3- 13 Verify report use case

|                             |  |
|-----------------------------|--|
| <b>Use case name</b>        | <b>Verify report</b>   |
| <b>Participating Actors</b> | The company supervisor   |
| <b>Description</b>          | the company supervisor can verify reports to ensure that the submitted report reflects the student's work.   |
| <b>Entry Condition</b>      | Supervisor is logged in to the system, and students have submitted reports   |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The supervisor opens the "Reports" page</li> <li>2. System displays list of reports that are submitted by students</li> <li>3. The supervisor can select one report to view</li> <li>4. the supervisor can mark reports as verified after viewing</li> </ol> |
| <b>Exit Condition</b>       | The report is marked as verified and sent to faculty supervisor.   |
| <b>Exception</b>            | None.  |

Table 3- 14 View task progress use case

|                             |   |
|-----------------------------|---|
| <b>Use case name:</b>       | <b>View Task progress</b>   |
| <b>Participating Actors</b> | The company supervisor  |
| <b>Entry Condition</b>      | The supervisor must be logged into the system, and has assigned tasks to students   |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. The supervisor selects the "View task progress" section</li> <li>2. The system displays a list of students who have been assigned tasks.</li> <li>3. The supervisor clicks on a student's name to view details</li> </ol> |
| <b>Exit Condition</b>       | The supervisor has viewed the tasks' progress successfully.   |
| <b>Exceptions</b>           | None  |



Table 3- 15 Announce internship opportunities use case

|                             |   |
|-----------------------------|---|
| <b>Use case name:</b>       | <b>Manage Announcement</b>  |
| <b>Participating Actors</b> | HR Manager  |
| <b>Description</b>          | In this case, the HR manager can manage announcement by editing, deleting or adding new announcement of internship opportunities  |
| <b>Entry Condition</b>      | The HR manager is logged in to the system   |
| <b>Flow of events</b>       | <ol style="list-style-type: none"> <li>1. HR Manager opens the announcement management page</li> <li>3. System shows previous announcement</li> <li>4. HR Manager edits and deletes existing announcements or add new one.</li> <li>5. HR Manager saves the changes.</li> </ol> |
| <b>Exit Condition</b>       | The announcement information is updated   |
| <b>Exception</b>            | None.   |

Table 3- 16 View application use case

|                             |   |
|-----------------------------|---|
| <b>Use Case Name</b>        | <b>View applications</b>  |
| <b>Participating Actors</b> | HR Manager  |
| <b>Description</b>          | The HR manager can view all applications submitted by students.   |
| <b>Entry Condition</b>      | The manager is logged-in, and students have submitted their application   |
| <b>Flow of Events</b>       | <ol style="list-style-type: none"> <li>1. HR Manager opens the Application page</li> <li>3. The system displays a list of applications with information about the applicants</li> <li>4. HR manager chooses any application from the list to view full details</li> </ol> |
| <b>Exit Condition</b>       | The HR manager has successfully viewed the list of applications   |
| <b>Exceptions</b>           | If there is a large number of requests, the HR manager can use filters.   |

Table 3- 17 Accept application use case

|                            |   |
|----------------------------|---|
| <b>Use case name</b>       | <b>Accept or reject applications</b>  |
| <b>Participating Actor</b> | HR manager  |
| <b>Description</b>         | After the student applies for an opportunity. The HR manager should be able to accept or reject the application   |
| <b>Entry conditions</b>    | The HR manager is logged in and has viewed an application is submitted by a student.  |
| <b>Flow of event</b>       | <ol style="list-style-type: none"> <li>1. The HR manger opens the Applications page</li> <li>2. The HR manager can select any application for more details .</li> <li>3. The HR manger clicks either accept or reject button</li> </ol> |
| <b>Exit conditions</b>     | Students who have applied for announced opportunity has been either accepted or rejected and notified.  |
| <b>Exceptions</b>          | None.   |

Table 3- 18 Assign supervisor to student

|                            |  |
|----------------------------|--|
| <b>Use case name</b>       | <b>Assign supervisor to student</b>  |
| <b>Participating Actor</b> | HR manager   |
| <b>Description</b>         | To allow HR manager to assign a supervisor to a list of students   |
| <b>Entry conditions</b>    | The HR manager is logged in, and students have been accepted   |
| <b>Flow of event</b>       | <ol style="list-style-type: none"> <li>1. The HR manger opens the manage Assign supervisor page</li> <li>2. System displays students that have been accepted</li> <li>3. The HR manger selects a list of students</li> <li>4. The HR clicks assign a supervisor button</li> <li>5. System displays supervisors' names</li> <li>6. The HR manager selects a supervisor</li> </ol> |
| <b>Exit conditions</b>     | Each supervisor has a group of students  |
| <b>Exceptions</b>          | None.  |

### 3.4 Developmental Methodology

In our project, we adopt the waterfall model as a developmental methodology. In waterfall development, development is divided into stages as shown in figure 3-6. Each stage must be completed before the beginning of the next stage. The process consists of five stages: requirements gathering and analysis, system design, implementation, integration and testing, and deployment of the system.

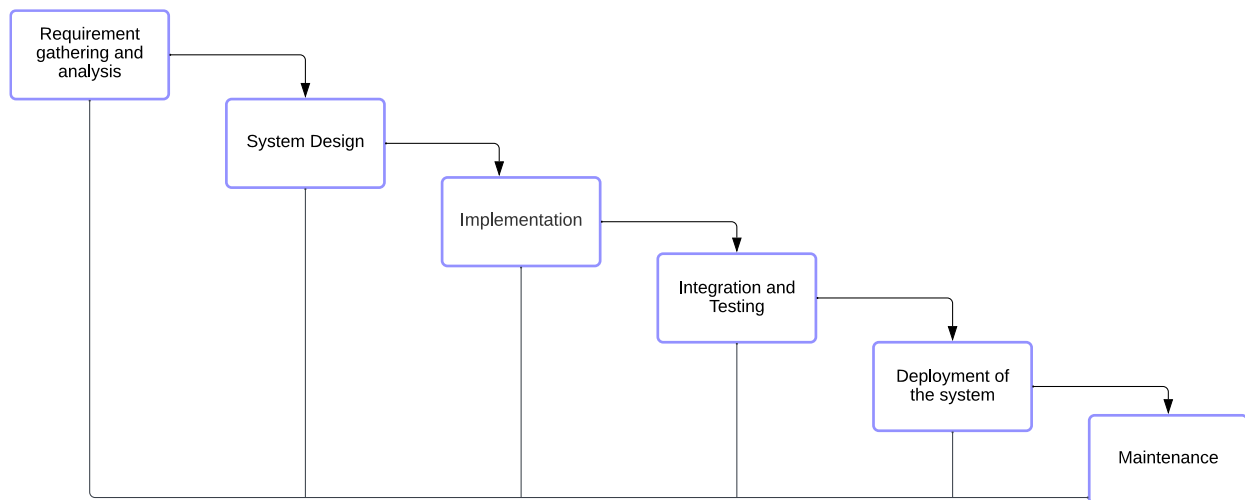


Figure 3- 6 Waterfall Model

#### 3.4.1 Phases of Waterfall Model

1. **Requirements gathering and analysis:** During this phase, we gathered the requirements using requirements elicitation techniques, such as studying related papers and brainstorming with team members. Also, we conducted a survey, and the findings helped us identify key requirements and areas for improvement in our system.
2. **System Design:** At this phase, we used several diagrams to demonstrate the system architecture and essential components. Including use case diagrams, class diagrams, and sequence diagrams. Also, we designed the user interface (UI) of the system.
3. **Implementation:** During this phase, the output of the system design phase will be used to develop the functionality of the system as units. These units will be integrated in the next phase.

4. **Integration and Testing:** During this phase, the developed units will be tested for any faults by unit testing. After testing each unit, we will integrate all units and perform system testing.
5. **Deployment of the system:** After testing the system, we will deploy the system to end-users in their environment.
6. **Maintenance:** At this phase, we will fix any bugs that arise after deployment. Also, we can add new functionality to the system.

### 3.5 Summary

In this chapter, we discussed the main requirements of the system, including functional, non-functional, and domain requirements. We also provided a use case diagram to show how users interact with the system, along with tables to describe each use case in detail. Finally, we explained the development methodology chosen for the project.

# Chapter 4: System Design

## 4.1 Introduction

In this chapter, we introduce the system design of our project. Section 4.2 discusses the architectural design of our system, defining the components and the interfaces between them. Section 4.3 represents object-oriented design, including structural static design and dynamic models. Section 4.4 presents the database structure of the system. Section 4.5 represents user interface design. Finally, Section 4.6 summarizes key points discussed in the chapter.

## 4.2 Architectural Design

Architectural design is concerned with understanding how a system should be organized and designing the overall structure of that system (Sommerville,2011). Figure 4.2 illustrates the architectural diagram for our system that uses the Model-View-Controller (MVC) design pattern. The system is divided into three logical components that interact with each other. The first component, the model, is responsible for managing data effectively. It defines the basic operations related to students, companies, reports, and others, inserting or retrieving data when needed. The second component is the view, which defines and manages how the data is presented to the user. Finally, the controller operates between the model and the view. It handles user input, works with the model to manage data, and updates the view to reflect any changes.

