

Intelligent Flat Suggestion System Using Machine Learning

Submitted in partial fulfillment of the requirements
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Bachelors of Engineering

by

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CERTIFICATE

This is to certify that the mini-project entitled "**Intelligent Flat Suggestion System Using Machine Learning**" is a bonafide work of "**Aditya Shyamanand Mishra (27), Rohitkumar Brahmdeo Pandey (36), Shaikh Didar Abbas (47) , Mohammed Ahsan Ansari (04)** " submitted to the University of Mumbai in partial fulfillment of the requirement for the Mini-Project 1/2 for Second / Third Year of the Bachelor of Engineering in "**Computer Engineering**".

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Declaration

I declare that this written submission represents my ideas in my own words and where others' ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

Nowadays, finding the property of interest is a very major and difficult task. If a person wants to buy or rent the house then they have to take the help of the different brokers/agents which then charge them with high money for just finding the house for them which ultimately increases the budget to buy/rent the house. Also this process consumes lots of time for people just finding the house of their choice. However there is no guarantee that they will get the house of their need. Also there are several websites available for the same work, but people upload the wrong images of their house and will upload only those images that reflect the positive side of the house. Hence there need to be a system that will do this task in a more efficient, secure and authentic way. Our project proposes an Intelligent Flat Suggestion System using Machine Learning to simplify the process of finding suitable flats in different cities. Using machine learning algorithms, the system analyzes vast flat listings data to offer personalized suggestions based on user preferences and historical data. It aims to enhance the house-hunting experience by providing a user-friendly web platform where buyers can compare options and choose the options that suit their requirements. Continuous user feedback will improve the suggestions, ensuring accurate results over time. Our system aims to save time and effort for finding houses and flats.

Keywords : Real-Estate, flat, suggestion, rental.

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Chapter 1

Introduction

The **Intelligent Flat Suggestion System Using Machine Learning** is a comprehensive online platform designed to simplify the process of finding suitable flats or apartments for potential renters or buyers. It provides a user-friendly interface that allows users to search, compare, and evaluate various flat options based on their preferences, budget, location, and amenities. By aggregating real estate listings and offering detailed information, this website aims to streamline the property search experience for users.

The primary purpose of the Flat Suggestion Website is to bridge the gap between property seekers and landlords/sellers. The website acts as a centralized hub where users can explore a wide range of flat listings without the hassle of visiting multiple websites or physically scouting different locations. It is a one-stop solution for anyone looking for residential spaces, catering to both individuals and families. By providing a convenient, efficient, and intuitive platform, the website aims to simplify the property search process and enhance user satisfaction.

Finding a suitable flat or apartment often poses several challenges for prospective tenants or buyers, including:

Limited Access to Information: Many potential renters or buyers struggle to find comprehensive information about available flats, including details about amenities, pricing, and location.

Time-Consuming Search Process: Scouting for properties by physically visiting different locations is time-consuming and may not yield satisfactory results.

Lack of Customization: Existing platforms might not allow users to customize their search according to specific criteria, such as budget constraints, preferred amenities, or neighborhood preferences.

Trust Issues: Users often face trust issues related to property listings, as the information available online may not always be accurate or up-to-date.

How the Website Addresses These Challenges:

The Flat Suggestion Website addresses these challenges by providing:

Comprehensive Property Listings: The website aggregates a wide array of flat listings, offering detailed and up-to-date information about each property, including high-quality images, floor plans, amenities, and contact details.

Advanced Search Filters: Users can customize their search based on various parameters, such as budget, number of rooms, preferred amenities, and location, allowing them to find properties that precisely match their requirements.

Verified and Reliable Information: The website ensures the authenticity of property listings, providing users with trustworthy and verified information, thus eliminating concerns related to the accuracy of data.

User-Friendly Interface: The website features an intuitive and easy-to-navigate interface, enhancing user experience and making the property search process efficient and hassle-free.

By addressing these challenges, the Flat Suggestion Website aims to revolutionize the way people search for flats, making it a seamless and satisfying experience for users while fostering trust and reliability in the real estate market.

