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Final Year Project

Survey Equipment Rental

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## **Abstract**

The project aims to create Survey Equipment Rental e-commerce platform to tackle the inefficient rental market structure of the survey equipment field in Nepal. As a surveyor who experienced firsthand the market problems the system focuses on inconsistency along with hard-to-find equipment availability and time-intensive coordination processes by creating a digital platform. Through the platform the users can access categorized equipment listings along with real-time availability views while using filters to book their rentals through a secure easy-to-use system. The system utilizes React.js at the frontend while Node.js with Express.js operates as the backend technology and the system deploys MongoDB for database management. Security payment services join user profiles and notification capabilities with real-time pricing automation features as main characteristics of the system. Through the Agile Scrum development process the system underwent repeated iterations of development during numerous sprints together with steady user feedback implementations. This modern platform serves as Nepal's initial officially structured digital tool which provides valuable resources for surveyors and small businesses while creating a basis to advance specialized rental system modernization throughout other industries.

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## **Introduction**

Nepal's fast-growing construction sector and surveying operations cause substantial increases in requirements for high-end surveying technology that includes total stations and drones together with GPS receivers level machines and digital theodolites. The increasing demand for survey equipment has led to major obstacles for independent surveyors and small businesses because of expensive equipment purchases along with shortage of equipment access combined with non-existent transparent rental solutions. Manual rental operations create operational inefficiencies and project cost increases through extended delays from unreliable availability and limited equipment supplier access along with multiple provider contacts and physical supplier visits due to pricing structure inconsistencies.

The "Survey Equipment Rental" project emerged as an answer to vital system limitations since it features a customized digital platform dedicated to improving survey equipment rental operations. The three key modern web technologies which power the platform include React.js for front-end development as well as Node.js with Express.js back-end development and MongoDB for database operations. These technologies ensure both scalability and high performance and great user experience. The Agile Scrum methodology facilitates system development through an iterative process which allows users to provide regular feedback for enhancing both platform usability and functionality.

Through this platform users gain access to a smooth rental experience which equips them with auto-updating equipment availability checks and secure online booking system and automated message alerts and full control over user profile management. The digital rental workflow of the platform solves classic rental failures while making pricing information clear and promoting dependable online transactions. The innovative service strives to enable survey professionals along with small businesses throughout Nepal through its efforts to deliver essential survey equipment which is easier to access, more affordable to obtain and better managed.



## **Project Briefing**

### **Project Overall Working**

The Survey Equipment Rental platform serves as an extensive e-commerce web application which enables the rental process of high-cost surveying equipment online. Since land surveyors and small businesses can rent essential surveying tools such as total stations, GPS devices and drones among others, the platform helps them access them without ownership while eliminating manual coordination requirements.

The platform operates with Admin and Customer as its main user types. Users have the capability to create an account and sign in before using the system to browse equipment while viewing information about details and adding desired items to the cart for secure payment. The system backend functions under admin control through management of user profiles as well as equipment entries booking history data and platform information. These administrators maintain complete authority to examine and change listings along with handling customer problems to manage system efficiency.

Real-time equipment availability together with dynamic pricing features stands alongside user profile management and secure payment integration as well as notification system functions and real-time equipment availability in this system. Users on this platform can register bookings via cart sections while the system handles customer surveys and stores booking logs.

The platform uses React.js for its frontend development because it creates a responsive interface for modern users simultaneously the backend relies on Node.js and Express.js to process application logic and routing needs. The MongoDB database delivers a storage solution which combines flexibility with scaling ability to store user details and booking records and product stock information. All project work follows the Agile Scrum model through which new features get created across multiple delivery periods called sprints. The system's evolution refined its performance through testing and feedback collection which happened during regular sprint planning and retrospective sessions. This enabled the system to deliver efficient solutions for practical needs.

## **Problem Domain**

The survey equipment rental system in Nepal has endured multiple difficulties since it became informal and created accessibility barriers. I struggle often to find suitable high-value equipment available for rent during fieldwork across my duties as an official land surveyor. Existing equipment rental procedures at Nepal operate as a fragmented manual system. The rental process requires phone and text message communication to various providers followed by physical visits to rental shops for correcting availability but there is no guarantee the tools will be available as needed.

A lack of unified rental listing platform produces various problems including unstable pricing along with equipment shortages and complicated scheduling and insufficient information disclosure. Small organizations and independent surveyors suffer more because they have limited resources to buy equipment alongside substantial delays to find available rentals. The lack of adequate equipment verification processes causes users to be at risk because providers demand advance payments before confirming equipment condition.

The current reality indicates that Nepal lacks any official or structured online marketplace which focuses on survey equipment rentals. All operations currently function offline and solely rest on the resources of personal contacts and antiquated methods. Without digitization the rental market has become challenging to manage and the processes need improvement for better reliability and efficiency. Surveyors require a modernized rental solution which should be both accessible and trustworthy at scale for the surveying industry to address current inefficiencies in the market.

## **System as a Technical Solution**

This enterprise solves Nepal's survey equipment rental sector deficiencies by building a complete digital platform for equipment rental management. The scheduling system offers instant bookings through a structured listing system that lets users view possible availability and choose length of rental time along with cost displays with adjustable pricing based on market demand to complete easy equipment reservations.

The platform resolves manual coordination issues by using automated booking confirmation processes as well as live inventory management. Through dynamic listing management providers can remove equipment availability doubts from their

operations. The site builds client trust through comprehensive product pages that display descriptions together with images featuring user-generated feedback systems.

The solution focused on security needs to match its ability to scale up. The system provides secure user authentication followed by role-based access control and contains payment processing features. The system provides notifications to users which update them regarding booking confirmations together with equipment returns and resolution of occurring issues. The platform possesses scalability through its foundation of the frontend technology React.js along with Express.js and Node.js on the backend and MongoDB for database usage enabling growth for additional users and equipment varieties while extending into new geographic regions.

### **Aims**

- To design and develop a user-friendly digital platform that improves access to professional survey equipment through a centralized rental system.
- To enhance efficiency and transparency in the survey equipment rental process by replacing traditional, manual methods with a modern e-commerce solution.
- To support the long-term scalability and digital transformation of the equipment rental industry in Nepal, especially for small businesses and independent surveyors.

### **Objectives**

- To solve the problem of limited and inconvenient access to survey equipment by providing a platform where users can easily browse, filter, and rent tools based on their specific project requirements.
- To address concerns related to trust and security in online rentals by implementing secure user authentication, payment systems, and transparent booking processes.
- To overcome static and inflexible pricing models by introducing dynamic pricing that adjusts based on demand, availability, and seasonal trends, improving affordability and utilization.

## Artefact

### FDD (Functional Decomposition Diagram)

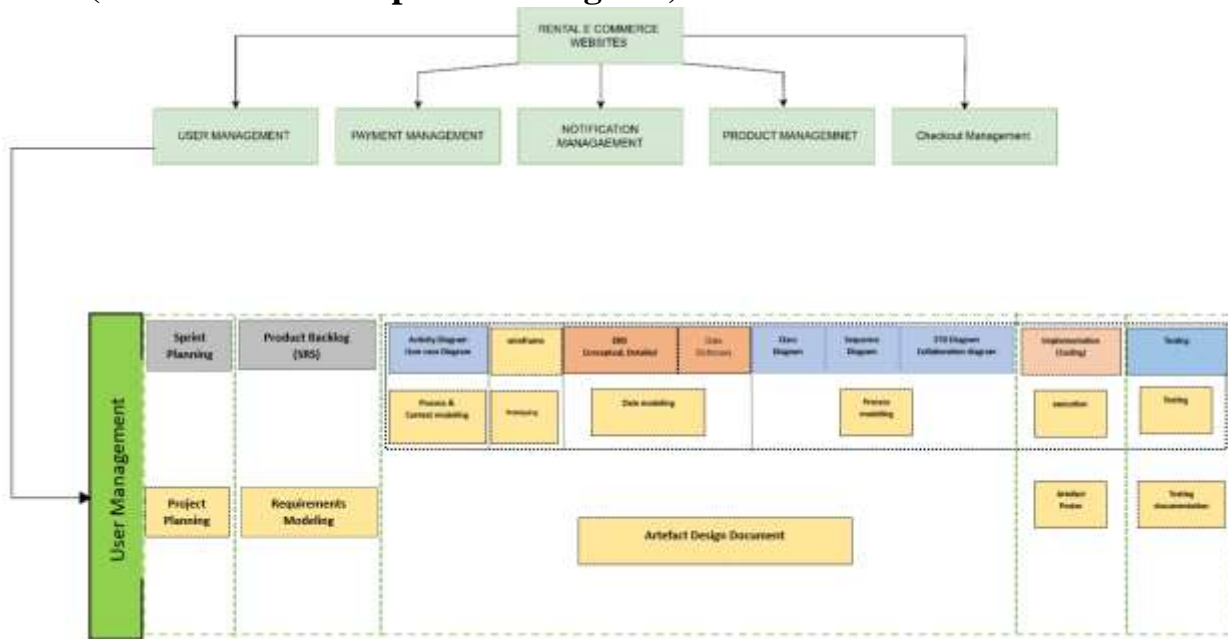
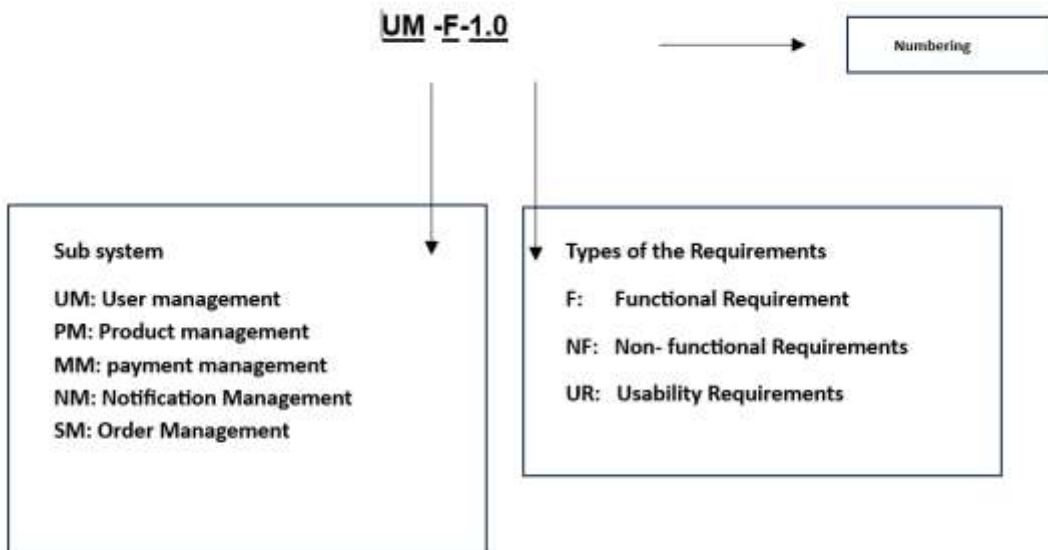


Figure 1:FDD Diagram



## **System Overview**

A web-based e-commerce platform exists for users to rent professional survey equipment online. This web-based e-commerce platform works to eliminate traditional survey equipment rental market practice through digital solutions starting from equipment discovery to booking and payment security.

The artifact employs React.js for front-end development and Node.js and Express.js for back-end processing and MongoDB as its database system. The platform offers its users functions for registering and managing accounts as well as equipment exploration and specialization filters and cost adjustments and real-time rental status updates and transaction security measures. The system as an artefact solves operational problems in traditional rental methods and presents a platform which meets the needs of surveyors and small business requirements through its scalable and accessible structure.

## **Subsystem Descriptions**

### **User Registration and Login**

Allows users to create an account, log in securely, and manage their session. Upon registration, users can access full platform features, view their profile, rental history, and saved preferences.

### **View and Update Profile**

Enables users to update personal information such as contact details, password, and payment methods. It also displays the user's rental history and preferred equipment.

### **Browse and Filter Survey Equipment**

Provides a searchable and filterable catalog of equipment, including total stations, drones, GPS devices, theodolites, and levels. Users can filter results based on availability, price range, and category.

### **Book Equipment**

Users can select equipment, define the rental duration, choose delivery/pickup options, and confirm payment. Real-time availability and cost calculation are displayed before final booking.

## **Dynamic Pricing System**

Implements variable pricing based on factors like equipment demand, seasonality, and inventory availability. This helps optimize resource utilization and encourage rentals during off-peak times.

## **Add to Cart**

Allows users to add multiple equipment items into a cart and review them before completing a rental transaction. This makes multi-item bookings seamless and efficient.

## **Notification System**

Generates automated notifications to users and administrators regarding booking confirmations, rental status updates, due returns, and any critical system alerts.

## **Customer Reviews and Ratings**

Implementing a feedback and rating system would allow users to review equipment and share their rental experience. This not only builds trust within the platform but also assists future users in making informed rental decisions based on previous feedback.

## **Discounts and Loyalty Program**

To promote customer retention, a loyalty program could be introduced, offering discounts or reward points to frequent users. This initiative would encourage repeat business and foster long-term relationships with users.

## **Academic Question**

- How can an e-commerce platform simplify survey equipment rentals for better customer retention?
- How can accessibility and efficiency in survey equipment rentals be improved through e-commerce?
- How can an e-commerce platform optimize costs and support growth for small survey businesses?

## **Explanation of Academic Questions**

### **1. Simplifying Rentals for Customer Retention**

Traditional survey equipment rental processes in Nepal are time-consuming, inconsistent, and often based on informal networks. By digitizing this process, the project investigates whether an intuitive, centralized platform can make renting easier and more reliable. Simplification is expected to improve the user experience, which in turn may encourage repeat usage and increase customer retention. Features such as real-time availability, clear pricing, and easy booking aim to address this question.

### **2. Improving Accessibility and Efficiency**

Many independent surveyors and small businesses face barriers due to limited access to equipment and inefficient rental procedures. This project explores how e-commerce can offer 24/7 accessibility, streamlined logistics, and reduced manual effort. By implementing online filtering, booking, and notifications, the platform aims to significantly improve the efficiency of equipment rentals compared to traditional methods.

### **3. Optimizing Costs and Supporting Business Growth**

High upfront costs for equipment ownership can hinder growth for smaller survey businesses. This question examines how a rental-based e-commerce model can reduce these financial burdens through flexible, on-demand access. Moreover, the integration of a dynamic pricing system allows the platform to adjust costs based on demand and seasonality, offering a financially viable alternative for long-term sustainability and scalability.

## **Scope and Limitation of the Project**

### **Scope**

The scope of the project is to develop a full-stack e-commerce web application tailored to the rental of survey equipment in Nepal. The platform specifically targets independent surveyors and small businesses who face challenges in accessing expensive tools due to high costs, limited availability, and a lack of centralized rental services.

