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### Project and Professionalism(6CS007)

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# Basnet Realties

## Declaration Sheet

**Award Title: BSc(Hons) Computer Science**

(Award Title for your project, if in doubt refer to your course/Module Registration)

### Declaration Sheet

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## Table of Contents

<b>Real-Estate Website</b> .....	8
<b>1. Introduction</b> .....	8
<b>1.1 Academic Questions:</b> .....	9
<b>1.2 AIMS:</b> .....	9
<b>1.3 OBJECTIVES:</b> .....	9
<b>2. Decomposition Diagram</b> .....	10
<b>3. Features:</b> .....	13
<b>4. Literature Review</b> .....	14
<b>Consumer Search &amp; Real Estate Websites: A Replication and Extension of the TAM</b> ....	14
<b>Research Study and Development of WebApp Based on Real-Estate Business</b> .....	14
<b>E-commerce's Impact on Retail Property Values</b> .....	15
<b>Applications, Opportunities and Challenges of AI in the Real Estate Sector</b> .....	16
<b>Enhancing Real Estate E-Service Quality with Deep Learning</b> .....	17
<b>Smart Real Estate Technologies: Adoption and Impact</b> .....	18
<b>5. Project Methodology</b> .....	20
<b>6. Reviews on Similar Websites:</b> .....	21
<b>6.1 Plan and Schedule</b> .....	23
<b>7. Artefact</b> .....	24
SRS .....	24
ER Diagram.....	26
Activity Diagram.....	26
Class Diagram .....	27
Test Case of User Management .....	27
Register User/Agent .....	27
Login.....	28
Admin Register Roles.....	29
Reset Password .....	29
Sequence Diagram .....	31
Use -Case Diagram .....	32
Test Report of User Management System .....	33
<b>B. House Management</b> .....	37

SRS .....	37
Sequence Diagram.....	38
ER Diagram.....	39
Activity Diagram .....	40
Test Case.....	41
Property CRUD operation.....	41
Browse listed property.....	41
Property detail with agent information.....	42
Class Diagram .....	42
User Case Diagram .....	43
Test Report for Customer Services.....	43
C. Dynamic Feed.....	46
SRS .....	46
ER Diagram.....	47
Use Case Diagram .....	47
Class Diagram.....	48
Sequence Diagram .....	48
Test Case.....	49
Property Click .....	49
Recommendation System.....	49
Failed Test Cases of Dynamic feed .....	50
Activity Diagram.....	51
Test Report of Dynamic Feed.....	52
D. Customer Service.....	54
SRS .....	54
ER Diagram.....	55
Use Case Diagram .....	55
Class Diagram.....	56
Test Case.....	56
Browse Product or Product Detail .....	56
Save favorite property .....	57
Proceed to book an appointment.....	58
Browse interactive maps.....	58

Browse Favorite.....	59
EMI Calculator .....	60
Land Area Converter .....	60
Sequence Diagram.....	61
Activity Diagram.....	62
Test Report for Customer Services.....	63
E. Appointment Booking .....	66
SRS .....	66
Sequence Diagram .....	67
Activity Diagram.....	68
Test Case.....	69
Fill the booking form .....	69
Browse appointments .....	69
Cancel or Accept booking .....	70
Update the Booking .....	70
Class Diagram.....	71
Use Case Diagram .....	72
ER Diagram.....	73
Test Report of Appointment Booking.....	74
8. Wireframes .....	77
9. Machine learning Methodology .....	79
10. Conclusion.....	82
11. Critical Evaluation of the project .....	83
12. Evidence of Project Management.....	84
Log Sheets.....	84
References.....	97

## Figures

1.	Functional Decomposition Diagram.....	3
2.	User Management.....	4
2.1	ER Diagram.....	4
2.2	Activity Diagram.....	5
2.3	Class Diagram .....	6
2.4	Sequence Diagram .....	7
2.4	Use Case Diagram .....	8
3.	House Management.....	9
3.1	Sequence Diagram .....	9
3.2	ER Diagram.....	10
3.3	Activity Diagram .....	11
3.4	Class Diagram.....	12
3.5	Use Case Diagram.....	13

## Real-Estate Website

### 1. Introduction

Rise of technology where every industry has been influenced where Real Estate is just another example. Due to which various app and website are being introduced which has caused every sort of high-level competition in the market. Although the development of various apps and website it has not yet clicked due to various problems and loop holes. In response to it, Basnet Realties is introduced which main goal is to build an open and easy to use online Real Estate system. Unlike other traditional real estate website which only focuses on the buy, rent and sell of properties, Basnet realties offer the various facilities such as recommendation system according to the user preferences, interactive maps, connection with the best certified agents. Basnet Realties incorporates artificial intelligence into their platform using a recommendation system based on machine learning to provide users with property suggestions that match their specific requirements. The implementation of this system involves supervised learning through the utilization of labeled property features which include type, location, size, and status for training a K-Nearest Neighbors (KNN) model.

One of the main challenges that Real Estate website is that unauthorized and uncertified agents are being able to sell houses with random price due to which it has caused unjustified rise in the prices of house. Basnet Realties aims to solve this problem by tightening the criteria to login as agent where one need to provide the Agent certified certification. This creates much secure and safe trading of house or land.

At the end, Basnet realties aim to be seamless browsing experience and a one-step solution for all the users. Through this project it emerges as a major advancement in Real Estate industry and amazing platform for the certified agents who want to do the business with various facilities. This system aims to be the revolutionary in the real estate market filling all the loop holes and providing amazing services. Basnet Realties introduces cutting-edge features like:

- AI-powered personalized recommendations
- Interactive property maps

### **1.1 Academic Questions:**

- How can Basnet's Realty contribute to enhance the experience for the user
- How does the organization of property/land into categories like for rental or buy contribute to a user-friendly shopping experience on your website?
- How can a Real-Estate website like Basnet Realties open barriers to the Real-Estate world?
- What kind of technologies and tools are best for developing platform like Basnet Realties'.

### **1.2 AIMS:**

- To create user friendly with well-equipped real-estate platform.
- To provide genuine information on the houses and lands.
- To give the comfort of booking the appointment schedule with top agents.
- To simplify the process of buying selling and lending of the house/land.
- To give the information on the hotspot land available.

### **1.3 OBJECTIVES:**

- To create professional Real-Estate environment with reasonable house pricing.
- To help create transparent marketplace where property price will be determined through multiple criteria such as location, facility and more.
- To integrate of various AI algorithm such as recommendation system will be introduced in order to build up user experience.
- To provide Trusted and professional agents who meets various strict criteria such as governmentally approved certificate ensuring high security and quality services.

## 2. Decomposition Diagram

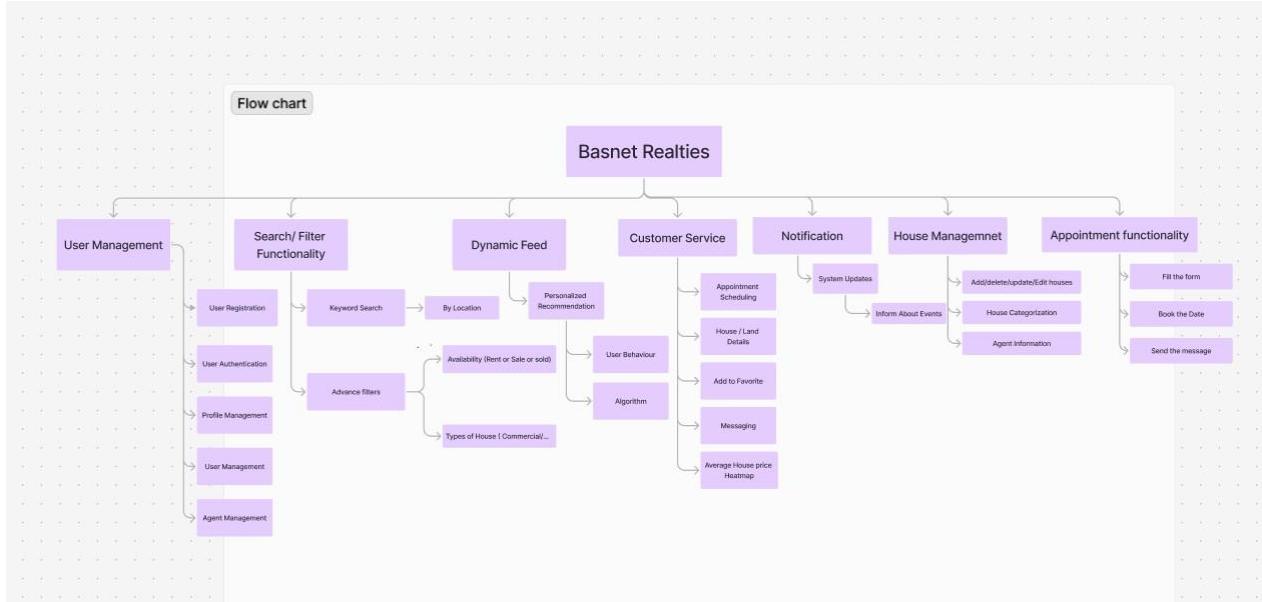


Figure 1 Functional Decomposition Diagram

- **User Management**

This platform begins with a user management system, which supports user registration, authentication, profile maintenance, and authorization. This subsystem facilitates user administration for both administrators and users. During the registration of a new user, the user must verify their details using their phone number. An OTP code will be sent to the user's phone number, from which the detail becomes verified. For the authorization portion, a JWT token is utilized so that once a user is logged in, the server does not need to save session state for each user.

- **Admin Management**

This subsystem provides a variety of tools for platform management. An interface for tracking and managing the platform is offered by the admin dashboard. Features like the admin dashboard, product management, Agent management are all included in the admin administration system. By enabling CURD (Create, Update, Read, and Delete) operations for the administrator,

product management features enable the addition, updating, and deletion of products.

- Agent Management

Agent Management subsystem where it provides the features like personal Agent dashboard, Messages, House CRUD operations, Appointments and profile management. This subsystem is only able to use by registered agents. Agent is only permissioned to add the house/ land in the website.

- Customer Service

The Customer services subsystem is dedicated to enhancing the Real-Estate experience. It includes features like House/ Land browsing, which allows user to explore the details and House/ Land search for finding specific items quickly. Detailed House/ land-page provides all the information of a land, while the one can book an appointment in order to inquire about a house or land with agent. User can also favorite the house and save it in the favorite list for future purchase. Additionally, user is provided with the tailored recommendation system according to their searches.

All the details of planned testing are as follow:

Unit Testing: Such a testing in which certain block of code or function are given in order match the output with the expected output.

Some tools used to do unit testing are as follow:

- Jest
- Mocha
- Chai
- React Testing Library

Integration Testing: This is a software testing technique in which identification of bugs that arises when different components are combined and starts to interact with each other.

Tools used to do Integration testing are:

- Postman
- Super test
- Insomnia

**Functional Testing:** Software testing technique that checks if each function of the software applications works as per the requirement and specification. This testing is more concerned with the result of processing.

Tools used for functional testing are as follow:

- Cypress
- Selenium

**Performance testing:** It is non-functional software testing technique that determines stability, speed, scalability and responsiveness of the application.

Tools used for performance testing are as follow:

- JMeter
- Lighthouse

**Security Testing:** This testing focuses on the evaluation of the security of the system and application.

Tools used:

- Helmet.js
- OWASP ZAP
- Burp suite

**End To End testing:** This testing verifies that all the components of system can run under real scenario' with the real data and functions.

Tools used are as follow:

- Cypress
- Playwright

**Regression Testing:** It is such a testing technique in which It ensures new changes runs and integrate into the system without any breaks.

Tools Used:

- Jest

- Cypress

### **3. Features:**

- Appointment Scheduling:
  - . Interactive calendar in order to book in-person meetings with various desired agents.
- Advance Search Filter:
  - . Provides various options such as price range, location, House Type (BHK) with interactive map.
- AI recommend system:
  - . Use of an AI algorithm in order to suggest the user as per the user's preference and choices.

#### **4. Literature Review**

##### **Consumer Search & Real Estate Websites: A Replication and Extension of the TAM**

Literature on searching behavior in real estate is based on economic theories of searching intensity and the cost of searching. In other words, it implies that the buyers will keep on searching for the things until the emerging possible savings are not worth the time and effort. It is possible that at a later date, factors like; income, family size, and location can contribute towards the amount of time taken on searching. For instance, when persuading the buyer to make a decision regarding a property, the word of a real estate agent would only showcase certain properties to the buyers. Although they do not guarantee that one will find an appropriate home easily, they assist in reducing the search time, as well as the chances of identifying a proper home for a pet. Then, buyers are relying on various sources of information mostly, agents, neighbor check-ups, referrals and online media. Real estate websites especially those accessed through the internet are very popular among young and tech-savvy potential buyers due to increased numbers of properties but are said to take more time than other means.

In the Technology Acceptance Model (TAM) adoption of technology, perceived usefulness and ease of use have been seen as the two main prerequisites. The extended TAM incorporate perceived enjoyment which addresses the motivation of the users. Perceived usefulness was found to be highly related with both attitude and behavioral intent, while perceived enjoyment also had an influence.

In fact, by using real estate websites, it is made possible to extend search time and visit many more houses, although the public perceives them as means of getting more pleasure and convenience out of property hunting. Such platforms usually lead buyers through various choices to make better decisions but in a more time-consuming way.

##### **Research Study and Development of WebApp Based on Real-Estate Business**

The literature review for developing a web-based property rental and selling system entails sourcing, evaluating, and synthesise the information from scholarly sources identified in the topic. It helps build a basis for constructing a real-world and more effective solution than the current method out there. These are

categorised into developmentally logical categories and involve deciding responsibilities and figuring out how knowledge can be systematically arranged.

Presently, almost all property rental and buying platforms are restricted mainly to Tier 1 and Tier 2 cities and are deficient in Tier 3, 4 or even districts. Therefore, the public in those regions depends on brokers. Tenants and property information is administered through filing systems by property managers, and these systems are usually cumbersome and tardy. Whenever a client shows interest in a particular property, managers provide details such as rent, deposit and other terms by email. This is slow, cumbersome as voluminous volumes of paper work are used and more to the point it is not secure. Furthermore, existing platforms can be presented in the form of textual ones, although graphical ones are more convenient, indicating the necessity for increases.

These limitations are the principle reasons why the proposed system endeavours to incorporate an interactive user interface. It is to bring property selling and purchasing, as well as rental and leasing services onto one platform where customers can make timely and secure decisions. This will mean that the platform will be open to persons, brokers, and builders making it more accessible and beneficial to anyone. Intended to be faster, safer, non-reliant on manual labour, and more accurate, it will minimise the use of labour and improve convenience. It will also emphasise customer, broker, and seller relations; the system will be active 24/7, with exceptions that would be considered server outages or crashes.

## **E-commerce's Impact on Retail Property Values**

This paper analyses the effects of e-commerce on retail property values pointing to the change in consumer behaviour triggered by online purchases. The physical stores are now aimed at addressing such issues as customer experience rather than just product presence. Analysing trends, it is assumed that their number will decrease, while those that will remain will need transformation to adapt to new trends. They defined e-commerce as the exchange of information through the electronic networks, and with the current increase in the growth of e-commerce the business have expanded to the omni-channel retailing that is the business conducts operations through both physical and electronic channels. This approach is in line with the trend towards switching from store-oriented to product-oriented consumption.

Thus, the present review aims at analysing how the e-commerce type has called the digitisation of the consumer information and pushed the retailing to synchronise

both, online and physically. Controversy also rises whether the electronically-controlled and physical store are substitute or complementary good. Critics have suggested that sales increased the size of physical stores, the so-called “omnichannel” view, while others draw a picture where e-commerce replaces physical ones, i.e. “death of retail”. Such phenomena as supply cannibalism, when new products perform better than existing ones, and the halo effect, where products help increase sales of others, are also examined. Research indicates that omni-channel supermarkets’ customers’ sales in cyber and physical stores are greater due to the halo effect.

The values of retail properties are captured in terms of the present value of expected future cash flows expected to be determined by net income, market risk and rates of growth. E-commerce has influenced demand and also the capitalization rates have increased while the property values have decreased. Lease contracts, especially in retail, are usually based on the revenues of tenants, which is problematic when considering that e-commerce is blurring the borders between the two. Others suggest that footfall rents should be used in its place. The review underscores the centrality of physical environment in the retail environment, calls for the bricks and mortar retailers and property owners to integrate physical with online space, innovate in their approaches to customer acquisition and engagement and address lease contract issues. Nonetheless, there is a lack of research that explored the effects of e-commerce to property value.

## **Applications, Opportunities and Challenges of AI in the Real Estate Sector**

This current paper employs a multivocal synoptic analysis of prior literature on AI in the context of the real estate industry, concentrating on applications, concerns, and directions for future research. Thus in this paper, the authors have used both the systematic approach to the literature review as well as the grey literature utilising white papers and online sources. In this review, different keywords related to both AI and RE were used. When selecting documents, some inclusion and exclusion criteria were taken into account for choosing 185 documents including 124 scientific papers and 61 GL sources.

These findings emphasise the sharp increase in the use of AI in RE research since 2017 up to 2021 with approximately 70 percent pertaining to functional AI utilisation including price prediction, and property valuation. AI tools are a lot better than

traditional approaches. Some of the most common ones are RF, XGBoost, and LSTM without any doubt. Some other areas include investment analysis, data extraction, cost prediction, document management, customer relationship management systems, recommendation engines, and home filtering.

In AI application, experienced increase in price prediction, property valuation, investment decision, marketing, sales and knowledge management. Scientific articles focus themselves on researching concrete cases of implementation while GL emphasises reasonable trends and prospects. Opportunities include aspects such as data disaggregation, people resistances to change, dealing with unstructured data, lack of qualified professionals in governance area, and more specific challenges of integrate spatial and non-spatial information.