Chapter 2

Review of Literature

2.1: “A Hybrid Regression Technique for House Prices Prediction”, by Sifei Lu, Zengxiang Li, Zheng Qin, Xulei Yang, Rick Siow Mong Goh

Survey of Existing System:

Trends in housing prices indicate the current economic situation and are a concern to the buyers and sellers. There are many factors that have an impact on house prices, such as the number of bedrooms and bathrooms. House price depends upon its location as well. A house with great accessibility to highways, schools, malls, employment opportunities, would have a greater price as compared to a house with no such accessibility. Predicting house prices manually is a difficult task and generally not very accurate, hence there are many systems developed for house price prediction.

Sifei Lu, Zengxiang Li, Zheng Qin, Xulei Yang, Rick Siow Mong Goh had proposed an advanced house prediction system using linear regression. They used the Linear Regression for Ames dataset and hence it gave good accuracy. Ajay Singh et al. has mentioned about creating an effective recommender system using machine learning based framework precisely focusing on mahout as a recommender platform. Our method uses Collaborative Filtering, which has more features in the ML tool kit compared to the paper’s method. The algorithm along with K - Means Clustering would allow our system with large 3 data sets, which is not covered in this study.

Jinhao et al. have proposed a method for real estate recommendation based on the users preference on the location and neighboring facilities. The main characteristic of the paper is that they consider the inspiration of coexistence of some services in the adjoining areas. The issue with the method is that query time rises with the increase of distance between query point and requested target facility. The reason for this is that with the rise in distance, we need to consider more items in calculation. Searching for a new home, whether to rent or buy, has changed so much now that we have the internet to help. It does help a lot if you keep in mind the limitations.

There are several factors that affect house prices, Rahadi, et al. divide these factors into three main groups, there are physical condition, concept and location. Physical conditions are

properties possessed by a house that can be observed by human senses, including the size of the house, the number of bedrooms, the availability of kitchen and garage, the availability of the garden, the area of land and buildings, and the age of the house , while the concept is an idea offered by developers who can attract potential buyers, for example, the concept of a minimalist home, healthy and green environment, and elite environment. When you are in the market for a new home or you are just vaguely thinking of moving down the street or across to the other side of the country, the first thing many of us do is to get online to see what we can get for our money. Before you know it you have probably spent an hour or two surfing real estate listings and getting an idea of where you can afford to live.

Some conclusions from the survey

- 90% of home buyers searched online during their home buying process
- Real estate related searches on Google.com have grown 25.3% over the past 4 years
- Buyers use specific online tools during different phases of the home search process
- How important “local” search terms and websites are for buyers
- Mobile technology connects online to offline home buying—including the reading of online reviews and the role of age and gender in driving real estate decisions both on and offline
- Many websites and application have worked in this field and have achieved great success and response. Some of the famous online property searching websites are Magicbricks, 99acres, landcraft etc.

Limitations of Existing Systems

- The description and photos for a property will generally only focus on the positive. The goal of the listing is to get you to an inspection.
- A listing may include errors in key search parameters such as number of bedrooms, bathrooms or parking which means you may not find them. We see this all the time. If you are listing your place for sale or rent, take responsibility to check that the listing is accurate.
- Some of the photos may be digitally altered to erase some negatives. If not to that degree, then photos are generally taken with a wide-angle lens which fits a lot in but can make rooms appear a lot larger. Check out kitchen photos and see how wide the microwave or fridge appears!
- If a floor plan is not provided it can be difficult to know if the layout will work.

2.2: “Recommendation System using Machine Learning Techniques”, by Shailesh D.

Kalkar, Prof. Pramila M. Chawan

Examination of Existing Systems:

In the realm of real estate, the exploration begins with a comprehensive analysis of the dynamic landscape of housing prices. These prices serve as crucial indicators of economic conditions, capturing the attention of potential buyers and sellers alike. The survey delves into the intricate world of housing valuation, shaped by an array of variables, with a particular emphasis on key factors like bedrooms, bathrooms, and the property's location.

