A

Mini Project Report

on

EstateInsight

Submitted in partial fulfillment of the requirements for the degree

Second Year Engineering – Computer Science and Engineering(Data Science)

By

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CERTIFICATE

This to certify that the Mini Project report on **EstateInsight** has been submitted by Varun Lad(22107043),RajChoudhary(22107044),SiddeshPatil(22107031),DeveshPatil(22107038) who are Bonafide students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfillment of the requirement for the degree in **Computer Science and Engineering(Data Science)**, during the academic year **2023-2024** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ABSTRACT

This project endeavors to create a robust real estate application using Python, focusing on enhancing user experience and functionality. The application acts as a centralized platform for accessing property information, detailed listings, and facilitating seamless transactions. Key features include an intuitive graphical user interface (GUI) designed with the tkinter library to simplify property browsing and search functionalities, ensuring a user-friendly experience. Advanced image processing techniques using the Python Imaging Library (PIL) optimize the visual presentation of property listings, improving their appeal to users. Additionally, location tracking features are seamlessly integrated using the tkintermapview module, enabling users to visualize property locations on interactive maps. Through these efforts, the project aims to streamline the real estate experience, making it more accessible, engaging, and efficient for users.

Chapter 1

INTRODUCTION

In our daily lives, navigating property transactions can be a cumbersome and often overwhelming task. Despite significant technological advancements in recent years, the real estate sector continues to grapple with persistent challenges that need addressing. These challenges not only impede the efficiency of buying, selling, and renting processes but also contribute to unnecessary complexities and frustrations for all parties involved.

At the core of our motivation lies a recognition of the shortcomings prevalent within the current real estate landscape. We have identified several key areas where improvement is urgently needed to streamline operations and enhance the overall experience for buyers, sellers, and renters alike. Among these issues, two critical factors stand out prominently which are Limited Information Access, Property Valuation, etc.

Recognizing the profound impact of these challenges on the real estate ecosystem, we are driven to develop innovative solutions that address these pain points head-on. Through our commitment to excellence and relentless pursuit of improvement, we envision a future where property transactions are seamless, transparent, and accessible to all.

1.1. Purpose :

The purpose of the real estate app is to revolutionize and streamline the property transaction process, addressing the persistent challenges and shortcomings faced by buyers, sellers, and renters in the current real estate landscape.

Comprehensive Property Information: The app provides users with access to a vast database of comprehensive and accurate property information, enabling them to make well-informed decisions when buying, selling, or renting properties.

Transparency in Property Valuations: By implementing standardized methodologies and transparent valuation processes, the app seeks to eliminate ambiguity and disputes surrounding property valuations, facilitating smoother negotiations between parties.

Efficient Property Search and Discovery: Through advanced search filters and intuitive user interfaces, the app simplifies the process of finding and exploring properties, saving time and effort.

Enhanced User Engagement: The app fosters increased user engagement by offering features such as virtual tours, interactive property listings, and real-time communication channels, providing a rich and immersive experience for users.

Empowerment of Real Estate Professionals: By equipping real estate agents with powerful tools and analytics, the app enables them to enhance their performance, streamline their workflows, and better serve their clients.

1.2. Problem Statement :

In today's ever-evolving real estate landscape, agencies grapple with daunting challenges, including the recruitment of skilled agents and the facilitation of smooth interactions between users and agents. Moreover, the absence of integrated chat functionality in numerous real estate applications poses a significant hurdle, leading to communication gaps and hindering transaction efficiency, thereby affecting user-agent engagement.

Solution:

Online Agents: Our innovative approach proposes granting users unprecedented access to a handpicked network of online agents directly through our application. This groundbreaking feature not only bridges the gap between users and agents but also ensures prompt assistance and expert guidance throughout the real estate journey.

Efficient Communication: To address the pressing need for streamlined communication, we suggest integrating a cutting-edge messenger system within our application. By facilitating seamless interaction channels between users and agents, this revolutionary feature aims to foster trust and elevate the overall transaction experience.

1.3. Objectives :

To develop a Comprehensive Python-Based Real Estate Application: The primary goal is to create a robust real estate application using Python. This application will serve as a centralized platform to streamline access to property information, providing users with detailed listings and facilitating seamless transactions.

Improve User Experience through Intuitive GUI: To utilize the tkinter library to design a graphical user interface (GUI) that simplifies property browsing and search functionalities.Ensure the GUI offers a user-friendly experience, allowing easy navigation through available properties based on preferences and requirements.

Enhance Visual Presentation with PIL Library: To implement advanced image processing techniques using the Python Imaging Library (PIL) to optimize the visual presentation of property listings.

Integrate Location Tracking with tkintermapview: To utilize the tkintermapview module to integrate location tracking features within the application.

1.4. Scope:

Database Creation: Develop a comprehensive database comprising both residential and commercial properties available for sale or rent.

Detailed Property Information: Provide detailed information about each property, including descriptions, photos, floor plans, virtual tours, and other relevant details to help users make informed decisions.

High-Quality Media Content: Ensure high-quality media content, including professional photographs and videos, to showcase properties effectively and attract potential buyers or renters.

Communication Tools: Implement communication tools such as live chat, messaging features to facilitate interactions between user/agents, enabling seamless communication and negotiation processes.

Chapter 2

LITERATURE REVIEW

Online real estate platforms have become increasingly prevalent in the modern digital landscape, offering users convenient access to property listings, transactions, and agent services. This literature review explores the current state of online real estate platforms, focusing specifically on the challenges and opportunities associated with enhancing user-agent interaction within these platforms.

Future Directions and Implications:

Looking ahead, the future of online real estate platforms lies in harnessing emerging technologies to further enhance user-agent interaction. From AI-driven personalization to immersive virtual reality experiences, there is vast potential for innovation in creating more engaging and effective user-agent communication channels (Li & Wang, 2020)[1].

Challenges in User-Agent Interaction:

Despite the convenience offered by online real estate platforms, challenges persist in fostering effective interaction between users and agents. Research indicates that users often encounter difficulties in finding reliable agents, communicating their preferences effectively, and receiving timely assistance throughout the transaction process (Singh & Samuel, 2019)[2].

Opportunities for Improvement:

Several studies have identified opportunities for enhancing user-agent interaction within online real estate platforms. One such opportunity lies in leveraging advanced technologies, such as artificial intelligence (AI) and chatbots, to provide personalized assistance and recommendations to users based on their preferences and behavior (Holtz-Eakin, 2017)[3].

User Experience and Satisfaction:

The quality of user-agent interaction plays a crucial role in determining user satisfaction and loyalty towards online real estate platforms. Research suggests that platforms that prioritize user experience and provide responsive, knowledgeable agent support tend to enjoy higher levels of user engagement and retention (Clemons & Barnett, 2017)[4].