AI avails a bunch of opportunities: Automated valuations, market forecast, automated documents, leases abstraction, CRM enhancements, and targeted marketing. However, some areas remain uncovered when measuring the effectiveness of AI innovation including the recommendation systems, CRM approach, and document automation.

However, AI adoption has a number of challenges: regulatory issues, data quality problems, managerial limitations, and non-technological characteristics of the RE transactions. This maps the state of AI in the real estate industry and ends by stating that overcoming these limitations is imperative for the future of real estate.

## **Enhancing Real Estate E-Service Quality with Deep Learning**

This literature review focuses on e-service quality (E-SQ) in real estate websites and the use of Deep learning in Achieving enhanced Tangibility. Tangibility means to make the services easy to understand and to have a substance by following the real life handling of the tangible goods /products where there is absence of contact in the e-services. Other use-born media like pictures and videos are important for illustrating property characteristics, evaluating the severity of damage and improving decision-making. However, to the current writer's knowledge, literature on the use of dynamic visual tools to enhance tangibility in real estate is still scanty thus a gap that continues to make many consumers complain of inadequate property information.

Computer vision and other deep learning technologies help to offer solutions that identify the image quality issues as well as the damages through clearer visualisations for the users. Such theories as Visual Metaphor Theory and the

Cognitive Load Theory provide evidence for the use of visuals when presenting complex information decisions to decrease the amount of work done on the mind of a receiver. AI also improves e-services relevance, minimises information gaps, and increases speed.

Researches confirm the effectiveness of image media information in real estate. Liu et al. (2019) demonstrated that the high quality of images leads to a high level of purchase intention; Qiqi (2023) focused on the use of visuals to convey understandable information. I supplemented the article with some gaps discovered by Ullah and Sepasgozar (2019) in the aspect of technology integration that should include tangible features. AI methods are being used for property evaluations with one such method being the Mask R-CNN and they do not have a direct customer orientated design.

Some of the previous works such as Grönroos (1984) and Dabholkar & Overby (2005) have defined that service quality is related to the factors of clarity and visual communication which supports the impact of tangibility for enhanced e-services. Despite the potential of AI, and especially deep learning, there is still a need for more studies to provide enhanced visualisation and more interactive philtres, in order to improve the users' experiences and their interactions with properties when operating with real estate platforms.

## **Smart Real Estate Technologies: Adoption and Impact**

This study essentially takes an appraising look at disruption in real estate, nine technologies known as the Big9 which include- drones-, IoT cloud, SaaS, big data, 3D scanning, wearable tech, VR/AR and AI/Robotics. Using 213 sources – articles and reports – it examines how these technologies enhance information accessibility in property decisions, which minimises regrets for consumers. The research uses the Technology Adoption Model (TAM) and assesses the use of web-based tools such as websites, apps and social media to disseminate real estate information. It also identifies core components of Smart Real Estate (SRE)—sustainability, innovative technologies, and user-centredness—and examines the roles of four stakeholder groups: consumers, the agents involved, the regulatory agencies and the complementary industries.

The research reveals that real estate is one of the industries relatively slow in using technology but shows increasing investment, especially in the United States. This means that disruptive technologies are key to removing suboptimal processes and developing new solutions. The Opportunities, Potential Losses, and Exploitation

Levels (OPTEL) index investigates the potential improvements in stakeholder requirements of each Big9 technology, with particular emphasis on the minimization of post-purchase regret through the enhancement of information accessibility.

In terms of method, the study utilised keyword-based approach in searching Google Scholar and Web of Science databases, from which 213 publications were identified after screening. The studies are therefore grouped under marketing the dissemination systems and the core elements of SRE. The analysis reveals that people go online and use mobile applications to get actionable real estate information that increases transparency, credibility, and choice.

Finally, using the Big9, the study focuses on the match between Big9 technologies and stakeholders needs to enhance the transformation of the existing industry into a customer-oriented efficient system that is enabled through TAM frameworks to promote better technology adoption and limit users' regret.

## 5. Project Methodology

As per my project requirement, Agile method is ideal as it ensures flexibility and continuous making it perfect for dynamic web development. Agile method also supports iterative development and adapting to the change at any certain time. Iterative development is technique in which it involves breaking down a project into smaller and more manageable components or cycles. Each cycle consists of planning, designing, implementing, testing and reviewing every cycles.

Unlike traditional way, agile method allows for adaption and flexibility while changing requirement and condition in between development phase. It also makes the development phase more transparent between the stakeholder and the developers which leads to better outcomes and customer satisfaction where new addition of the features or reduce the features as per the need. Due to continuous feedbacks it also helps to reduce the risk.

Agile workflow consists of defining the scope and vision, creating backlog, planning sprint, conduct meetings, develop iteratively and continuous testing and feedback. Some tools can be used in order to follow agile methods are Jira, slack or Git hub projects.

## **6. Reviews on Similar Websites:**

### **Realtor.com**

From home seekers and homeowners, to real estate pros and home dreamers, realtor.com® is a one-stop platform for for-sale properties and relevant information, together with the resources, and professional guidance that help consumers navigate the real estate market. Since 1995 as the official site of the National Association of REALTORS, realtor.com was one of the first to bring the power of the web to real estate and is now dedicated to helping all things home be simple, easy, and fun.

it provides the most comprehensive information on real estate available regarding buying, selling, and rental homes. Through its intuitive, informative resources and personalized support, Realtor.com aspires to push and carry its users up every step in the real estate journey. Continuously innovating and adapting to the various market turns, Realtor.com believes and aims to further be the ultimate real estate solutions destination, thus ensuring a smooth and pleasant experience for everyone.

### **Trulia.com**

Trulia is a widely demanded and top Real-Estate website whose purpose, or mission, is to bring together people by helping them find a home that they are really going to love. When it was released in 2005 it revolutionized the way people found homes by making real estate available in internet. Through its website and mobile apps, Trulia has allowed homebuyers and renters to have an even greater understanding of the properties and neighborhoods in the United States. Such users can receive personalized recommendations, enjoy insights from local residents, and access 34 interactive map legs that show information on commute times, crime reports, schools, local businesses, and more.

- Zillow

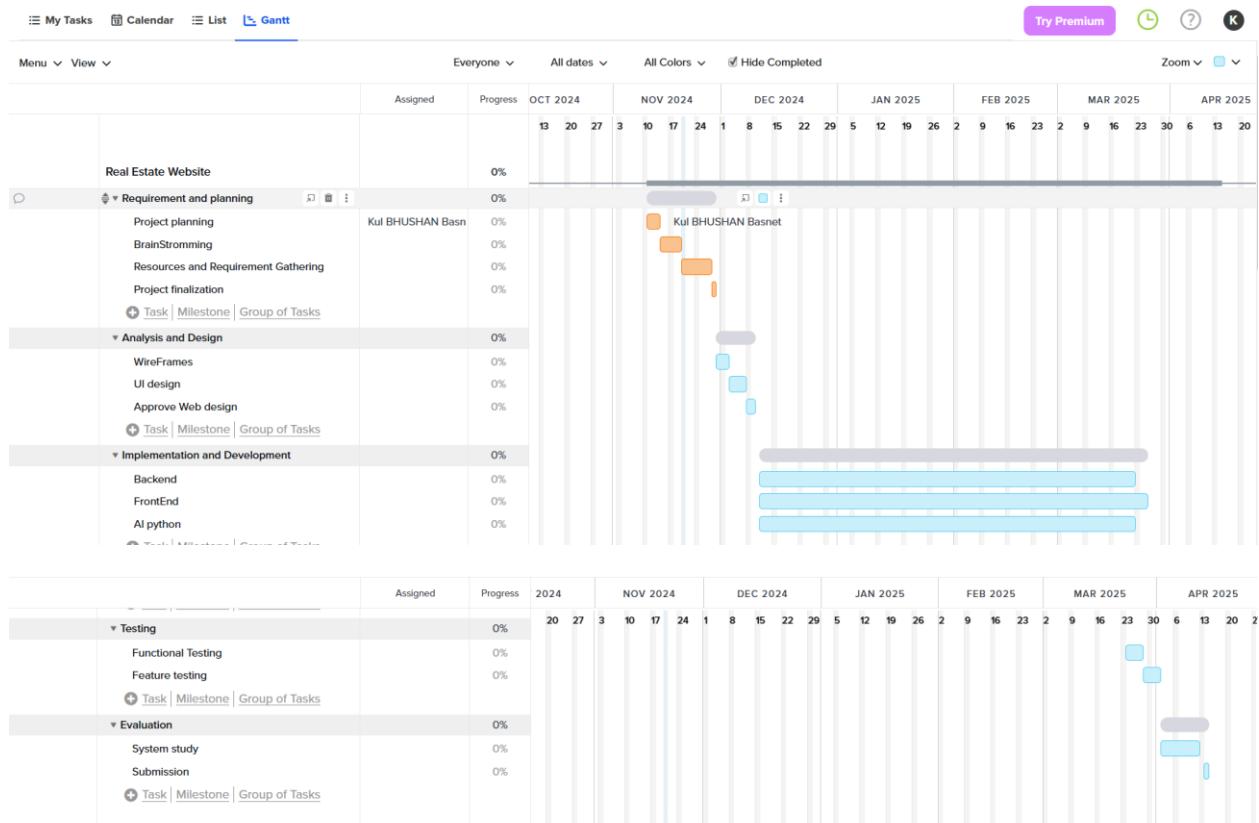
It is the largest real estate platform in the United States, with the primary goal of providing a seamless, end-to-end transaction experience as well as the process of purchasing and renting properties. Zillow is known for its user-friendly layout, advance search filters, and home valuation estimates. This website also includes a

3D tour of the house, land analysis, the ability to interact with agents, and a variety of educational resources. Zillow has its own tool called the Zestimate Tool, which allows users to estimate the value of their land/homes.

## **Acres**

Acres is land data and mapping platform designed to bring transparency and accessibility to World's biggest asset land. With data for over 150 million parcels of land, Acres brings together the information you need to understand and value land with confidence. This platform offers Access to more accurate and comprehensive land intelligence, comparable sales, and easy-to-use mapping tools for fast, informed decision making. Acres is also perfect for real Estate, agriculture, and development, providing features such as valuations of lands with improved accuracy.

## 6.1 Plan and Schedule



Above Ganntt chart has been organized into rows which has all various project phases such as **Requirement and Planning**, **Analysis and Design**, **Implementation and Development** and many more where at the column is the timeline respective to their features for the completion. At the first, Requirement and planning where it focuses on project planning, brainstorming features, UI/UX, and submitting the proposal for project finalization.

The second phase, **Analysis and Design**, has a shorter timeline compared to the other phases. During this stage, wireframes and UI designs are created and finalized after approval. The third phase, **Implementation and Development**, is the most important and time-intensive, focusing on turning the plans and designs into a fully functional real time project. The next phase, **Testing**, involves identifying and fixing bugs to ensure the project works seamlessly in real-world scenarios.

Finally, the project concludes with the **Submission Phase**, where the completed project and all related documentation are delivered to the designated platform.

## 7. Artefact

### A. User Management

#### SRS

Req. No	Req. description	Use Case	Moscow Prioritization
UMS.F.1.0	User/ Agent be able to open a new account.	Create Account	Must have
UMS.F.1.1	When the account is created, notify the User/ Agent.	Create Account	Should have
UMS.NF.1.2	User/ Agent detail should be encrypted	Create Account	Must have
UMS.NF.1.3	Which creating a new accountthe account needs to be verified through OTP	Create Account	Should have
	User/ agent can reset password	Reset Password	Must have
	User/agent gets the email link for changing the password.	Reset Password	Must Have

UMS.F.1.4	User/ Agent should be able to log in with their account.	Login	Must have
UMS.NF.1.5	User/ Agent should be guided by the system with the correct information when logging in.	Login	Should have
UMS.NF.1.6	System should display all error or success messages.	Login	Should have
UMS.F.1.7	After Login User/Agent should be able to use their system	View Profile	Must have
UMS.F.1.8	User/ Agent should be able to stay logged in until user logs out	Authorization	Must have
UMS.F.1.9	User/ Agent should be able to view Profile and view their information	View Profile	Must have
UMS.F.1.10	Admin can login with pre-informed credentials,	Admin Login	Must have
UMS.F.1.11	User should be able to easily logged out from the system	Logout	Must have
UMS.F.1.11	Admin can View , update and delete their profile.	Admin profile	Must have
UMS.F.1.11	Admin should be able to easily logged out from the system	Logout	Must have

## ER Diagram

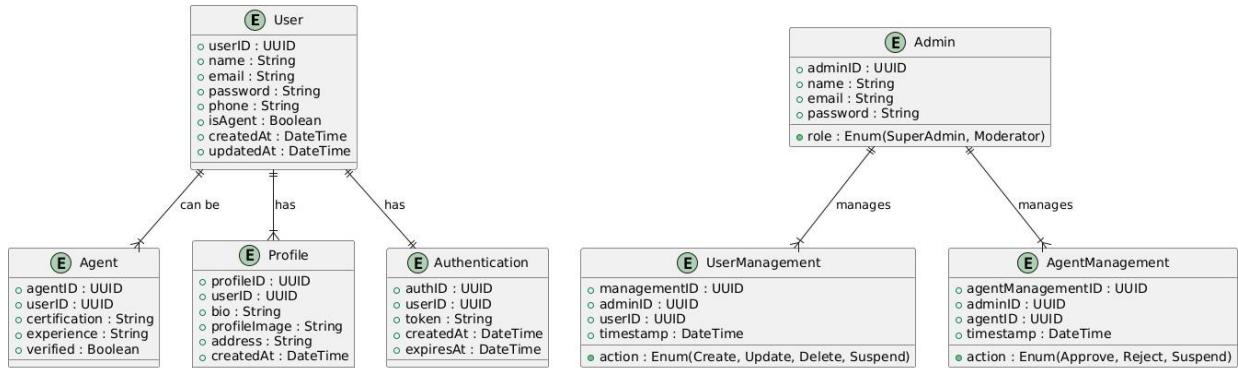


Figure 2 ER Diagram

## Activity Diagram

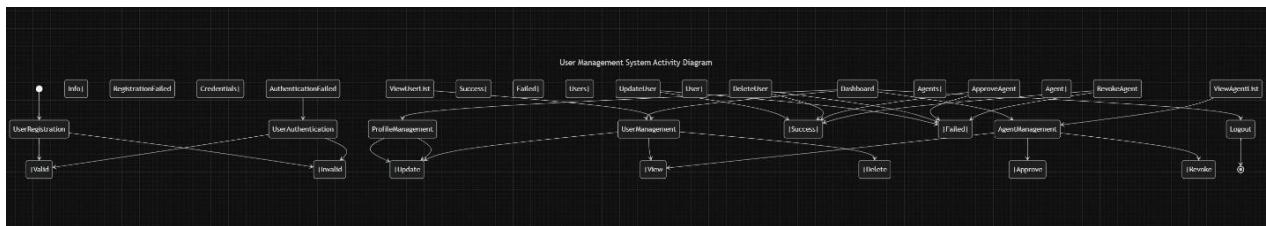


Figure 3 Activity Diagram

## Class Diagram

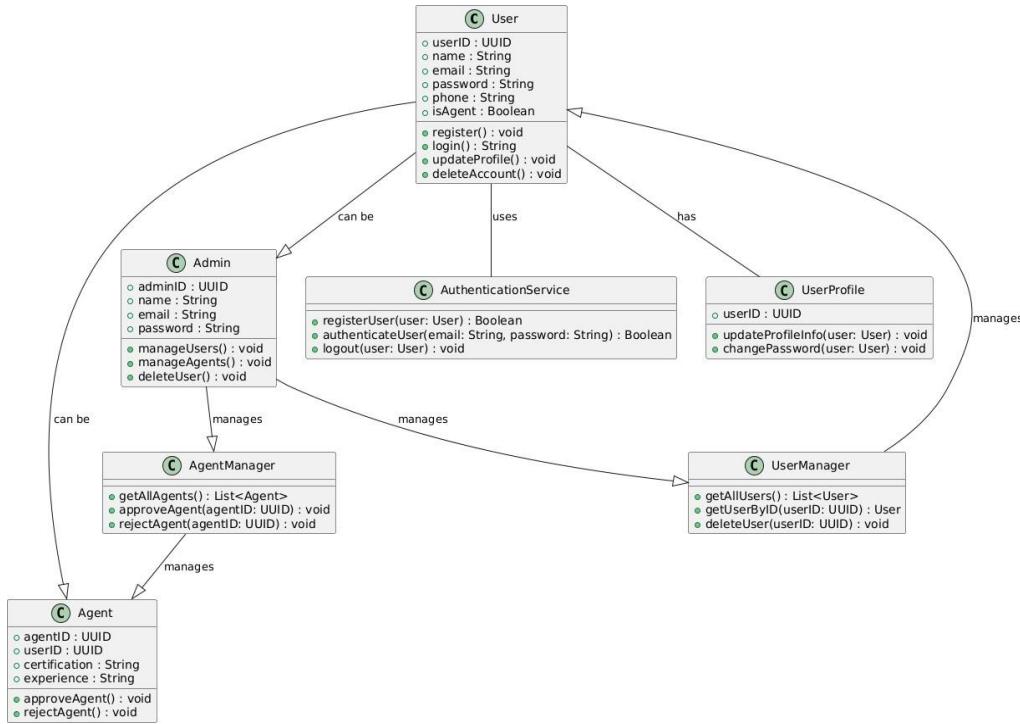


Figure 4 Class Diagram

## Test Case of User Management

### Register User/Agent

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"> <li>The website is accessible.</li> <li>The user has internet connectivity.</li> <li>The user is not logged in to the website.</li> </ul>

Steps	<ul style="list-style-type: none"> <li>• Go to the Signup page</li> <li>• Enter all necessary fields including your password, email address, and phone number. And choose roles : User or Agent.</li> <li>• Email will receive an OTP code; use such a code to confirm.</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• The account is successfully created.</li> <li>• Success message is shown and redirected to login page.</li> </ul>

## Login

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"> <li>• The website is accessible.</li> <li>• The user has internet connectivity.</li> <li>• The person needs to be registered in the system with an account.</li> </ul>
Steps	<ul style="list-style-type: none"> <li>• Navigate to the Login up</li> <li>• Enter the information that is Email and Password</li> </ul>

Expected Result	<ul style="list-style-type: none"> <li>Success message is shown and redirected to Hero page.</li> </ul>
-----------------	---

## Admin Register Roles

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"> <li>User needs to have the pre-informed admin credentials</li> </ul>
Steps	<ul style="list-style-type: none"> <li>Goes to the login page with pre-informed credentials.</li> <li>Enters necessary fields such as email and password.</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>Success message is shown.</li> <li>Redirected to the admin Dashboard</li> </ul>

## Reset Password

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"> <li>The website is accessible.</li> <li>The user/agent has internet connectivity.</li> <li>The user/agent needs to be registered in the system with an account.</li> </ul>
Steps	<ul style="list-style-type: none"> <li>Navigate to the Login page.</li> <li>Click forgot password which navigates to forget password page.</li> <li>Enter the registered email to get the link for changing password.</li> <li>Click the link and change the password</li> </ul>

**Expected Results**

- User/Agent can successfully change password.