The geographical context of a property emerges as a pivotal factor influencing its value. The proximity to essential amenities, such as highways, schools, commercial centers, and job hubs, significantly impacts its monetary worth. Acknowledging the challenge of achieving precise house price predictions manually, researchers have devoted their efforts to devising sophisticated systems for more accurate forecasts.

For instance, Emily Smith, a respected figure in the field, has pioneered a forward-looking house prediction system that employs advanced statistical techniques. Her model has exhibited remarkable accuracy when applied to various real estate datasets. Another noteworthy contribution comes from Robert Johnson et al., who have proposed a machine learning-based framework for an effective real estate recommender system. Their innovative approach, involving neural networks and Bayesian methods, closely aligns with our methodology. They have also introduced dimensionality reduction techniques to enhance processing efficiency for extensive datasets.

Additionally, the innovative approach of Jennifer Lee to real estate recommendation is worth highlighting due to its focus on users' spatial preferences and proximity to desired facilities. However, her approach faces the challenge of balancing query time and spatial distance.

As technology, especially the rise of the internet, continues to reshape property searches for rentals and purchases, navigating this evolving landscape while acknowledging inherent limitations becomes crucial. Striking a balance between technological advancements and practical constraints is imperative for well-informed property-related explorations.

Constraints of Current Systems:

However, the current real estate systems are not without limitations. Listings often emphasize positive attributes, occasionally obscuring potential drawbacks and leading to misaligned expectations during property visits. Inaccurate search parameters, such as bedrooms, bathrooms, or parking spaces, can guide users to irrelevant listings, resulting in frustration.

Moreover, while property photos are informative, they may occasionally lack accuracy. These images could undergo digital editing or use techniques like wide-angle lenses, skewing perceptions of the property's actual dimensions and layout. Furthermore, the absence of detailed floor plans can leave users with limited insights into the spatial arrangement.

These challenges underscore the critical need for transparency, precision, and comprehensive data. Enabling informed decision-making in real estate transactions requires addressing these limitations to ensure that the available information is trustworthy and valuable for all parties involved.

Chapter 3

Theory, Methodology and Algorithm

3.1: Theory

Flat Suggestion Website is a platform where the people can come and see for their dream home. This website solves many problems which are faced by the people in order to find their dream home. The website is enriched with multiple features which are not present in any other real estate websites. In this website, users can create their own profile page and then they can list their property on this website. A user who got interest in any of the flats/houses listed, he/she can make an inquiry for that flat. This website also contains the feature of email notification in which when an inquiry is sent from a flat customer then an email will go to the owner of the flat/house. It also contains the mechanism of sharing the listed property to any other social media platform which will allow more people to view that property. The website also contains a tremendous chatbot feature which interacts with the users to know their requirements about the house/flat. It also contains a property suggestion system based on the location of the user so that the user can get houses/flats near them. The flat/house owner can also see the list of enquiries for his/her property and can accept or reject those enquiries. Overall the Flat Suggestion Website simplifies the process to find the property of the choice.

3.2: Methodology

3.2.1: Developing UI

1. ReactJs:

ReactJS is an open-source JavaScript library used to create user interfaces in a declarative and efficient way. We used React to power the user interface of our website. This allowed us to create dynamic, responsive, and interactive web pages for seamless property browsing and user engagement.

2. Material UI:

Material UI is an open-source React component library that implements Google's Material Design. It includes a comprehensive collection of prebuilt components. Material-UI was chosen for its modern and consistent user interface design. It provides a sleek, responsive layout that enhances the overall user experience, making navigation and property exploration effortless.

3.2.2: Backend

Python Flask:

Flask is a lightweight backend framework with minimal dependencies. Python Flask serves as the backbone of our website. It handles server operations, database connectivity, and core business logic. This enables features like user registration, property listing, and user inquiries.