The system offers the following key functionalities:

- **User Management:** Registration, login, and profile management including personal information, rental history, and preferences.
- **Product Management:** Admin-side interface for adding, editing, and managing survey equipment listings including categories such as total stations, GPS devices, drones, and theodolites.
- **Browse and Filter:** Customers can search and filter available equipment based on type, price, and availability.
- **Booking and Rental Workflow:** Equipment booking with customizable rental duration, delivery/pickup preferences, and live rental cost calculation.
- **Add to Cart:** Users can manage multiple equipment selections before completing checkout, enabling batch rentals.
- **Dynamic Pricing System:** Pricing is adjusted based on factors such as demand, seasonality, and equipment availability.
- **Secure Payment Integration:** Basic online payment processing for secure transaction handling.
- **Notification System:** Automatic alerts for booking confirmations, equipment availability, and rental reminders.

The system is built using React.js for the frontend, Node.js and Express.js for the backend, and MongoDB for database management. The Agile Scrum methodology was followed to ensure iterative development with user feedback integration.

## Limitation

While the project successfully delivers its core objectives, several features and enhancements were identified but remain outside the scope of the current implementation due to time, resource, and technical constraints:

- **Real-Time Equipment Tracking:** Integration of GPS or RFID for tracking rented equipment in real time was considered but not developed due to hardware and infrastructure limitations.
- **Loyalty and Discount Programs:** Features such as repeat customer discounts or rewards programs were identified as beneficial but are deferred for future development.
- **Advanced Payment Options:** Although basic payments are functional, the system does not yet support mobile wallets, installment plans, or multi-currency support.
- **Logistics and Delivery Tracking:** Users can input delivery preferences, but live delivery tracking or third-party logistics integration is not currently part of the system.



- **Mobile Application:** The platform is developed for web access only; no Android/iOS application is available in the current release.
- **High-Load Performance Testing:** Due to infrastructure limitations, the platform was not tested under large-scale concurrent user conditions in a real-world environment.
- **Multilingual Interface:** The application supports English only; regional language support was not implemented in this phase.

These limitations serve as opportunities for future enhancement based on user feedback, market demand, and the potential growth of the platform.

## **Report Structure**

## **Literature Review**

### **Cost Benefits Analysis of Renting vs Buying**

The paper analysis of renting versus buying, the author undertakes critical review on the various economic aspects that are involved in the decisions of organizations on whether to own or hire their property, especially the fixed or equipment. Some of the points that the paper makes include the first-time outlay of capital for the purchase out right, annual recurring charges to maintain the machinery over a long time, depreciation charges, and rental flexibility. Outsourcing is deemed appropriate for companies where particular equipment is not required on a daily basis since renting makes it possible for the businesses to save their cash that they would have used to purchase the equipment, maintain them, store them, and bear the expenses if they depreciate. On the other hand, purchase is usually in the best interest of the business entities that use equipment regularly for an extended period because after sometime the total cost could be higher than out-right purchase of the assets.

Interestingly, these concepts can be easily applied to the framework of my project: a survey equipment rental platform. Instruments like total stations, theodolites, UAVs, GPS receivers, levels and other accessories are costly assets for small business and individual practitioners. For [these professionals], the acquisition of such costly machines may be unrealistic, particularly when the equipment is going to be used for certain activities or occasional work. The following advantages are pertinent to hiring these tools on demand, one time and as required.

In addition, rental of survey equipment is more advantageous than ownership since those to be used in particular projects can be hired while the contractors do not need to store or maintain other equipment's that might not be frequently used. The general discussed aspects of cost-saving in case with renting are justified for businesses in the survey industry because the kinds of projects that they may occur and equipment required can be quite different. In this regard, the findings of the paper about the benefits of rent to the disadvantage of home ownership are useful for surveyors and the small businesses who wish to reduce their spending. (Bajwa, 2021)

### **Logistic and Operational Challenges**

It is necessary to specify that the paper reveals several more concerns essential for practical implementation of EV and operation and management of logistics vehicles in the transportation sector. All these challenges are most applicable in businesses such as survey equipment rental as they experience similar operational issues. In survey equipment rental, the matters of concern include the movement of the equipment through great distances, timely delivery and collection of large bulky equipment and guaranteeing on the equipment. Due to the surveying, it becomes important to have the right routes and right time when the surveyors need to be supplied with the necessary equipment's.

Similarity may also be noted where there is necessary to charge infrastructure for EVs: so necessary is to store, maintain, and calibrate the surveying equipment. In both cases, the process of creation and service provision of such facilities is expensive, although which are crucial to effective functioning. Additionally, with reference to the routing for EVs, rental of survey equipment requires routing to factor time for equipment re-calibration and general maintenance so that equipment does not seize up at some point during key surveys. Both industries also face the challenge of real-time location tracking to guarantee positioning of vehicles and equipment's on right tracks to save time and avoid wastage. (Angel Alejandro Juan, 28 January 2016)

### **Ecommerce in Rental Business**

After reviewing the paper, it becomes evident that the principles under discussion can be successfully applied in survey equipment rental business. The paper also describes how e-commerce system enhances the rental through making products easily accessible by customers, avoiding close contacts, and enhanced operation (Author, Year). This is even especially with the survey equipment rental market,

generally speaking the equipment is expensive and specific, and is only needed by the renter for a short period. The existing model of e-commerce can be applied to survey equipment rental platforms and provide a simple and convenient web frontend where surveyors can filter equipment, make bookings, and pay for total stations, drones, and GPS online.

Inventory management and availability of stock are also discussed in the paper, it is impartial for a rental business (Author, Year). When it comes to survey equipment, this feature would help the customers always know which of the equipment are available for hire, and this would work to matters such as overhiring whereby some of the instruments hired are not returned on time or what is worse, are not available when they are needed. Also, the dislocation of payment systems together with a flexibility of price setting as captured in this paper, offers the surveyor an opportunity to hire equipment from whoever is offering the best price depending on his project period.

Similarly, benefits outlined in the paper as applying customer data analytics for recommendation of specific surveys, would be valuable in the survey rental market. We could recommend specific equipment for the surveyed rental businesses based on previous rentals or their required projects, so as to enable them hire the right equipment for their tasks. In sum, implementing these e-commerce strategies into survey equipment rental industry can cut cost down, increase utilization of resource, and increase overall client satisfaction. (Chukurna, 2024)

### **Rental platform Security and Trust Mechanism**

The topics relevant to the paper was chosen with reference to the growing threat of security issues in e-commerce, and the heightened need to protect customer's information in the digital era of shopping. It focuses on the concept of the digital ecommerce buying process which covers various processes also known as stages including, Consideration, purchase, and communication. During every development phase, there are threats like unauthorized access to business site, leakage of information or fraud that may erode customer trust and business credibility. Paper pointed out relevant instruments required for guarding ecommerce transaction which include fire-wall, encryption application, and digital certificates, which provide confidentiality, integrity, and authenticity. It also goes further to provide an account of security privileges including access control, nonrepudiation, and audit, which is critical in the provision of secure online shopping environment.

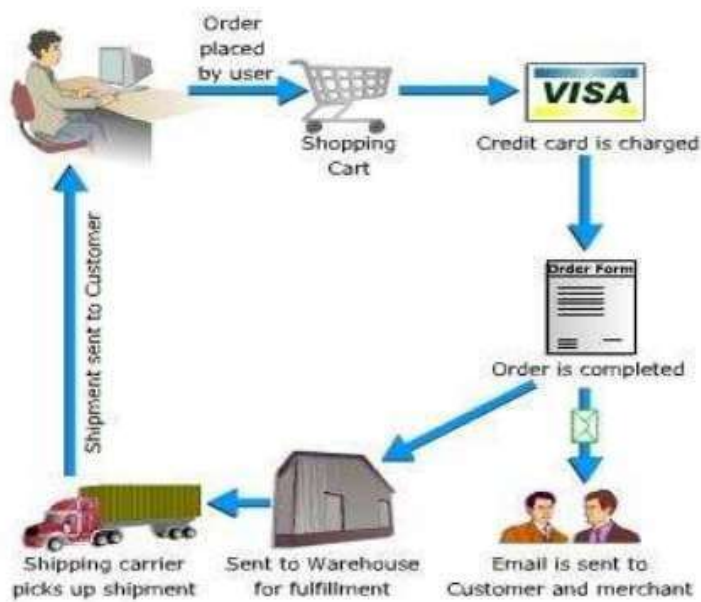


Figure 2:E-commerce Cycle.

The paper covers main e-commerce security issues such as denial of services (DOS), unauthorized access, and fraud as well as the measures taken to avoid these risks. There are methods such as encryption and digital signature described as the basic technologies that should be used in order to avoid interception and guarantee secure business transactions. The paper also emphasizes the importance of exercising security reviews and user awareness as well as applying best practices to sustain e-commerce security against potential future IT threats. The finding of the study is that e-commerce security is an evolving process where companies have to constantly evolve their approaches to protecting customer information and establishing trust. This is important to the achieving of the goal of e-commerce sites and to the creation of safe and stable rental space for the consumers. (Liwei Li, 2020)

## Customer Behavior and Preferences in Rental Services

The findings presented in the paper specify that the pandemic has led to a new consumer attitude characteristic by speed, safety, and convenience with a strong focus on omnichannel. Therefore, in the same manner as survey equipment rental business, these trends are also valid. The increased focus on touchless rentals and. Restricted customer interactions also mean that customers are now demanding fast, convenient and safe rentals. Similarly, as such concepts like safe and contactless payment during checkouts are becoming popular and introduced by retail businesses, the same should be applied to rental platforms: contactless pick and return of equipment should be allowed together with digital payment options.

Another major factor that can be derived from the paper is the use of real-time consumer feedback via what is received through social media where firms are in a position to determine evolving consumer trends a move that helps them to alter their operations. This idea is most of essential for a rental service business because knowing the customers' demands and tastes would enable the company to adjust equipment supply, and price and promotion tactics. Retailers can reflect the feedback from their customers and the trends on shared platforms with rental platforms with an attempt to enhance the customer base and to attract the existing consumers with special offers and promotions, free period/or deeper discounts, or special bundle offers.

This paper has also argued the need to being flexible when making decisions to respond to the new desires of consumers. This can be applied to the rental industry by using a variable pricing structure, customized rental plans according to a customer's preferences, and using the miscellaneous variations in currents and proposed stock levels. (Stacy H.N. Lee, 2020)

### **Case Studies and Market Demand**

I observed that while reading the paper on the challenges facing the e-commerce industry it was possible to identify areas where these problems could be specifically formulated to suit the creation of a survey equipment rental platform. Recall that one of the factors threatening the company's success is the weak digital marketing competencies that ultimately affect brand recognition and customer loyalty and acquisition. The survey equipment rental business is a competitive niche thus as I go ahead with my platform, I realize the need to integrate strong online marketing techniques. This shall be vital for attracting the right clientele, especially focusing on small businesses, sole traders, surveyors, landlords or any person of necessity when it comes to hiring rental equipment. On this count, I can harness social media networks and other online animals effectively to counter this challenge and popularize the platform.

The second problem arising from this is that there are higher risks associated with fraud and data security on the online platform. The paper brings out the fact that issues of security and particularly customer transaction and business networks are very vital in the case of e-commerce. Since my platform will deal with renting survey equipment, the data involved requires secure transactions and protection of user data. Some of the protections that I will put in place include: use of encryption, MFA, and secure payment processing to protect both client and corporate information. This will assist in the creation of trust and thus the credibility of the created platform.

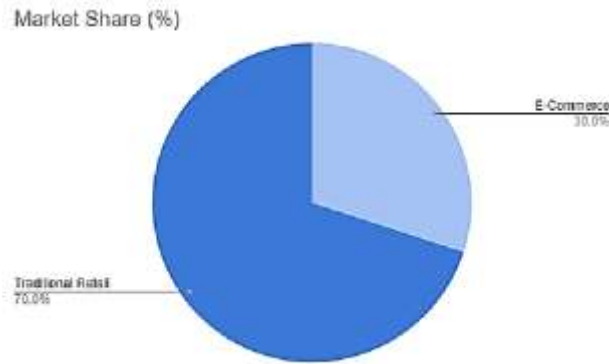


Figure 3:E-commerce market in Nepal.

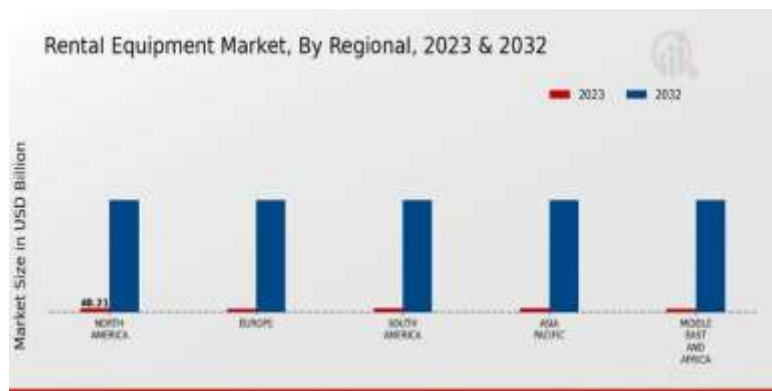


Figure 4: Rental Equipment Market by Region

The paper also features information on compliance with health and safety regulations, which while more applicable to physically tangible products, also applies to survey equipment rentals two aspects will be key for both the customer satisfaction as well as the credibility of the platform; The regular maintenance of equipment and compliance with safety requirement. At last, the experiences and findings delineated in the paper strike a thus far very apt chord with my platform.

Concerning logistics operations, issues such as delay in receiving equipment can affect the customer experience in a very big way. (Nandi, 2025)

## Sustainability and Environment Impact of Equipment Rentals

The paper focuses on sustainability prospects for the fashion rental industry which gives the necessary ideas for the survey equipment rental business. The significance of cleanliness and safety protocol presence is another thing. Similar to fashion rental services that see the clothes washed before being rented out, a survey equipment

rental platform should also clean equipment such as total stations, GPS systems, and drones among others before renting them out. This would not only increase the life span of the equipment but also give customers that much needed confidence that the equipment is not only safe to use, but standard as well.

Communication is also found to be relevant as supported by the article. Competing factors in the fashion rental sector include the definition of rental terms and conditions, precautions taken, and price offered to the customers. Likewise, at a survey equipment rental platform there should be stated policies on how long a piece of equipment can be rented, how to use the equipment, and what to do in case of an adverse event.

While fashion companies make their brands responsible for ethical labor and community support, a survey equipment platform can benefit small business, independent surveyors, and educational institutions that will be able to acquire quality equipment for a reasonable price. Most of these efforts help not only in building customer loyalty but also in the growth of the industry. (Lindsay McCoy, 2022), (Costamagna, 2023)

## **Similar Related Work**

### **Asian Techno Traders**

Asian Techno Traders Pvt. Ltd. is one premier suppliers of survey equipment rentals in the market in Nepal. Total Stations, Auto Levels as well as other surveying equipment; available from the website has undergone various tests by experienced technicians. The full inventory of the bikes and the details about renting -inventory, pricing and availability, and other features of the bikes are available to users registered on the site. It also has background information about the industry and current developments. Qualified workers help to choose a suitable tool to the customer.