## Sequence Diagram

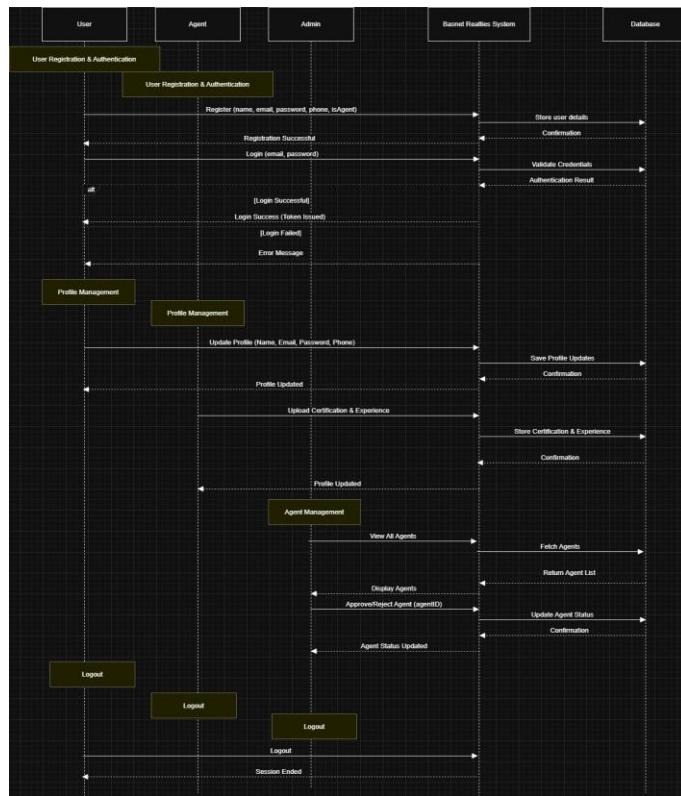


Figure 5 Sequence Diagram

## Use -Case Diagram

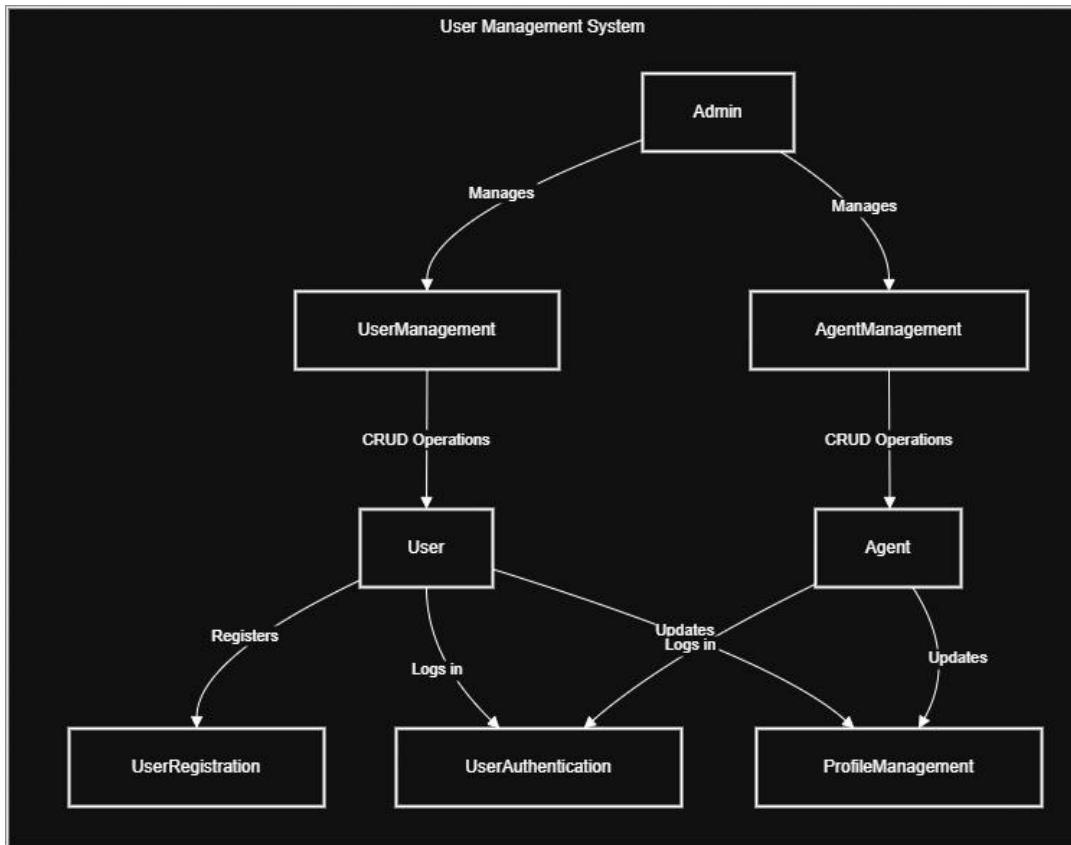


Figure 6 Use Case Diagram

# Test Report of User Management System

Test Report	User Management System	
Test Summary	All user management system features were checked and validated by this test.	
Test Results	Register User	Result :Pass  Comment: The User was successful to create a new Account with preferred role Agent or User.
	Login	Result :Pass  Comment: The User/Agent was successful to Login into the system.
	Admin Login	Result :Pass  Comment: User was successful to login into admin system
	Forget Password	Result : Failed  Comment: User/Agent was unsuccessful in order to change password. Because user/agent did not have the account before.
Summary	The User Management System passed every test case.  Testing turned up with one issue where while trying to change password from the not registered account.	

## Screenshots



Login

Email

Password

OR

 [Sign in with Google](#)

[Forgot Password?](#)

Don't have an account? [Create an Account](#)

Figure 6: Successful user registration

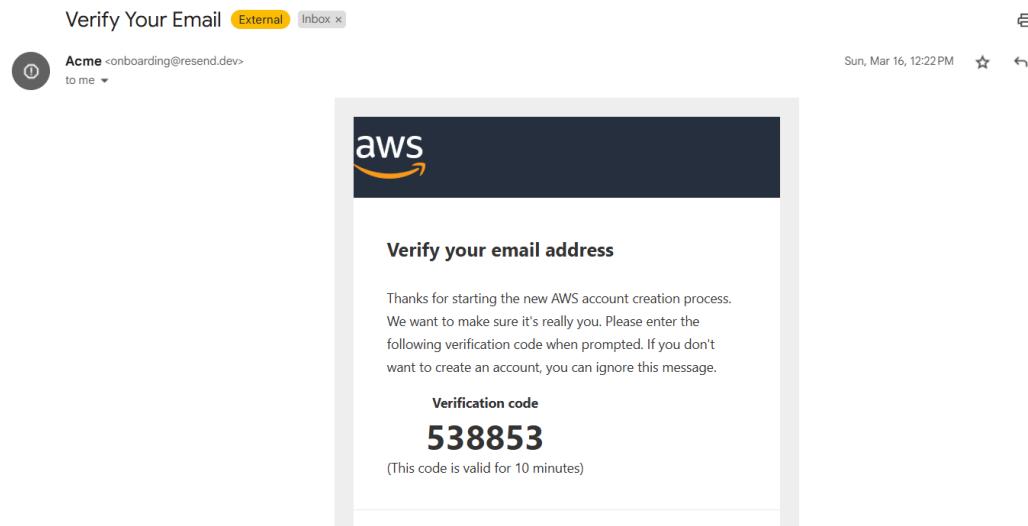
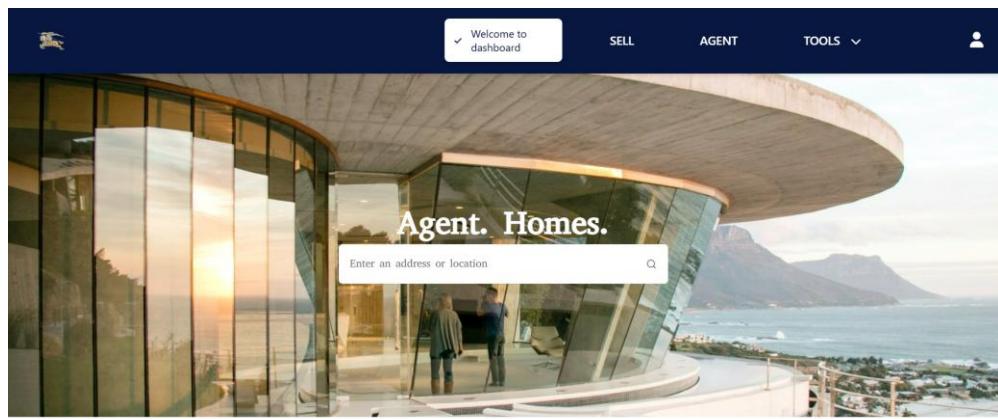


Figure 1 Verification Code



Recommended Homes For You

*Figure 2 User Dashboard*

The dashboard has a dark header with 'DASHBOARD' and 'CLIENTS' tabs. It shows a table of property listings:

Location	Price	Size	Property Number	Property Type	Bedroom	Bathrooms	Status	Description	Actions
Swoyambhu, Kathmandu, Nepal	\$6,565,656	4000	986	Land			Sale	At the City Centre	
Jorpati	\$208,888,888	2123	886	Land			Sale	Outskirts of Town	
Naxal, Kathmandu	\$9,999,999,999	88888	989	House	6	6	Rent	At the City Centre	
Lakeside, Pokhara	\$90,000,000	4000	987	House	9	8	Sale	Around the Lake	

*Figure 3 Agent Dashboard*

## Login

Email

np03cs4a220500@heraldcollege.edu.np

Password

.....

**Login**

[Forgot Password?](#)

Don't have an account? [Create an Account](#)

[User?](#)

*Figure 4 Admin Login*



Figure 5 Admin Dashboard

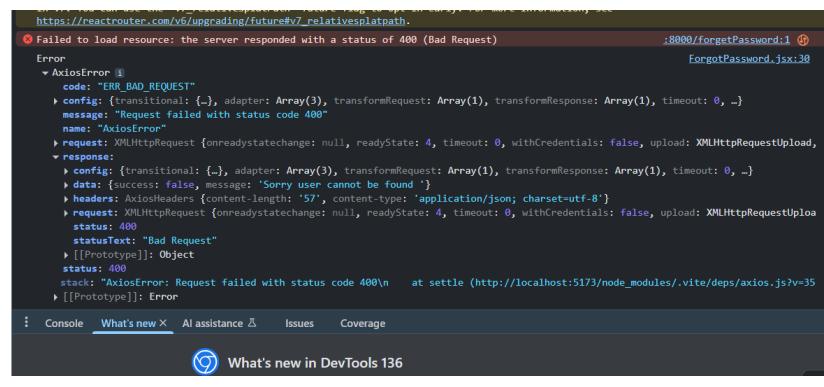


Figure 6 Failed Reset Password function

## B. House Management

SRS

Req. No	Req. description	Use Case	Moscow Prioritization
UMS.F.1.0	Agent be able add, update, view and delete property.	Crud Operation	Must have
UMS.F.1.1	Agent can browse their listed property.	Browse	Must have
UMS.NF.1.2	Property details should have the respective agent information	Agent Information	Must have
UMS.NF.1.3	Property can be categorized in various segment such as Land, house, apartment.	Categorization	Must have

## Sequence Diagram

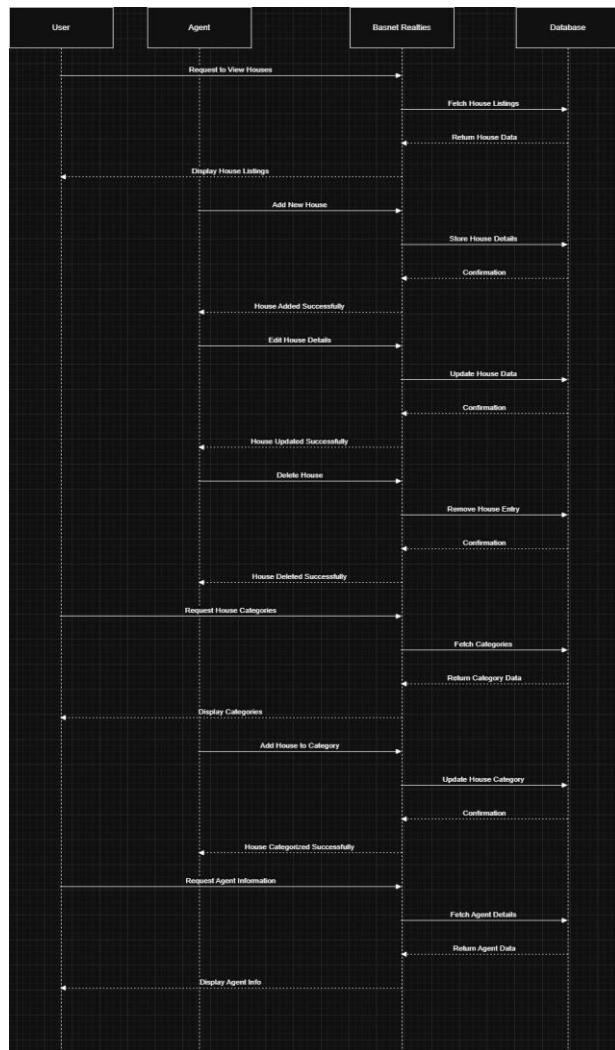


Figure 7 Sequence Diagram

## ER Diagram

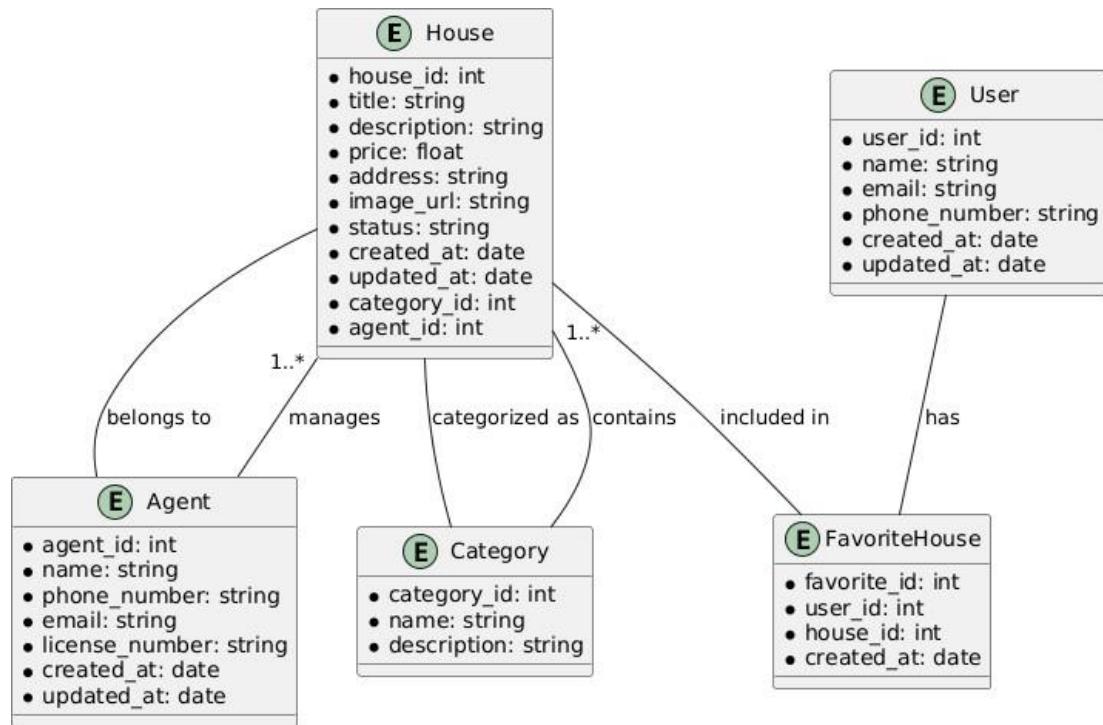


Figure 8 ER Diagram

## Activity Diagram

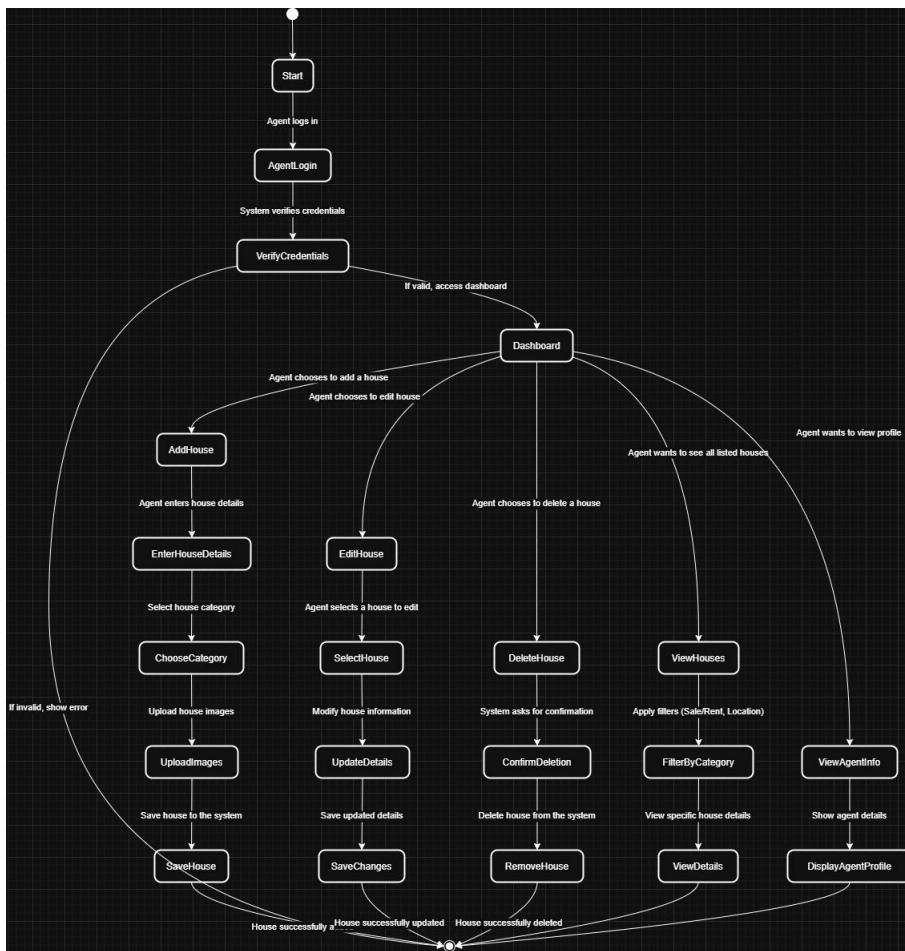


Figure 9 Activity Diagram

## Test Case

### Property CRUD operation

Test Case	Property Crud operation
Precondition	<ul style="list-style-type: none"><li>• The website is accessible.</li><li>• The Agent has internet connectivity.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Navigate to the Dashboard page</li><li>• Click on Add button.</li><li>• Fill the form with house information.</li><li>• View the product Detail at the table with various update and delete icon.</li></ul>
Expected Result	<ul style="list-style-type: none"><li>• The property can be added, edited and deleted.</li></ul>