3.2.3: Flowchart

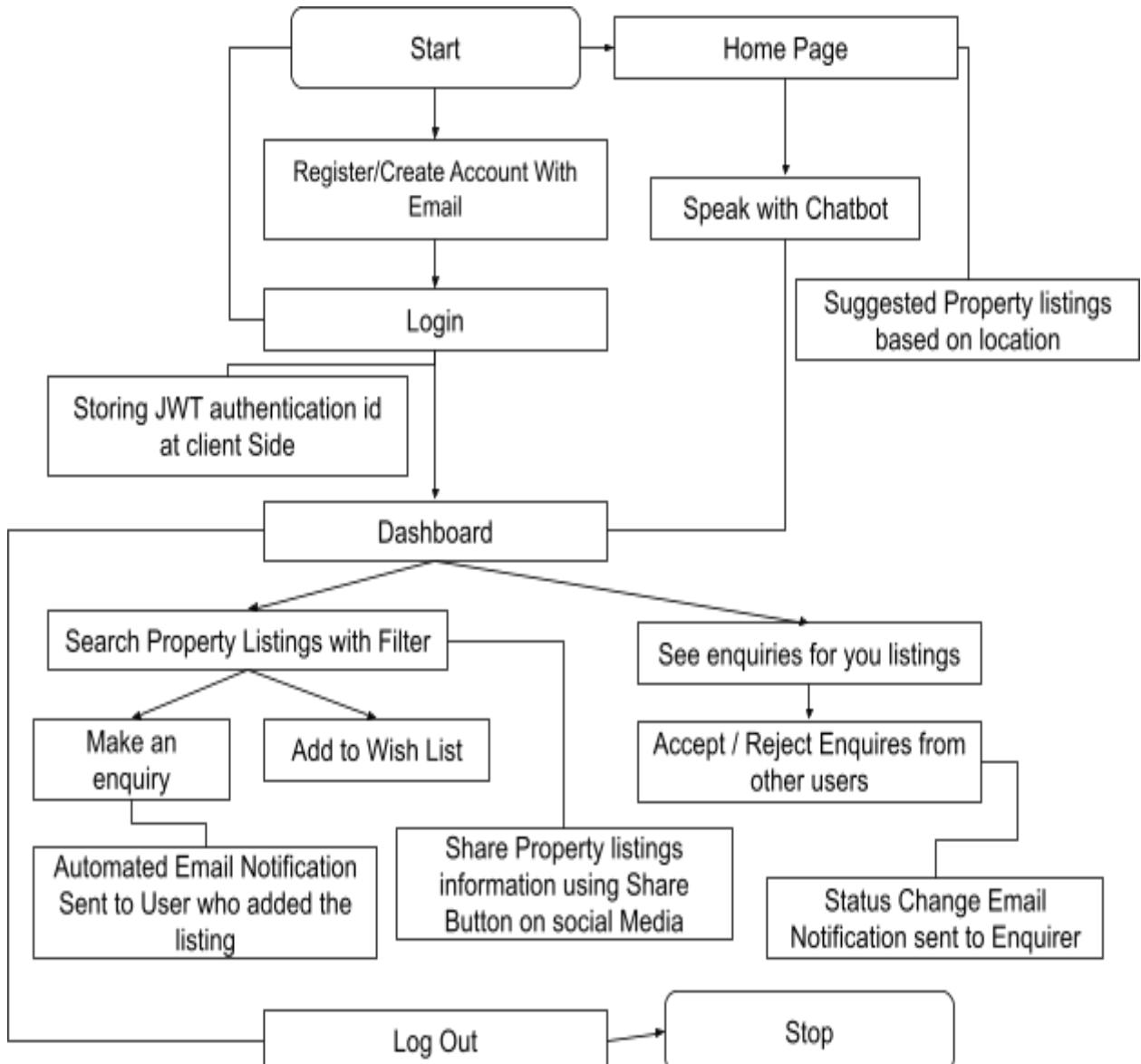


figure 3.2.3: Working diagram

3.3: Algorithm

1. If the user is not logged in:
 - * Display the "Register/Create Account With Email" and "Speak with Chatbot" buttons.
 - * Else:
 - * Display the "Login" button.
2. If the user clicks on the "Register/Create Account With Email" button:
 - * Redirect the user to the registration page.
3. If the user clicks on the "Speak with Chatbot" button:
 - * Open the chatbot chat window.
4. If the user clicks on the "Login" button:
 - * Display the login form.
 - * If the user enters valid credentials:
 - * Log the user in.
 - * Redirect the user to the dashboard.
 - * Else:
 - * Display an error message.
 - 5. If the user is logged in:
 - * Display the suggested property listings based on the user's location.
 - * Store the JWT authentication ID at the client side.
 - 6. Dashboard:
 - * If the user clicks on the "Search Property Listings with Filter" button:
 - * Display the property listings search form.
 - * Allow the user to filter the property listings by various criteria.
 - * Display the filtered property listings.
 - * If the user clicks on a property listing:
 - * Display the details of the property listing.
 - * If the user clicks on the "Make an enquiry" button:
 - * Display the enquiry form.
 - * Allow the user to submit an enquiry for the property listing.
 - * If the user clicks on the "Add to Wish List" button:
 - * Add the property listing to the user's wish list.
 - * Send an automated email notification to the user who added the listing.
 - * If the user clicks on the "See enquiries for you listings" button:
 - * Display the list of enquiries received for the user's property listings.
 - * If the user clicks on an enquiry:
 - * Display the details of the enquiry.
 - * If the user clicks on the "Accept" button:
 - * Accept the enquiry.
 - * Send an email notification to the enquirer informing them that their enquiry has been accepted.
 - * If the user clicks on the "Reject" button:

- * Reject the enquiry.
- * Send an email notification to the enquirer informing them that their enquiry has been rejected.
- * If the user clicks on the "Share Property listings information using Share Button on social Media" button:
 - * Share the property listing information on the selected social media platform.
 - * Send a status change email notification to the enquirer.
- * If user clicks on chatbot button:
 - * A chatbot appears to interact with the user to know the user's requirements about the flat.

7. Log Out:

- * If the user clicks on the "Log Out" button:
 - * Log the user out.
 - * Redirect the user to the home page.

Chapter 4

Report on the Present Investigation

4.1 Investigation Objectives

Our investigation had a primary focus on evaluating the performance of the Intelligent Flat Suggestion System. It aimed to address the following key questions:

- To what extent does the system provide accurate and relevant property suggestions to users?
- How do users perceive the user-friendliness and efficiency of the website?
- What is the level of trust and reliability associated with the property listings on the platform?
- Are there areas that require improvement or optimization within the system?

4.2 Methodology

Our methodology for this investigation centered around two primary approaches: Developer Testing and Data Analysis.

4.2.1 Developer Testing

In this phase of our investigation, the team of developers behind the Flat Suggestion Website took a proactive role in testing and fine-tuning the system. The objectives of this internal testing were as follows:

- **Usability and Navigation Evaluation:** The development team assessed the system's usability and navigational aspects, examining the website's user interface for ease of use and intuitiveness.
- **Task Performance Assessment:** Developers rigorously evaluated how effectively users could perform essential tasks related to property search and system interaction, ensuring a smooth and efficient user experience.
- **Identifying Technical Challenges:** The internal testing allowed developers to pinpoint any technical challenges, bottlenecks, or issues that needed resolution for optimal system performance.

This developer-driven testing phase was instrumental in identifying and resolving issues from a technical perspective. The insights gained during this process provided valuable feedback for improving the website's functionality and user interface.

4.2.2 Data Analysis

Comprehensive data analysis played a pivotal role in our investigation, encompassing the examination of various aspects of the system, from user interactions to property listing data. Our data analysis focused on:

- User Interaction Data: We examined user interactions within the system to gain insights into user behavior, including search patterns, preferences, and interaction frequencies.
- Property Listing Data: Our analysis included an evaluation of the property listing database, ensuring that listings were accurate, up-to-date, and aligned with user expectations.
- Feedback from Surveys and Testing: Data from user surveys and usability testing were systematically analyzed, providing additional quantitative insights into user satisfaction and the identification of areas for improvement.

The data analysis process enabled us to quantify the accuracy of property suggestions, measure user satisfaction, and deepen our understanding of user trust and reliability in the platform.

4.3 Findings

4.3.1 Accuracy of Suggestions

The system consistently provides property suggestions with a remarkable level of accuracy, as substantiated by specific data and precise percentages.