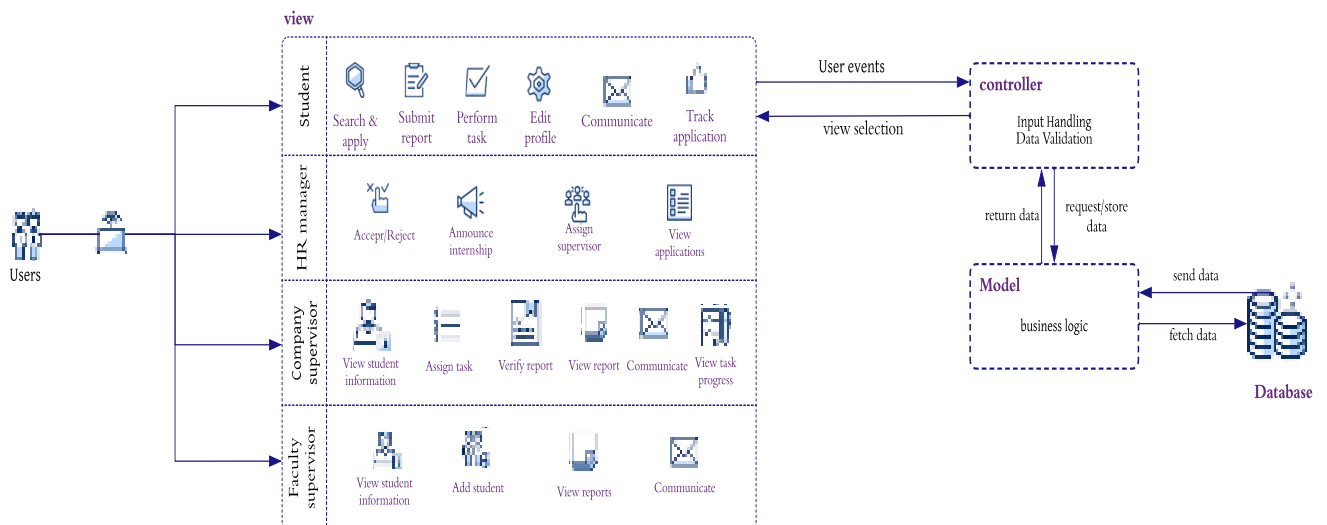


Figure 4- 1 Architectural diagram

### 4.3 Object Oriented Design

Object-oriented design focuses on how different parts of the system interact with each other. In this section, we will represent the structural static models and dynamic models.

### 4.3.1 Structural Static Models

The class diagram describes the structure of the system by specifying its attributes, operations, and the relationships among objects.

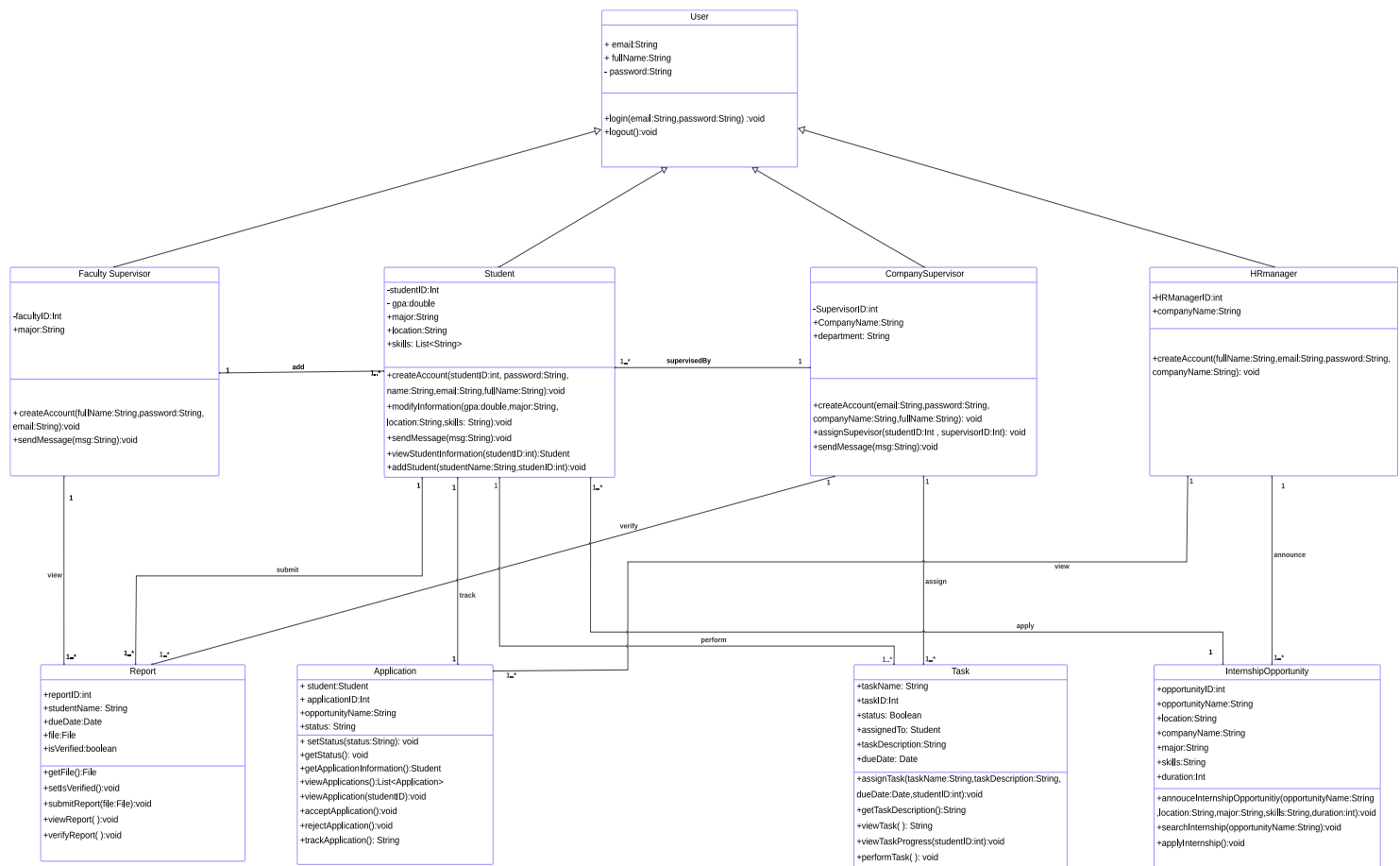


Figure 4- 2 Class diagram

### 4.3.2 Dynamic Models

A sequence diagram is a dynamic model that shows the flow of messages between objects in a use case. It illustrates the order of interactions over time. Each column represents an object, and arrows indicate messages between them. The figures below illustrate the sequence diagrams of our system.