Evolution of Online Real Estate Platforms:

The evolution of online real estate platforms can be traced back to the early days of the internet, with the emergence of property listing websites. Over the years, these platforms have evolved into comprehensive ecosystems that facilitate various aspects of property transactions, including property search, financing, and communication with real estate agents (Hanna & Rohm, 2011)[5]

Real Estate Management System:

In their 2023 Real Estate Management System (REMS), Aishwarya S and Ritesh J utilized a blend of HTML, CSS, JS for front-end development, coupled with Python Flask for back-end functionality. Their system boasts robust property listing capabilities and efficient maintenance tracking features. However, challenges arise from incomplete property information and inconsistent data quality, potentially hindering user satisfaction and system reliability. Addressing these issues is paramount to ensuring the REMS delivers a seamless and reliable real estate management experience for users[1].

Real Estate Management System:

In Deepika S's 2022 Real Estate Management System (REMS), PHP and MySQL were employed to enhance property searches with faster and more accurate results. The system also integrates geo-tagged photos for precise property location. However, crucial technical details, such as security measures and scalability considerations, are lacking. Addressing these deficiencies is imperative to ensure the REMS meets industry standards and user expectations for reliability and security[2].

E-Property Bid –The smart approach:

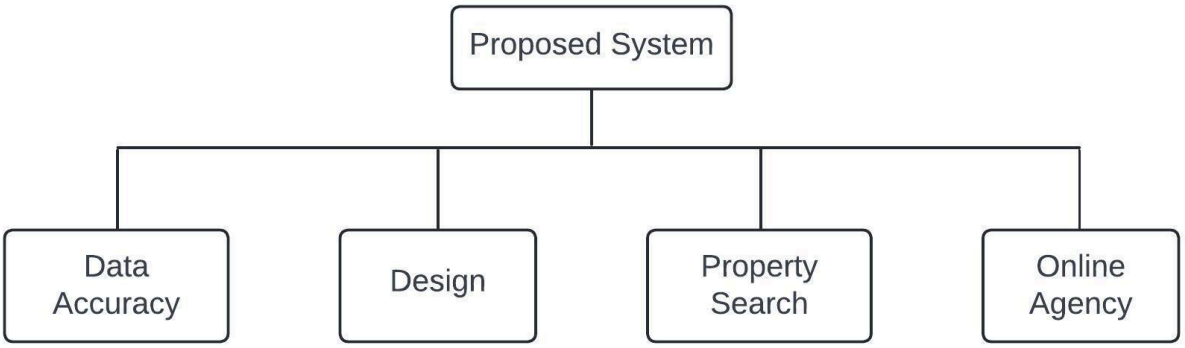
Evaluating Aastha B, Akanksha V, Anuj T, and Ashish Kumar Gupta's E-Property Bid System:
In their 2022 project titled "E-Property Bid – The Smart Approach," the team utilized MongoDB and SQL Database to implement the system. Their approach focused on leveraging the latest technologies and implementing specific-based searching functionalities. However, the system is plagued by user privacy concerns and issues related to data accuracy and reliability. Addressing these challenges is essential to instill trust and confidence among users and ensure the system's long-term viability and success[3].

Chapter 3

PROPOSED SYSTEM

The EstateInsight is a comprehensive real estate application aiming to improve user-experience and provide more comprehensive information to customers.

Key features of Proposed System include:



Data Accuracy: Guarantee the accuracy and currency of property prices and details to provide users with reliable information.

User-Friendly Design: Revamp the application's design to enhance usability, ensuring ease of navigation and simplifying the process for users to find properties and access information.

Improved Property Search: Enhance the search functionality to make it simpler for users to find properties, enabling them to refine their searches effectively and locate desired listings effortlessly.

Online Agent Provision: Introduce online agent provision to assist users in better understanding properties, providing expert guidance and support throughout the property exploration and decision-making process.

3.1. Features/Functionality:

The improved Real Estate application will incorporate a range of features and functionalities to enhance the user experience, provide more accurate information, and ensure the sustainability of the platform. These include:

Property Selling:

Create a feature that allows users to not only buy but also sell a particular property by implementing the sell feature.This feature will include all the property details to be included and the property details will be resurfaced on the app once uploaded.

Property Viewer:

Develop a property detail page that provides comprehensive information about the properties listed on the application. This page should include property descriptions, images and owner information.

Chat:

Design a user-friendly chat functionality that permits users to talk with the agents available within the application. This feature will ensure the users are able to talk with agents for a more detailed guidance.

Search:

Implement a robust search feature that allows users to input specific property names, types within the application. The search function should provide relevant and accurate results for a seamless user experience.

Property Location:

Implement a map location system that allows users to see the location of a property in the property viewer page.

Land Value Graph:

Addition of graphs showing the price charts of a particular land from previous years.This feature will be uploaded by the admin through the admin page.

E.M.I Calculator:

Implementation of a E.M.I calculator for users wanting to buy a property based on it.

Chapter 4

REQUIREMENT ANALYSIS

Requirement analysis is a pivotal phase in software development, essential for delineating the scope and functionality of the system. It encompasses identifying stakeholders, comprehending user interactions, specifying functional and non-functional requirements, designing the database schema, and selecting the appropriate technology stack. This meticulous process ensures the final product aligns with the needs and expectations of users and stakeholders.

The Real Estate Application caters to a diverse array of stakeholders, including buyers, sellers, renters, agents, and administrators. Buyers and renters are primary users who utilize the platform to explore properties and initiate transactions, while sellers list their properties for sale or rent. Agents facilitate transactions, providing guidance and assistance to users throughout the process. Administrators oversee the application's operations, managing listings, user accounts, and system functionality.

Functional requirements of the application encompass robust property listing management capabilities, allowing administrators to add, update. Property search functionalities enable users to browse available properties based on various criteria.Transaction features facilitate secure and efficient property transactions, including buying, selling, and renting.

Non-functional requirements, including performance and usability, are paramount. The application must perform optimally under varying user loads, ensuring responsiveness and reliability. Usability features, such as an intuitive user interface and streamlined navigation, cater to users of all technical levels, enhancing the overall user experience.

The database design forms the backbone of the application, defining entities and relationships essential for the database schema. Entities such as Users (buyers, sellers, renters, agents, administrators), Properties are central to the database schema. Relationships are established to efficiently store and retrieve data, ensuring seamless interaction between entities and system functionality.

Chapter 5

PROJECT DESIGN

Project design is planning how a project will work before starting it. It involves figuring out what's needed, setting goals, and deciding how to build it. Key parts include figuring out how the system will be set up, how data will be stored, what the interface will look like, how things will work, how to test it, and how to handle any problems.