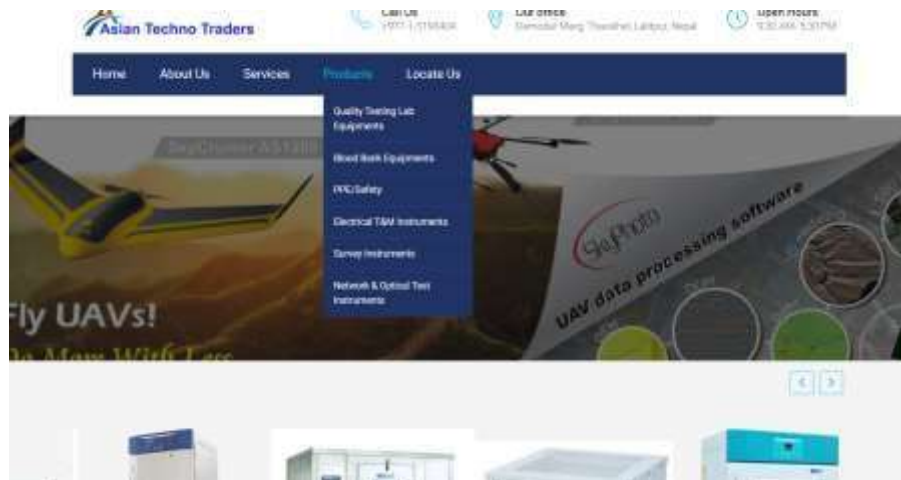


Figure 5: Asian Techno Traders

## Office Materials Nepal

Office Materials Nepal offers wide range of surveying and construction instruments for sale which include; Total Stations, Digital Theodolites, and Leveling Machines. It is a reliable supplier of surveying and measuring instruments that serves the requirements of various professionals of Nepal. It deals with supplying quality products for several sectors such as construction and surveying. But they appear not to provide rental service for these products.

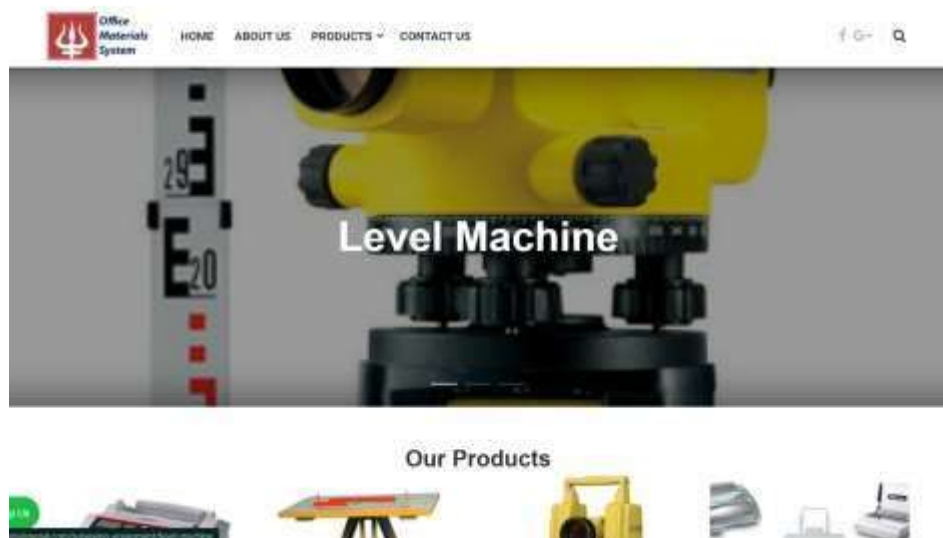


Figure 6: Office Materials Nepal



## Surveying Concern

Surveying Concern offers surveying instruments like Total Stations, GPS and Digital Theodolites primarily selling its own products. They supply surveying equipment to surveyors and civil engineers in Nepal, but they don't have the retail service for internet shopping or equipment rental. Unlike most online based companies, their main focus involves coming into direct contact with the consumers.



Figure 7: Surveying Concern.

## Similarity Check

Features	Asian Techno Traders	Office Materials Nepal	Surveying Concern
Attractive UI	NO	NO	NO
Easy Navigation	NO	NO	NO
Display list of Equipment	YES	YES	YES
Booking	NO	NO	NO
Search Feature	NO	NO	NO
Blog	YES	NO	YES
User Profile	NO	NO	NO
Notification	NO	NO	NO

Figure 8: Similarity Check

## Project Methodology

Scrum was selected as the development methodology due to its flexibility, adaptability, and its strong alignment with the modular and user-driven nature of the Survey Equipment Rental Platform. The system required constant improvement, evolving requirements, and frequent feedback all of which are best supported by Scrum.

Scrum was chosen to suit the specific needs of the Survey Equipment Rental Platform, allowing flexibility, incremental delivery, and continuous user feedback throughout development. (S, 2025)



Figure 9: Scrum Methodology

## Iterative Development for Modular Subsystems

The system was divided into smaller functional modules — such as user authentication, product listing, booking and checkout, payment processing, and notifications. Scrum enabled each module to be developed, tested, and improved incrementally during sprints, reducing complexity and allowing better focus on quality.

## Flexibility to Accommodate Change

During development, certain features like dynamic pricing, cart management, and notification logic needed to be adjusted based on feedback. Scrum provided the flexibility to revise plans and priorities sprint-by-sprint without disrupting the overall flow of the project.

## User-Centric Design

The target user surveyors and small rental businesses had specific needs. Scrum's frequent review cycles made it easier to validate that each sprint aligned with user expectations and real-world use cases. This helped build a more relevant and usable product.

## Incremental Feature Delivery and Early Testing

Scrum enabled early development of core features, which were tested and validated before additional complexity was added. For example, equipment browsing and cart

functionality were completed early, tested, and improved before implementing advanced features like payment and feedback systems

## Enhanced Project Visibility and Control

Each sprint allowed for planning, task breakdown, and review. Using tools like ClickUp made it easier to manage tasks and deadlines. This level of visibility and control helped prevent bottlenecks and ensured smooth project progression.

## Gantt Chart

<b>Sprint 4</b>	11/25/2024	12/1/2024	1st Milestone	7
Sprint Planning	11/26/2024	11/26/2024		1
Proposal Writing	11/27/2024	12/1/2024		5
Sprint Retrospective	12/1/2024	12/1/2024		1
<b>Sprint 5</b>	12/13/2024	1/2/2025	Milestone 2	21
Sprint Planning	12/14/2024	12/14/2024		1
Wireframes design	12/15/2024	12/16/2024		2
Research on Literature Review	12/18/2024	1/1/2025		15
sprint Retrospective	12/29/2024	12/29/2024		1
<b>Sprint 6</b>	1/2/2025	2/2/2025	Milestone 3	31
Sprint planning	1/3/2025	1/3/2025		1
Frontend development (Login, Signup, product page,)	1/4/2025	1/24/2025		21
Artefact design	1/25/2025	2/1/2025		7
sprint retrospective	2/2/2025	2/2/2025		1
<b>Sprint 7</b>	2/3/2025	3/3/2025	Milestone 4	28
Sprint Planning	2/4/2025	2/4/2025		1
Backend Development(Admin Dashboard)	2/5/2025	2/23/2025		19
Project and professionalism report	2/24/2025	3/1/2025		6
Sprint Retrospective	3/2/2025	3/2/2025		1
<b>Sprint 8</b>	3/4/2025	3/31/2025	Milestone 5	27
Sprint Planning	3/5/2025	3/6/2025		2
Backend development (Payment and Booking)	3/7/2025	3/23/2025		17
Final Report Draft	3/24/2025	3/30/2025		7
Sprint Retrospective	3/30/2025	3/30/2025		1

Figure 10 : Major Milestone Gantt Chart

## Different Tools and Technology

The technologies and tools used in this project were carefully selected to support modern web development practices, enable rapid iteration, and ensure scalability and maintainability. Given that the system is a full-stack web platform, it required responsive design, efficient server-side processing, a flexible database, and integration with external services like payment and notifications. All tools were chosen based on their reliability, community support, and alignment with the Scrum methodology.

## **Frontend: React.js**

React was chosen because of its component-based architecture, which allowed reusable UI blocks for things like product cards, filter panels, and booking forms. Its virtual DOM ensures fast rendering, and it integrates well with state management tools for handling cart and user sessions.

## **Backend: Node.js with Express.js**

Node.js was selected to keep the development entirely JavaScript-based across frontend and backend. Express.js provided a lightweight but powerful routing layer for managing APIs, such as booking, payments, user authentication, and notifications.

## **Database: MongoDB**

MongoDB was chosen for its flexible, schema-less structure, which made it easy to store and manage various types of data like user profiles, equipment listings, and bookings. Its support for embedded documents and indexing improved data retrieval, while integration with Mongoose helped maintain validation and consistency.

## **IDE: Visual Studio Code**

Visual Studio Code was selected for its lightweight design and powerful development features. It provided seamless support for both frontend and backend code, with helpful extensions for React, Node.js, and MongoDB. Built-in Git integration and debugging tools made development faster and more efficient.

## **Version Control: Git & GitHub**

Git was used for source code management, while GitHub served as the remote repository. The use of branches helped organize feature development sprint-wise, and pull requests made it easier to review and manage code changes. GitHub also enabled regular backups and tracking of project progress.

## **Project Management: ClickUp**

ClickUp was chosen to support the Scrum methodology used throughout the project. It helped in breaking down the work into user stories and sprint tasks. Its dashboards, calendar view, and progress tracking features made it easier to monitor deadlines, sprint goals, and daily productivity.

## **Design & Prototyping: Figma**

Figma was used for wireframing, interface design, and creating interactive prototypes. This allowed for early user feedback and rapid design adjustments before actual development began. It also made collaboration smoother by allowing real-time commenting and shared access during reviews.

## **Use of Unit Testing and Mock Testing Frameworks**

During development, various testing techniques and tools were applied to ensure the reliability and performance of the Survey Equipment Rental Platform:

### **Unit Testing (Jest & React Testing Library)**

Used to test individual frontend components such as login forms, product list, and booking interfaces. These tools allowed simulation of user interactions and validation of component behavior in isolation.

### **Integration Testing (Postman)**

Postman was used to manually test RESTful API endpoints such as user registration, equipment booking, and payments. This ensured smooth communication between frontend and backend before full integration.

### **Performance Testing (Apache JMeter)**

JMeter was used to simulate multiple users accessing the platform simultaneously, helping assess system performance under load and identify potential bottlenecks.

### **User Acceptance and Usability Testing**

Final system testing was done with real users (e.g., surveyors and small business owners) to gather feedback on functionality, ease of use, and flow. Insights gained were applied to refine the system before submission.

## **Use of Package Manager**

### **Node Package Manager (NPM)**

NPM was used to manage all project dependencies and development tools for both frontend and backend. Libraries such as React, Express, Mongoose, Axios, dotenv, and bcrypt were installed and updated using NPM. It also allowed for script automation (start, test, build), ensuring consistent setup across development environments.

## Artefact Designs

### Sub System Milestone 1

<b>Sprint 4</b>	11/25/2024	12/1/2024	<b>1st Milestone</b>	7
Sprint Planning	11/26/2024	11/26/2024		1
Proposal Writing	11/27/2024	12/1/2024		5
Sprint Retrospective	12/1/2024	12/1/2024		1

Figure 11: Subsystem Milestone 1

## SRS Document

### SRS for User Registration and Login (URL)

Req. Code	Requirement Description	Priority
URL-F-1.0	The system shall allow users to register using email and password.	High
URL-F-1.1	The system shall allow users to securely log in and log out.	High
URL-F-1.2	The system shall support role-based login (Admin and Customer).	High
URL-F-1.3	The system shall allow users to reset their passwords via email verification.	High
URL-NF-1.0	Registration and login data shall be encrypted before transmission.	High
URL-UR-1.0	The login and registration forms shall be mobile responsive and friendly	High

### SRS for Equipment Search and Booking (ESB)

Req. Code	Requirement Description	Priority
-----------	-------------------------	----------

ESB-F-1.0	The system shall allow users to search equipment by type, price, and availability.	High
ESB-F-1.1	Users shall be able to view detailed equipment information before booking.	High
ESB-F-1.2	The system shall provide a status of real-time availability for each item.	High
ESB-F-1.3	The system shall allow users to add equipment to a cart before booking.	High
ESB-F-1.4	Users shall be able to select the rental duration and view the total cost.	High
ESB-NF-1.0	Search results shall load within 3 seconds under standard server conditions.	High
ESB-UR-1.0	The equipment listing page shall be responsive and visually accessible on mobile devices.	Medium

### **SRS for Payment and Notification (PNM)**

<b>Req. Code</b>	<b>Requirement Description</b>	<b>Priority</b>
PNM-F-1.0	The system shall allow users to make secure payments using online gateways.	High
PNM-F-1.1	Users shall receive payment confirmation and an invoice via email.	High



PNM-F-1.2	The system shall notify users about booking status, payment success, or failure.	High
PNM-F-1.3	The admin shall be notified of new bookings and payment completion.	Medium
PNM-NF-1.0	Payment information shall be handled securely and not stored on the server.	High
PNM-UR-1.0	The payment form shall include input validation and display user-friendly error messages.	High

### **SRS for Profile Management (PM)**

<b>Req. Code</b>	<b>Requirement Description</b>	<b>Priority</b>
PM-F-1.0	Users shall be able to view and update their profile information.	High
PM-F-1.1	Users shall be able to change their password from their profile settings.	High
PM-F-1.2	Admin shall be able to view and manage user accounts.	High
PM-UR-1.0	Profile forms shall be accessible and easy to use on desktop and mobile devices.	Medium