### Browse listed property

Test Case	Browse Listed Property or Property Detail
Precondition	<ul style="list-style-type: none"><li>• The website is accessible.</li><li>• The Agent has internet connectivity.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Navigate to the Dashboard page</li><li>• View your listed property Detail</li></ul>
Expected Result	<ul style="list-style-type: none"><li>• The p can be Browse easily</li><li>• The detail page can be viewed.</li></ul>

## Property detail with agent information

Test Case	Browse property with agent information
Precondition	<ul style="list-style-type: none"> <li>The website is accessible.</li> <li>The Agent has internet connectivity.</li> </ul>
Steps	<ul style="list-style-type: none"> <li>• Navigate to the buy page</li> <li>• Click on the property card.</li> <li>• View the property Detail with agent information</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• Property with agent information can be Browse easily.</li> </ul>

## Class Diagram

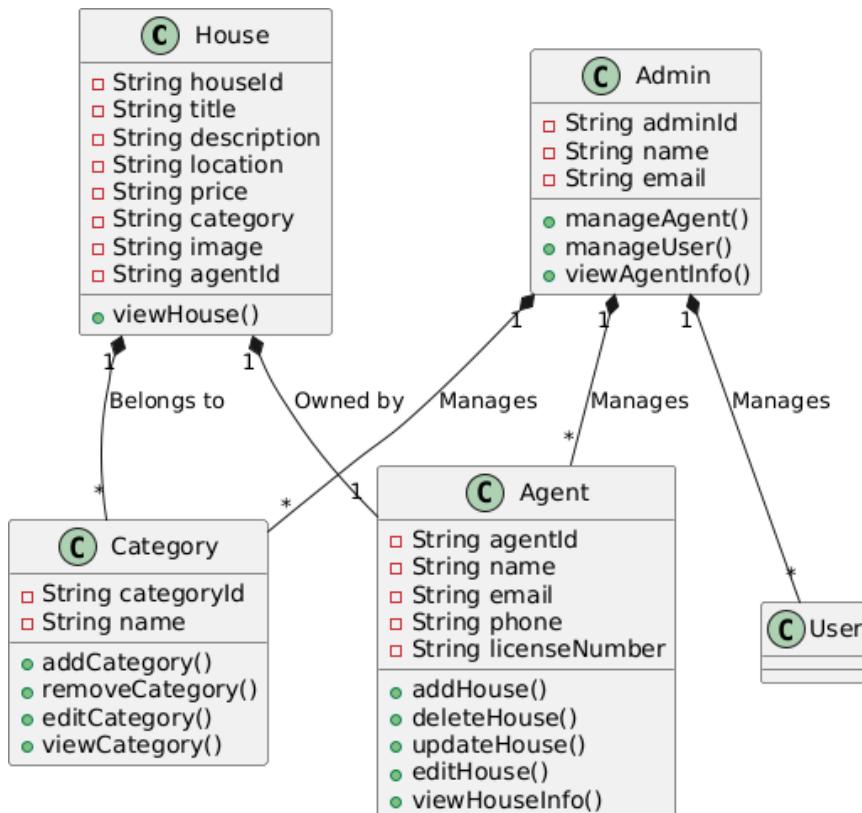


Figure 10 Class Diagram

## User Case Diagram

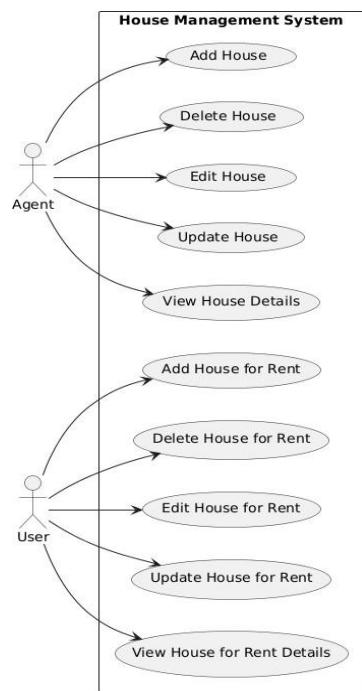


Figure 11 Use Case Diagram

## Test Report for Customer Services

Test Report	Customer Services					
Test Summary	This test aims to check or validate all the features, functionalities Of House management.					
Test Results	<table border="1"><tr><td>Property CRUD operation</td><td>Result :Pass</td></tr><tr><td></td><td>Comment: The User was successful to Browse Product or Product Detail</td></tr></table>		Property CRUD operation	Result :Pass		Comment: The User was successful to Browse Product or Product Detail
Property CRUD operation	Result :Pass					
	Comment: The User was successful to Browse Product or Product Detail					

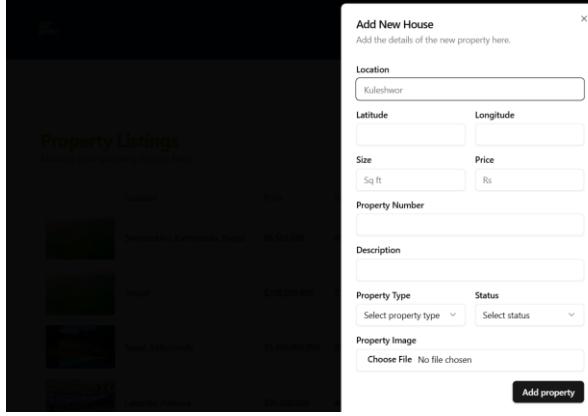
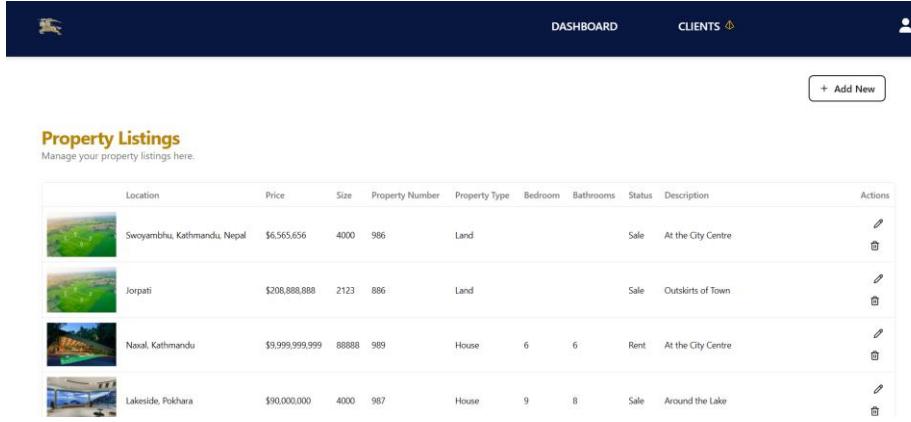
	Browse your listed property	<b>Result :Pass</b> Comment: The User was successful to Checkout / view order
	Property detail with agent information	<b>Result :Pass</b> Comment: The User was successful to Browse Category/ Add to wish list
Summary	Over all the house management system worked completely fine, house management system successfully passed all the test cases, some with minor bugs and some with no error	
Screenshots	 	

Figure 7 CRUD Operation

Figure 8 Browse Listed Property



kulbhushan basnet  
+977 981869497

Get In Touch

EMAIL \_\_\_\_\_

NAME \_\_\_\_\_

Phone Number \_\_\_\_\_

MESSAGE \_\_\_\_\_

 Pick a date

**Send Message**

Figure 9 Property Detail with agent information

## C. Dynamic Feed

SRS

Req. No	Req. description	Use Case	Moscow Prioritization
UMS.F.1.0	User can click a card of house in order to see property details.	Click	Must have
UMS.F.1.1	From the Click of house, user can see the recommended house accordingly.	Recommendation	Must have

## ER Diagram

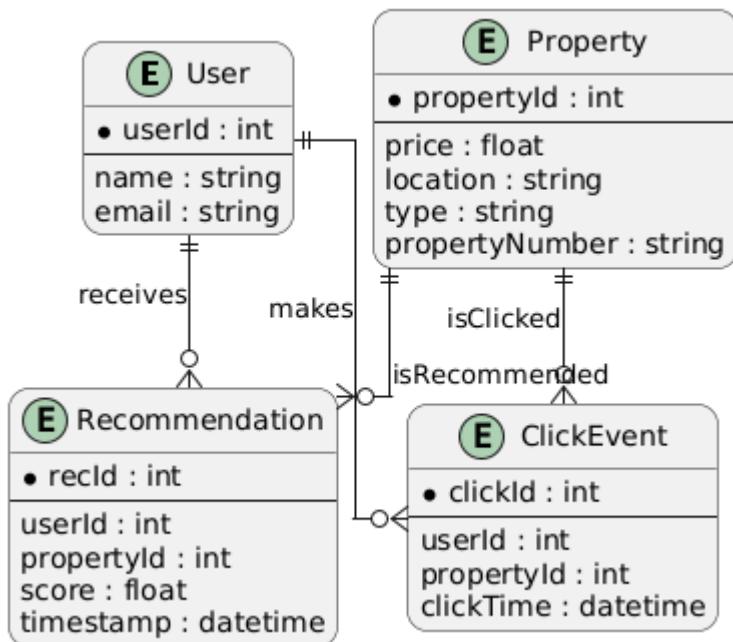


Figure 10 Appointment Booking ER

## Use Case Diagram

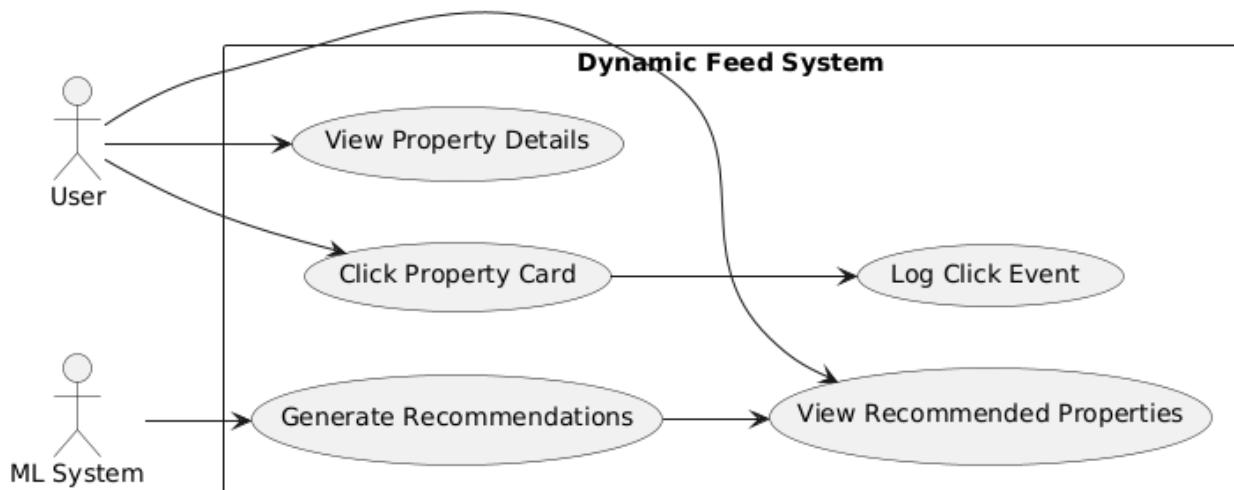


Figure 11 Appointment Booking Use Case

## Class Diagram

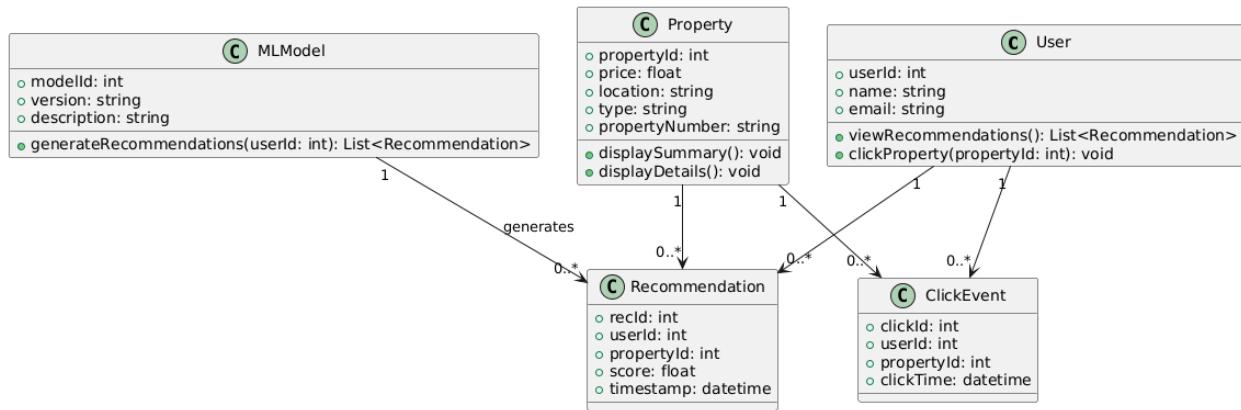


Figure 12 Appointment Booking Class

## Sequence Diagram

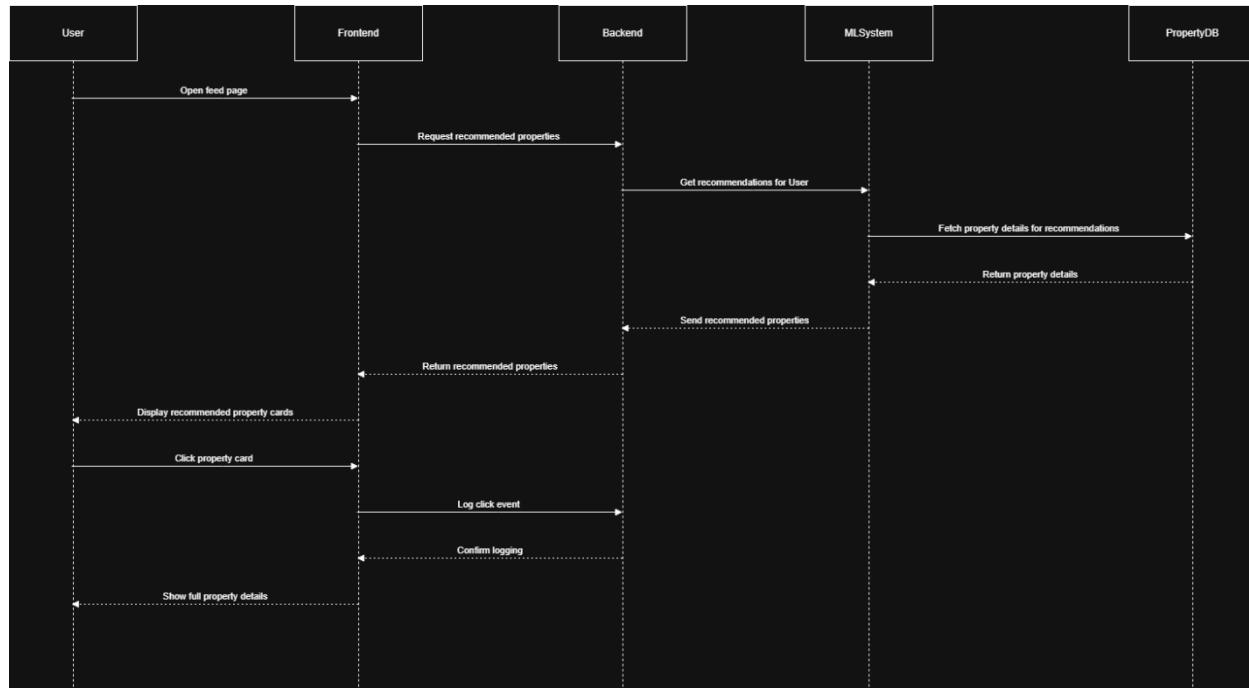


Figure 13 Appointment Booking Sequence

## Test Case

### Property Click

Test Case	Property Crud operation
Precondition	<ul style="list-style-type: none"><li>• The website is accessible.</li><li>• The user has internet connectivity.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Navigate to the buy page</li><li>• Click a property card</li><li>• View the property detail.</li><li>• Stores houseID for Machine learning.</li></ul>
Expected Result	<ul style="list-style-type: none"><li>• The property can be clicked and Stores houseID for Machine learning.</li></ul>