5.1. System Architecture:

System architecture refers to the overall structure and design of a software system or application. It defines how different components of the system are organized, how they interact with each other, and how data flows between them. System architecture typically includes various layers or tiers, such as the presentation layer (user interface), the application layer (business logic), and the data layer (database). It also involves decisions about technologies, frameworks, and protocols to be used, as well as considerations for scalability, reliability, security, and performance. A well-designed system architecture ensures that the software system meets its functional requirements, is maintainable, and can easily adapt to changes or future enhancements.

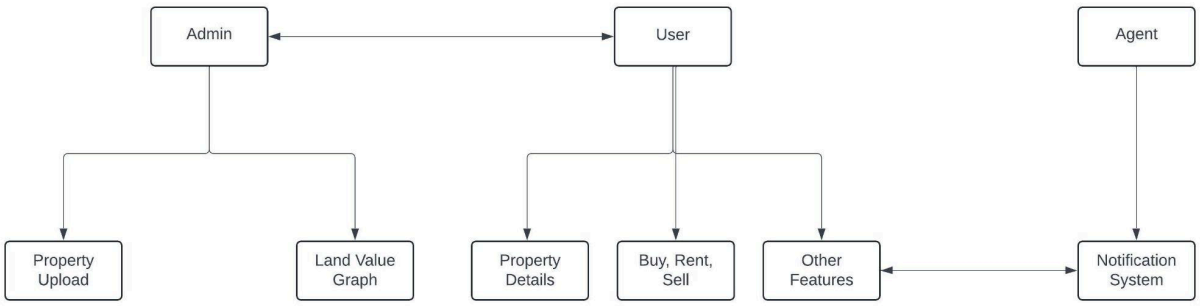


Figure 5.1.1: Block Diagram

The EstateInsight Application has three major system, Admin Page, User Page and a Agent Page.The User Page is the main page that a user will get once they login in the application.The user will able to see properties , chat with agents and many such features within the Application.The Admin Page consists of Property and Land Value Graph Uploading systems where the application admin can upload properties and land value graphs in the User Page.The Agent Page will be same as user page but will have a chat notification system where when a user sends a request for chatting with a agent, the agent who has logged-in can chat with the user.

5.2. Implementation:

During implementation, the team turned design ideas into actual UI elements, using UI photos as guides. They carefully designed each screen to match the intended user experience. For example, the homepage is easy to navigate with clear search bars. Property listing pages show detailed info and nice photos. They made sure everything looks consistent and attractive across all screens. By following the UI photos closely, they made an interface that's even better than expected, giving users a smooth and enjoyable experience.

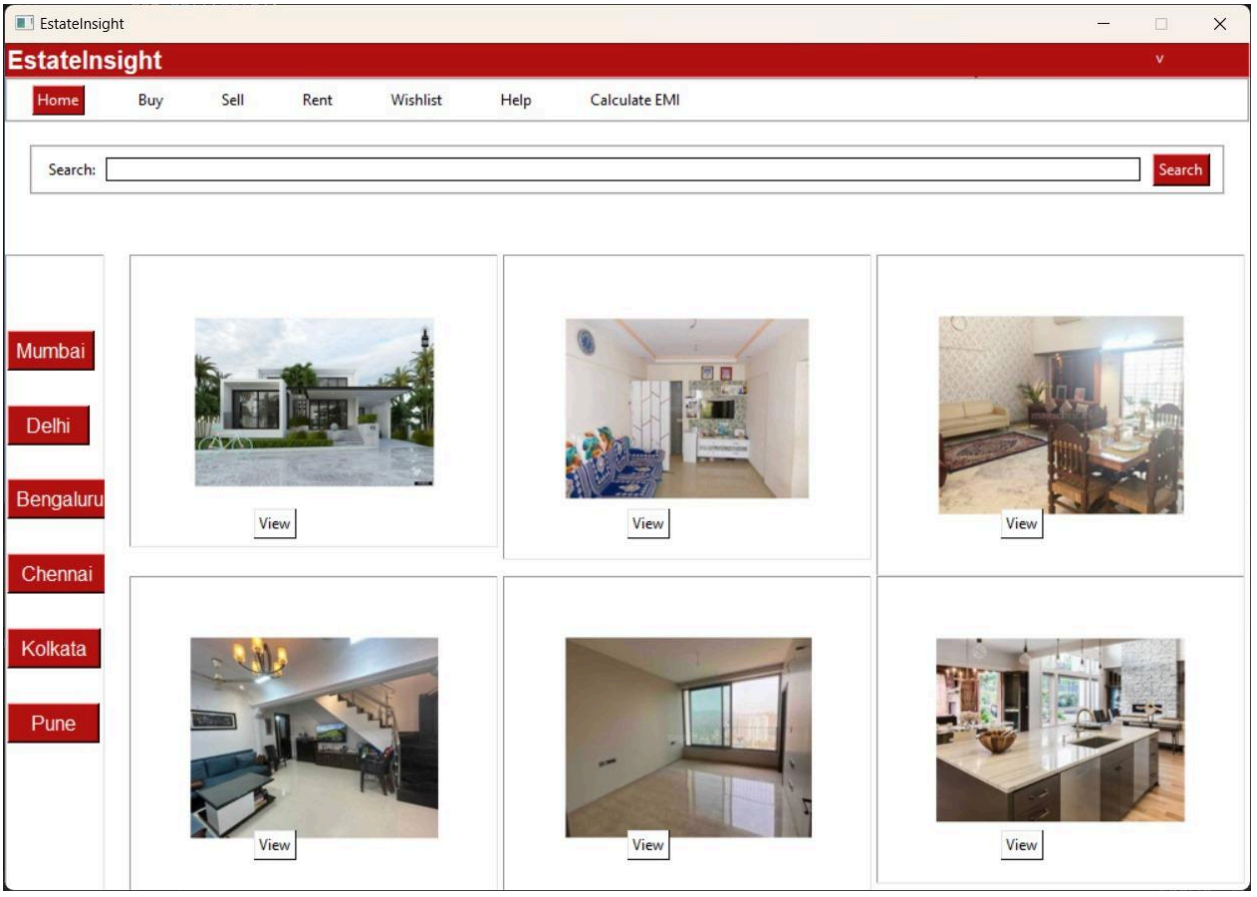


Figure 5.1.2: HomePage

HomePage where all the property details, search, buying, selling and other features will be available.