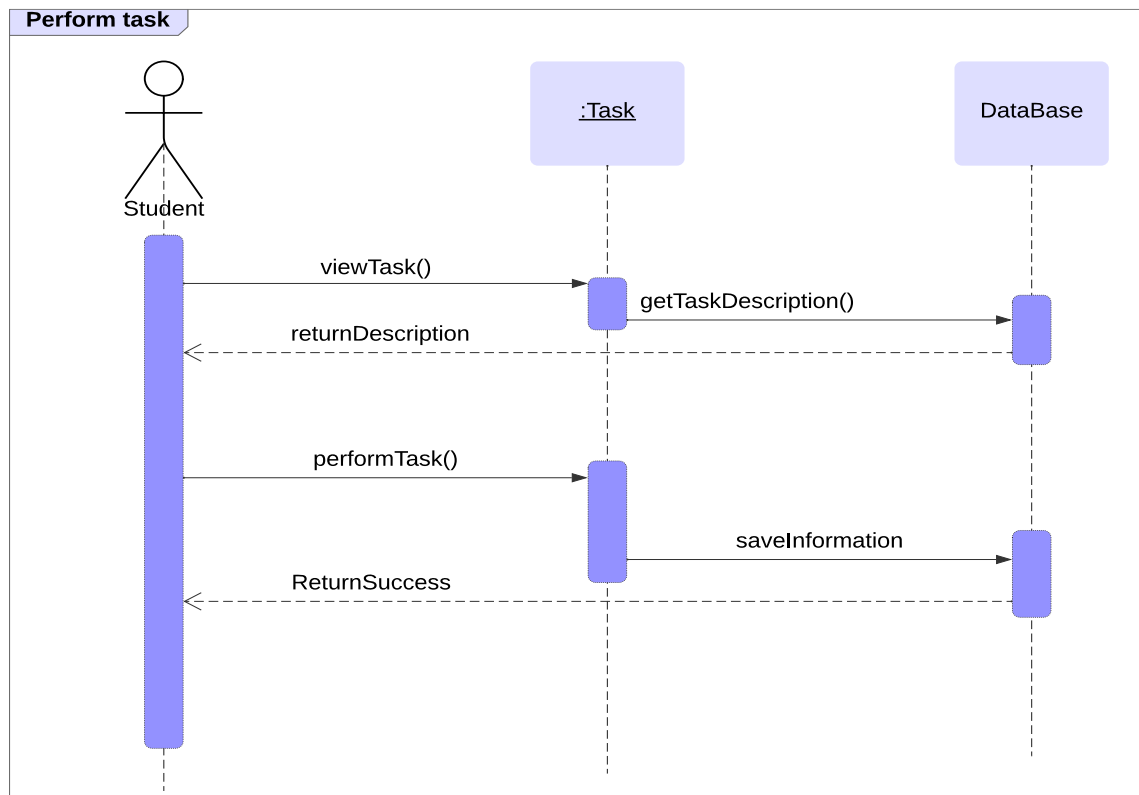


Figure 4- 3 Perform task sequence diagram

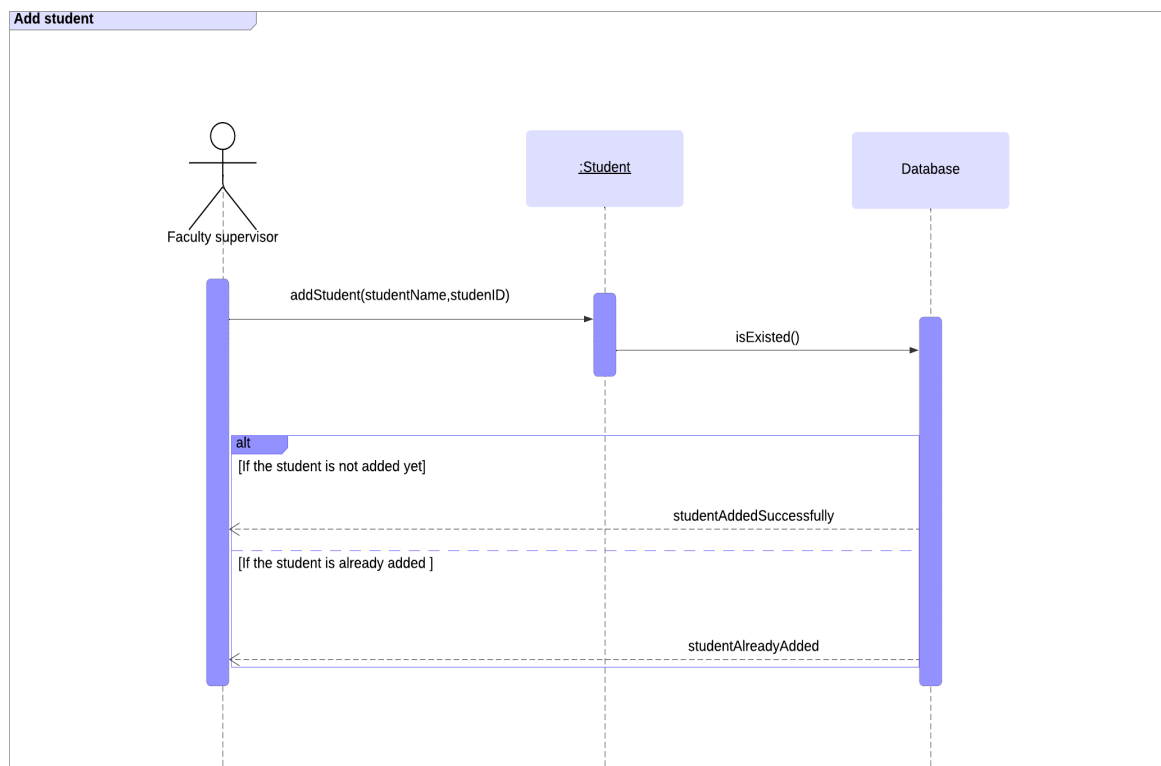


Figure 4- 4 Add student sequence diagram



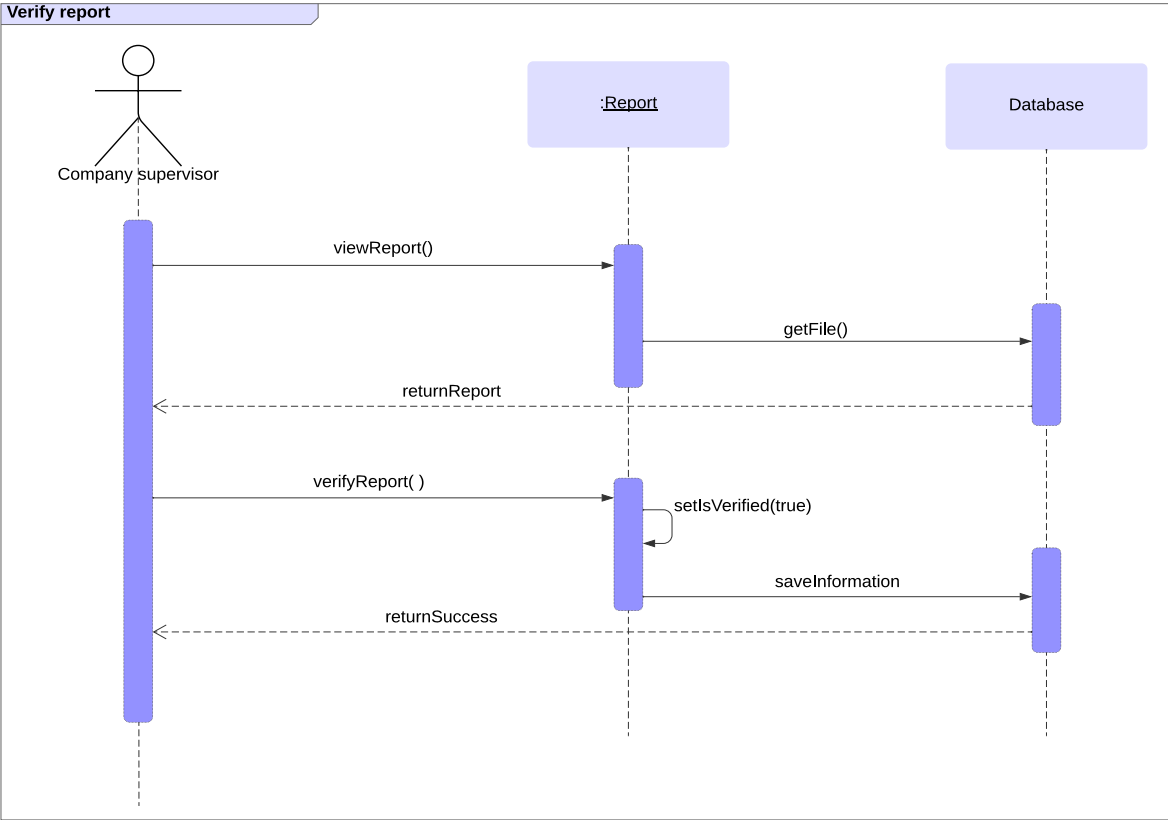


Figure 4- 5 Verify report sequence diagram

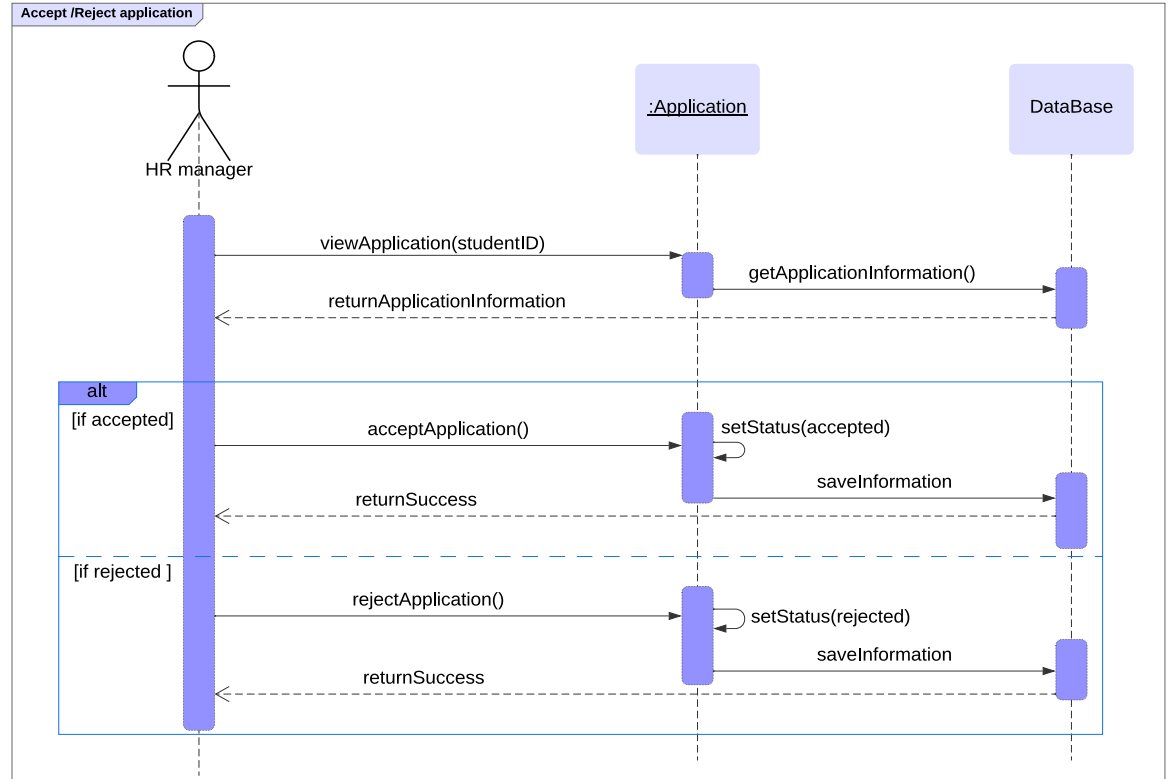


Figure 4- 6 Accept/Reject application sequence diagram

## 4.4 Data Modeling

Data modeling represents conceptual data objects and their relationship between data elements. The aim of data modeling is to illustrate the types of data utilized and preserved in the system and the relationships between them.