### Recommendation System

Test Case	Property Crud operation
Precondition	<ul style="list-style-type: none"><li>• The website is accessible.</li><li>• The user has internet connectivity.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Navigate to the hero page.</li><li>• List of similar houses are recommended</li></ul>
Expected Result	<ul style="list-style-type: none"><li>• List of recommended property according to the click can be seen.</li></ul>

## Failed Test Cases of Dynamic feed

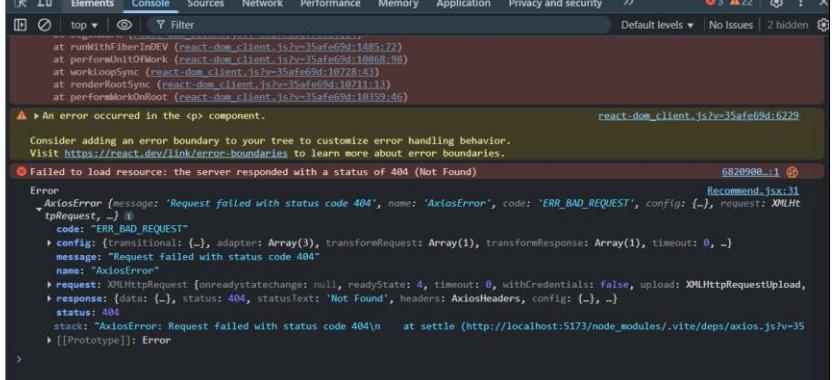
Test Report	Multiple click of property card	
Test Summary	For dynamic feed to work user need to click one property card for recommendation. For multiple it may show error.	
	Recommendation of property during multiple property card click.	<p>Result :<b>Failed</b></p> <p>Comment: User was unsuccessful to see the list of recommendations of property during multiple card click.</p>
Summary	The Dyanmic Feature failed one test case.	
Screenshots	 <p>The screenshot shows a browser's developer tools console with the 'Console' tab selected. It displays an error stack trace from 'react-dom_client.js?v=35afe69d:6229' and a message about failed resource loading. The error message includes a link to learn more about error boundaries.</p>	

Figure 14 Recommendation failed during multiple card click

## Activity Diagram

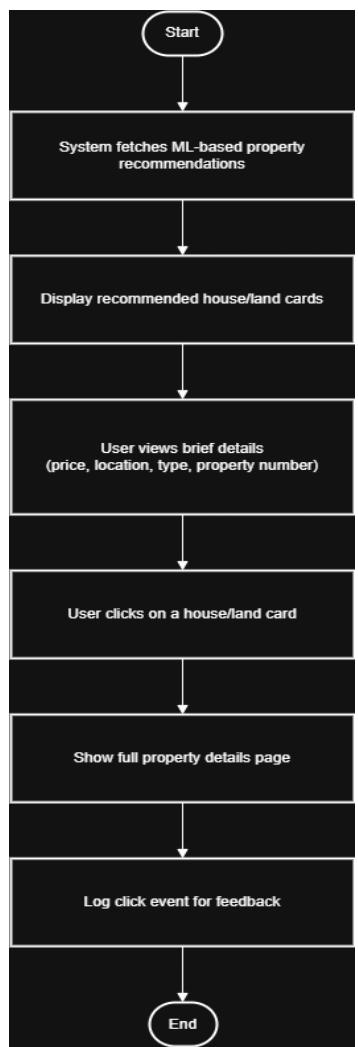


Figure 15 Appointment Booking Activity

## Test Report of Dynamic Feed

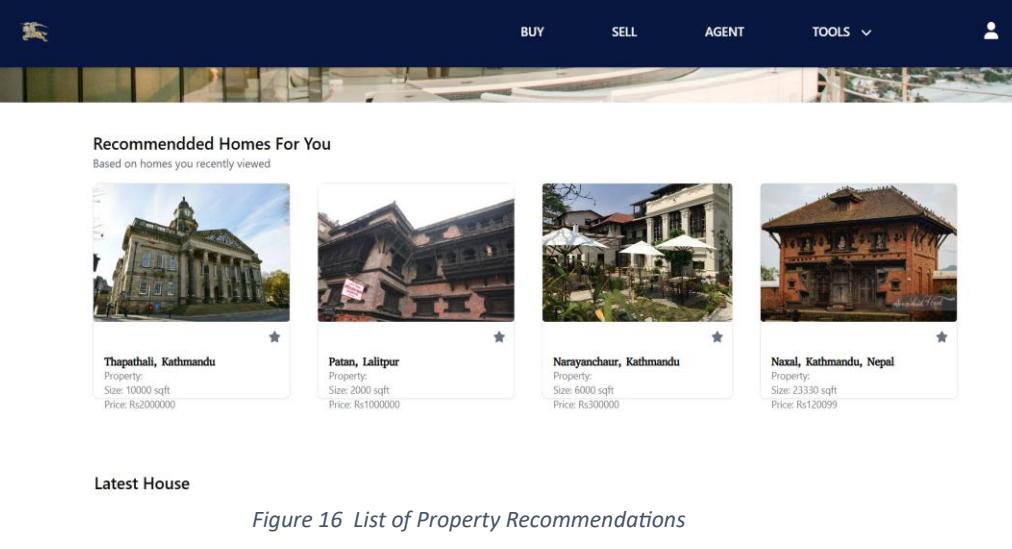
Test Report   User Management System	
Test Summary	All Dynamic feed features were checked and validated by this test.
Test Results	Property Click
	Result :Pass  Comment: The User was successful to click the property card for more details.
	Recommendation of property
	Result :Pass  Comment: User was successful to see the list of recommendations of property as per their property card click
	Admin Login
	Result :Pass  Comment: User was successful to login into admin system
Summary	The User Management System passed every test case.  Testing turned up no issues or failures.
Screenshots	 <p>The screenshot displays a user interface for a real estate platform. At the top, there is a dark header bar with navigation links: BUY, SELL, AGENT, TOOLS, and a user profile icon. Below the header, a banner shows a large image of a modern building. Underneath the banner, the text "Recommended Homes For You" is displayed, followed by the note "Based on homes you recently viewed". Four property cards are shown in a row, each featuring a small image of a house, the location name, property details, and a star rating. The properties listed are:</p> <ul style="list-style-type: none"> <li><b>Thapathali, Kathmandu</b> Property: Size: 10000 sqft Price: Rs2000000</li> <li><b>Patan, Lalitpur</b> Property: Size: 2000 sqft Price: Rs1000000</li> <li><b>Narayanchaur, Kathmandu</b> Property: Size: 6000 sqft Price: Rs300000</li> <li><b>Naxal, Kathmandu, Nepal</b> Property: Size: 23330 sqft Price: Rs120099</li> </ul> <p>At the bottom of the screenshot, the text "Latest House" is visible.</p>

Figure 16 List of Property Recommendations

The image shows a real estate listing for a property in Kuleshwor, Kathmandu. At the top left is a map of the area, with a red arrow pointing to the property's location. To the right is a large photograph of a traditional-style house with a tiled roof and brick walls, featuring a courtyard with yellow umbrellas and outdoor seating. Below the photo is the property's name, "Kuleshwor, Kathmandu". To the right of the name are two buttons: "Book an agent" and a small profile picture. On the far right, there is a vertical sidebar with "TOOLS" and a user icon at the top, followed by a search bar and a list of recent properties.

**Kuleshwor, Kathmandu**

PRICE: Rs. 7500000  
SIZE: 12000 Anna  
PROPERTY ID: 777  
PROPERTY TYPE: House

Book an agent

TOOLS

Search

Recent Properties

Figure 17 Property Card Clic

## D. Customer Service

### SRS

Req. No	Req. description	Use Case	Moscow Prioritization
CS.F.1.1	The system should allow users to browse and view available houses/ land.	Browse House/land	Must Have
CS.F.1.2	It should provide detailed information about each Land / house, including descriptions, category, pricing, agent information and images.	House/ land Details	Must Have
CS.F.1.3	The system should enable users to save as house/land to their favorites page.	Save as Favorite	Must Have
CS.F.1.4	The system needs to let users see what's in their favorite page.	View page	Must Have
CS.F.1.5	User can send particular messages to preferred agent.	Proceed to message	Must Have
CS.F.1.6	User should be able to view their message history.	View messages	Should Have
CS.F.1.7	The system should enable users to use live interactive map with the house/land information.		Must Have
CS.F.1.9	The system should allow users to update, send appointment details to agent.	Manage Appointments	Must Have
CS.F.1.10	The system should enable users to browse house/land by category or type.	Browse Category	Must Have

## ER Diagram

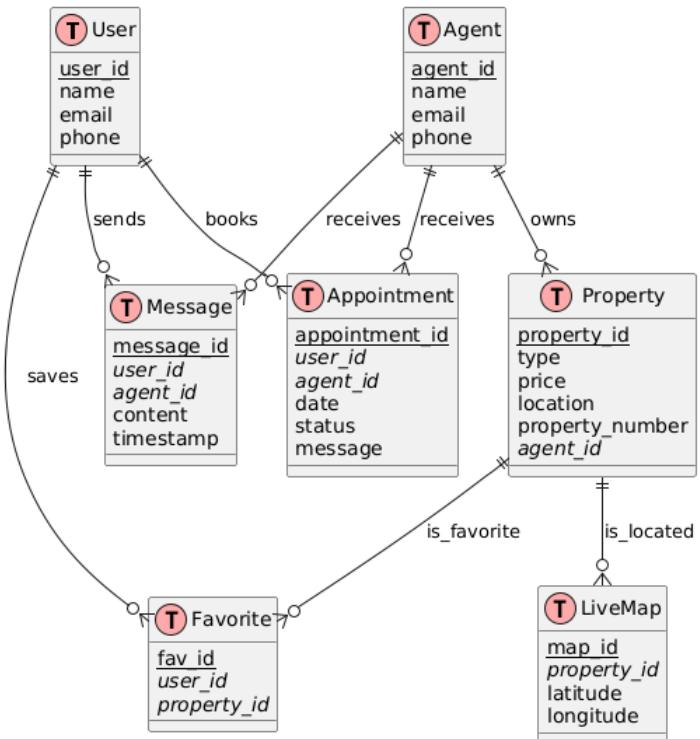


Figure 18 Customer\_Service ER

## Use Case Diagram

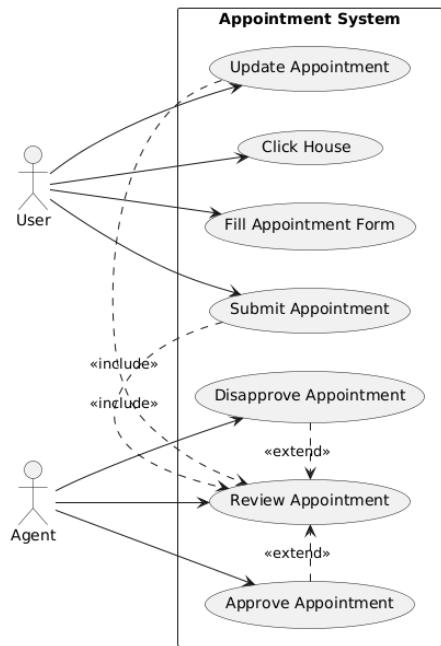


Figure 19 Customer\_service UseCase

## Class Diagram

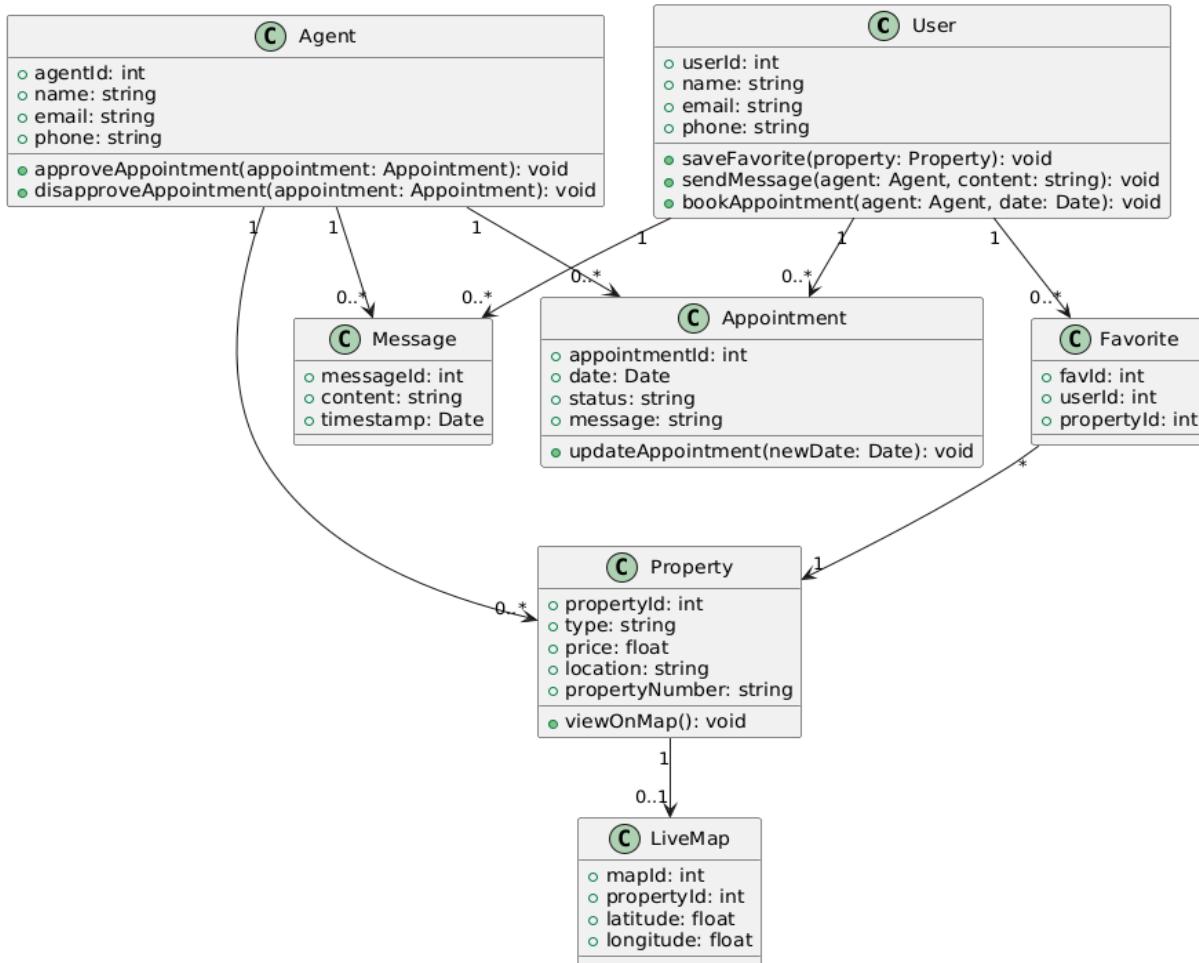


Figure 20 Customer\_Service Class

## Test Case

### Browse Product or Product Detail

Test Case	Browse Product or Product Detail
Precondition	<ul style="list-style-type: none"> <li>The website is accessible.</li> <li>The user has internet connectivity.</li> </ul>

Steps	<ul style="list-style-type: none"> <li>• Navigate to the buy page/ hero page</li> <li>• Click the preferred house</li> <li>• View the house/land detail</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• House/land can be Browse easily</li> <li>• The detail page can be viewed.</li> </ul>

## Save favorite property

Test Case	Add to favorite page
Precondition	<ul style="list-style-type: none"> <li>• House/land favourite addition requires user login.</li> </ul>
Steps	<ul style="list-style-type: none"> <li>• View the item to be saved to the page. Select star icon to save in as favorite. Go to the Nav bar's favorite page.</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• The house/land can be easily saved in favorite page.</li> <li>• All the favorite property are shown on favorite page.</li> </ul>

Proceed to book an appointment.

<b>Test Case</b>	Proceed to book an appointment.
Precondition	<ul style="list-style-type: none"><li>• There has to be login by the user.</li><li>• The user needs to have click the agent page or some house card.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Go to the agent page</li><li>• Click on the preferred agent profile.</li><li>• Fill up the details with message, date and name.</li><li>• Click send button to book an appointment.</li></ul>
Expected Result	<ul style="list-style-type: none"><li>• The user can easily proceed to book an appointment with agent.</li><li>• After the successful booking placement the user can view order.</li></ul>

Browse interactive maps.