### **Diagrams**

#### **Entity Relationship Diagram**

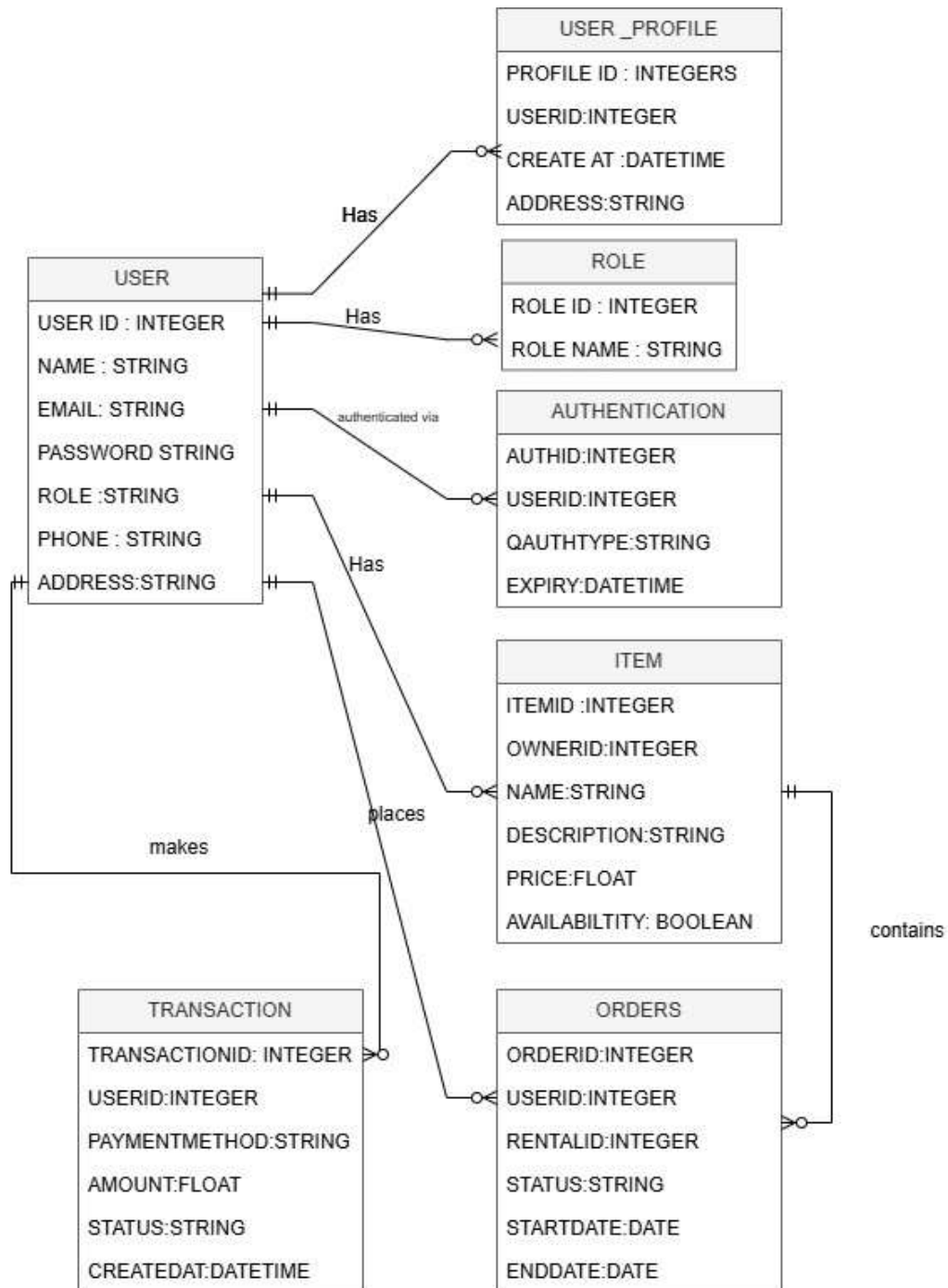


Figure 12 : ERD Diagram

## Activity Diagram

## User Registration

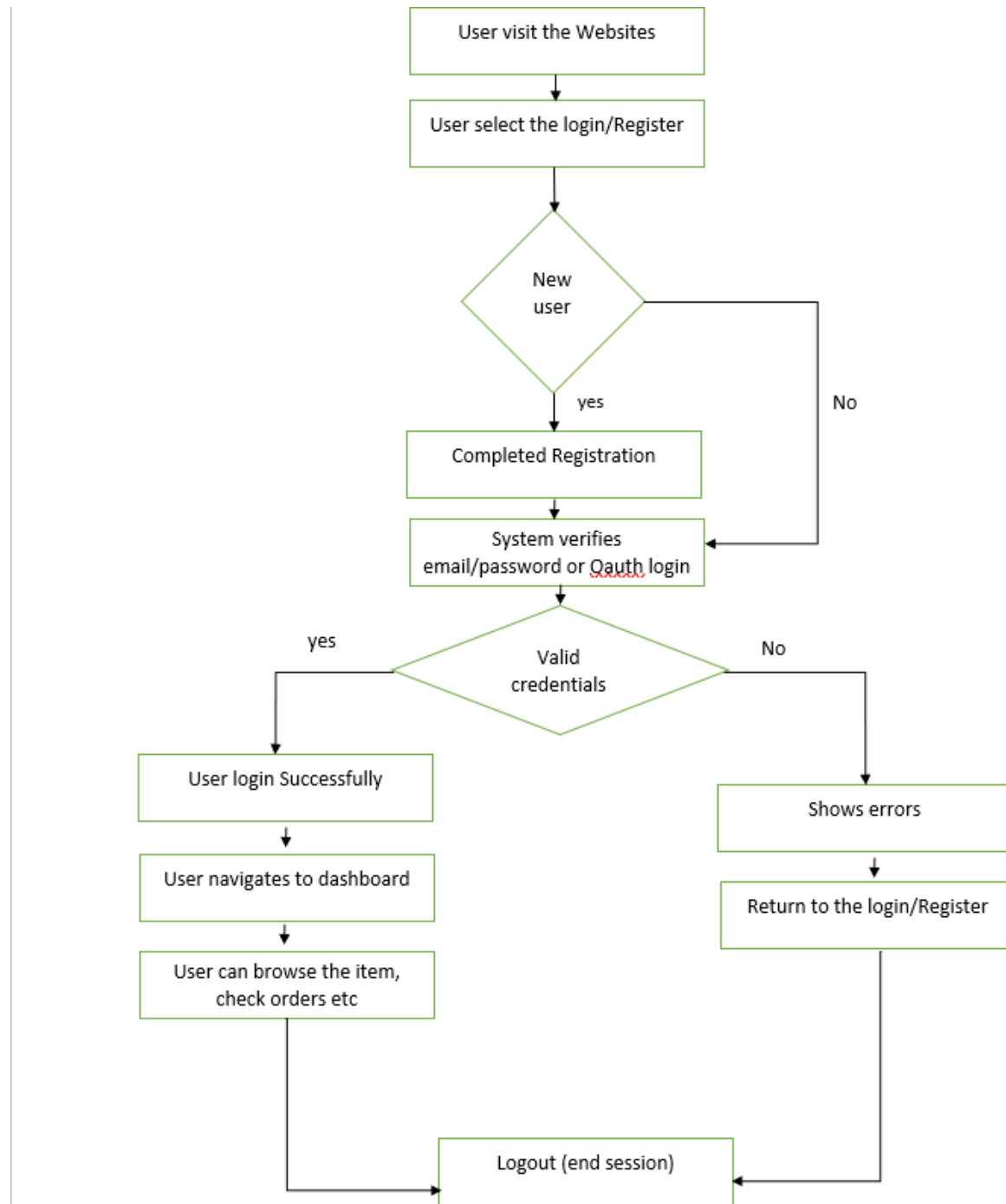


Figure 13: User Registration Activity Diagram.

The user registration process logical flow is shown in this activity diagram. The user starts with the registration page and fills in the details of their name, email and password. Once the form fields are validated, the system then checks whether the

email is registered in the database. But if this email is unique, then it hashes the password and saves the user details, sends a confirmation or success message. If the input is valid or the email already exists, no error message is displayed. The registration logic is visualized in this diagram and validation and decision points in the flow are identified.

## User Login

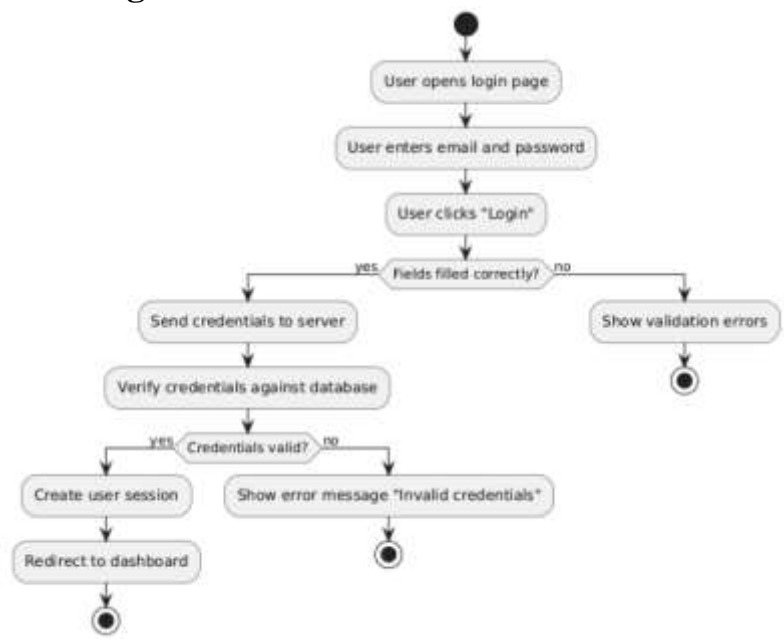


Figure 14: User Login Activity Diagram.

The following figure describes the steps that a user goes through to log into the platform. From here, this is a process where they enter the email and password and press the submit form. It first validates the fields and then checks against the values in the database record. If the credentials get matched, session created and redirect user to their dashboard. The system issues an error message if the credentials are false or the input has been incorrect. The authentication decision flow and error handling paths are quite clearly shown in this diagram.

## Forget Password

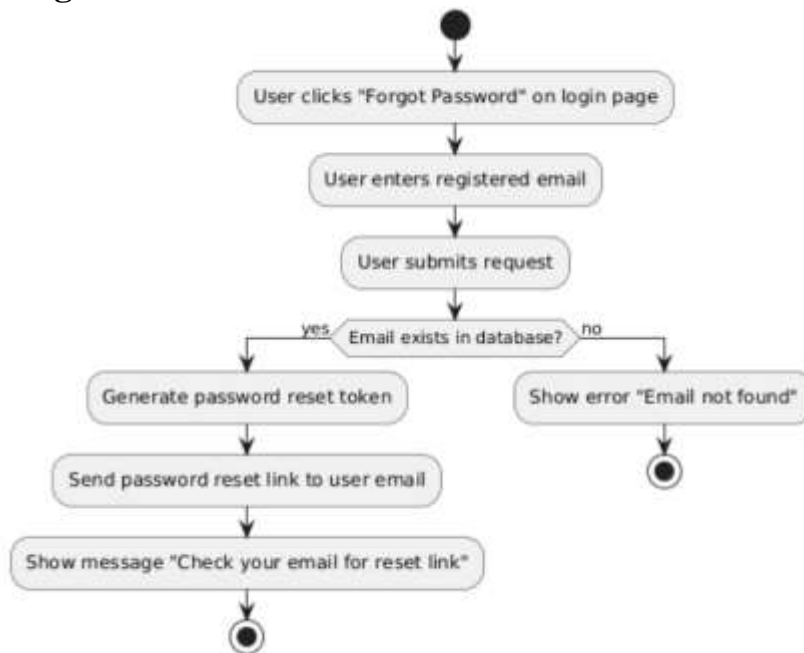


Figure 15: Forget Password Activity Diagram.

If the users forget their password then the forgot password activity diagram will show how users can recover their account. When the user is on the login page, clicks on “forgot Password”, enters the email that they are registered under and submits the request, this is the first step of the process. If the email already exists on the database the system checks it if it is the user. It does a reset token is generated and an email containing a password reset link is sent to the user’s email. In the case where email cannot be found, it shows some appropriate error message. By ensuring the clarity of how password recovery is being secure handled, this diagram makes it clear.