### 4.4.1 Entity Relationship Diagram (ERD)

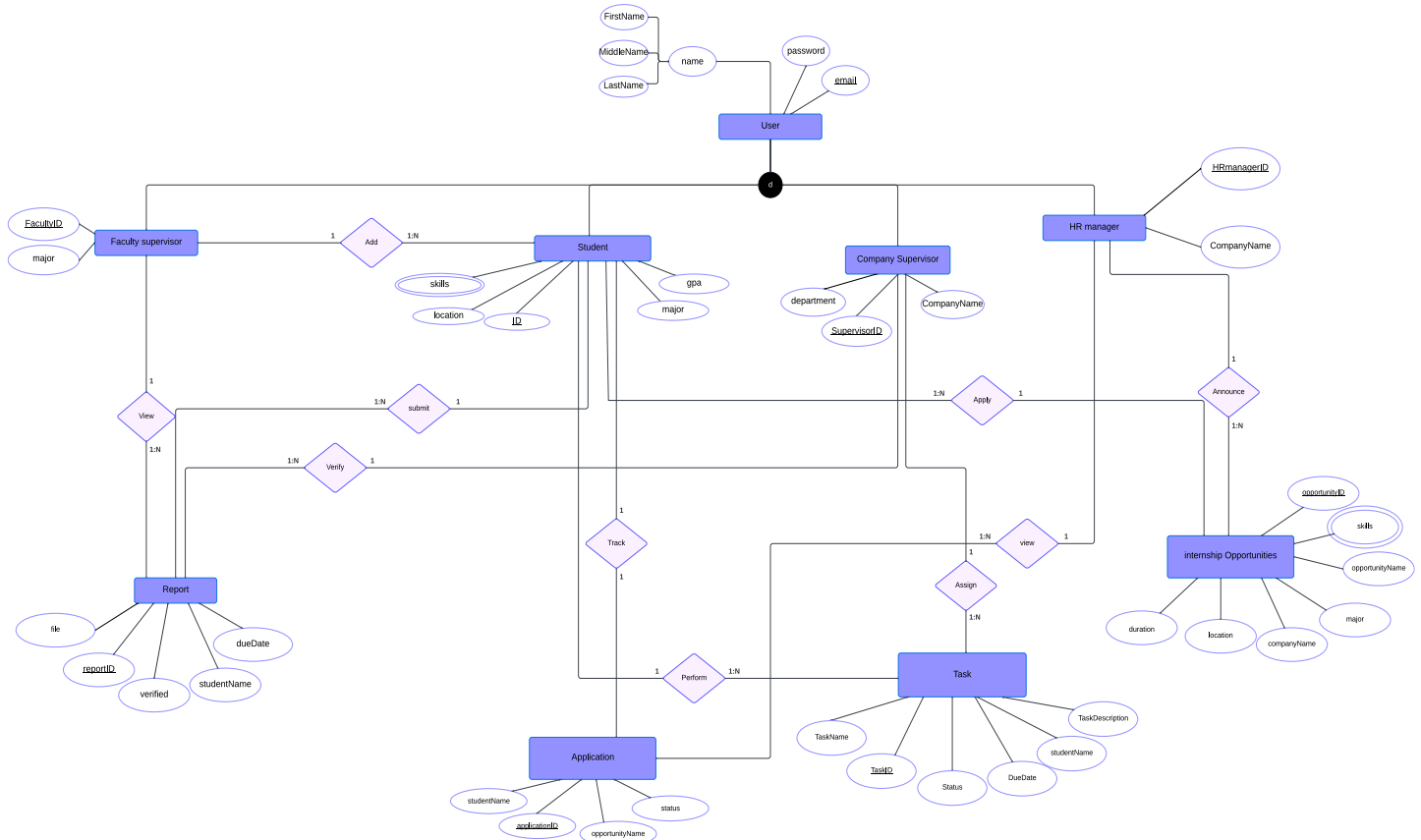


Figure 4- 7 ER Diagram

## 4.5 User Interface Design

The user interface (UI) links human-computer interaction and communication in a device. The following figures show the user interface design for our system.