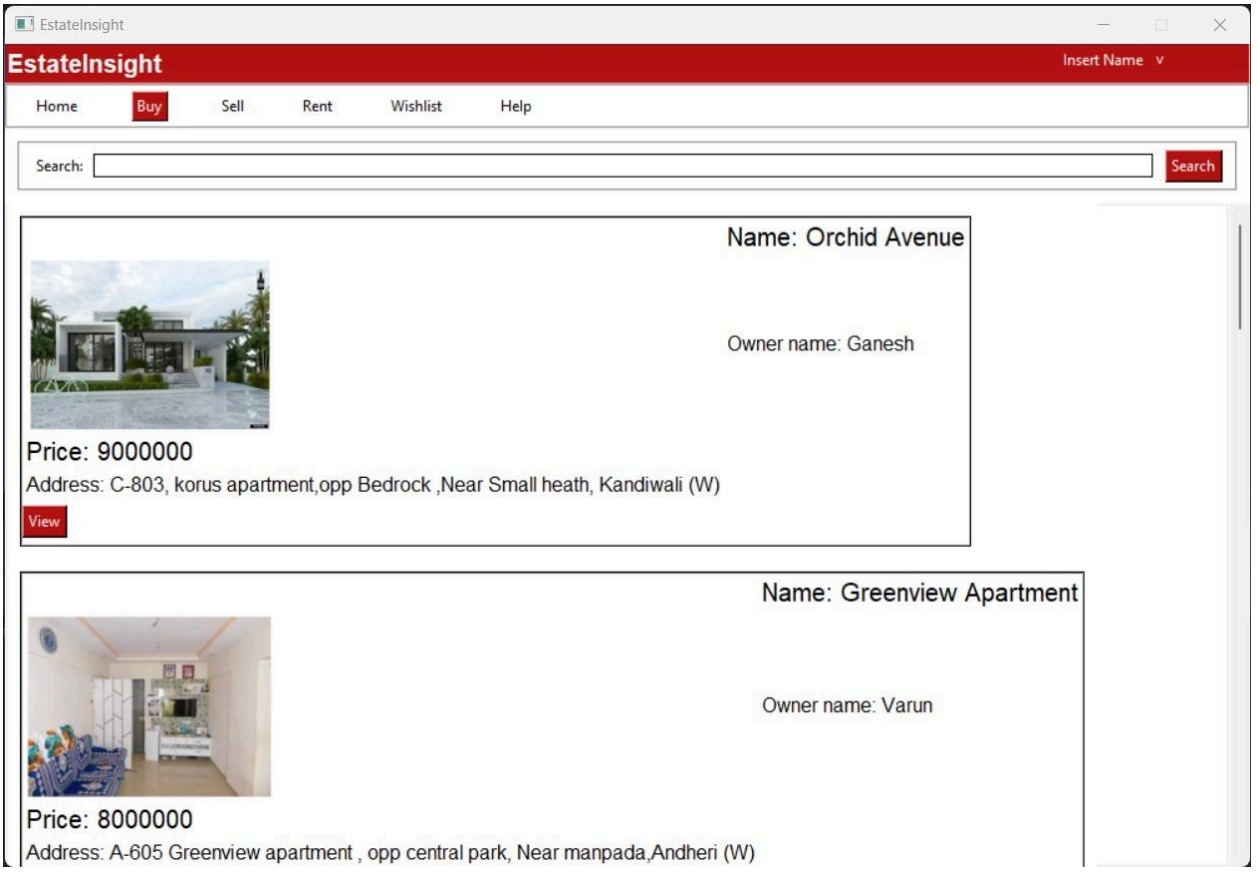


Figure 5.1.3: Buy Page

Buy Page where all the properties listed for buying will be displayed.

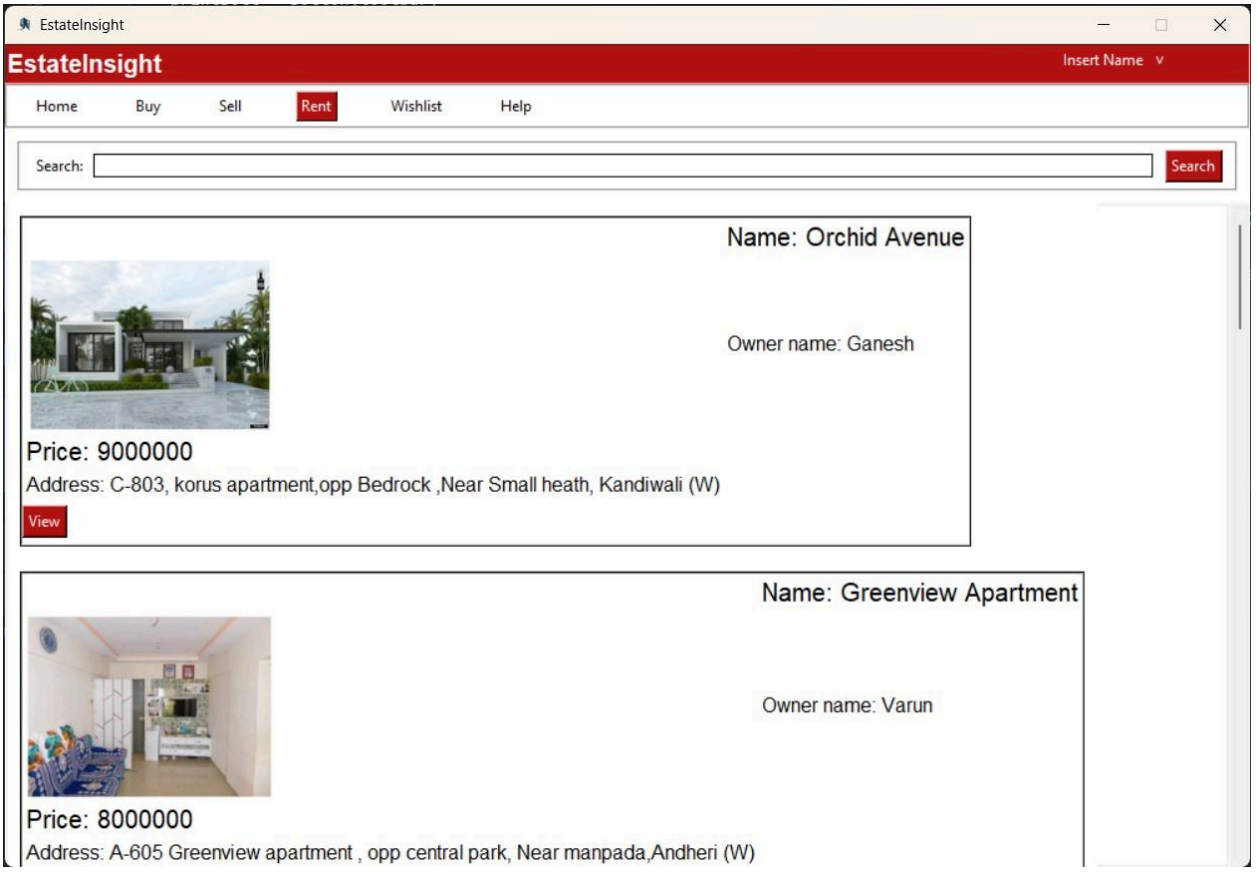


Figure 5.1.4: Rent Page

Rent Page where all the properties listed for renting will be displayed.