## Use Case Diagram

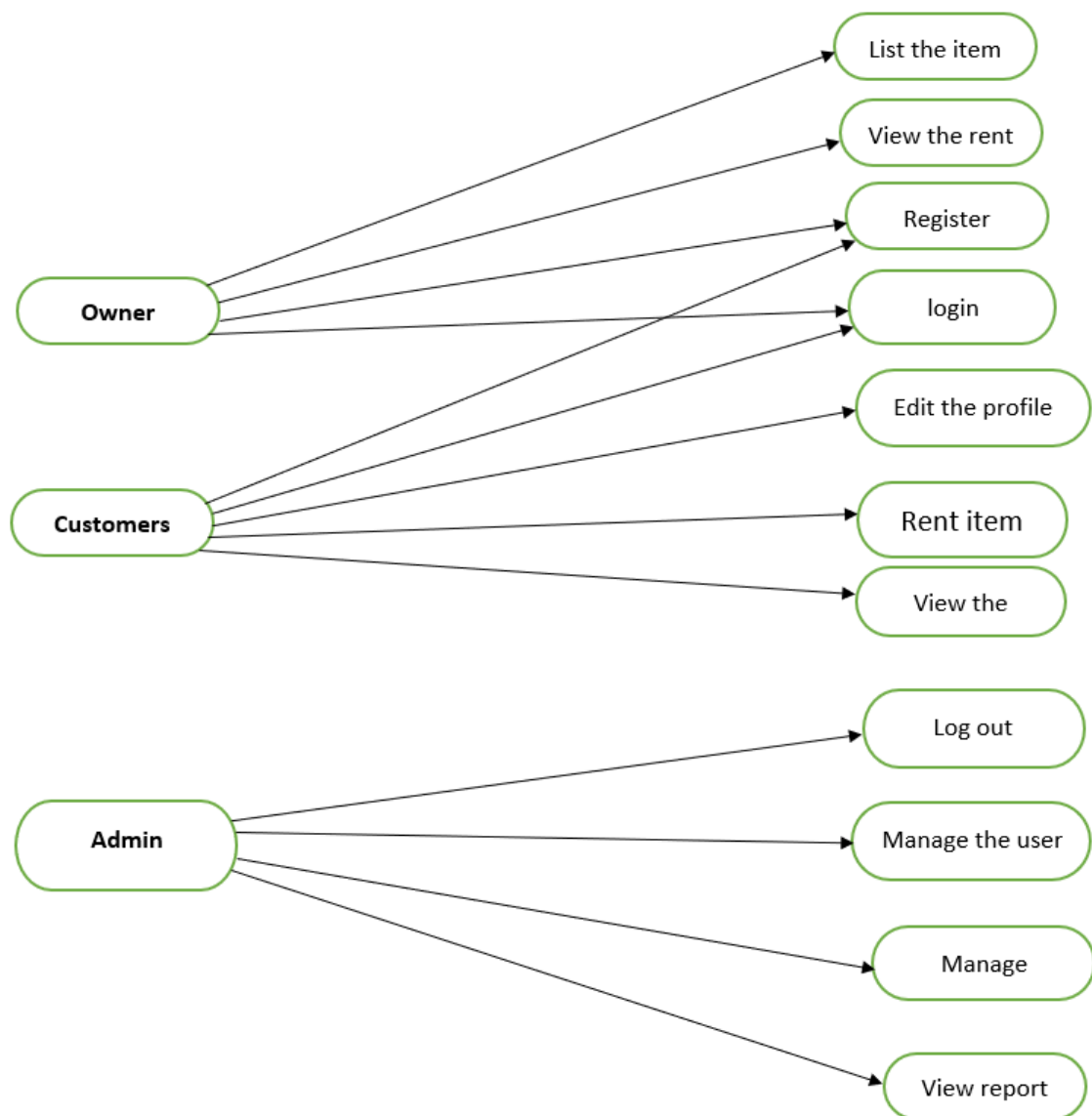


Figure 16: Use Case Diagram

## Class Diagram

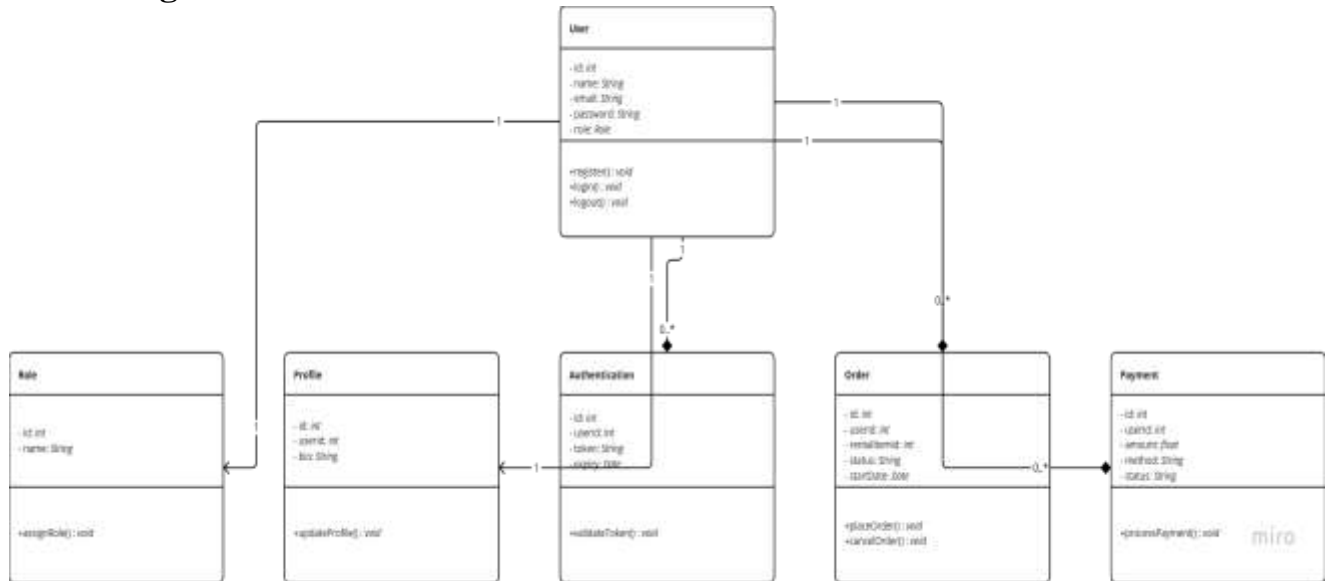


Figure 17: Class Diagram

## Sequence Diagram

### User Registration

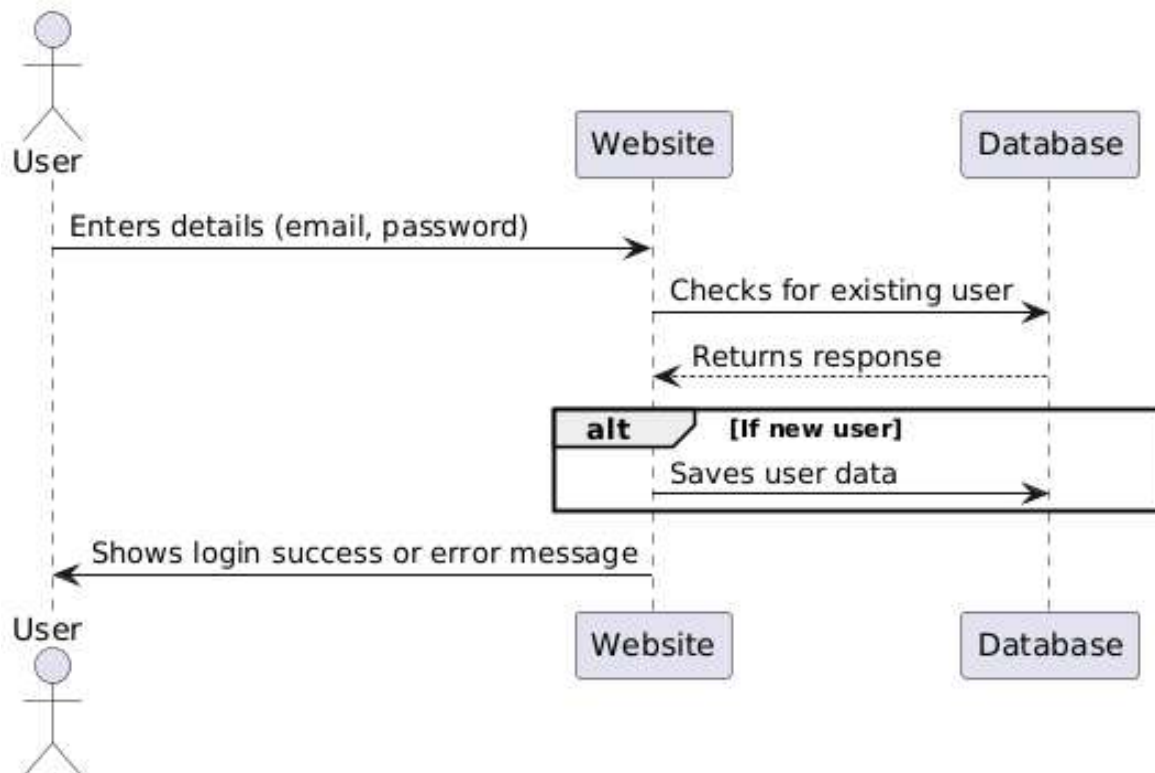


Figure 18: Sequence Diagram of User Registration

Shown is the system components interaction in the user registration process in this sequence diagram. This is a process where the user works on the frontend interface, the backend server (API) and the database. The user provides information of her/his registration details and submits it to the server via the frontend. If valid, the server hashes the password and check's database for email duplication and stores the user data. After successful registration, the server will give us confirmation and the frontend will show a success message to the user. This diagram shows exactly how this workflow works separated into sequential communication and responsibilities of each component in this workflow.

## User Login

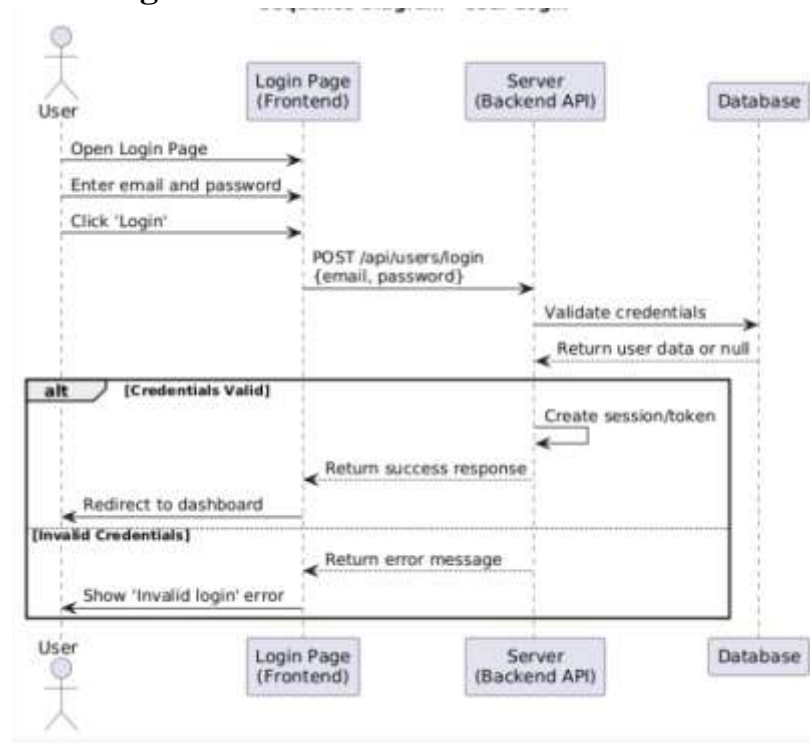


Figure 19: Sequence Diagram of User Login.

The following is a depiction of login user to database process flow. At first the user enters credentials and submits the form on the frontend. The data passed to the backend, which will then check the credentials against the database. It consists of creating a session or token upon which a success response is returned if valid. It raises an error message if not. It helps visualize how the components of the system participate in the process of login.



## Forgot Password

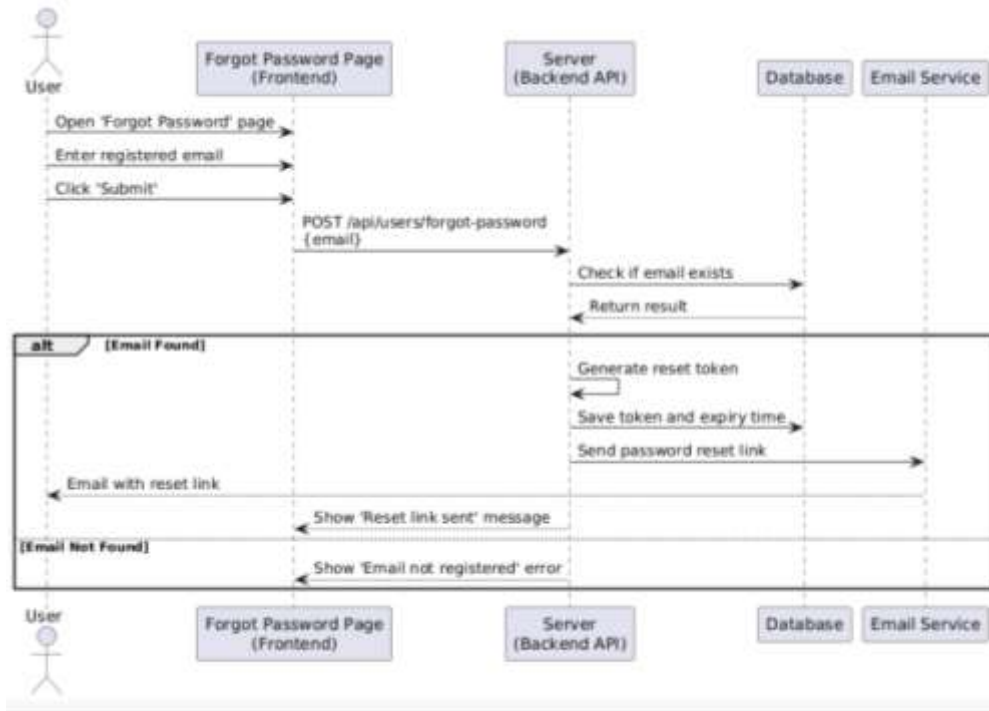


Figure 20: Sequence Diagram of Forgot Password.

Instead, this is a sequence diagram of forgot password flow. The user submits their email, if their email already exists in the database the server will fail. If that's the case, the server will in turn save the reset token and send the user a reset link on their email. In the case where the email cannot be found, the system will notify the user with an error. It makes it easier to visualize how the password recovery is organized between components in a secure manner.

## Product Management ER Diagram

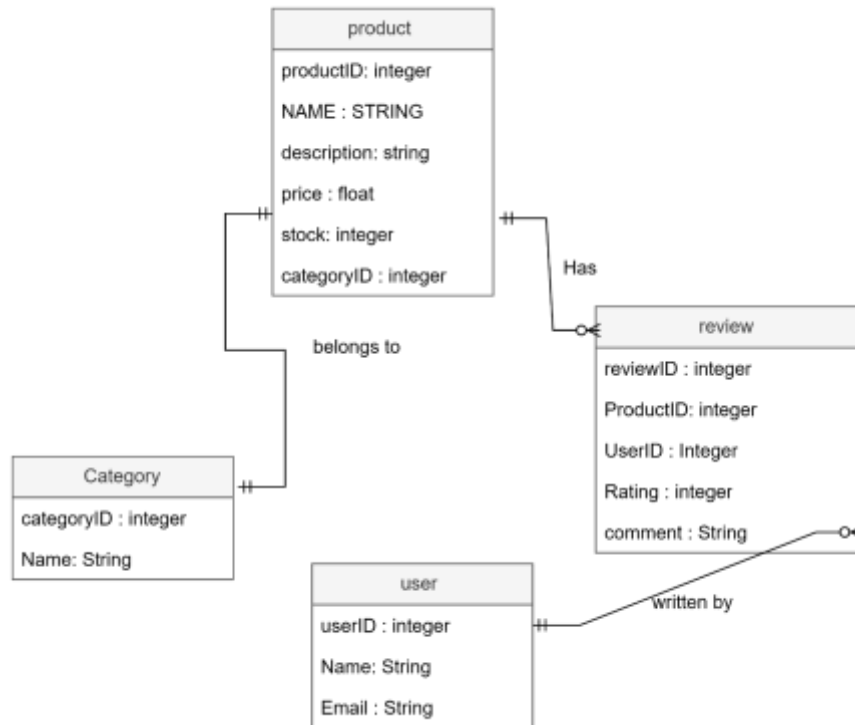


Figure 21: ER Diagram of Product Management

## Class Diagram

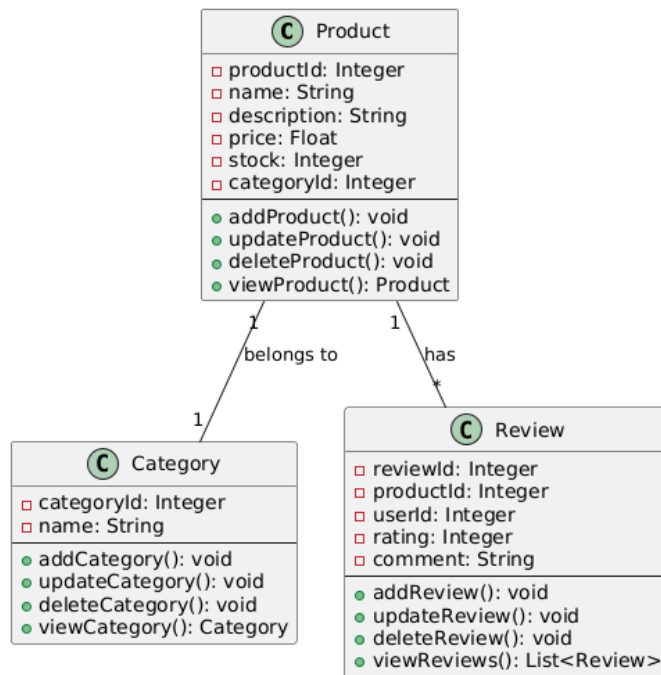


Figure 22: Class Diagram of Product Management.

## Activity Diagram

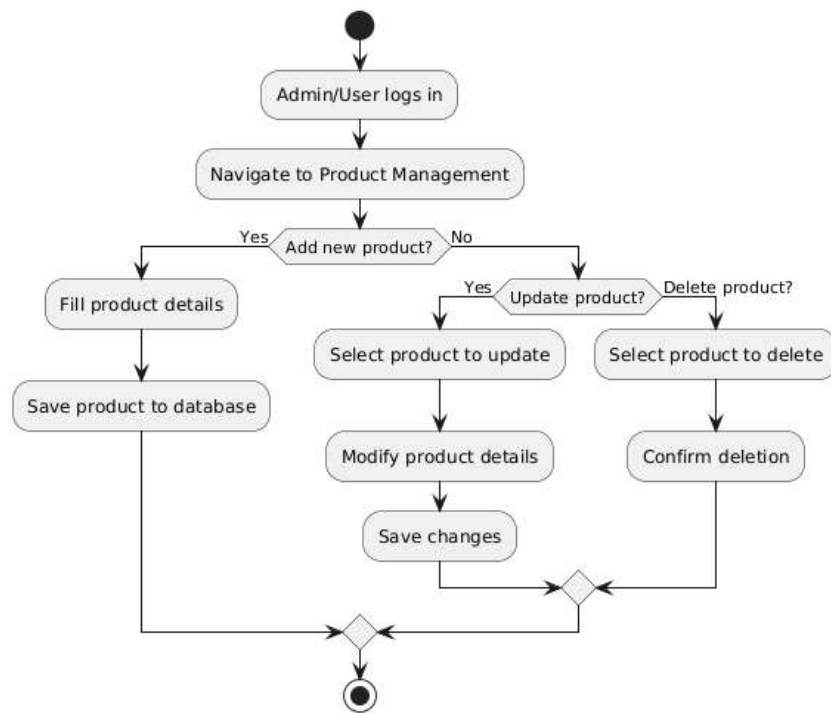


Figure 23: Activity Diagram of product Management.