Chapter 4: System Design

- Sign in UI

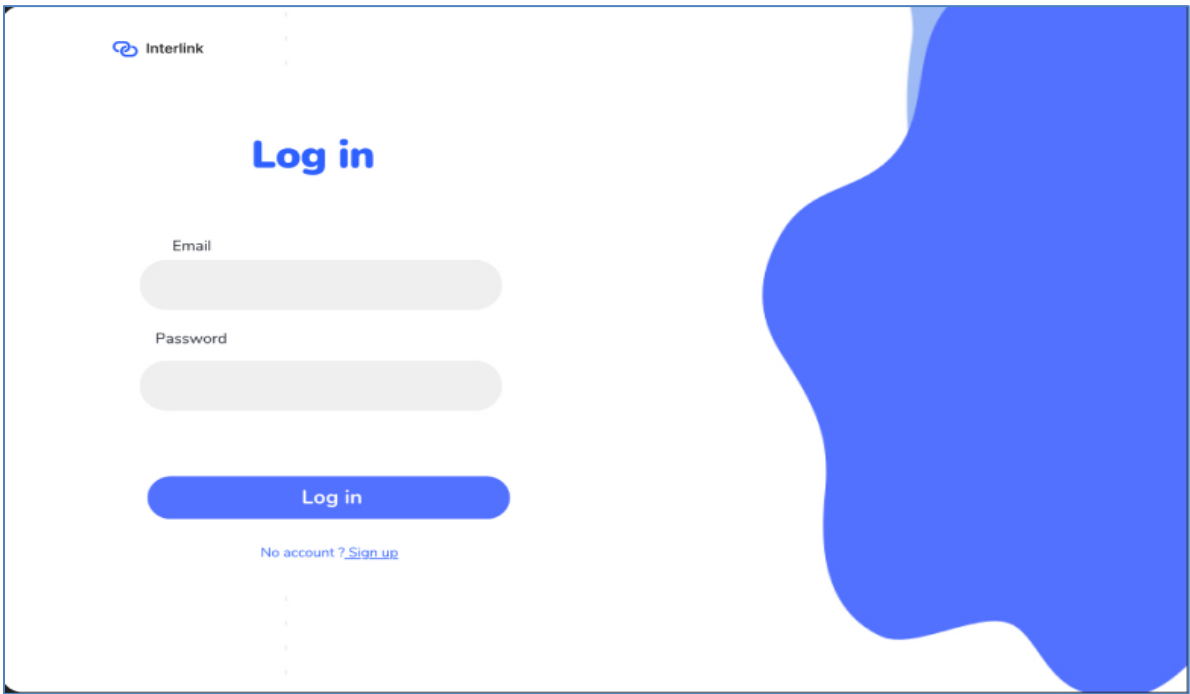


Figure 4- 8 Sign in page

- Student UI

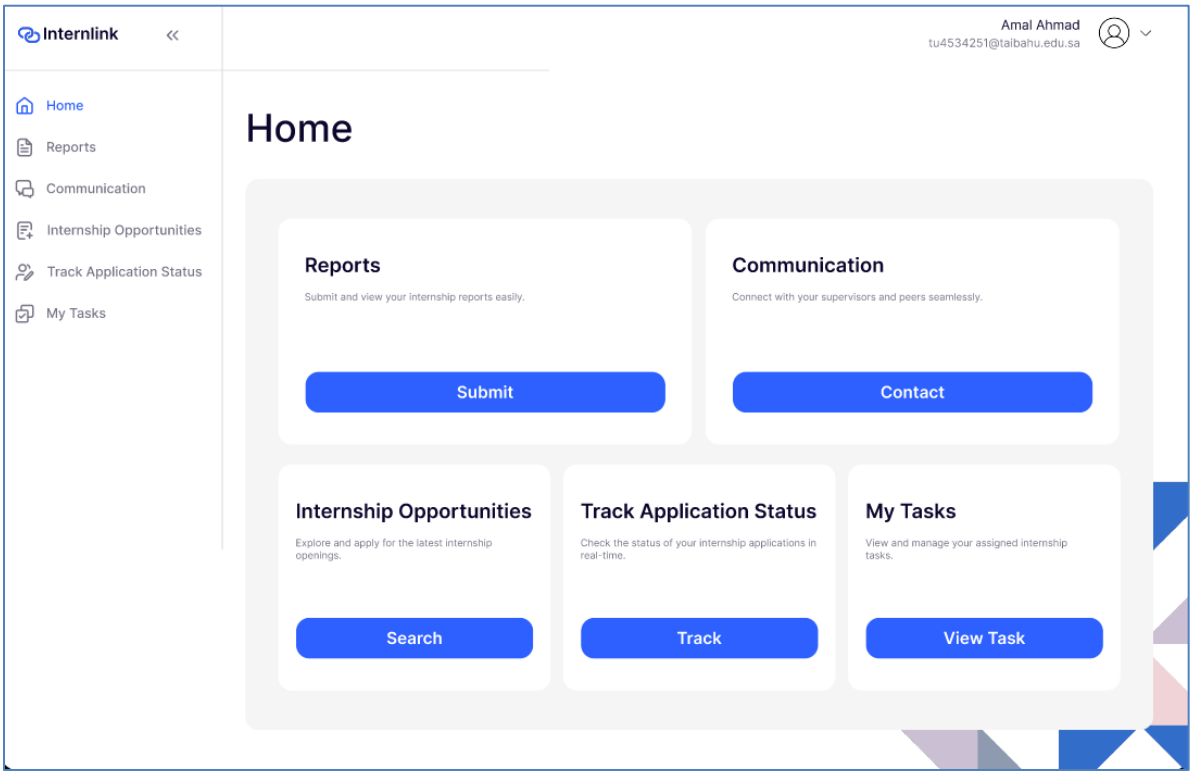


Figure 4- 9 Student home screen

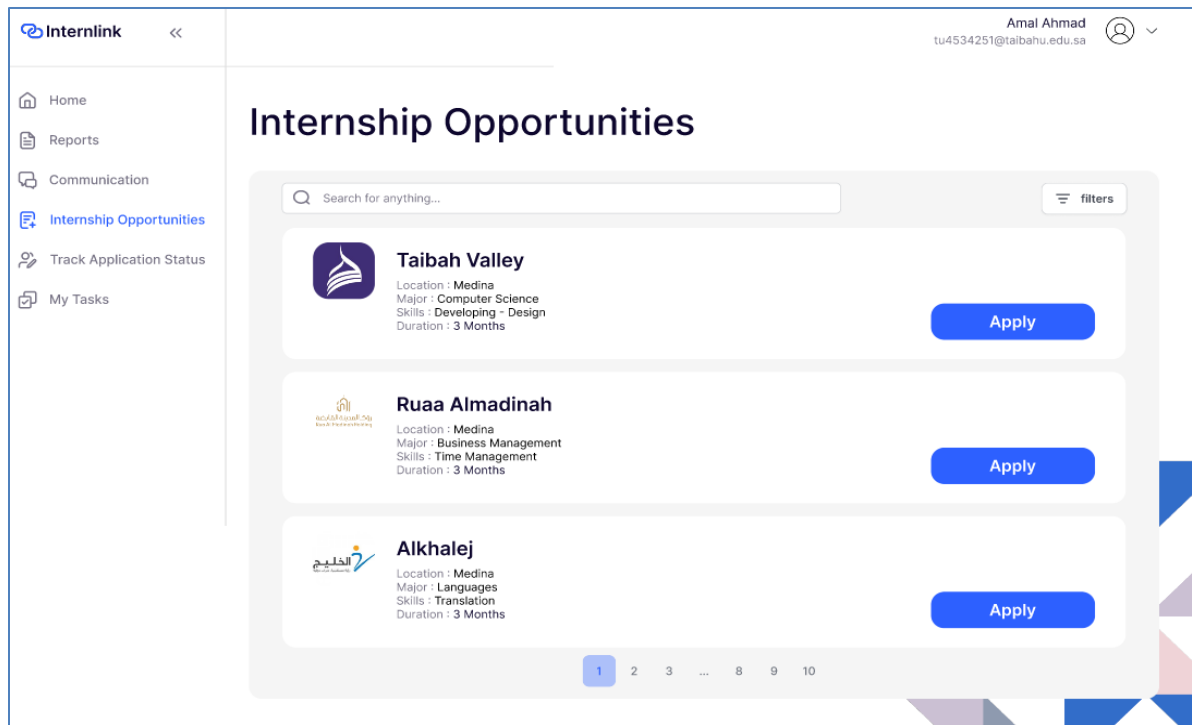


Figure 4- 10 Search for internship page

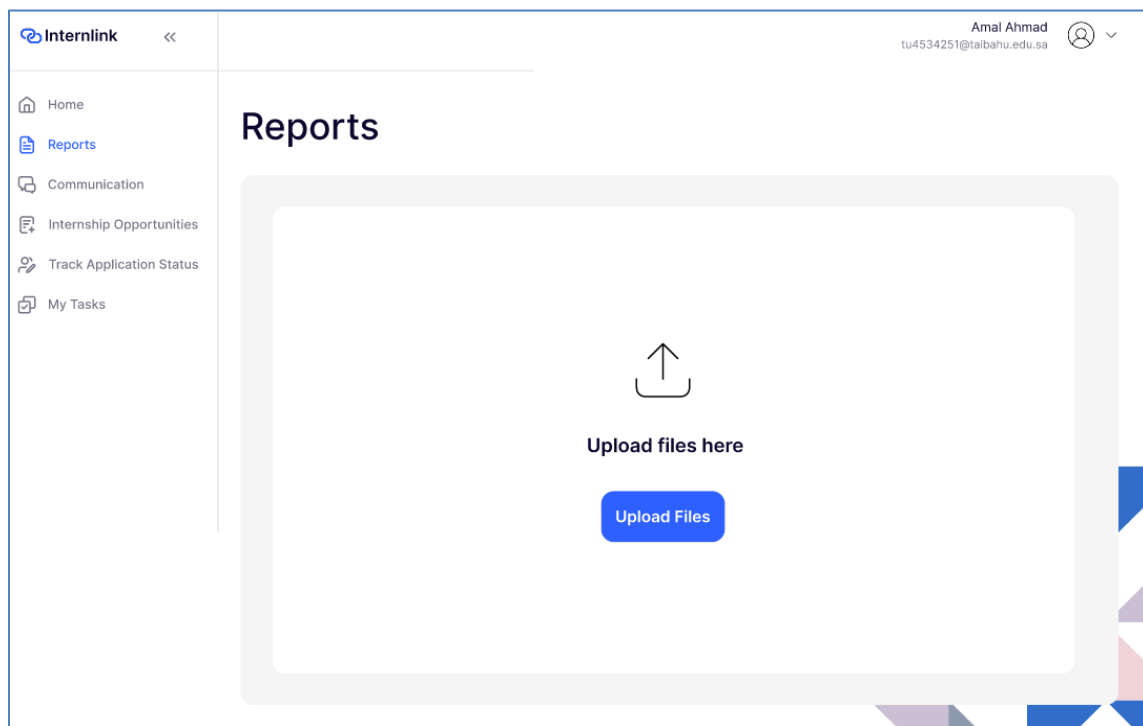


Figure 4- 11 Uploading report page

- **Company supervisor UI**

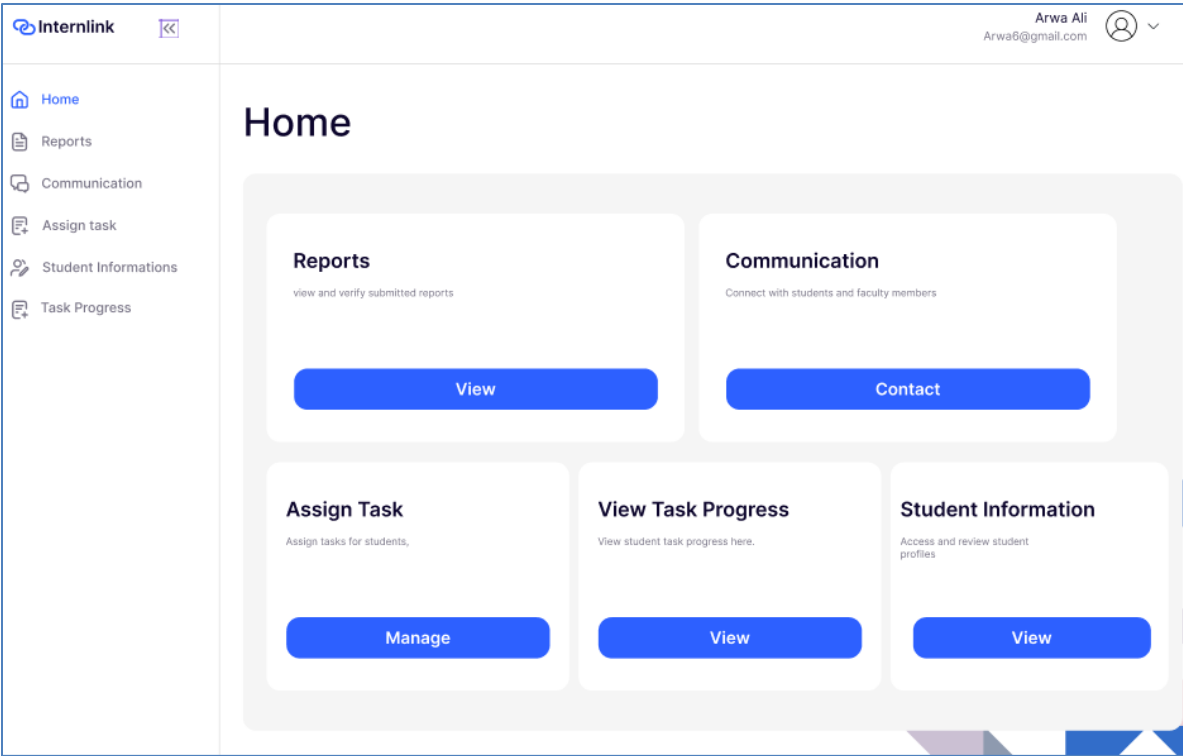


Figure 4- 12 Company supervisor home screen

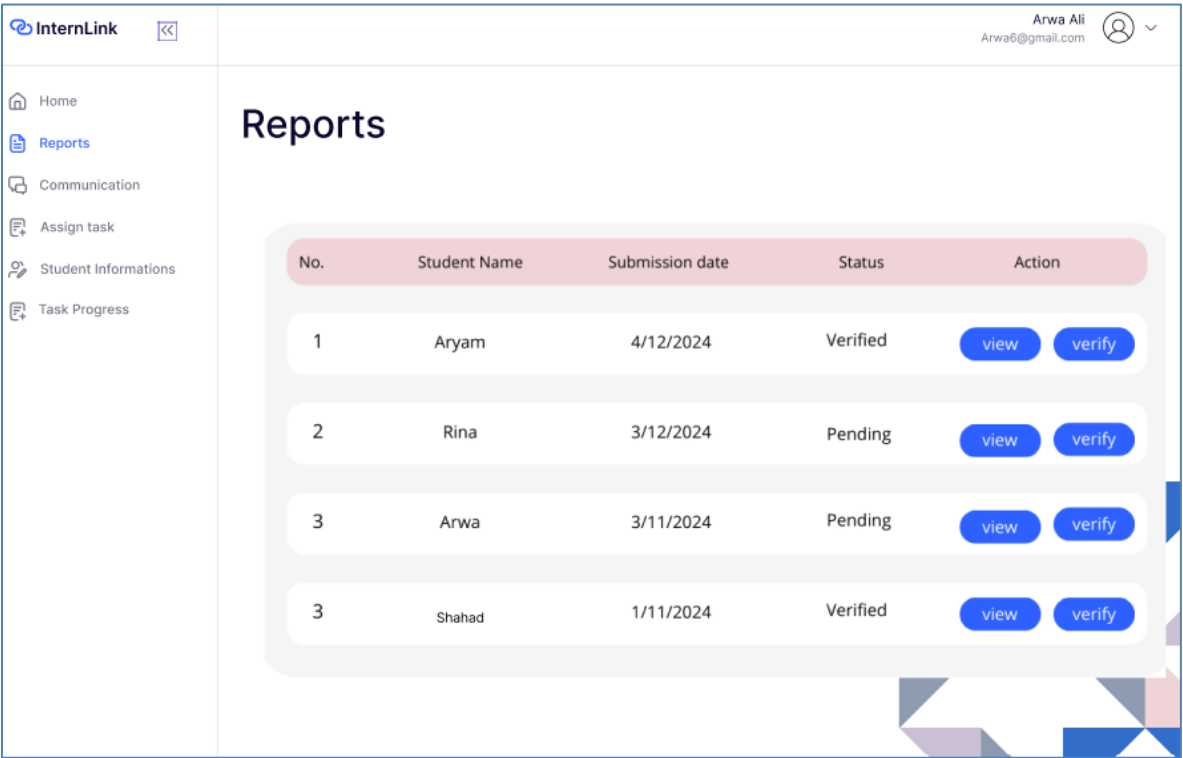


Figure 4- 13 View and verify reports page

The screenshot shows the 'Add New Task' form in the InternLink application. The form is located in the center of the page and contains four input fields: 'Task Name', 'Description', 'Student ID', and 'Due Date'. A blue 'Assign task' button is positioned at the bottom right of the form. The left sidebar contains a navigation menu with options: Home, Report, Assign task (highlighted), Student Information, Communication, and Task Progress. The top right corner displays the user's name 'Arwa Ali' and email 'Arwa6@gmail.com'.

Figure 4- 14 Assign task for students

- **Faculty supervisor UI**

The screenshot shows the 'Home' page for a Faculty supervisor in the InternLink application. The page features three main sections: 'Reports' (with a 'View' button), 'Student Information' (with a 'View' button), and 'Communication' (with a 'Contact' button). The left sidebar contains a navigation menu with options: Home (highlighted), Reports, Communication, and Student Informations. The top right corner displays the user's name 'Huda Alharbi' and email 'Huda@talbahu.edu.sa'.