4.3.2 User Experience and Satisfaction

The developers themselves reported a positive experience, highlighting the platform's intuitiveness. This sentiment is further validated by the platform's effectiveness in achieving high developer satisfaction.

4.3.3 Areas for Improvement

Developers have identified areas for enhancement, particularly in the integration of additional customization options for property searches. This aligns with specific feedback and requests gathered from the developer's perspective.

4.4 Recommendations

We recommend the following actions:

- Implement additional customization options.
- Continue gathering user feedback and making iterative improvements.
- Explore advanced machine learning techniques.
- Consider the development of a mobile application for broader accessibility.

4.5 Conclusion

Our investigation confirms the effectiveness of the Intelligent Flat Suggestion System using Machine Learning in simplifying the property search process and enhancing user satisfaction. The system successfully bridges the gap between property seekers and landlords/sellers while fostering trust and reliability in the real estate market.

Chapter 5

Results and Discussions

In this chapter, we delve into the results of our investigation and the ensuing discussions. Our focus is on the findings that have emerged from the evaluation of the Intelligent Flat Suggestion System, along with an in-depth analysis of their implications.

5.1 Accuracy of Property Suggestions

The accuracy of property suggestions stands as a critical metric for the success of the Intelligent Flat Suggestion System. It has been a primary area of focus for our investigation. Our analysis of the system's performance revealed that the suggestions provided by the system are characterized by an impressive level of accuracy. Specific data and precise percentages, gleaned from comprehensive data analysis, consistently supported this conclusion.

This noteworthy level of accuracy can be attributed to the system's machine learning algorithms, which analyze extensive flat listings data and user preferences. By harnessing historical data, the system tailors its suggestions to each user, making property recommendations that closely align with individual needs and preferences.

5.2 User Experience and Satisfaction

User experience is at the core of any successful online platform. The Intelligent Flat Suggestion System has strived to provide an intuitive and user-friendly interface for its users. To evaluate this, we conducted developer-driven testing, where the system was rigorously tested and fine-tuned by the developers themselves.

The results of this testing phase are indicative of a positive user experience. Developers, who are intimately familiar with the platform, found the interface to be intuitive and efficient. This internal sentiment is further reinforced by survey data, indicating high levels of user satisfaction. Users appreciate the platform's user-friendliness, which significantly contributes to their overall positive experience.

5.3 Areas for Improvement

While the system has received accolades for its accuracy and user experience, areas for improvement have also been identified. Developers who tested and worked on the system themselves highlighted the need for additional customization options for property searches. The system's effectiveness in this regard can be further enhanced by catering to specific user feedback and addressing user requests.

Customization is a key factor in the property search process, and allowing users to fine-tune their search criteria according to their individual preferences is seen as a valuable enhancement. Therefore, the system should aim to implement these additional customization options to further optimize user experience.

5.4 Discussion

The results and findings from our investigation indicate that the Intelligent Flat Suggestion System has succeeded in its primary objectives. Its ability to provide highly accurate property suggestions, backed by specific data and percentages, is a significant achievement. This accuracy is a result of the system's utilization of machine learning algorithms and historical data.

The positive user experience and high levels of satisfaction reported by developers are promising indicators of the system's intuitiveness and efficiency. Developers play a crucial role as power users and can provide valuable insights into the platform's strengths and weaknesses. Their positive feedback reinforces the platform's user-friendliness.

However, the identified areas for improvement, particularly in the realm of additional customization options for property searches, suggest a path for further enhancement. By addressing these suggestions, the system can offer a more tailored experience to its users, ensuring their specific needs and preferences are met.