## Use Case Diagram

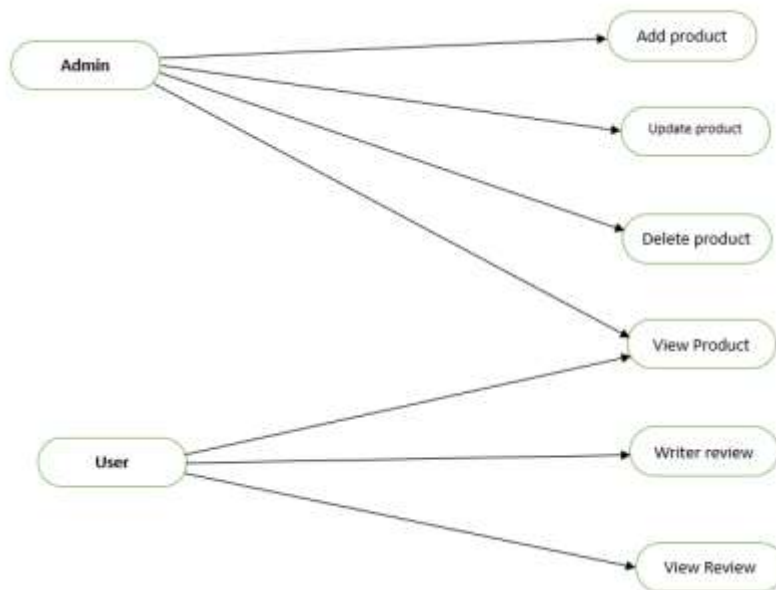


Figure 24: Use Case Diagram of Product Management.

## Sequence Diagram

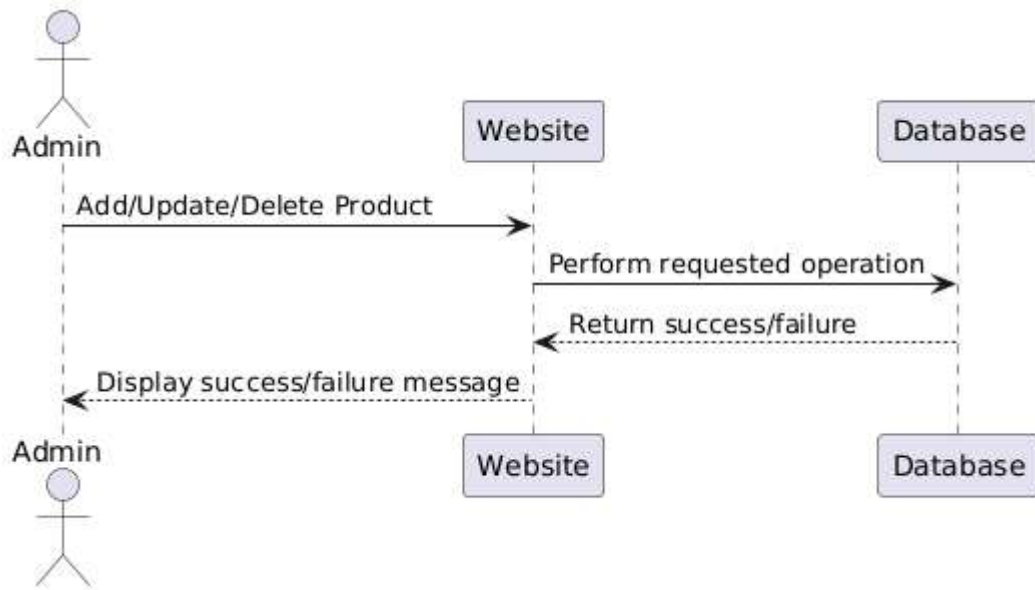


Figure 25: Sequence Diagram of Product Management.

## Payment Methods

### ER Diagram

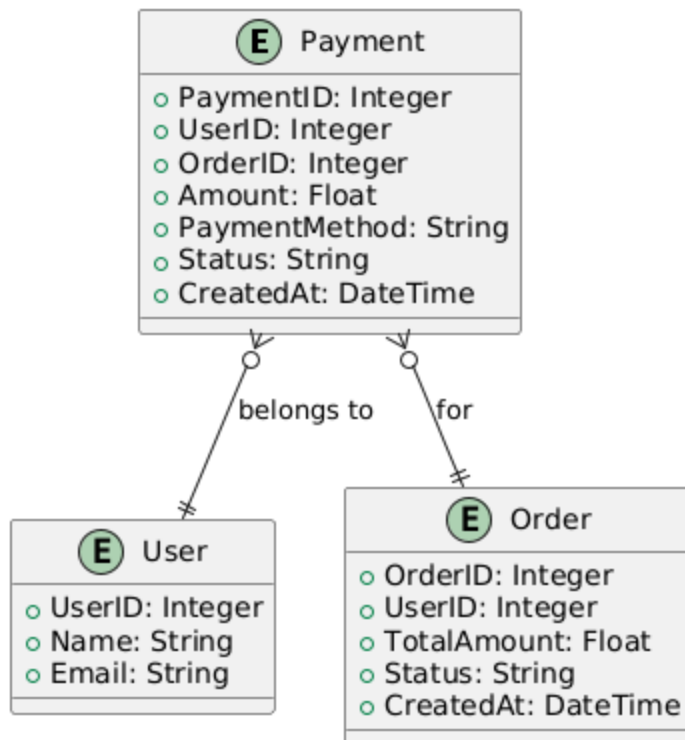


Figure 26 : ER Diagram of Payment.

## Class Diagram

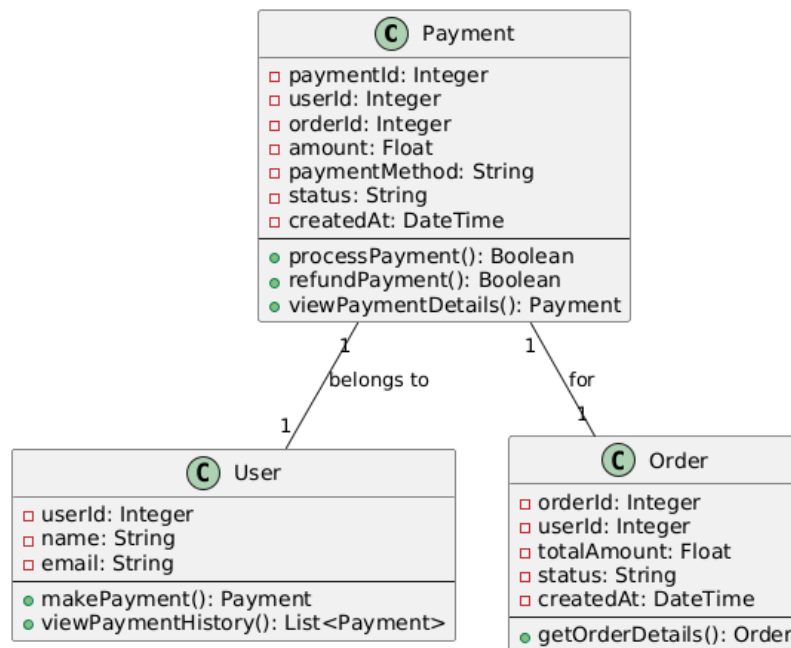


Figure 27: Class Diagram of Payment.

## Activity Diagram

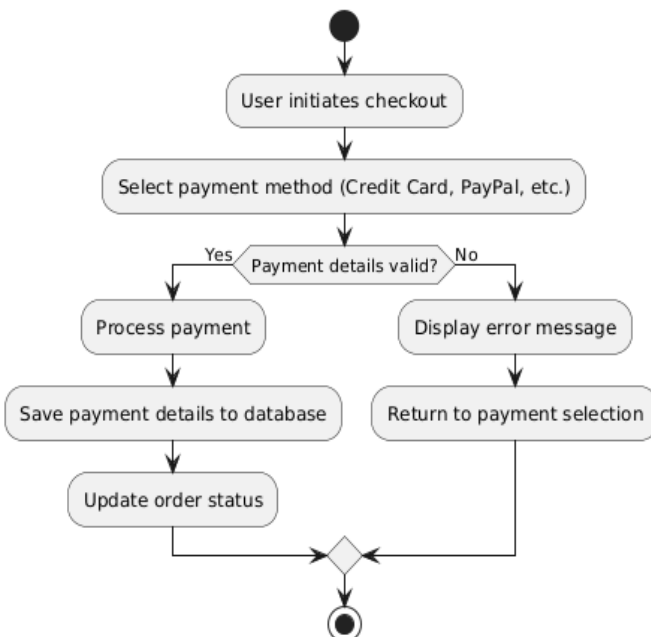


Figure 28: Activity Diagram of Payment.

## Use Case Diagram

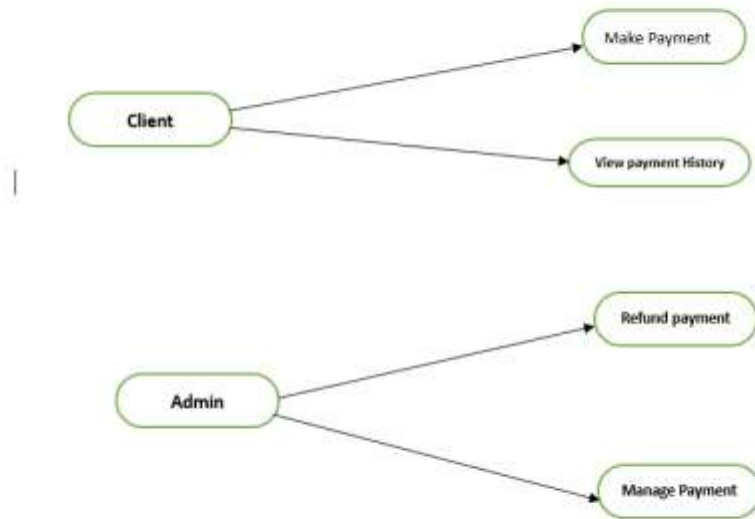


Figure 29: Use Case Diagram of Payment.

## Sequence Diagram

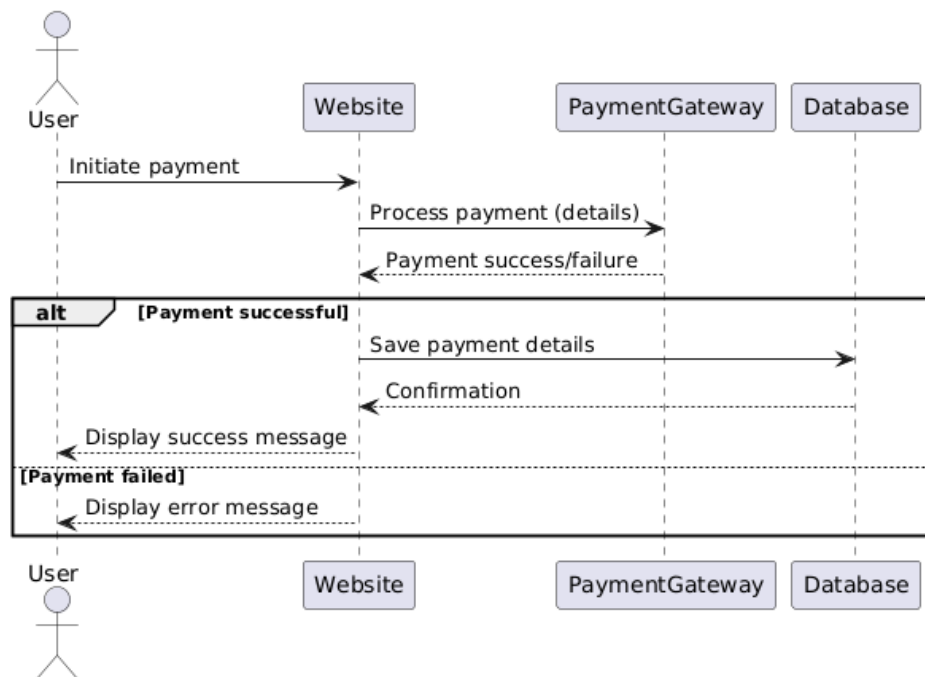


Figure 30: Sequence Diagram of Payment.

## Notification Management

### ER Diagram

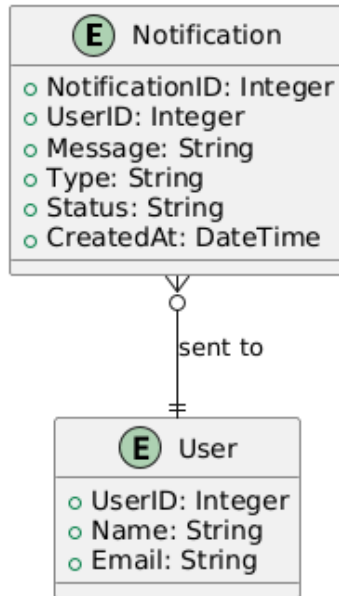


Figure 31: ER Diagram of Notification Management.

### Class Diagram

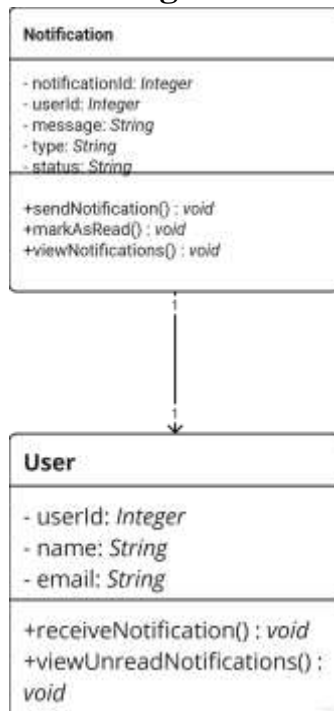


Figure 32: Class Diagram of Notification Management.