Figure 4- 15 Faculty supervisor home page

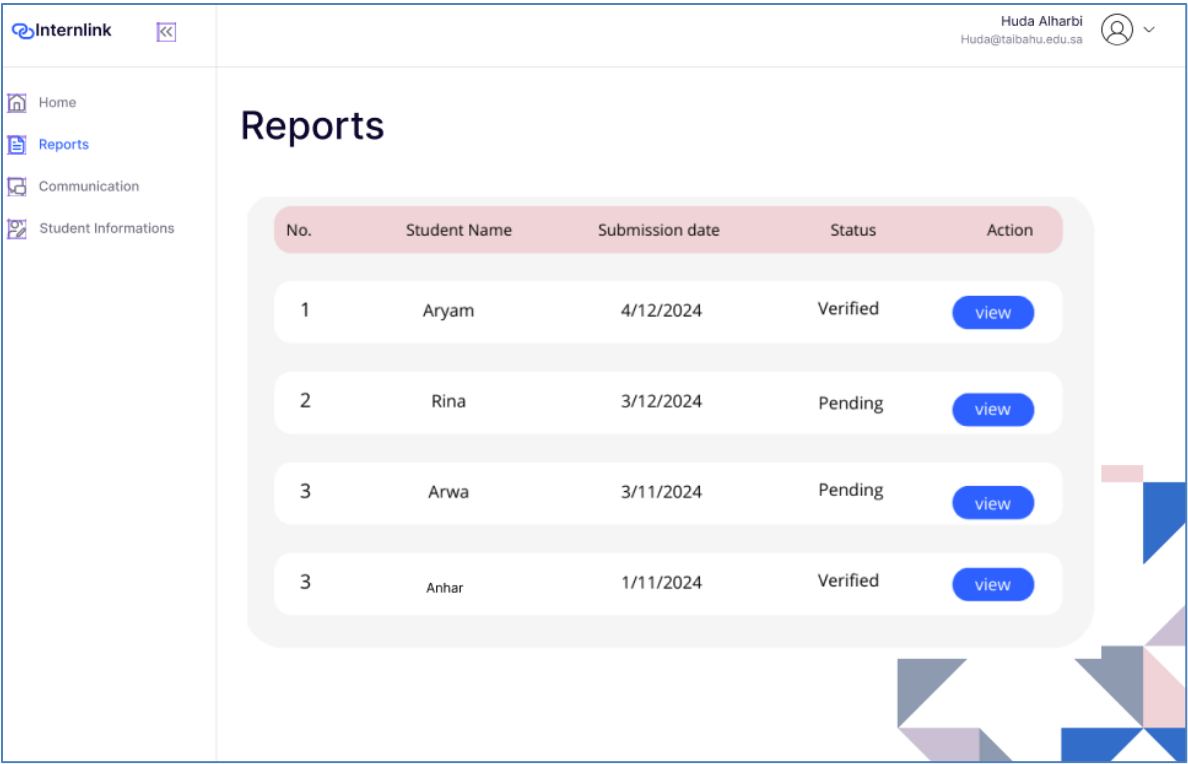


Figure 4- 16 View report page

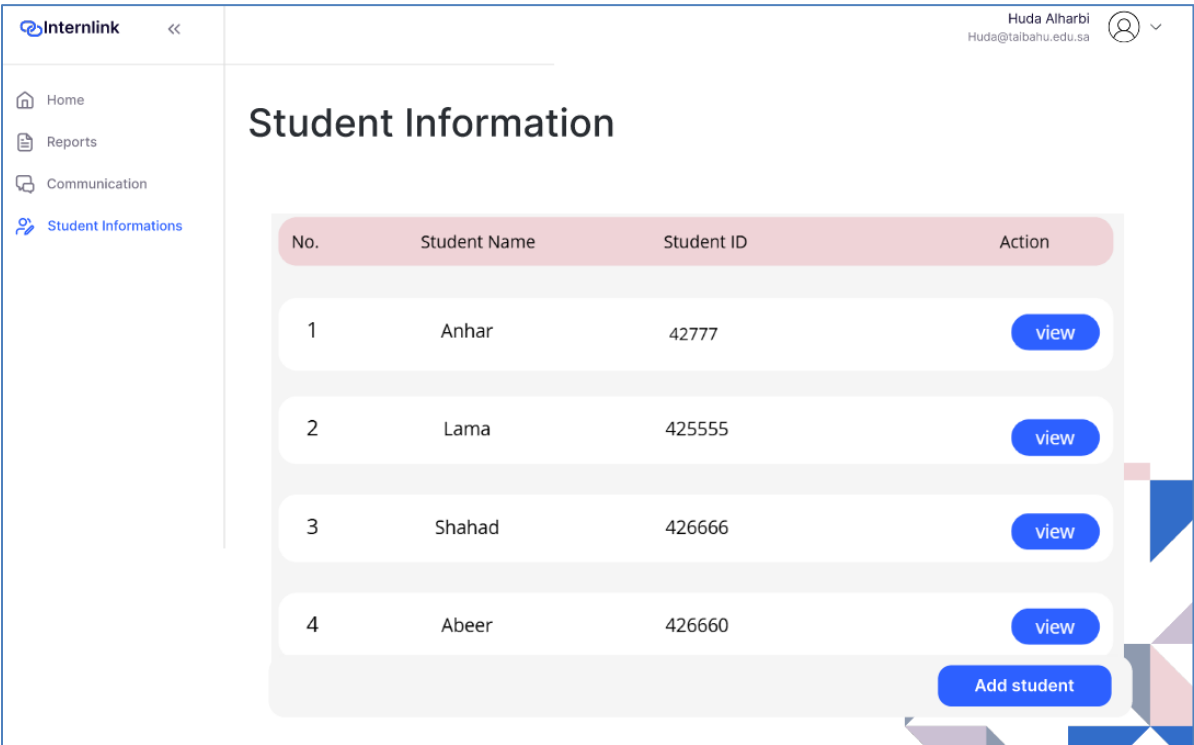


Figure 4- 17 Student information page

- **HR manager UI**

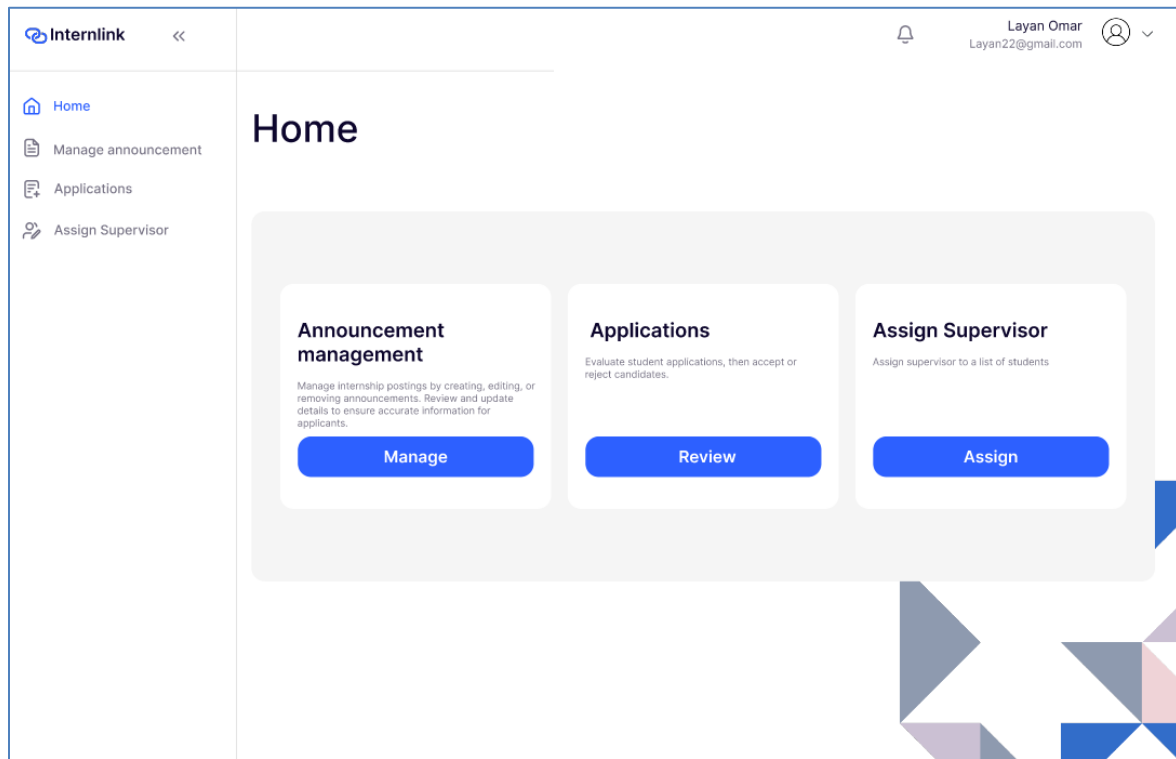


Figure 4- 18 HR manager home page



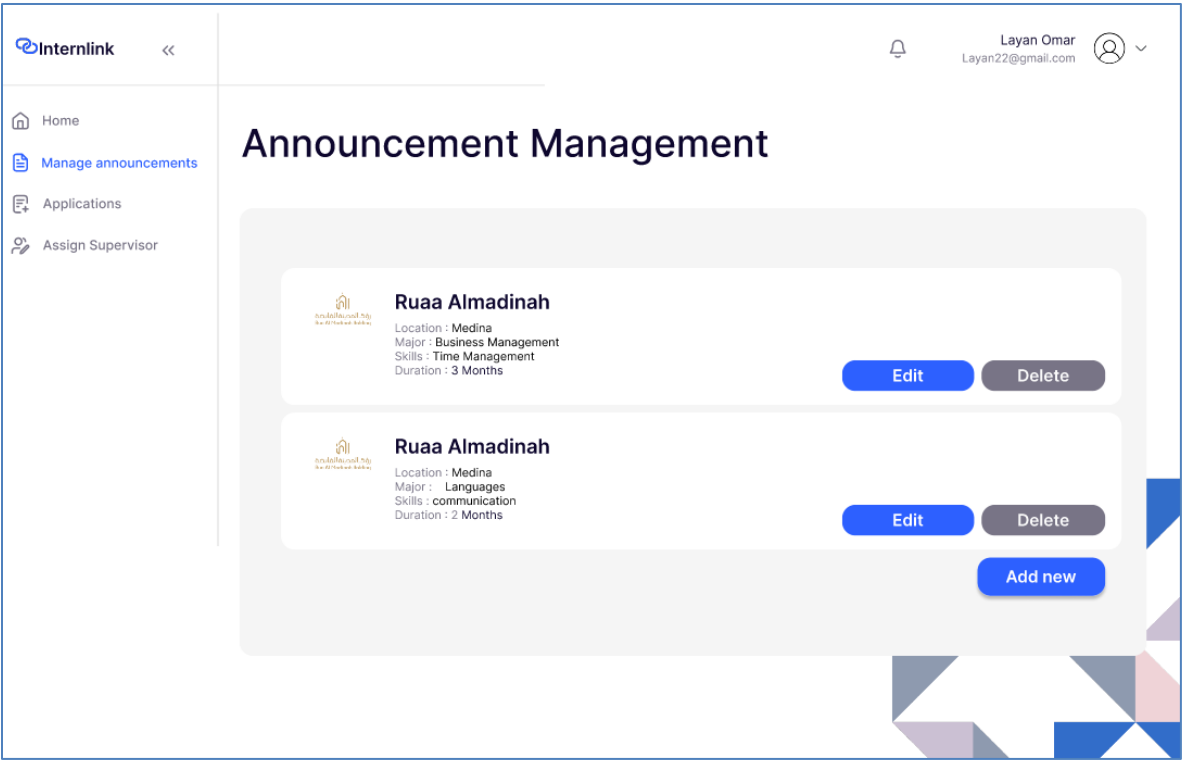


Figure 4- 19 Announcement management page

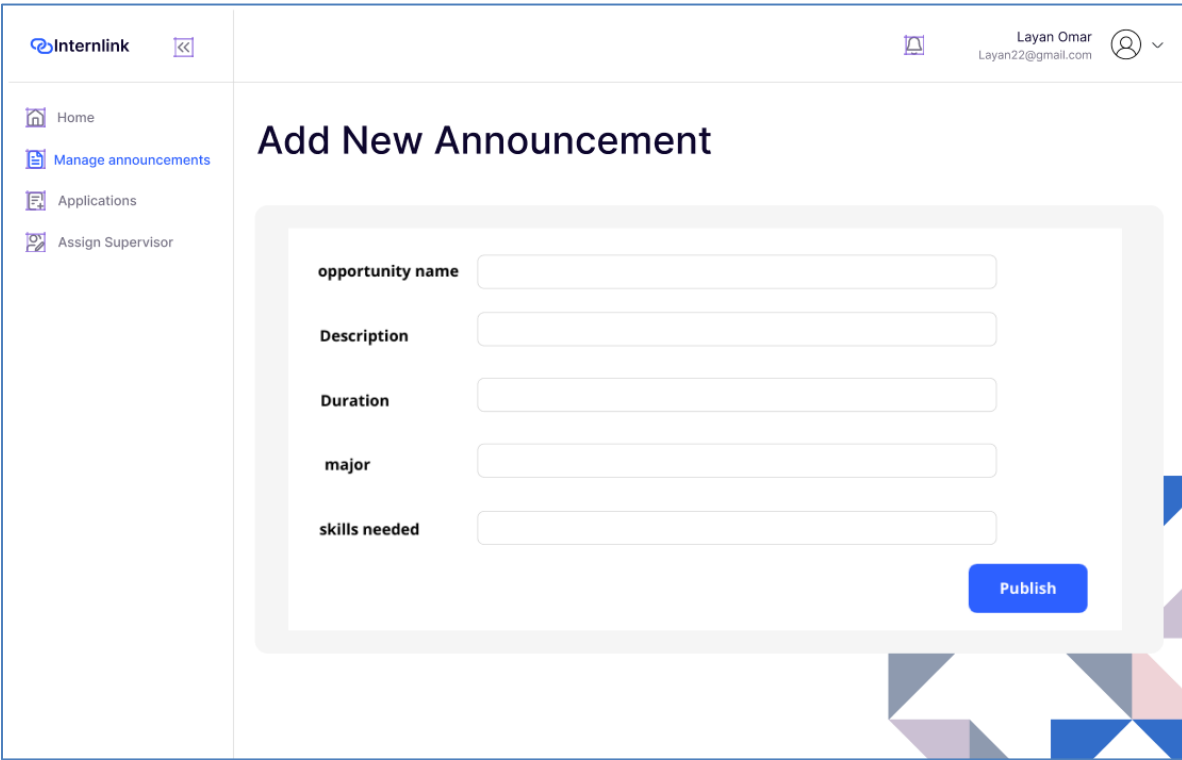


Figure 4- 20 Add new announcement

## 4.6 Summary

This chapter explained our system's structure by breaking it down into its main parts and modules. The architectural diagram showed how the system is set up and how its different parts work together. The class diagram described the system by listing its classes, their attributes, and how they interact. The sequence diagrams showed how the system's parts communicate step by step in specific situations to complete tasks effectively. Finally, The ER diagram represented data entities and attributes and relations between them.