<b>Test Case</b>	<b>Browse interactive map</b>
Precondition	<ul style="list-style-type: none"><li>• The user must be logged in.</li></ul>

Steps	<ul style="list-style-type: none"> <li>• Go to the buy page.</li> <li>• Use will be able to see the big interactive map.</li> <li>• Cursor through map to your liking location.</li> <li>• View a house with some details.</li> </ul>
-------	---

	<ul style="list-style-type: none"> <li>• Add it to wish list</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• The user can easily browse through category of their choice</li> <li>• Later on the product can be added to wish list for future purchase</li> </ul>

## Browse Favorite

Test Case	Review and Rating
Precondition	<ul style="list-style-type: none"> <li>• The user must be logged in.</li> </ul>
Steps	<ul style="list-style-type: none"> <li>• View a product you like</li> <li>• Navigate to user icon at the nav bar</li> <li>• Click the favourite</li> <li>• It'll navigate you to your favorite page.</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• User can easily see the favorited house cards.</li> </ul>

## EMI Calculator

Test Case	Review and Rating
Precondition	<ul style="list-style-type: none"><li>The user must be logged in.</li></ul>
Steps	<ul style="list-style-type: none"><li>Navigate to tool section at the nav bar</li><li>Click the EMI</li><li>It'll navigate you to your EMI page.</li><li>Fill the numbers.</li></ul>
Expected Result	<ul style="list-style-type: none"><li>User can easily calculate the loans and emi.</li></ul>

## Land Area Converter

Test Case	Review and Rating
Precondition	<ul style="list-style-type: none"><li>The user must be logged in.</li></ul>
Steps	<ul style="list-style-type: none"><li>View a product you like</li><li>Navigate to Tool section at the nav bar</li><li>Click the Unit/Naptol</li><li>It'll navigate you to your land Converter page.</li></ul>
Expected Result	<ul style="list-style-type: none"><li>User can calculate their land in any metrics.</li></ul>

## Sequence Diagram



Figure 21 Customer\_service Sequence

## Activity Diagram

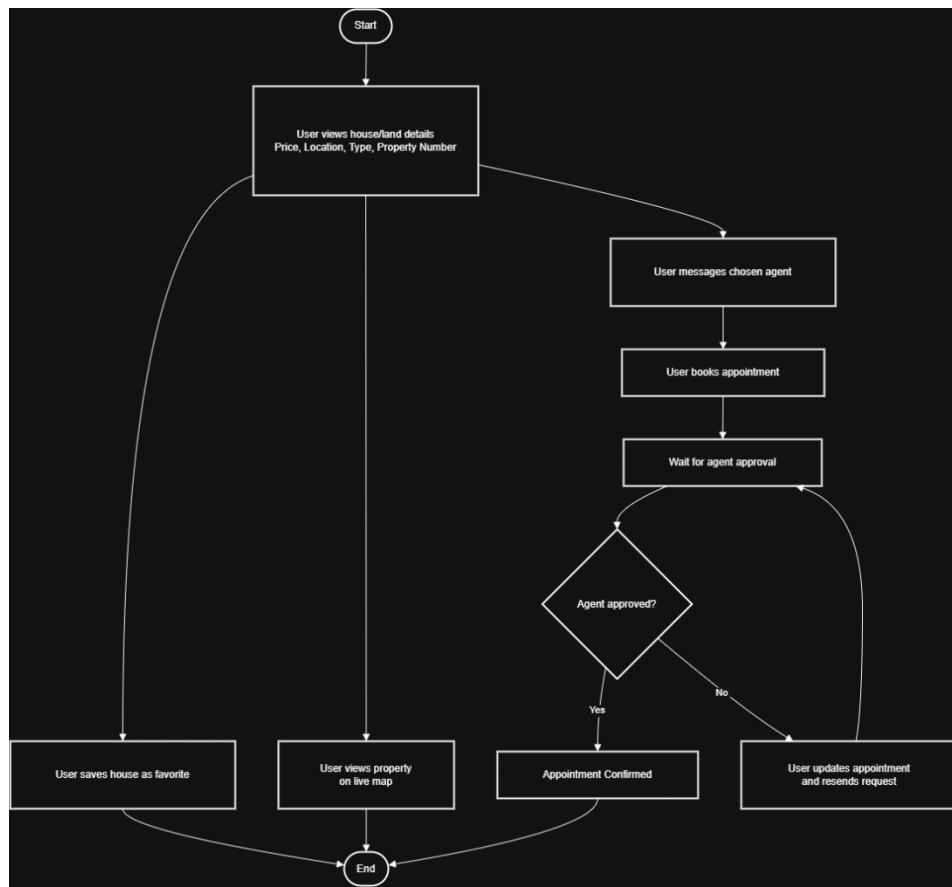
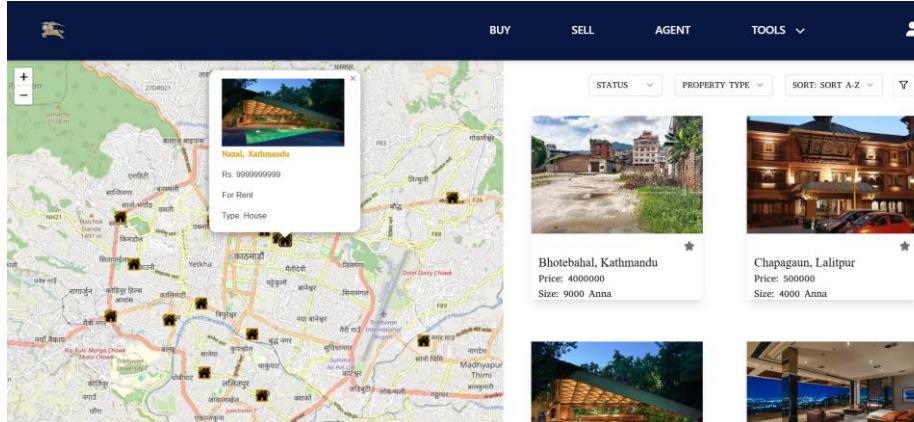
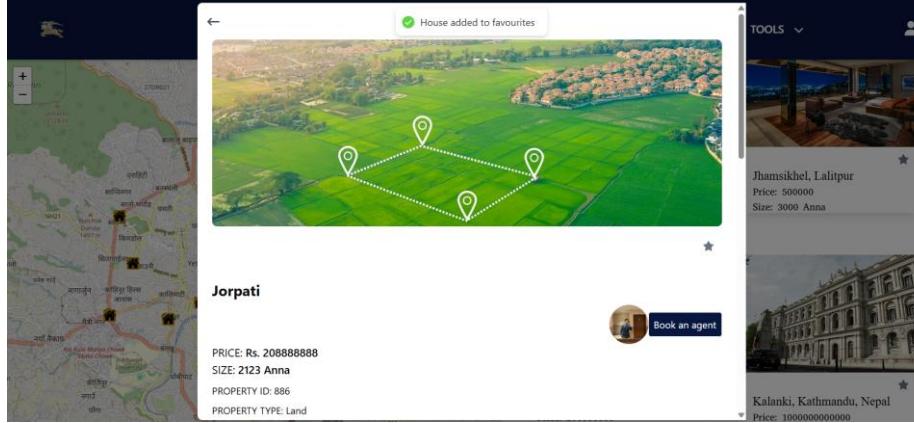


Figure 22 Customer\_service Activity

## Test Report for Customer Services

Test Report	Customer Services	
Test Summary	This test aims to check or validate all the features, functionalities of customer Services.	
Test Results		
	Browse property or property Detail	Result :Pass  Comment: The User was successful to Browse Product or Product Detail
	Save Favorite property	Result :Pass  Comment: The User was successful to Save Favorite property
	Emi calculator	Result :Pass  Comment : User can easily calculate the loan with preferable intrest and years.
	Land Area Converter	Result :Pass  Comment : User can now convert their land in any metrics

	Interactive map	Result :Pass  Comment: The User was successful to use interactive map with property information.
	Browse Save Favorite property	Result :Pass  Comment: The User was successful to Browse favorite page

	<p>Booking an appointment</p>	<p><b>Result :Pass</b></p> <p>Comment: The User was successful to book an appointment</p>
Summary		Over all the Customer System worked completely fine, Customer System successfully passed all the test cases, some with minor bugs and some with no error
Screenshots		 <p>Figure 23 Interactive map</p>  <p>Figure 24 Property saved in favorite</p>

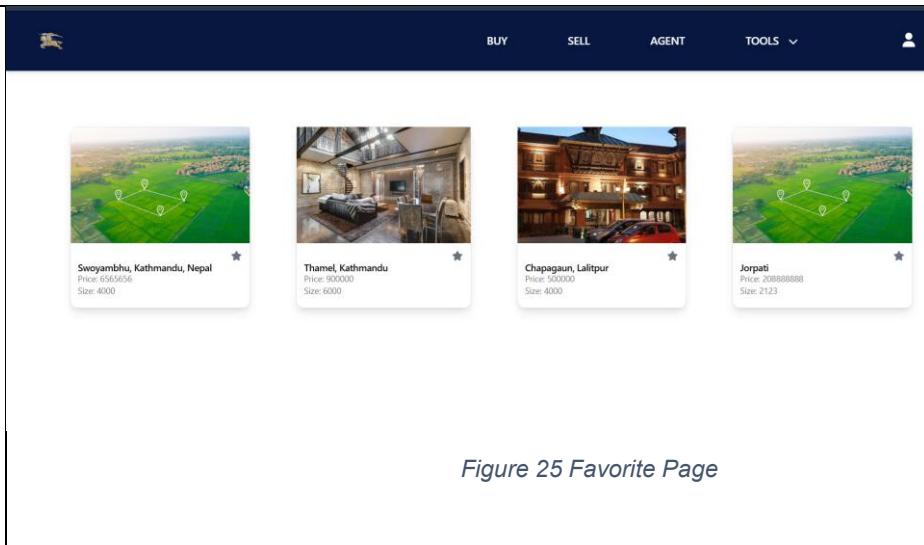


Figure 25 Favorite Page

Figure 26 EMI calculator

Figure 27 Land Unit Converter

## E. Appointment Booking

### SRS

Req. No	Req. description	Use Case	Moscow Prioritization
UMS.F.1.0	User be able to fill their details such as name, phone number, message and date.	Fill the form	Must have
UMS.F.1.1	When the user press book the information should go to respective agent.	Booking an appointment	Must have
UMS.NF.1.2	User can be able to reconsider the appointment by updating after the cancelation.	Re-Booking	Must have
UMS.NF.1.3	User can browse the appointments.	Browse	Should have
	Agent can browse all the bookings they have.	Agent Browse	Must have
	Agent can cancel or accept the booking of appointment	Accept or Cancel booking	Must have

## Sequence Diagram

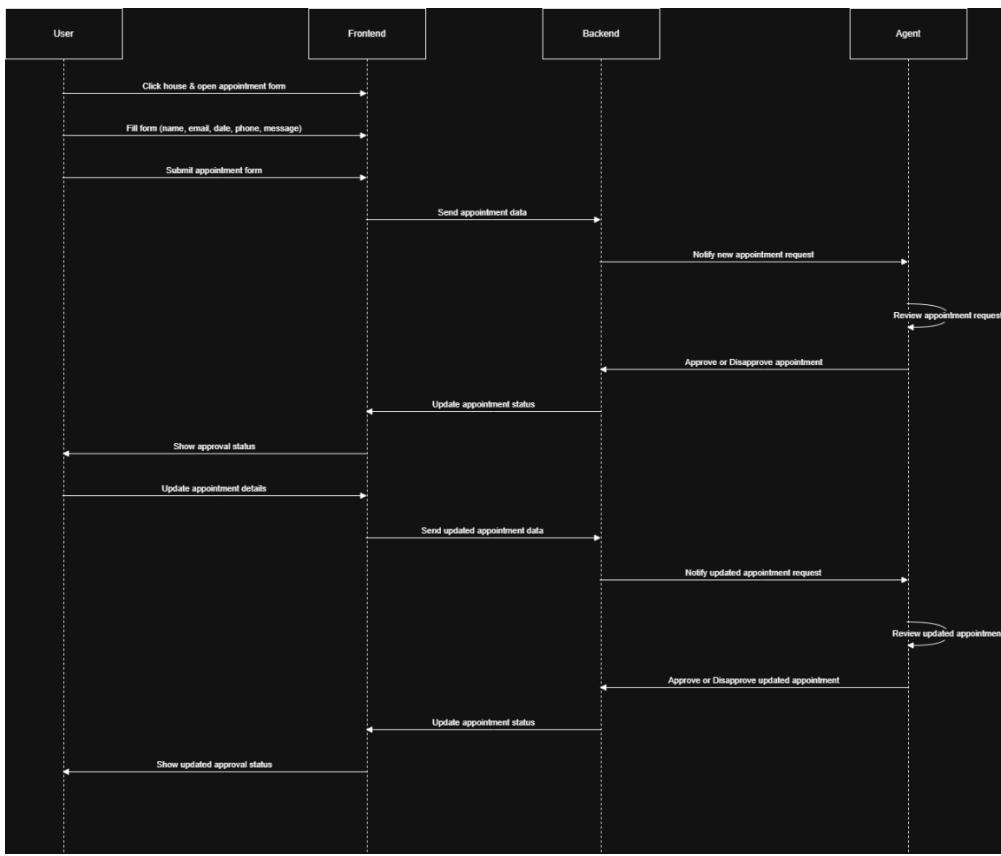


Figure 28 Appointment\_Booking Sequence

## Activity Diagram

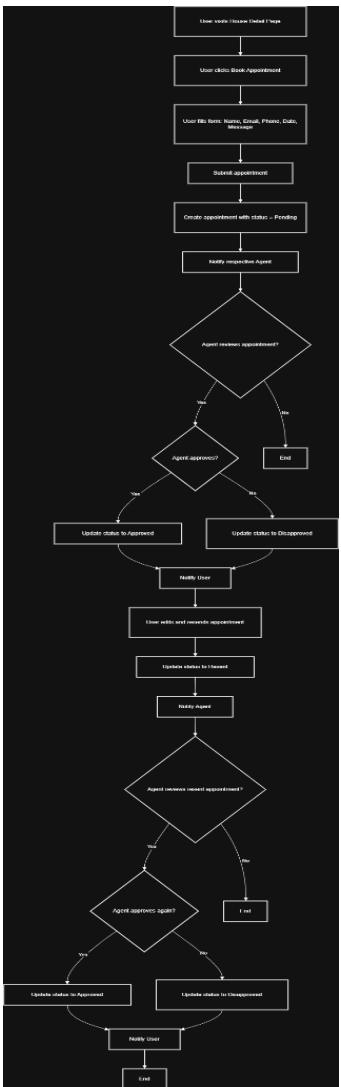


Figure 29 Appointment\_Booking Activity

## Test Case

### Fill the booking form

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"><li>• The website is accessible.</li><li>• The user has internet connectivity.</li><li>• The user is logged in to the website.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Go to the buy page</li><li>• Click the card of a house.</li><li>• At bottom fill the get in touch form.</li><li>• Press Book button for booking.</li></ul>
Expected Result	<ul style="list-style-type: none"><li>• Appointment is sent with all information to respective agent.</li><li>• Sent message is shown.</li></ul>

### Browse appointments

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"><li>• The website is accessible.</li><li>• The user has internet connectivity.</li><li>• The user is logged in to the website.</li></ul>
Steps	<ul style="list-style-type: none"><li>• Go to user icon in nav bar.</li><li>• For Agent go to client in the nav bar.</li><li>• For User, Enter Appointment and its navigates to the appointment page.</li><li>• Both Agent and user can see the list of appointment with status.</li></ul>

Expected Result	<ul style="list-style-type: none"> <li>• List of booking can be seen with present status.</li> </ul>
-----------------	--

### Cancel or Accept booking

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"> <li>• The website is accessible.</li> <li>• The Agent has internet connectivity.</li> <li>• The Agent is logged in to the website.</li> </ul>
Steps	<ul style="list-style-type: none"> <li>• Go to the Client page.</li> <li>• Agent can accept or cancel booking as per their liking.</li> <li>• Status will be changed accordingly.</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• Booking is canceled or accepted.</li> </ul>

### Update the Booking

Test Case	Register User / Create Account
Precondition	<ul style="list-style-type: none"> <li>• The website is accessible.</li> <li>• The User has internet connectivity.</li> <li>• The User is logged in to the website.</li> </ul>

Steps	<ul style="list-style-type: none"> <li>• Go to the Appointment page</li> <li>• Enter reconsider to update.</li> <li>• Fill the forms.</li> <li>• Status will be changed to pending.</li> </ul>
Expected Result	<ul style="list-style-type: none"> <li>• The booking is updated.</li> <li>• Status is changed to pending if reconsider.</li> </ul>