## Activity Diagram

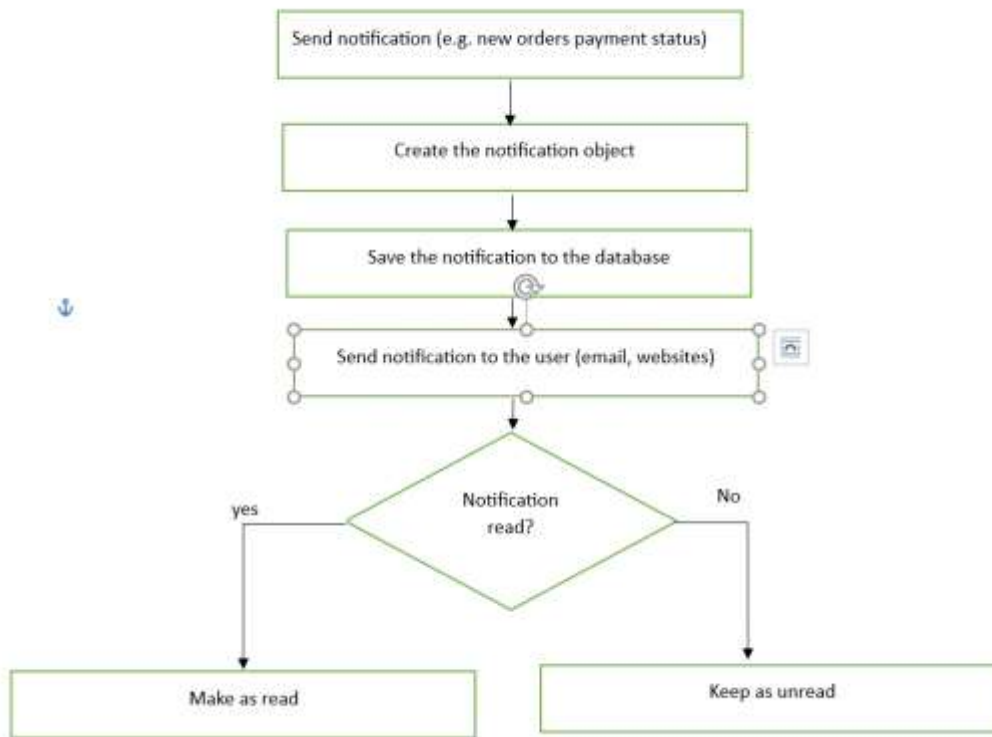


Figure 33: Activity Diagram of Notification Management.

## Use Case Diagram

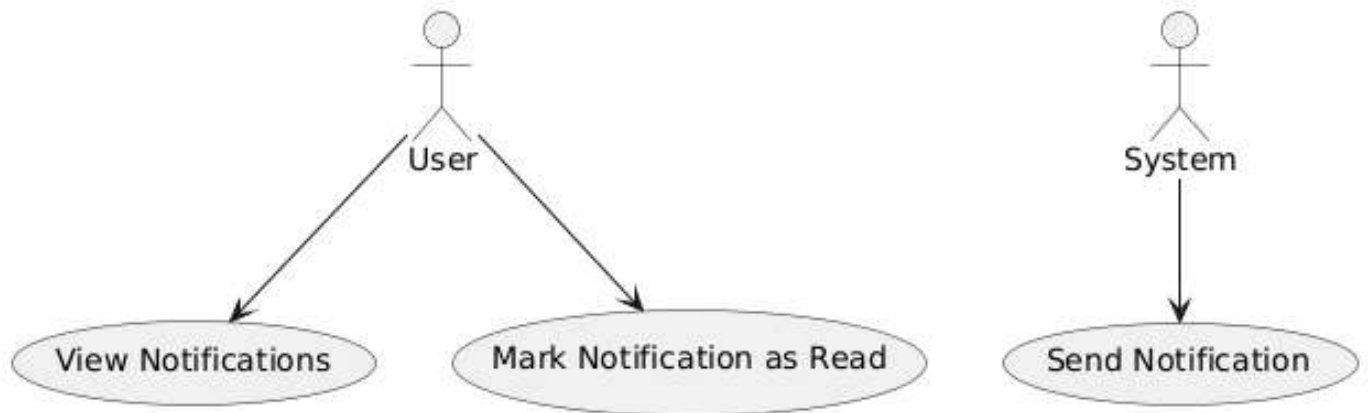


Figure 34: Use Case Diagram of Notification Management.



Sequence Diagram

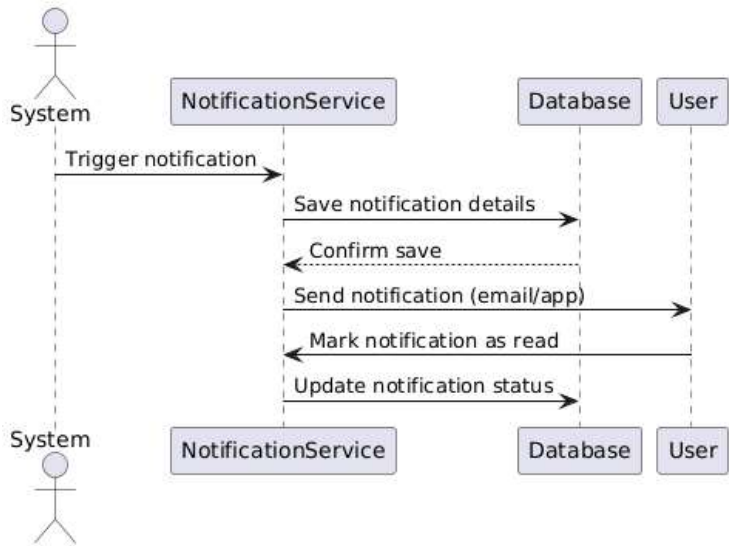


Figure 35: Sequence Diagram of Notification Management.

Wireframes

Testing

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T01	Login	Verify that users can log in with valid credentials.	User should be able to log in and access the dashboard.	User successfully logged in with valid credentials, and access to the dashboard was granted.	Pass

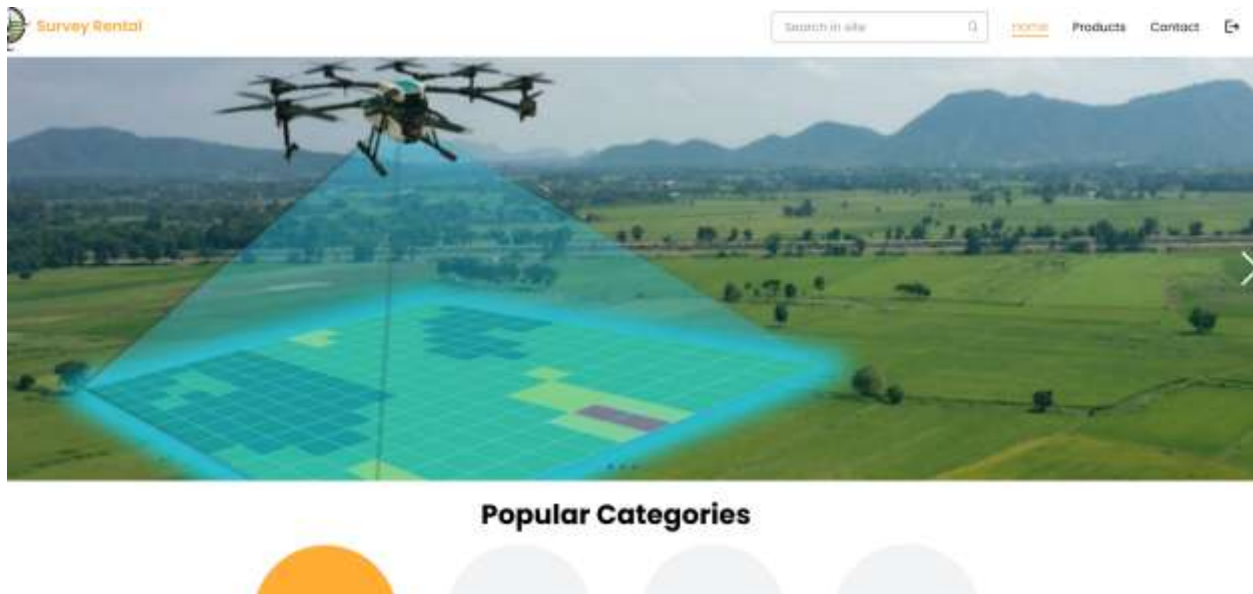


Figure 36: Login Testing

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T02	Invalid Login	Verify that an error message appears for incorrect credentials.	User should see an error message when using invalid credentials	User entered incorrect credentials, and an error message was displayed.	Pass

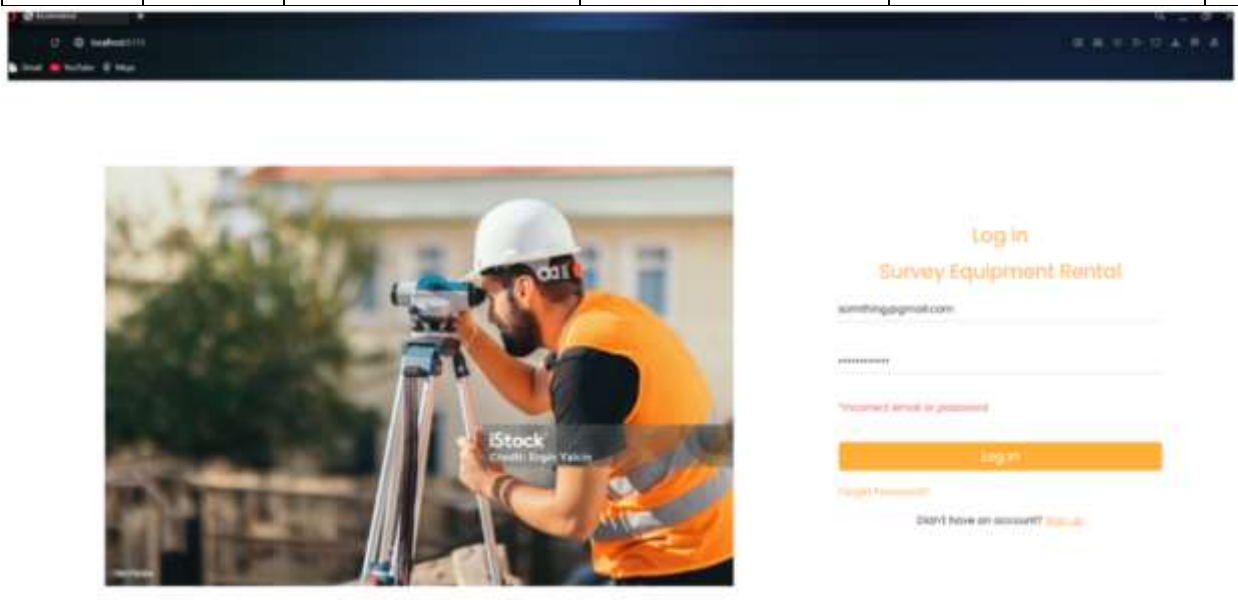


Figure 37: Testing of Invalid Login

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T03	User Registration	Verify that a new user can successfully register.	User should be able to create an account.	User filled out the registration form, submitted it, and received confirmation	Pass



Create an account

manoj

manoj@gmail.com

9814791050

.....

sign up

Sign up with Google

Already have account? [log in](#)

Figure 38: User Registration Testing

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T04	Browse Equipment	Ensure that users can view the list of available survey equipment.	Equipment list should be displayed properly.	User navigated to the equipment page, and all items were displayed correctly.	Pass

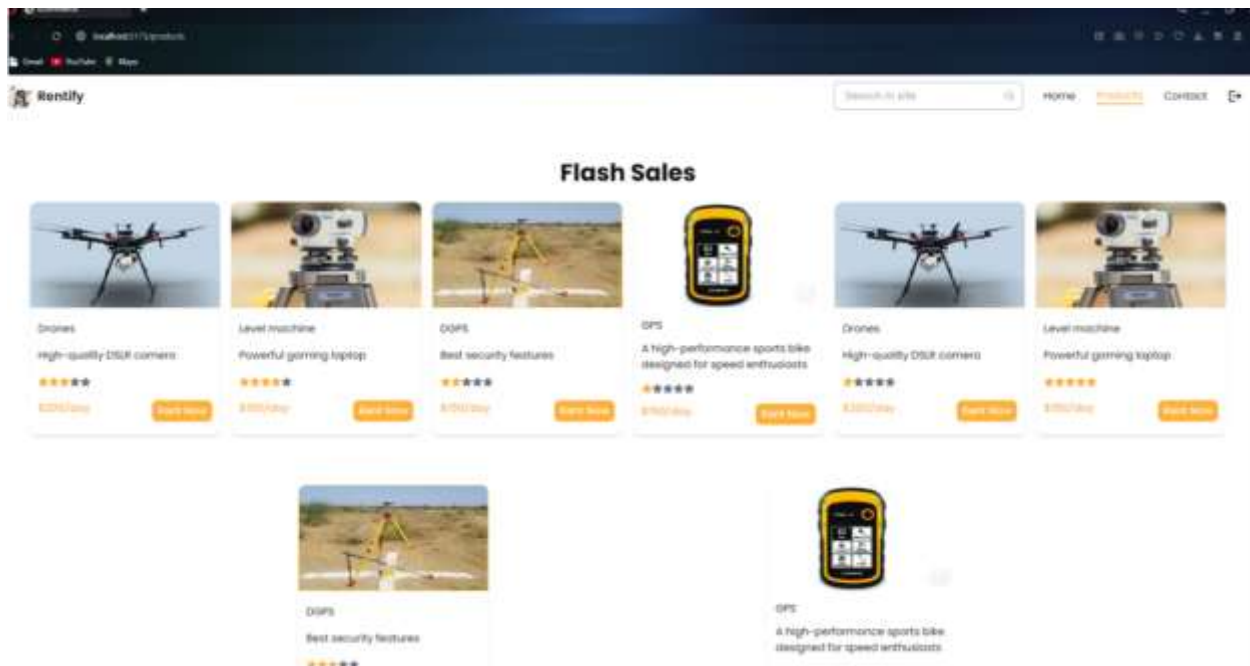


Figure 39: Equipment Browsing Testing

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T05	Equipment Details	Verify that users can view detailed information on an item.	Clicking on an item should open a details page.	User clicked on an item, and the detailed information was displayed correctly.	Pass

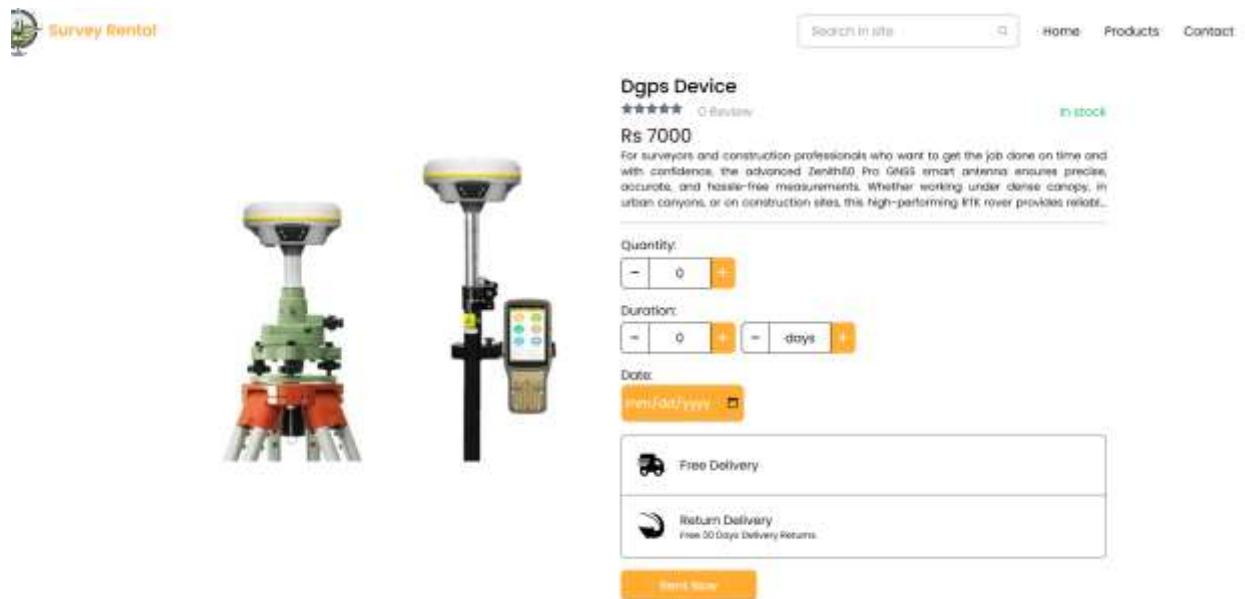


Figure 40: Equipment Details Showing Testing

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T06	Checkout page	Verify that the checkout page is shown correctly.	The checkout page should show all the input fields and users can fill the form.	User was shown the checkout form correctly and user was able to fill all the input fields.	Pass