# **Chapter 5: Conclusion and Future Work**

## **5.1 Conclusion**

Internship management can be difficult due to the lack of centralized management platforms, which affects the experience of all parties involved. Therefore, we designed our system to simplify this process. We aimed to turn what can be a stressful experience into a smooth and organized journey. By integrating many features, the system helps everyone to be connected and informed, helping students develop professionally, while facilitating follow-up and communication with teachers and companies. The system ensures everyone is connected and informed.

## **5.2 Goals Achieved**

In this project we achieved the following goals:

- Defined the project's problems, scope, and objectives
- Reviewed related work and identified their functionalities
- Established functional and non-functional requirements for the system based on user needs
- Designed models such as use case diagrams and class diagrams to visualize the system structure and user interactions.
- Designed the user interface for the system

## **5.3 Challenges and Future Work**

One challenge is that the decision to support multiple languages is still pending, which may make it hard for some users to access the system. Also, there is currently no rating system for students to review companies and internships, which would be very useful for future users. These challenges also create opportunities for future improvements. We plan to focus on the following areas for future development:

- Add a simple rating system for students to review companies and internships.
- support multiple languages to reach more users.

- Add features to support group projects with tools for teamwork.
- Add a recommendation feature to simplify the search process
- Require companies to specify if the announced opportunities are suitable for people with special needs

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## Appendix A

The following is the complete questionnaire:



### استبيان حول تحديات وفرص تحسين تجربة التدريب التعاوني

نحن مجموعة من الطالبات من كلية علوم وهندسة الحاسب الآلي، نسعى إلى تطوير نظام جديد لإدارة التدريب للطلاب والمشرفين، يركز على تنظيم العملية وجعلها أكثر سلاسة وفعالية، مما يسهل على الطلاب الحصول على الفرص المناسبة، ويساعد المشرفين على متابعة التقدم وتقديم الملاحظات بسهولة أكبر.

نهدف من خلال هذا الاستبيان إلى فهم أعمق لتجربتكم في مجال التدريب: ما هي التحديات التي واجهتموها؟ وكيف يمكن أن نجعل هذه التجربة أفضل؟ ممتنون لمشاركاتكم ووقتكم، وكل فكرة أو اقتراح قد يساهم في تحسين هذا النظام ستكون ذات قيمة كبيرة لنا.

 [aryamm0002@gmail.com](mailto:aryamm0002@gmail.com) تبدیل الحساب

 غير مشترك

\* تشير إلى أن السؤال مطلوب

هل سبق أن تدرّبت عند إحدى الشركات؟ \*

نعم ☐

لا ☐

محو النموذج التالي



## استبيان حول تحديات وفرص تحسين تجربة التدريب التعاوني



تسجيل الحساب aryamm0002@gmail.com

غير مشترك

\* تشير إلى أن السؤال مطلوب

### استبيان حول تحديات وفرص تحسين تجربة التدريب التعاوني

ما المدة التي مرت منذ تخرجك من الجامعة؟

- ☐ في فترة التدريب
- ☐ أقل من سنة (حديث تخرج)
- ☐ من سنة إلى ثلاث سنوات
- ☐ من ثلاث إلى خمس سنوات
- ☐ أكثر من خمس سنوات

هل واجهت أحد هذه الصعوبات أثناء البحث عن الفرص التدريبية؟ \*

- ☐ عدم المعرفة بموعد بدء التقديم
- ☐ التقيد بالموقع الجغرافي أثناء البحث عن الفرص
- ☐ عدم تلقي رد بالرفض أو القبول
- ☐ إجراءات التقديم المخطوطة
- ☐ أخرى:

هل واجهتك صعوبة في التواصل مع المشرفين ؟ \*

- ☐ أوافق بشدة
- ☐ أوافق
- ☐ محايد
- ☐ لا أوافق
- ☐ لا أوافق بشدة

هل واجهتك مشاكل أثناء تسليم التقارير ؟ \*

- ☐ أوافق بشدة
- ☐ أوافق
- ☐ محايد
- ☐ لا أوافق
- ☐ لا أوافق بشدة

هل وجدت صعوبة في فهم المهام الموكلة إليك بسبب عدم وضوح المسؤوليات ؟

- ☐ أوافق بشدة
- ☐ أوافق
- ☐ محايد
- ☐ لا أوافق
- ☐ لا أوافق بشدة

هل واجهتك أي مشاكل أخرى خلال فترة التدريب؟

إجابتك:

هل تعتقد أن وجود نظام إلكتروني لإدارة التدريب سيساعد على حل هذه المشكلات؟ \*

- ☐ أوافق بشدة
- ☐ أوافق
- ☐ محايد
- ☐ لا أوافق
- ☐ لا أوافق بشدة

هل لديك أي اقتراحات إضافية لتطوير النظام الإلكتروني بحيث يقدم احتياجاتك كمطالب بشكل أفضل؟

إجابتك:

محو النموذج

إرسال

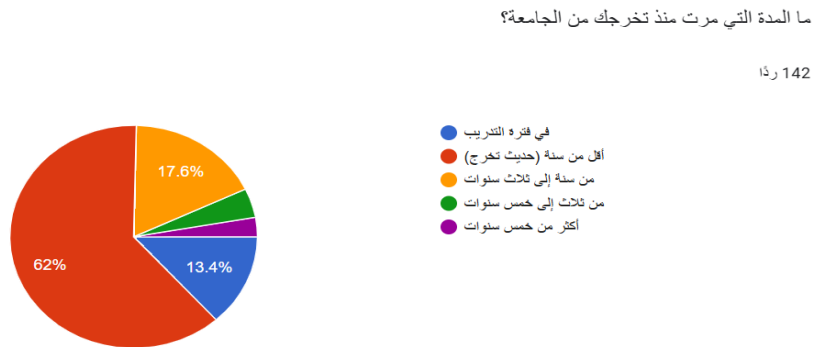
رجوع



## Appendix B

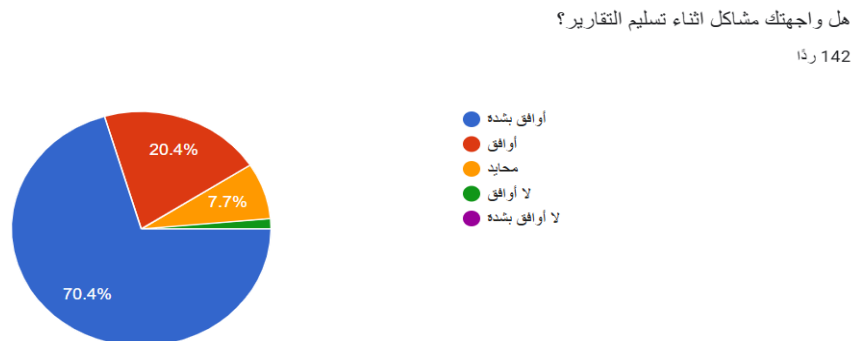
This section contains the analysis of remaining questions in the questionnaire that we used to understand challenges that faced students during the internship. To define the requirements of our system.

- **How much time has passed since you graduated from university?**



The chart shows that most respondents (62%) graduated less than a year ago, while fewer graduated one to three years ago (17.6%), and even fewer from three to five years or more. This suggests the internship process may not have improved much over time. If the process had gotten better, we might expect more older graduates to share positive experiences. however, the results show that recent graduates still face the same challenges.

- **Have you encountered any problems when submitting reports**



The chart shows that 70.4% of respondents strongly agree that they faced problems when submitting their reports. Another 20.4% agree, while only 7.7% are neutral. Very few people disagreed. This means that most students had issues with the report submission process, which suggests that it might need to be improved.

- **Do you have any additional suggestions to improve the electronic system so that it better serves your needs as a student?**

هل لديك أي اقتراحات إضافية لتطوير النظام الإلكتروني بحيث يخدم احتياجاتك كطالب بشكل أفضل؟

13 ردًا

|  |
|--|
| لا يوجد  |
| يسمح للمشرف الميداني برفع تقريره من خلال النظام لأنه أحياناً يكون غائب أو مشغول في ساعات العمل |
| لو كان ممكن نرفع التقارير في هذا الموقع بدل من الايميل   |
| انه يوضح اذا الفرصة الوظيفية ملائمة لذوي الهمم من ناحية طبيعة العمل او مرافق الشركة            |
| i suggest adding a feature where we can rate the experience to share it with others            |

The responses suggested some improvement, including better communication with supervisors, uploading reports directly using the web application, and adding a rating feature. One student also suggested that company should clarify if the opportunity is suitable for people with special needs. We have taken these suggestions into consideration, and some of them have been added as future work.