## Class Diagram

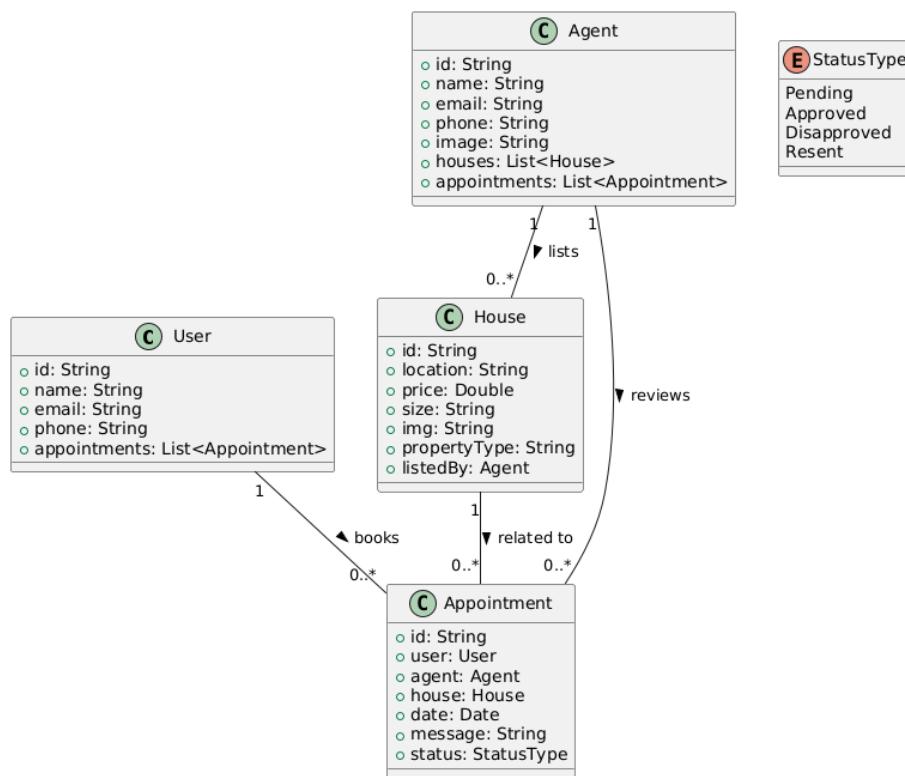


Figure 30 Appointmen\_Booking Class

## Use Case Diagram

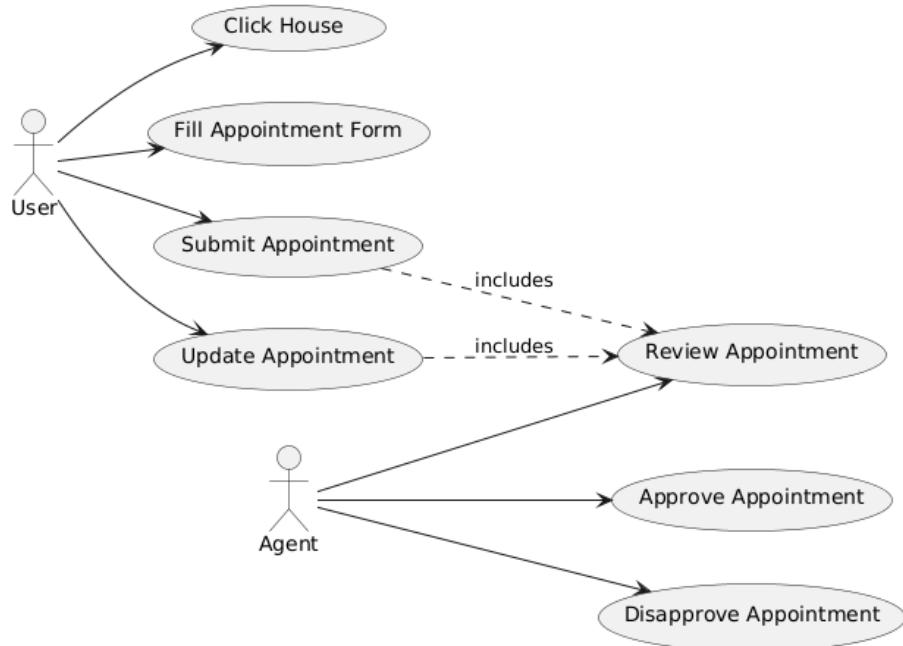


Figure 31 Appointment\_Booking UseCase

## ER Diagram

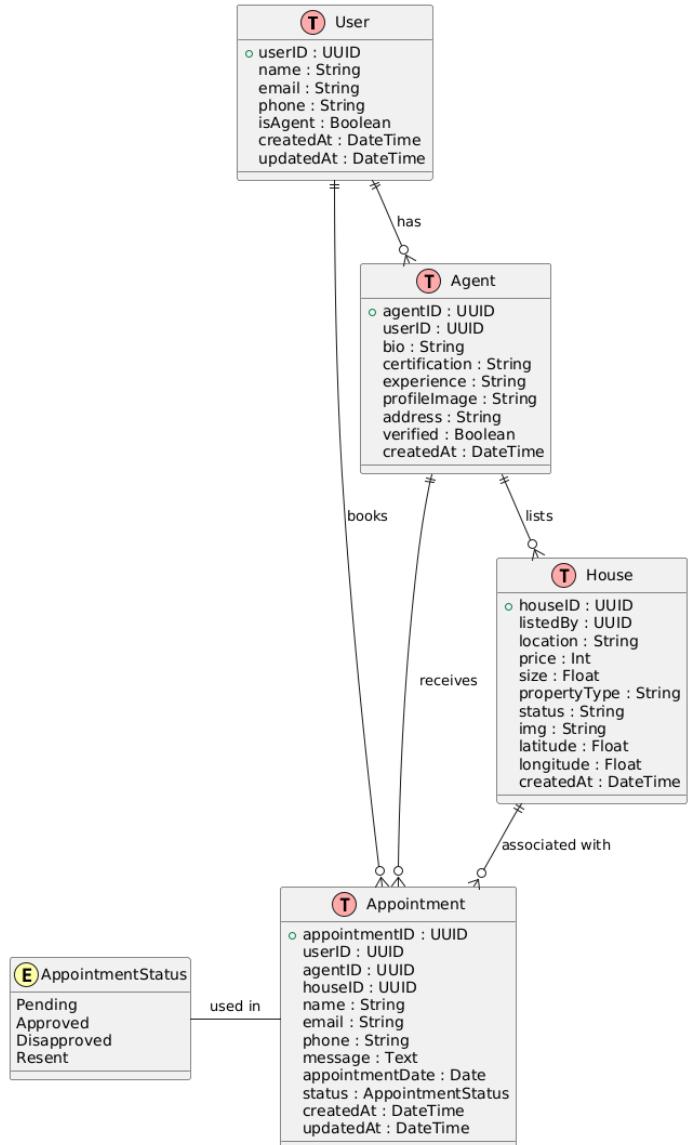


Figure 32 Appointmen\_Booking ER

## Test Report of Appointment Booking

Test Report	User Management System		
Test Summary	All appointment booking features were checked and validated by this test.		
Test Results	Cancel or accept booking	Result :Pass  Comment: The Agent was successful to cancel or accept.	
	Update booking	Result :Pass  Comment: The user was successful to update their booking.	
	Browse Appointments	Result :Pass  Comment: Both Agent and user can browse appointment	
	Fill the booking form	Comment: Form can be filled.	
Summary	The appointment booking passed every test case.  Testing turned up no issues or failures.		

## Screenshots

The screenshot shows a user interface for managing appointments. At the top, there are navigation links: BUY, SELL, AGENT, TOOLS, and a profile icon. Below this is a search bar with a 'SORT' dropdown and a '▼' button. The main section is titled 'Received Messages' with the sub-instruction 'View and manage your appointments'. Two appointment entries are listed:

- Appointment 1:** From 'kulbhushan basnet' (np03cs4a220500@heraldcollege.edu.np). Status: Cancelled. Date: 4/29/2025 at 12:00:00 AM. Message: 'I want to alive inquiry on theh house'. Buttons: 'Reconsider' and 'Cancel'.
- Appointment 2:** From 'kulbhushan basnet' (np03cs4a220500@heraldcollege.edu.np). Status: Cancelled. Date: 5/31/2025 at 12:00:00 AM. Message: 'I want to alive inquiry on theh house'.

Figure 33 User appointment page

A modal dialog box titled 'Update Booking' is displayed over a dark background. The dialog contains fields for 'Name' (with a placeholder 'Please enter correct and full Name\*'), 'Phone Number' (empty), 'Message' (empty), and a date picker with the placeholder 'pick a date'. A large 'Update' button is at the bottom right of the dialog.

Figure 34 Update Booking

The screenshot shows a user interface for managing property viewing appointments. At the top, there are navigation links for 'DASHBOARD' and 'CLIENTS'. A search bar with a 'SORT' dropdown and a filter icon is also present. The main section is titled 'Received Messages' with the subtitle 'View and manage your property viewing appointments'. It displays two messages from a client named 'krishma' (apexdigno@gmail.com). Both messages are marked as 'Cancelled'. The first message is dated 4/29/2025 at 12:00:00 AM, and the second is dated 5/31/2025 at 12:00:00 AM. Both messages state: 'I want to have inquiry on their house'.

**Received Messages**  
View and manage your property viewing appointments

**Messages:**

krishma  
apexdigno@gmail.com

Cancelled  
4/29/2025  
12:00:00 AM

I want to have inquiry on their house

krishma  
apexdigno@gmail.com

Cancelled  
5/31/2025  
12:00:00 AM

I want to have inquiry on their house

**Get In Touch**

EMAIL \_\_\_\_\_

NAME \_\_\_\_\_

Phone Number \_\_\_\_\_

MESSAGE \_\_\_\_\_

Pick a date

Send Message

This screenshot shows an appointment booking form. On the left, there is a profile picture of a man and a woman on a motorcycle, with the name 'Krishma' and the phone number '+977 9849572298' displayed. On the right, the form is titled 'Get In Touch' and contains fields for 'EMAIL', 'NAME', 'Phone Number', and 'MESSAGE'. Below these fields is a button labeled 'Pick a date' with a calendar icon. At the bottom right is a large orange button labeled 'Send Message'.

Krishma  
+977 9849572298

EMAIL \_\_\_\_\_

NAME \_\_\_\_\_

Phone Number \_\_\_\_\_

MESSAGE \_\_\_\_\_

Pick a date

Send Message

## 8. Wireframes

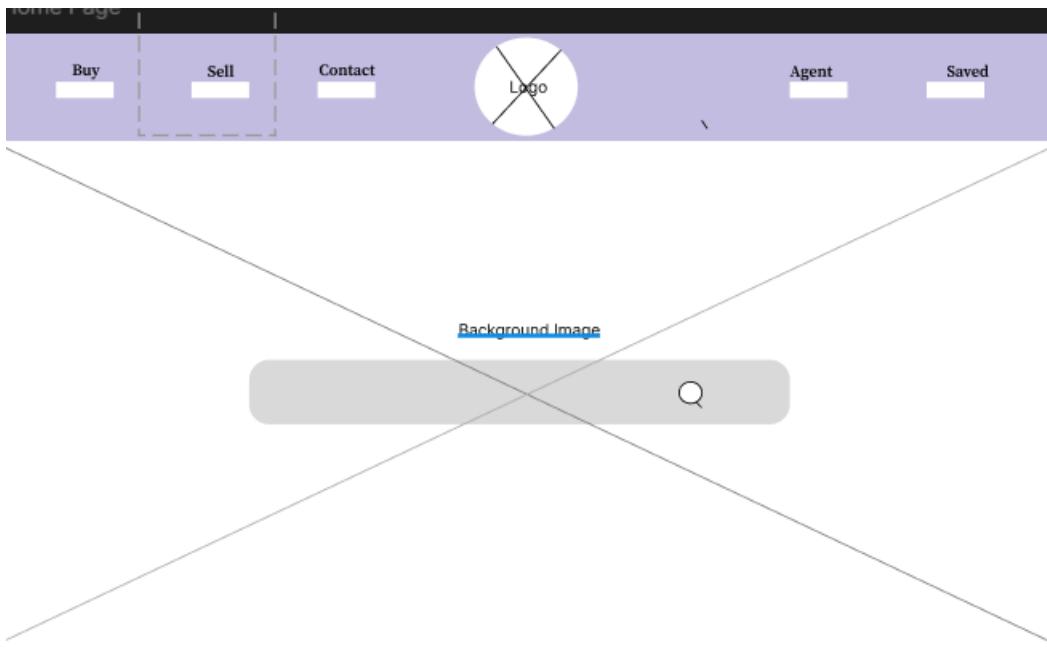


Figure 37 Hero Page

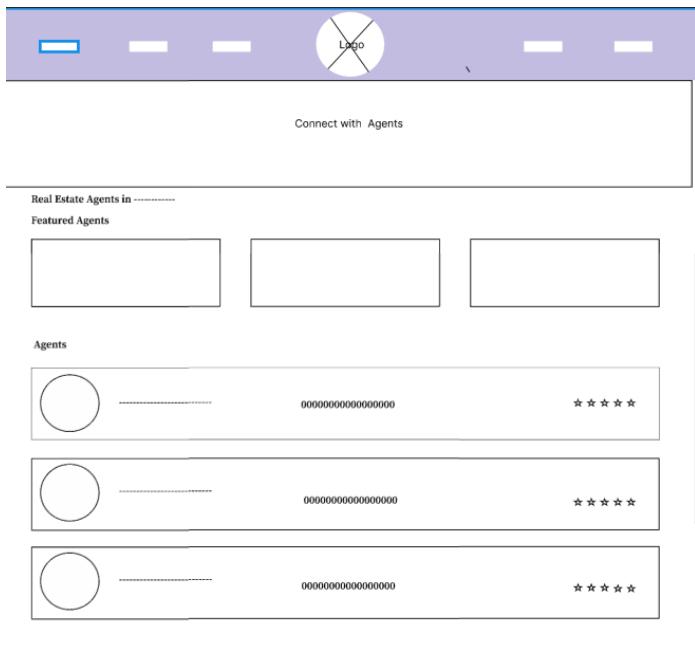


Figure 38 Agent Page

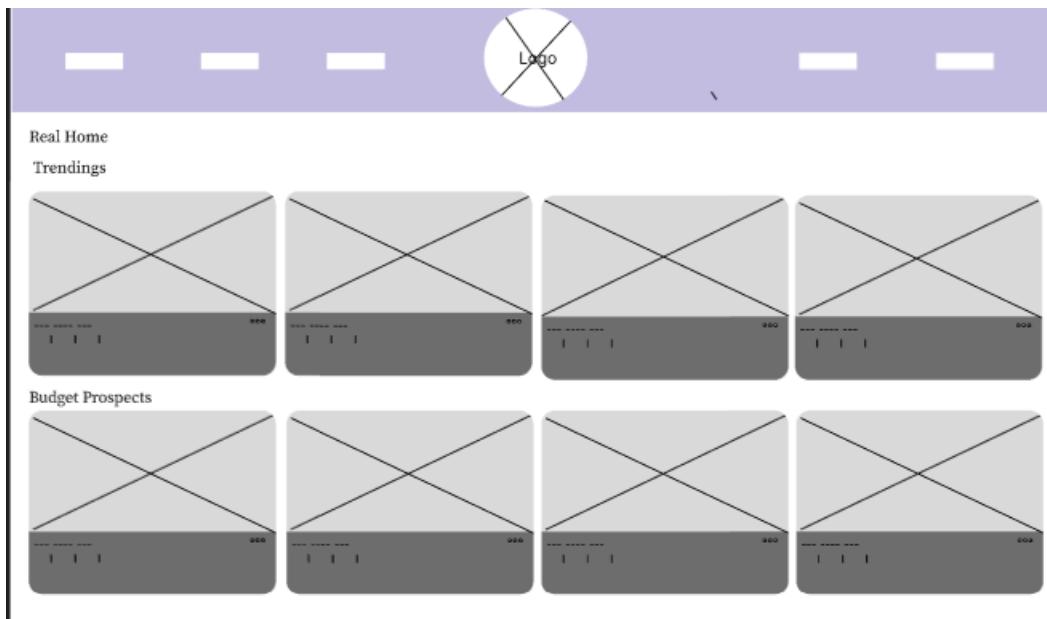


Figure 39 Buy Page

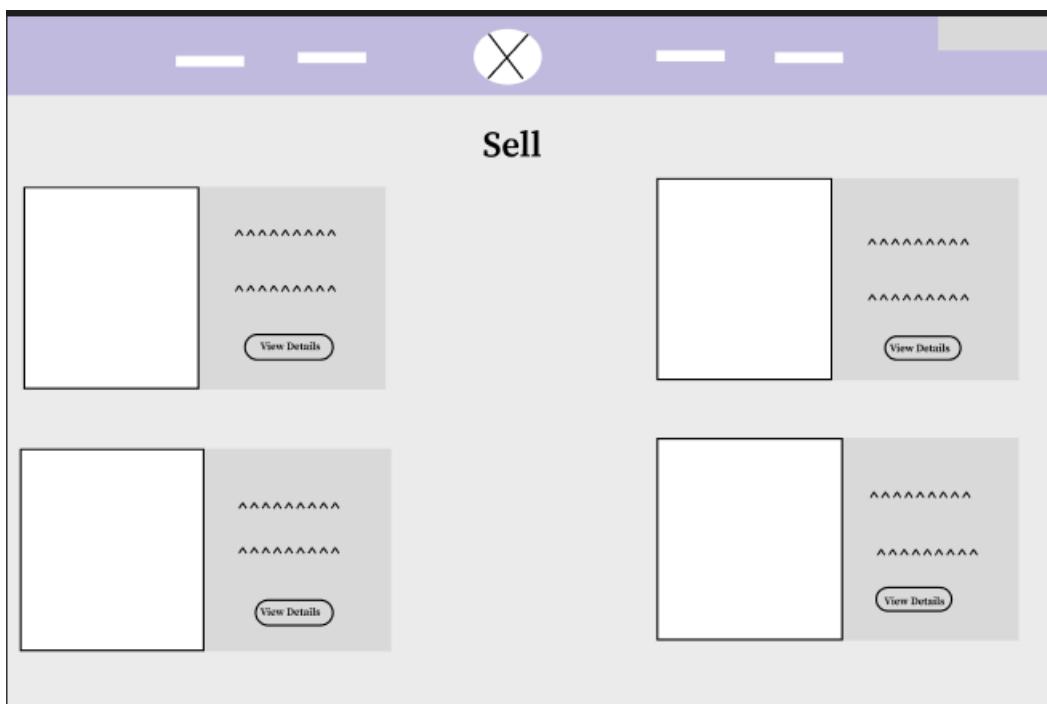
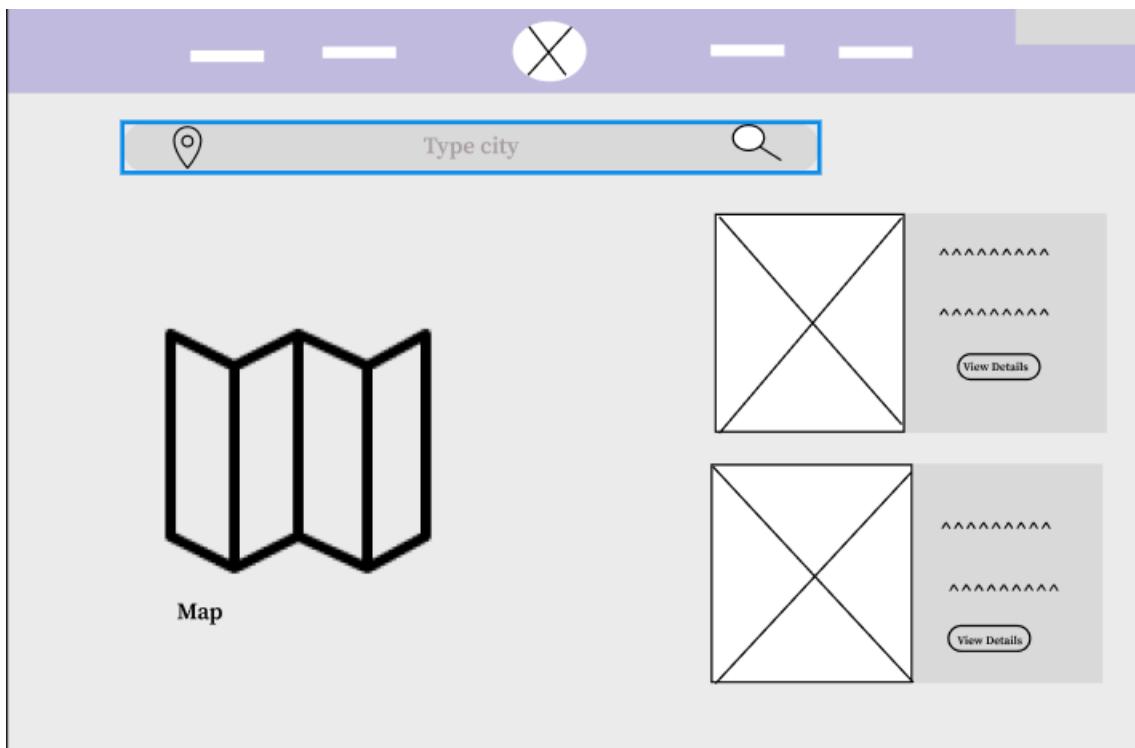