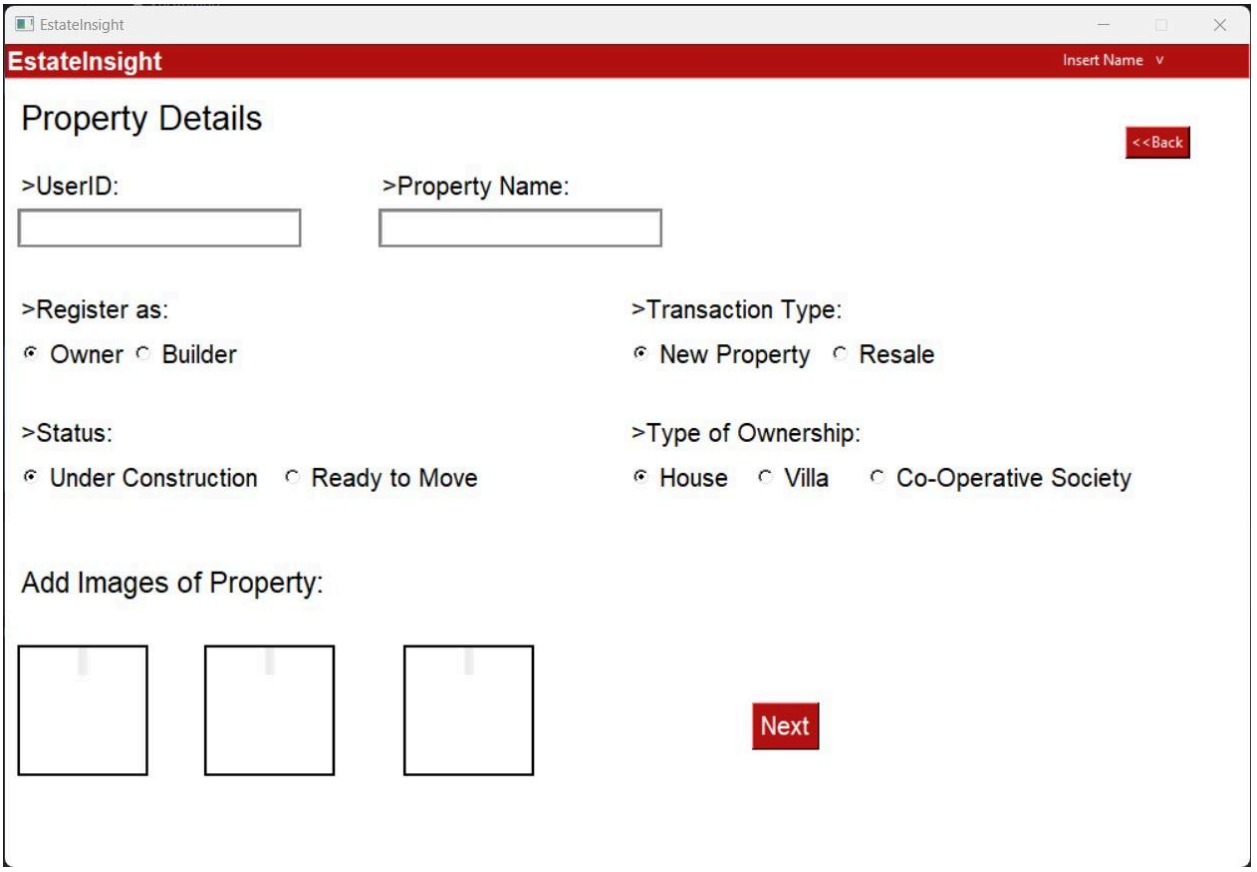


Figure 5.1.5: Sell Page

Sell Page where user can sell their properties to others

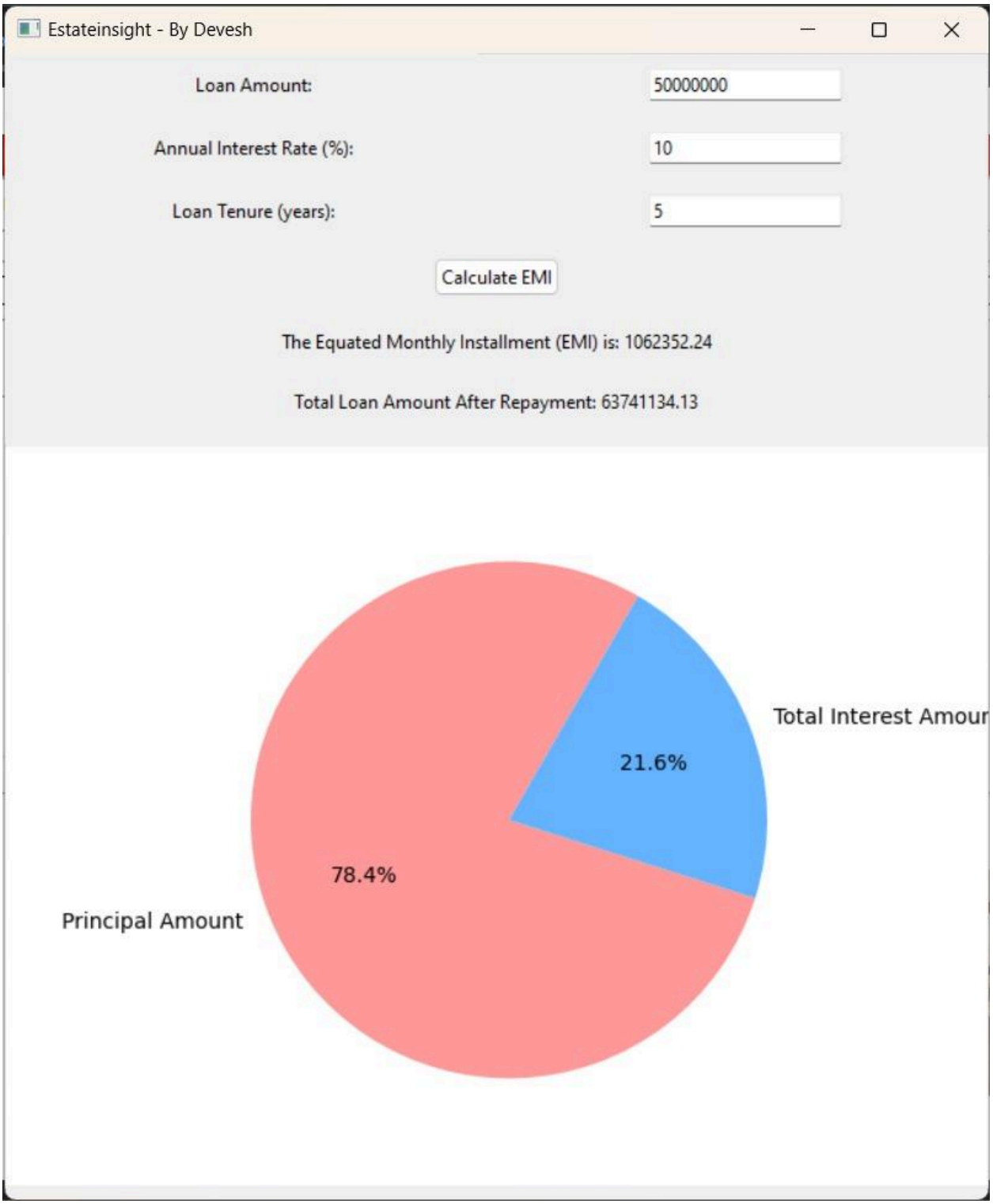


Figure 5.1.6: E.M.I Calculator