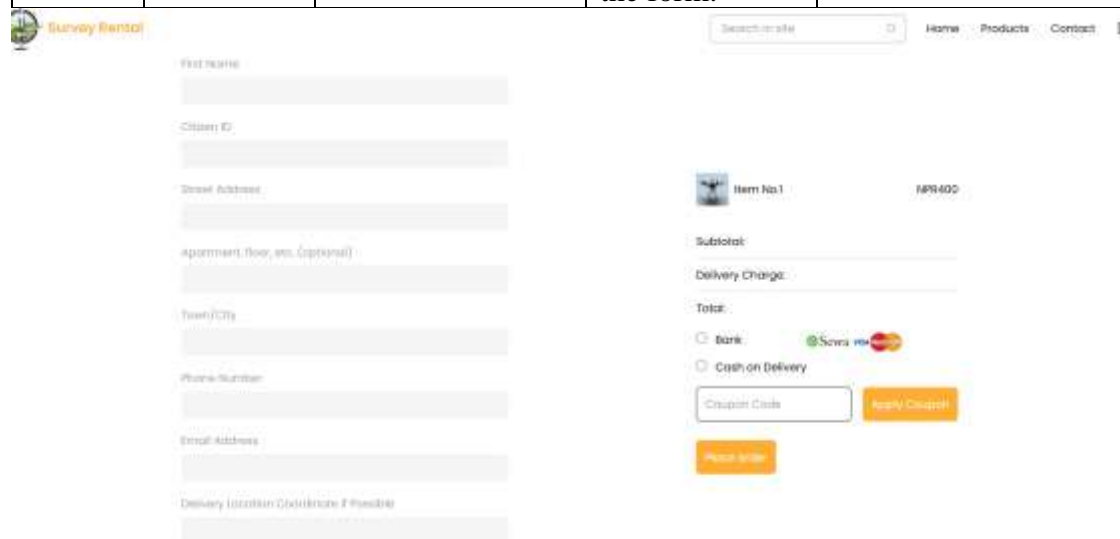


Figure 41 : Testing of Checkout Page

Test Case ID	Test Name	Test Description	Expected Result	Observation	Result
T07	Logout	Ensure users can log out and be redirected to the login page.	Users should be logged out and redirected to the login page.	User clicked 'Logout' and was redirected to the login page.	Pass



Log in

Survey Equipment Rental

admin@gmail.com

password

Log in

[Forgot Password?](#)

Didn't have an account? [Sign up!](#)

Figure 42: Logout Testing

## Sub System 2

<b>Sprint 5</b>	12/13/2024	1/2/2025	<b>Milestone 2</b>	21
Sprint Planning	12/14/2024	12/14/2024		1
Wireframes design	12/15/2024	12/16/2024		2
Research on Literature Review	12/18/2024	1/1/2025		15
sprint Retrospective	12/29/2024	12/29/2024		1

Figure 43: Subs System Milestone 2

## Sub System 3

<b>Sprint 6</b>	1/2/2025	2/2/2025	<b>Milestone 3</b>	31
Sprint planning	1/3/2025	1/3/2025		1
Frontend development (Login, Signup, product page,)	1/4/2025	1/24/2025		21
Artefact design	1/25/2025	2/1/2025		7
sprint retrospective	2/2/2025	2/2/2025		1

Figure 44: Sub System Milestone 3

## Sub System 4

<b>Sprint 7</b>	2/3/2025	3/3/2025	Milestone 4	28
Sprint Planning	2/4/2025	2/4/2025		1
Backend Development(Admin Dashboard)	2/5/2025	2/23/2025		19
Project and professionalism report	2/24/2025	3/1/2025		6
Sprint Retrospective	3/2/2025	3/2/2025		1

Figure 45: Sub System Milestone 4

## Sub System 5

<b>Sprint 8</b>	3/4/2025	3/31/2025	Milestone 5	27
Sprint Planning	3/5/2025	3/6/2025		2
Backend development (Payment and Booking)	3/7/2025	3/23/2025		17
Final Report Draft	3/24/2025	3/30/2025		7
Sprint Retrospective	3/30/2025	3/30/2025		1

Figure 46: Sub System Milestone 5

## Conclusion

## Critical Evaluation

## Evidence of Project Management Log Sheet

Faculty of Science and Engineering  
School of Mathematics and Computer Science

UNIVERSITY OF WOLVERHAMPTON

**PROJECT MANAGEMENT LOG**

First Name: M. Aghajani Surname: Diakol  
Student Number: 1852256 Supervisor: Nikolaos Pantel  
Project Title: Survey of Hospital Routes Month: October

What have you done since the last meeting?

- Created a wireframes for a project.
- Completed wireframes design.

What do you aim to complete before the next meeting?

- Start to design the wireframes.

Supervisor comments:

- Complete the wireframe design and start the project.

We confirm that the information given in this form is true, complete and accurate.

Student Signature: M. Aghajani Date: 22-8-2024  
Supervisor Signature: N. Pantel Date: 20-29-12-15



PROJECT MANAGEMENT LOG	
First Name: <u>Mawsham</u>	Surname: <u>Alakal</u>
Student Number: <u>835886</u>	Supervisor: <u>Nikunj Lamsal</u>
Project Title: <u>Sony Equipment Rental</u>	Month: <u>December</u>
What have you done since the last meeting	
- Completed the design process of wireframes.	
What do you aim to complete before the next meeting	
- Aim to complete half of the design process.	
Supervisor comments	
- Try to complete the overall design and start the development.	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Mawsham

Date: 12-15-2024

Supervisor Signature: Nikunj

Date: 29-12-2024

PROJECT MANAGEMENT LOG	
First Name: <u>Mawsham</u>	Surname: <u>Alakal</u>
Student Number: <u>835886</u>	Supervisor: <u>Nikunj Lamsal</u>
Project Title: <u>Sony Equipment Rental</u>	Month: <u>December</u>
What have you done since the last meeting	
- Completed half of the design process in figma.	
What do you aim to complete before the next meeting	
- Complete all the design process.	
Supervisor comments	
- Start designing the project & work on it.	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Mawsham

Date: 12-22-2024

Supervisor Signature: Nikunj

Date: 2024/12/23

PROJECT MANAGEMENT LOG

First Name: <u>Maulam</u>	Surname: <u>Dakal</u>
Student Number: <u>285886</u>	Supervisor: <u>Nikunjia Lakshmi</u>
Project Title: <u>Survey Equipment Rental</u>	Month: <u>December</u>
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Completed the design process in figma.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Aim to complete literature Review.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Complete the literature review.</li> <li>- Start front end designing.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Maulam Date: 12-12-2024  
Supervisor Signature: [Signature] Date: 2025/01/05

PROJECT MANAGEMENT LOG

First Name: <u>Maulam</u>	Surname: <u>Dakal</u>
Student Number: <u>285886</u>	Supervisor: <u>Mr Nikunjia Lakshmi</u>
Project Title: <u>Survey Equipment Rental</u>	Month: <u>January</u>
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Completed the literature review.</li> <li>- Started to design frontend</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Complete the frontend design of login and signup page.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Prepare the backend design with at least 2-3 diagram.</li> <li>- Work on the development.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Maulam Date: 01/05/2025  
Supervisor Signature: [Signature] Date: 2025/1/26

PROJECT MANAGEMENT LOG	
First Name: <u>Manshan</u>	Surname: <u>Shakel</u>
Student Number: <u>2358956</u>	Supervisor: <u>Dr. Nikunjia Lambal</u>
Project Title: <u>Survey Improved Relevance</u>	Date: <u>26-01-2025</u>
What have you done since the last meeting	
<ul style="list-style-type: none"><li>- Created a product page</li><li>- working on backend</li></ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"><li>- complete the artifact design with their diagrams.</li></ul>	
Supervisor comments	
<ul style="list-style-type: none"><li>- Complete the diagrams.</li><li>① Add overall system.</li><li>② Subsystem artifact diagrams.</li><li>- At least 2 module to be completed with testing &amp; document.</li></ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Manshan

Date: 26-01-2025

Supervisor Signature: [Signature]

Date: 26-01-2025

PROJECT MANAGEMENT LOG	
First Name: <u>Maulham</u>	Surname: <u>Shakel</u>
Student Number: <u>2858836</u>	Supervisor: <u>Mr. Nikunj Lalani</u>
Project Title: <u>Survey Equipment Rental</u>	Month: <u>02-02-2025</u>
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- Completed the diagram with their artefact design.</li> <li>- Created FDD overall system.</li> <li>- Tested the system subsystem of website successfully.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- work on development process</li> <li>- create the database for sign up page.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Start working on other modules.</li> <li>- correct the use case diagram.</li> <li>- Prepare for the demo session.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Maulham Date: 02-02-2025  
Supervisor Signature: Shakel Date: 2025/02/03

PROJECT MANAGEMENT LOG	
First Name: <u>Maulham</u>	Surname: <u>Shakel</u>
Student Number: <u>2858836</u>	Supervisor: <u>Mr. Nikunj Lalani</u>
Project Title: <u>Survey Equipment Rental</u>	Month: <u>February, 21, 2025</u>
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>- worked on a front-end development on product page.</li> <li>- Developed a Database for user registration.</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>- Complete the development process of product page.</li> <li>- Aim to complete the next process for customer.</li> <li>- Aim to make landing page more attractive.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Add validation to sign up.</li> <li>- Speed up the work.</li> <li>- work on the left modules.</li> <li>- Extension &amp; notification + calendar feature.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Maulham Date: 02-28-2025  
Supervisor Signature: Shakel Date: 2025/03/02

PROJECT MANAGEMENT LOG	
First Name: <u>Muhammad</u>	Surname: <u>Shakal</u>
Student Number: <u>2358836</u>	Supervisor: <u>Mr. Nikunjia Lamsal</u>
Project Title: <u>Survey Equipment Rental</u> Month: <u>March-03-2025</u>	
What have you done since the last meeting?	
<ul style="list-style-type: none"> <li>- Added Validation to signup.</li> <li>- Added a calendar features.</li> </ul>	
What do you aim to complete before the next meeting?	
<ul style="list-style-type: none"> <li>- Aim to add a contacts on <del>backend</del> navigation.</li> <li>- Aim to add notification while signup.</li> <li>- work on a frontend.</li> <li>- Add items according to their categories.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Configure the notification.</li> <li>- Complete the remaining modules.</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Muhammad

Date: 03-03-2025

Supervisor Signature: Shakal

Date: 2025/1/23

PROJECT MANAGEMENT LOG	
First Name: <u>Muhammad</u>	Surname: <u>Shakal</u>
Student Number: <u>2358836</u>	Supervisor: <u>Mr. Nikunjia Lamsal</u>
Project Title: <u>Survey Equipment Rental</u> Month: <u>03-23-2025</u>	
What have you done since the last meeting?	
<ul style="list-style-type: none"> <li>- worked on a report.</li> <li>- Added functionality to a search bar.</li> <li>- updated checkout page with real data.</li> </ul>	
What do you aim to complete before the next meeting?	
<ul style="list-style-type: none"> <li>- Aim to complete the dashboard of Admin panel.</li> <li>- Aim to add products according to their categories.</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Admin panel to be finished.</li> <li>- Days extension.</li> <li>- Notifications management</li> </ul>	

We confirm that the information given in this form is true, complete and accurate.

Student Signature: Muhammad

Date: 03-23-2025

Supervisor Signature: Shakal

Date: 2025/1/20

## Gantt Chart

Task	Start Date	End Date	Milestone	Work Days
Project Start	9/22/2024	9/28/2024		7
Research for Project Title	9/22/2024	9/22/2024		1
Gathering Information for Project Approval	9/24/2024	9/28/2024		5
Sprint Retrospective	9/29/2024	9/29/2024		1
<b>Sprint 1</b>	9/30/2024	11/9/2024		41
Sprint Planning	10/1/2024	10/3/2024		3
System Requirements	10/4/2024	10/20/2024		17
Information Collecting and Research	10/21/2024	11/8/2024		19
Sprint Retrospective	11/10/2024	11/10/2024		1
<b>Sprint 3</b>	11/18/2024	11/24/2024		7
Sprint Planning	11/19/2024	11/19/2024		1
Proposal Defence	11/20/2024	11/23/2024		4
Sprint Retrospective	11/24/2024	11/24/2024		1
<b>Sprint 4</b>	11/25/2024	12/1/2024	1st Milestone	7
Sprint Planning	11/26/2024	11/26/2024		1
Proposal Writing	11/27/2024	12/1/2024		5
Sprint Retrospective	12/1/2024	12/1/2024		1
<b>Sprint 5</b>	12/13/2024	1/2/2025	Milestone 2	21
Sprint Planning	12/14/2024	12/14/2024		1
Wireframes design	12/15/2024	12/16/2024		2
Research on Literature Review	12/18/2024	1/1/2025		15
sprint Retrospective	12/29/2024	12/29/2024		1
<b>Sprint 6</b>	1/2/2025	2/2/2025	Milestone 3	31
Sprint planning	1/3/2025	1/3/2025		1
Frontend development (Login, Signup, product page,)	1/4/2025	1/24/2025		21
Artefact design	1/25/2025	2/1/2025		7
sprint retrospective	2/2/2025	2/2/2025		1
<b>Sprint 7</b>	2/3/2025	3/3/2025	Milestone 4	28
Sprint Planning	2/4/2025	2/4/2025		1
Backend Development(Admin Dashboard)	2/5/2025	2/23/2025		19
Project and professionalism report	2/24/2025	3/1/2025		6
Sprint Retrospective	3/2/2025	3/2/2025		1
<b>Sprint 8</b>	3/4/2025	3/31/2025	Milestone 5	27
Sprint Planning	3/5/2025	3/6/2025		2
Backend development (Payment and Booking)	3/7/2025	3/23/2025		17
Final Report Draft	3/24/2025	3/30/2025		7
Sprint Retrospective	3/30/2025	3/30/2025		1

Figure 47:Gantt Chart

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## Appendices