Figure 40 Sell Page



## 9. Machine learning Methodology

- Shortest distance and feature calculation

The system follows pathfinding principles to recommend houses through K-Nearest Neighbors (KNN). The KNN algorithm functions as the successor function by finding the most similar neighbors through multi-dimensional features including dimensions and geographic location and property details and current status. The goal test requires the system to identify properties which closely match the characteristics of the target house. The system derives its solution through a combination of Euclidean distance on standardized feature vectors along with geopy's geodesic geographic distance calculation. The system uses this combined similarity measure to perform a successful ranking of recommended houses

- Data Collection

The system acquires data through MongoDB by storing each house as a separate document containing fields which include property type, status, size, latitude and longitude coordinates, image, location together with price information. The system allows agents to enter data manually through its internal platform which guarantees precise results and human monitoring. The recommendation engine receives training from the complete dataset when the application starts up. The system performs asynchronous background data refreshing every 5 minutes to maintain recommendation accuracy without the need for manual intervention.

- Model Development

For the recommendation system to achieve accurate house similarity detection, a systematic model development approach comprising preprocessing and training stages is necessary. In the start for model development, one hot encoding is done for categorical features such as property type, and status which turns the non numeric data in to binary vectors. Then for numerical features such as size, latitude, longitude, standard scaling is done in order to produce standardized features that can reduce bias in the distance measurement. Finally, the pre processed and standardized vectors are set for model training where both are combined into a single feature matrix. While training, KNN model helps to find the similarity using Euclidean distance. To find the closest neighbours among them, KNN model learns through data structures through unsupervised learning.

- Optimization Evaluation

The system employs a number of optimization strategies and evaluation techniques to guarantee precise and pertinent house recommendations. Depending on the total number of available homes, the K-Nearest Neighbors (KNN) model dynamically caps the number of neighbors it considers at 20 or fewer in order to preserve performance and prevent overfitting. Both feature-based and location-based distances are combined in a hybrid scoring mechanism to identify the most pertinent recommendations.

- Through using geodesic calculations between house coordinates 30% final score is finalized by the geographic distance.
- To make the score fair and compatible while scoring, MinMaxScaler was used.

- Through taking all the approach balances and helps to surface houses that are not only similar but also close to each other geographically which helps to enhance the user satisfaction of the recommendation.
- Integration into Application

FastAPI backend includes the AI-based recommender system through a Python class named `HouseRecommender` where the dedicated class performs two main functions such as processing housing data from MongoDB at application startup and doing one-hot encoding on categorical features whereas numerical scaling operations. After data preparation, the K-Nearest Neighbors (KNN) model gets trained to find the similar properties. The system creates a RESTful API endpoint located at `/r/recommend/{house\_id}` to process house ID information and deliver recommended house listings. The backend system transforms MongoDB ObjectIds into strings in order to use base64 encoding for image data before forwarding the information to the frontend. The design maintains complete separation of recommendation logic within the backend system which allows frontend developers to obtain recommendations and present them.

- Comparing Algorithm Performance

A performance evaluation that compares K-Nearest Neighbors (KNN) based recommendations with random selection baseline should determine recommendation system effectiveness. A recommended evaluation method uses two different systems by comparing K-Nearest Neighbors (KNN) recommendations with random selection.

- One method involves testing the recommender on held-out houses to measure recommendation quality through either simulated user feedback or manual inspection.
- Helps establish whether recommended properties maintain genuine feature similarities and geographic proximity to the input house.
- Using a train-test split to validate KNN model matches for location and property type and size attributes. The evaluation process strengthens the recommendation logic and builds trust in its practical application.

## 10. Conclusion

The final report captures all the documented detail of Basnet Realties with explaining all the essentials topics like development, implementation and evaluation. I am over the moon to see the final outcome of my report, it presents a clear and structured overview of project, including the aims, objectives and academic questions that guided the development. The report presents the detailed explanation of how it platform supports both Real estate agents and developers. The diagrams such as use case diagram, sequence diagrams, and class diagrams, enhances the reports clarity and provides a good visual presentation of the system. As iterative development is used for development methodology for Style sphere, it has proven to be highly beneficial. By continuous cooperation with client. I could easily make changes to the system based on the feedback.

The tools and technologies used for the development of Basnet Realties was well-chosen I must say, as I already had some experience and some knowledge on React it was easy for me to get in MERN. Use of React and tailwind for the development of UI was easy for me without requiring me to use other resource. Using Express, Node and Mongo as well as machine learning for recommendation system was new for me but through different course on YouTube and resource available online, I was able to achieve my goal.

## 11. Critical Evaluation of the project

This final report covers all the parts of the Basnet Realities in documented from which explains the critical topics such as development, planning and execution. This documentation process has been the great experience, where it presents clear overview of Basnet Realties with its aims and objectives. There are also many detailed diagrams such as user case diagram, class diagram, sequence diagram and many more explaining the work system and workflow of my project just in case reader might find it easy.

As I have chosen agile method for development of Basnet Realties, it has been the biggest contributor and beneficial in helping my project finish successfully. Through my process of development, I was in contact and collaboration with the client in every development process and continuous improvement on the product through client suggestions. While using this method it was significantly more flexible in the working environment too.

The tools and technologies used for the development of Basnet Realties was well-chosen I must say, as I already had some experience and some knowledge on React it was easy for me to get in MERN. Since, every startups use MERN stack for web development due to easy and fast development of product It was no brainer to use this stack. Use of React and tailwind for the development of UI was easy for me without requiring to use other resource. Using Express, Node and Mongo was new for me but through different course on YouTube and resource available online, I was able to achieve my goal. And for the machine learning part, it was everything new since to execute the recommendation effectively needed vast amount of knowledge.

This Basnet Realities project has been the good learning experience and self-reflection on my ability with various skill and handle various programming languages. Through this project, I have been able to deal with various problems and came up with various solution which has increased my ability on problem solving skills. Similarly, dealing with various libraries and programming language has made my ability to research deeply and execute which has made me a full stack web developer. Main skill that's was significantly improved was time management where I have successfully worked within my time division as per

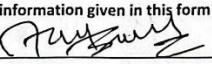
scale of my requirement of work. And made my habit to code every day and understand the code as well as mechanisms which has also benefitted me.

## 12. Evidence of Project Management

### Log Sheets

PROJECT MANAGEMENT LOG	
First Name: Kulbhushan Basnet	Surname: Basnet
Student Number: 2332953	Supervisor: Avanindra Shrestha
Project Title: Basnet Realities	Month: 15 December
What have you done since the last meeting	
After the last meeting I have <del>made</del> designed the Buy page, Sell page and pop up portfolio page.	
What do you aim to complete before the next meeting	
In the Next page I'll try to finish Details of buy page may be Change the layout if necessary and add the search boxes. And <del>Add</del> Add <del>Enterachire</del> map <del>if</del> if Clicked the card. <del>And</del> <del>list</del> of	
Supervisor comments	
<ul style="list-style-type: none"><li>- Complete the design and prototype of the system.</li><li>- Continue with the development as well.</li></ul>	

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

Student Signature: 

Date: \_\_\_\_\_

Supervisor Signature: 

Date: 2024/12/15

Faculty of Science and Engineering  
School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name:	Kulbhushan
Surname:	Basnet
Student Number:	23B2953
Supervisor:	Anandra Shrestha
Project Title:	Basnet's Realeye
Month:	December

What have you done since the last meeting

Since the last meeting I have done login and sign up page and has added the feature of signing with Google.

What do you aim to complete before the next meeting

Now I aim to complete :

- \* Navigating to admin, agent and hero page of user.
- \* fully complete the UI of sign and login page.
- \* Add some UI of user and agent dashboard features.

Supervisor comments

- Start with literature review  
(At least 5 research papers & 3 similar system)
- Authentication and start with other modules

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

Student Signature: Rajkumar

Date: \_\_\_\_\_

Supervisor Signature: Anandra Shrestha

Date: 2024/12/29



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PROJECT MANAGEMENT LOG

First Name: Kulbhushan Barnet Surname: Barnet  
Student Number: 2332953 Supervisor: Avanindra Misra  
Project Title: Barnet Realties Month: January

What have you done since the last meeting

Since the last meeting :

- \* I have solved the authentication problem .
- \* I have made changes in Agent Dashboard . Where agent can add the house .

What do you aim to complete before the next meeting

I Aim to :

- \* I will add another authentication in which user will be able to login with email with otp send .
- \* I will make UI UX Change in agent dashboard

Supervisor comments

- Work on UI of the application .

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

Student Signature: A. Barnet

Date: January 5<sup>th</sup>

Supervisor Signature: Avanindra Misra

Date: 2025/01/05



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 School of Mathematics and Computer Science

PROJECT MANAGEMENT LOG	
First Name: Kulbhushan Basnet	Surname: Basnet
Student Number: 2332953	Supervisor: Avanindra Shrestha
Project Title: Basnet Realties	Month: February
What have you done since the last meeting	
<p>Since the last meeting :</p> <ul style="list-style-type: none"> <li>* User Agent can add the house with information</li> <li>* User All agents list</li> <li>* Search agents</li> <li>* User Howe filter</li> <li>* latest house</li> <li>* Homepage / sell / buy / Agent page</li> </ul>	
What do you aim to complete before the next meeting	
<p>I am going to :</p> <ul style="list-style-type: none"> <li>* Integrate interactive map</li> <li>* User / Agent can edit their profile</li> <li>*</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Add loader in the pages.</li> <li>- Work on UI as well.</li> </ul>	

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

Student Signature: 

Date: \_\_\_\_\_

Supervisor Signature: 

Date: 2023/02/23



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PROJECT MANAGEMENT LOG

First Name: Kishan

Surname: Bansal

Student Number: 2332953

Supervisor: Anindra Mistrya

Project Title: Basket realities

Month: March 2 - 8

What have you done since the last meeting

- \* I have added map
- \* I have done user profile edit and delete .

What do you aim to complete before the next meeting

More

Supervisor comments

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

Student Signature: Rajesh

Date: \_\_\_\_\_

Supervisor Signature: Anindra Mistrya

Date: 2025/03/02

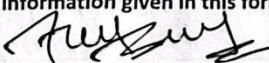


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PROJECT MANAGEMENT LOG	
First Name: Kulbhushan	Surname: Barnet
Student Number: 2832953	Supervisor: Avanindra Shrestha
Project Title: Barnet Realties	Month: March 9 - 15
What have you done since the last meeting	
<p>Since last meeting :</p> <ul style="list-style-type: none"> <li>* Added feature to update and delete house ,</li> <li>* Added Agent profile with delete and update feature ,</li> <li>* Designed some cards feature with respective maps .</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>* To aim to complete ,</li> <li>* Appointment booking -</li> <li>* Start on admin Dashboard .</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Populate the existing data in edit fields.</li> <li>- Add toast while validation errors .</li> <li>- Work on UI</li> </ul>	

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

Student Signature: 

Date: \_\_\_\_\_

Supervisor Signature: 

Date: 2025/03/09



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School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name: <u>Kulbhushan</u>	Surname: <u>Banset</u>
Student Number: <u>2322953</u>	Supervisor: <u>Adarindra Shrestha</u>
Project Title: <u>Banset healthies</u>	Month: <u>February March</u>
What have you done since the last meeting	
<ul style="list-style-type: none"><li>* I have added house filters .</li><li>* Made Admin Dashboard, login and sign up function with pages</li><li>* Made <del>us</del> Admin <sup>Admin</sup> profile information and able to delete admin profile</li></ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"><li>* Add Various Charts in Admin Dashboard , style admin pages .</li><li>* Start on doing appointment booking .</li></ul>	
Supervisor comments	
<ul style="list-style-type: none"><li>- Add Latitude and Longitude fields while entering data</li><li>- Look into similar application for feature addition</li><li>- Start with appointment booking .</li></ul>	

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

Student Signature: Fulksen

Date: \_\_\_\_\_

Supervisor Signature: Shrestha

Date: 2025/03/16



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PROJECT MANAGEMENT LOG	
First Name: Kulbhushan	Surname: Basnet
Student Number: 2832953	Supervisor: Avonindra Shrestha
Project Title: Basnet realities	Month: March
What have you done since the last meeting	
<ul style="list-style-type: none"><li>* Admin logout , verification , forgot password</li><li>* Replaced resend for email verification with Node mailer</li></ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"><li>* Charts for admin Dashboard</li><li>* Appointment meeting .</li></ul>	
Supervisor comments	

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

Student Signature: Kulbhushan

Date: \_\_\_\_\_

Supervisor Signature: Avonindra Shrestha

Date: 2025/03/23



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PROJECT MANAGEMENT LOG	
First Name: <u>Kulbhushan</u>	Surname: <u>Basnet</u>
Student Number: <u>2332953</u>	Supervisor: <u>Anandira Shrestha</u>
Project Title: <u>Basnet features</u>	Month: <u>May</u>
What have you done since the last meeting	
<ul style="list-style-type: none"><li>* Calendar Validation</li><li>* MDF Validation</li><li>* Filtering the appointment booking</li></ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"><li>* Aim to</li><li>* finish the Machine learning part.</li><li>* Upgrade and add some UI/UX</li></ul>	
Supervisor comments	

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

Student Signature: Mukund

Date: 4th May

Supervisor Signature: Anandira Shrestha

Date: 2025/05/04



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PROJECT MANAGEMENT LOG			
First Name:	Kubhushon	Surname:	Basnet
Student Number:	2832953	Supervisor:	Anandra Shrestha
Project Title:	Basnet Realties		
Month: May			
What have you done since the last meeting			
<ul style="list-style-type: none"><li>* I have done Machine learning for content based filtering .</li><li>* Added &amp; Upgraded the UI UX of favorite page .</li></ul>			
What do you aim to complete before the next meeting			
<ul style="list-style-type: none"><li>* Testing S</li><li>* Integrate Machine learning in my project .</li></ul>			
Supervisor comments			

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

Student Signature: Kubhushon

Date: 11<sup>th</sup> May

Supervisor Signature: Anandra Shrestha

Date: 2025/05/11

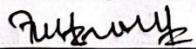


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PROJECT MANAGEMENT LOG	
First Name: Kulbhushan	Surname: Basnet
Student Number: 2832953	Supervisor: Avinindra Shrestha
Project Title: Basnet Realities	Month: 01 April
What have you done since the last meeting	
<ul style="list-style-type: none"> <li>* Data cleaning</li> <li>* Data Preprocessing for Art content based filtering recommendation system</li> </ul>	
What do you aim to complete before the next meeting	
<ul style="list-style-type: none"> <li>* <del>Use of KNN and</del></li> <li>* Research much deeper on Art</li> <li>* Start on machine learning Model .</li> </ul>	
Supervisor comments	
<ul style="list-style-type: none"> <li>- Work on VI</li> <li>- Work on Recommendation System .</li> </ul>	

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

Student Signature: 

Date: 4/20

Supervisor Signature: 

Date: 2025/04/20



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School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name:	Kulbhushan
Surname:	Basnet
Student Number:	2332953
Supervisor:	Anindra Shrestha
Project Title:	Basket Recom's
Month:	May

What have you done since the last meeting

- \* Done the Completed the Recommendation system .
- \* Calender validation

What do you aim to complete before the next meeting

- \* Make the recommendation system faster .

Supervisor comments

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

Student Signature: Kulbhushan

Date: 5/18

Supervisor Signature: Anindra Shrestha

Date: 2025/05/18



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School of Mathematics and Computer Science



PROJECT MANAGEMENT LOG	
First Name: Kulbhushan	Surname: Basnet
Student Number: 2332953	Supervisor: Avanindra Shrestha
Project Title: Basnet realities	Month: April
What have you done since the last meeting	
<p>* I have added various loader with UI * Added some charts and in admin Dashboard * finished appointment booking</p>	
What do you aim to complete before the next meeting	
<p>* Add Various page transition (<del>and</del> animations) and make UI and UX better. * Add Land Area Unit converter feature * Start on recommendation system.</p>	
Supervisor comments	
<p>- Add notification in the system. - Send email after booking confirmation.</p>	

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

Student Signature:

Date: \_\_\_\_\_

Supervisor Signature:

Date: 2025/04/06



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