E.M.I where it can be calculated if required.

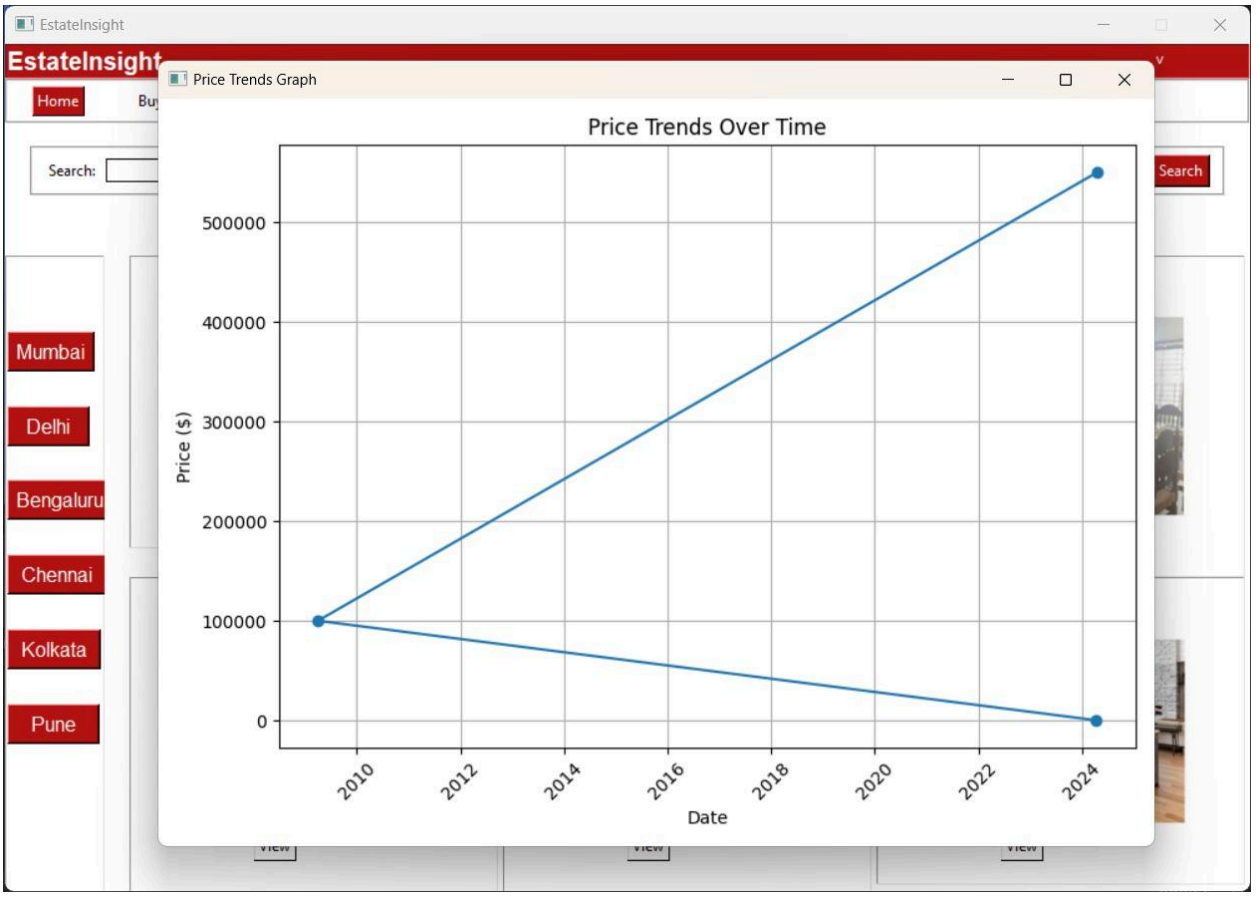


Figure 5.1.7: Land Value Graph

Page where the price graph of the land values from previous years is displayed.

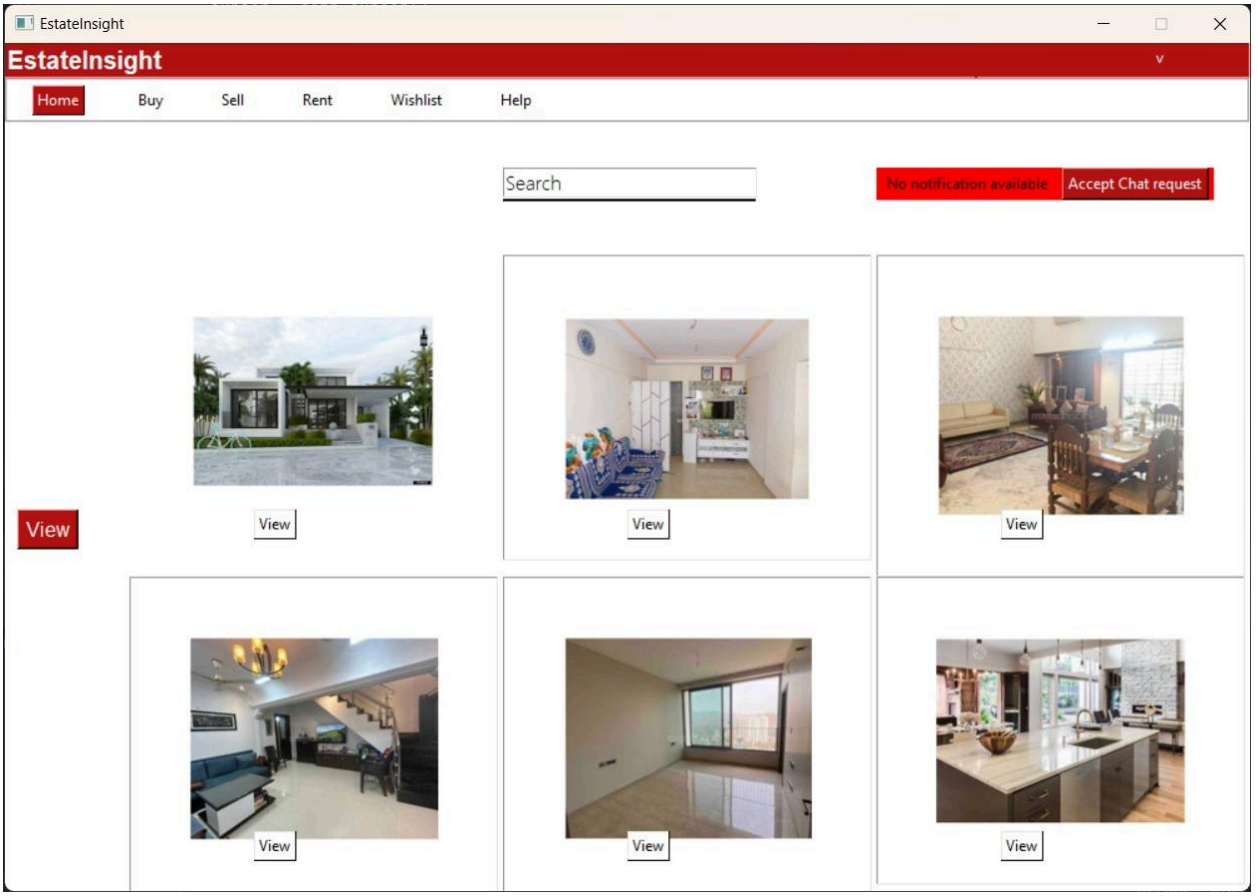


Figure 5.1.8: Agent Page

The page when the agent logs in as an agent the following page will open where notification system is provided when a user sends a chat request.

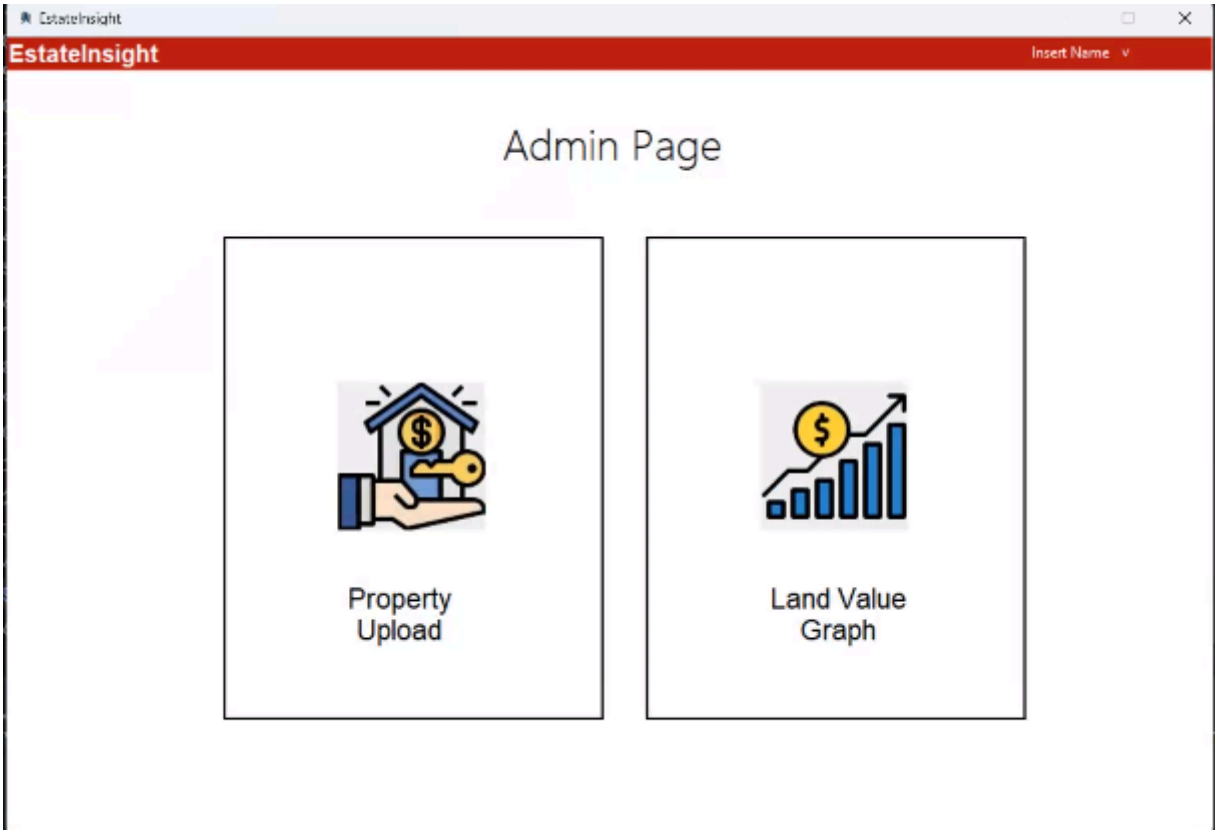


Figure 5.1.9: Admin Page

Admin Page where admin can upload properties and land value graphs in HomePage.

Chapter 6

TECHNICAL SPECIFICATION

Frontend GUI:

For the frontend graphical user interface (GUI), our application leverages the power and versatility of Python 3.11 and 3.12 in conjunction with Tkinter. Tkinter, being a standard GUI toolkit for Python, offers a robust framework for developing intuitive and interactive interfaces, ensuring a seamless user experience.

Libraries:

To enhance the functionality and visual appeal of our frontend, we utilize several libraries:

PIL (Python Imaging Library): This library facilitates image processing tasks, enabling us to optimize and manipulate property images for optimal display within the application.

Tkintermapview: By integrating Tkintermapview, we enrich our application with mapping functionalities, allowing users to visualize property locations and explore nearby amenities directly within the interface.

Matplotlib: Matplotlib is utilized to create dynamic and visually appealing data visualizations, enabling us to present property-related data in an informative and engaging manner.

Backend:

For the backend infrastructure of our application, we rely on MySQL Workbench 8.0. MySQL Workbench provides a comprehensive and user-friendly environment for designing, developing, and managing relational databases. By leveraging MySQL Workbench, we ensure efficient data storage, retrieval, and management, supporting the seamless operation of our real estate application.

This technology stack forms the backbone of our real estate application, enabling us to deliver a feature-rich, intuitive, and efficient platform for property transactions.

Chapter 7
PROJECT SCHEDULE

Sr. No	Group Member	Time duration	Work to be done
1	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	End of January	Topic Finalisation
		2nd week of February	Drawing a paper prototype of the finalized project.
2	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	2nd week of March	Developing the G.U.I
3	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	1st week of March	Developing the G.U.I
4	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	2nd week of March	Discussion about Database
5	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	2nd week of March	Developing the Database
6	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	2nd week of March to 1st week of April	Connection of Database
7	Varun Lad Raj Choudhary Siddesh Patil Devesh Patil	2nd week of April	Finalizing the Project

Table 7.1 Project Schedule

GANTT CHART

A Gantt chart is a visual representation of a project schedule or plan that shows tasks or activities along a timeline. It is a widely used project management tool that provides a clear and concise way to view the sequence of work and the duration of each task within a project. Gantt charts were developed by Henry L. Gantt in the 1910s and have since become a staple in project management.

Key features of a Gantt chart include:

Timeline: The horizontal axis represents time, often displayed in days, weeks, or months. It provides a chronological view of the project's schedule.

Tasks or Activities: Tasks or activities to be completed in the project are represented as horizontal bars on the chart. Each bar corresponds to a specific task or activity and shows its start and end dates.

Task Duration: The length of each bar represents the duration of the corresponding task. The starting point of the bar marks the task's start date, and the ending point indicates when it is scheduled to be completed.

Dependencies: Gantt charts can show task dependencies, indicating which tasks must be finished before others can start. These dependencies are often depicted as arrows or lines connecting the bars of dependent tasks.

Milestones: Milestones are significant events or key points in the project. They are marked on the chart to denote the completion of a critical phase or the achievement of specific goals.

Resource Allocation: Some Gantt charts include information about resource allocation, indicating which individuals or teams are responsible for each task or activity.

Progress Tracking: Gantt charts are dynamic tools that allow for tracking progress. As tasks are completed, bars may be shaded or marked to reflect the actual progress made.

Gantt charts are valuable for project planning, scheduling, and monitoring. They help project managers and teams visualize the project's timeline, allocate resources efficiently, identifpotential delays, and track progress. They are used in a wide range of industries, including construction, software development, event planning, manufacturing, and more.

Figure 7.2: Gantt Chart

To visualize this schedule, a Gantt chart is employed, providing a graphical representation of task durations, start and finish dates, and interactivity. Additionally, Gantt charts help illustrate the project's work breakdown structure and the relationships between activities, ensuring effective project management and progress tracking. Here in the above figure, the rows of the chart contain the task titles such as the project conception and initialization as well as the project design and implementation which in subdivision contains the group formation, topic finalizing, prototype, GUI designing, backend implementation etc. The columns contain the duration of the task completed, percentage of work completed,number of weeks required to complete a particular task, the specific dates, the team members who contributed towards the completion of tasks The detailed explanation of the Gantt chart is explained below:

The project conception and initiation task were executed by the end of the month around 31/01/24. The task of initiation included many more sub-tasks such as group formation and topic finalization which was performed during the 1st week of project initialization.

The group formed included 4 members Varun Lad, Raj Choudhary, Siddesh Patil, Devesh Patil and the finalized topic was EstateInsight.Further, the upcoming week led to the task of identifying the scope and objectives of the mini projects. The next sub-task was to identify the functionalities of the project which was done by all the members in a span of one week from 31/01/24 to 07/02/24. The discussion of the project topic with the help of a paper prototype was completed with equal contribution from all the group members within one week from 07/02/24-14/02/24.

The next task, Database Connectivity and functionalities of modules in the app were done by Varun Lad, Raj Choudhary, Siddesh Patil, Devesh Patil from 16/03/24 to 03/04/24. The Integration of all modules, user interfaces and report writing was completed by Varun Lad, Raj Choudhary, Siddesh Patil, Devesh Patil from 03/04/24 to 10/04/24. The preparation of final presentation II work was equally shared by all the group members in the time of 1 week from 10/04/24 to 17/04/24.

Chapter 8
RESULTS

The outcomes of this project represent the desired results and achievements following the implementation of the enhanced Real Estate application. These outcomes are designed to meet the project objectives and serve the needs of customers:

Buying, Selling, Renting: Users will be empowered to engage in buying, selling, or renting specific properties directly within the application, offering convenience and versatility in real estate transactions.

Detailed & User-Friendly Information: Each property listing will provide comprehensive and easily understandable information to ensure a seamless user experience, fostering clarity and confidence in decision-making.

Simple-to-Use Application: The application will feature straightforward navigation and intuitive features to enhance user engagement, ensuring a user-friendly experience that facilitates efficient interaction with the platform.

Property Search Functionality: Users can effortlessly search for their desired properties using a user-friendly search bar, enabling swift and effective property discovery tailored to their preferences and requirements.

Online Chat Functionality: The application will facilitate online communication with real estate agents, allowing users to seek guidance and assistance in navigating the complexities of the real estate domain through convenient online chat features.

E.M.I Calculation: Users will have the capability to calculate the estimated monthly installment (E.M.I) required for purchasing a specific property, providing valuable financial insights and aiding in informed decision-making regarding property acquisition.

Chapter 9

CONCLUSION

In conclusion, our real estate application is dedicated to promoting sustainability and responsible customer choices. Real estate management systems offer significant benefits such as streamlined operations, improved communication, and enhanced efficiency in organizing property-related data. Despite the advantages, challenges such as complexity, cost, and integration issues need to be addressed during implementation.Proper planning, training, and maintenance are essential to maximize the effectiveness of real estate management systems.Despite potential limitations, the advantages of implementing these systems outweigh the drawbacks, particularly in today's digital era.Thank you for joining us on this journey.

Chapter 10

FUTURE SCOPE

Expansion of Features:

Continuously expand and enhance the features of the Real Estate application to cater to evolving user needs and industry trends. This may include integrating advanced search filters, implementing virtual reality property tours, or introducing personalized recommendation engines.

Integration of AI and Machine Learning:

Explore the integration of artificial intelligence (AI) and machine learning (ML) technologies to enhance user experiences and optimize processes. This could involve implementing AI-powered chatbots for customer support, predictive analytics for property pricing, or image recognition for property classification.

Geographic Expansion:

Consider expanding the geographic coverage of the Real Estate platform to target new markets and regions. This may involve partnering with local real estate agencies or integrating data from additional property markets to provide users with a more comprehensive selection of properties.

Community and Social Features:

Introduce community and social features to foster user engagement and interaction within the Real Estate platform. This could include user forums, community events, or social networking functionalities to connect buyers, sellers, and agents within the platform.

Partnerships and Collaborations:

Explore strategic partnerships and collaborations with other real estate service providers, technology companies, or industry organizations to leverage synergies and expand the reach and capabilities of the Real Estate platform.

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