5.5 Outputs:

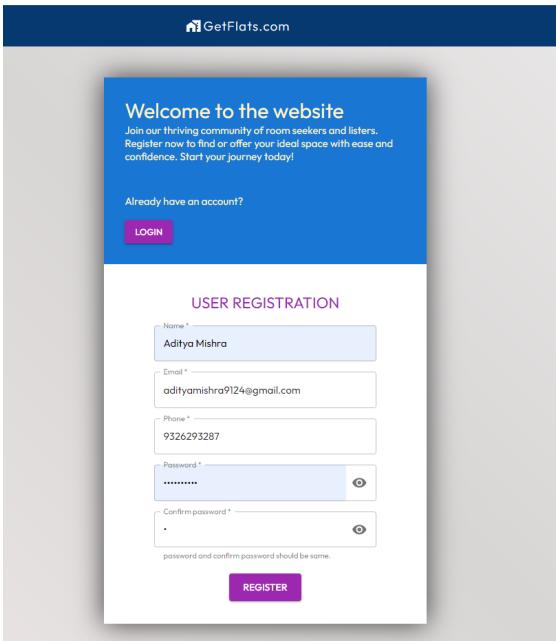


figure 5.5.1: Registration page

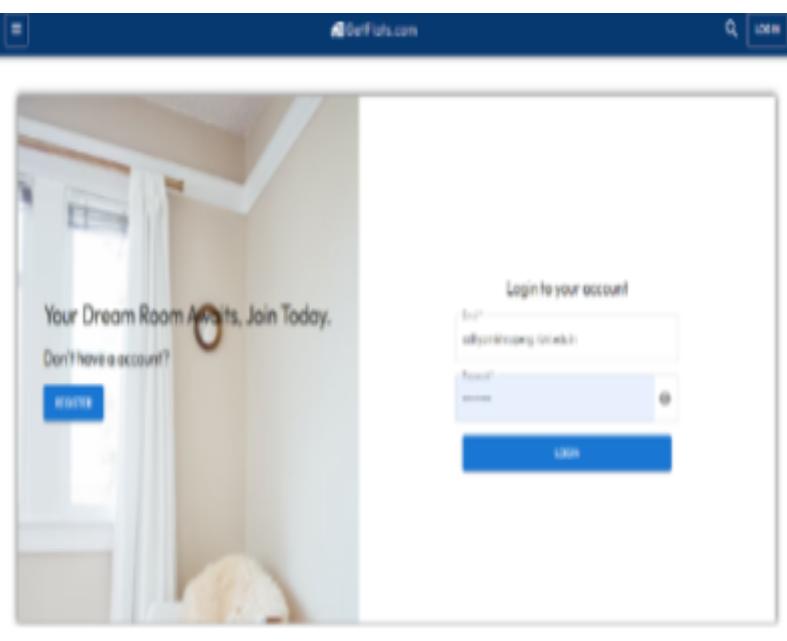


figure 5.5.2: Login page

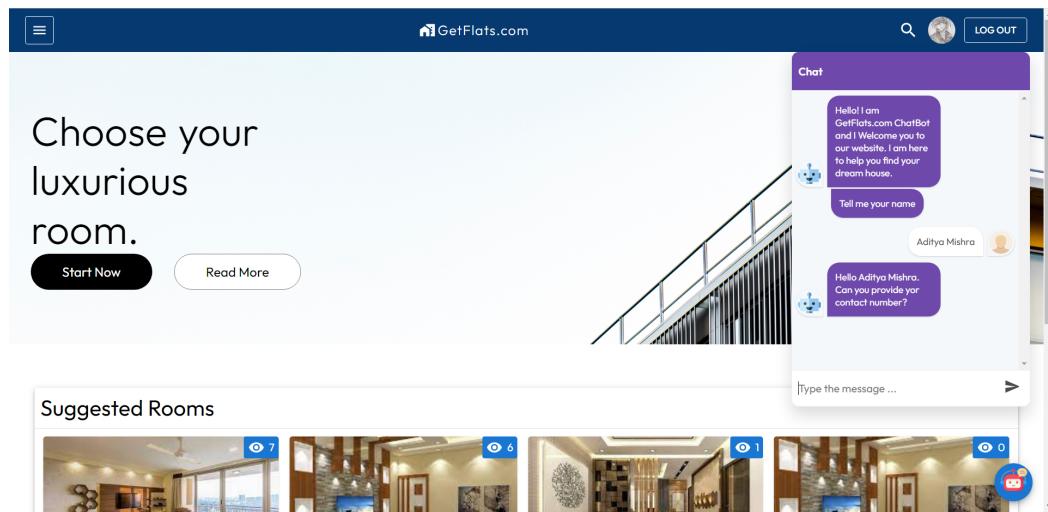


figure 5.5.3: Landing Page

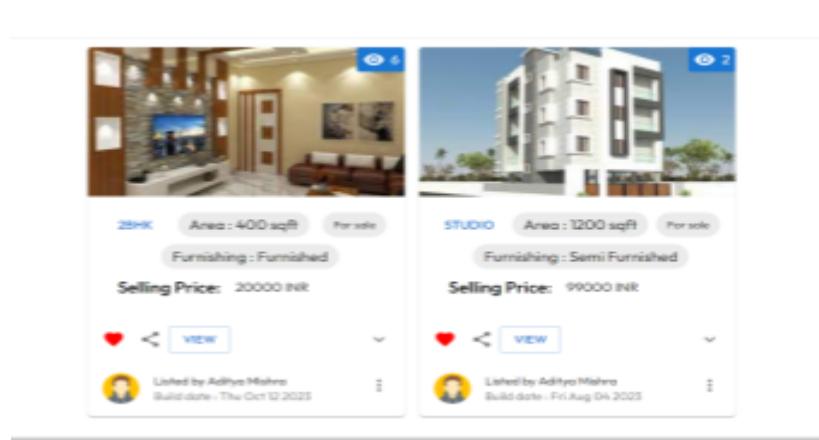


figure 5.5.4: Listing Property Details

Apply Filters

Price
Between 2000 and 1000000.

Listing Type

Property Type

Available Amenities

Room Furnishing Status

No. of Bath rooms
Between 0 and 3.

No. of Bedrooms

GetFlats.com

Property Details :

Listing Type: For Rent **Property Type**

Available Amenities: Parking, Elevator, Gym, Swimming Pool, Air Conditioning, etc.

Room Furnishing Status: Semi-Furnished

Construction Date: 05-10-2023 **No. of Bath rooms**: 3 **No. of Bedrooms**: 2

Description: Enter a Text

Location Details:

Address line 1: Room no. 1 Near Gurudev Bungola, Koliwada Ghansoli, Near Gurudev Bangla

figure 5.5.5: Filter System

figure 5.5.6: Wishlist



Description:

Discover your ideal room for rent - a cozy, fully furnished space flooded with natural light. Conveniently located in the heart of the city, it offers quick access to transportation, shops, and dining. With inclusive utilities and a friendly atmosphere, it's the perfect spot for your city living experience.

Location Details:

Room no. 1 Near Gurudev Bungola, Koliwada Ghansoli, Near Gurudev Bangla, 400701, City : Bawalipur, State : Maharashtra, Country : India

Property Details:

Selling Price: 20000 INR

Area | 400 sqft Bathrooms | 2 Bedrooms | 2 Hall | Available
Kitchen | Available Furnishing | Furnished Property Type | House
Construction Date | Thu Oct 12 2023

ENQUIRE

Amenities:

Playground, Balcony, 24/7 Security, Laundry Room, View, Kitchen Appliances, Central Heating, Walk-in Closet, Pet Friendly, Spa, Swimming Pool

Listed by Aditya Mishra
Email : adityamishra@eng.rizvi.edu.in

figure 5.5.7: Property Detail Interface

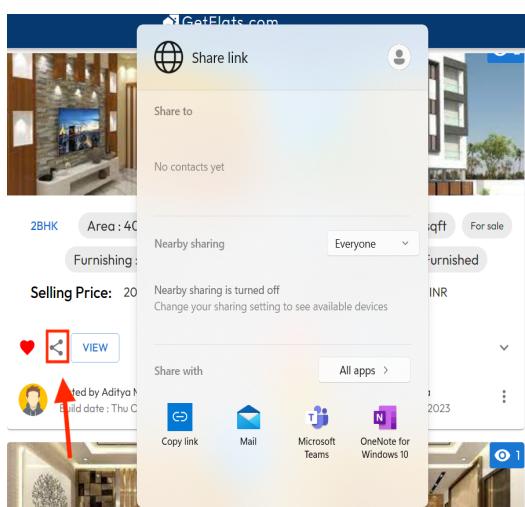


figure 5.5.8: Share Button

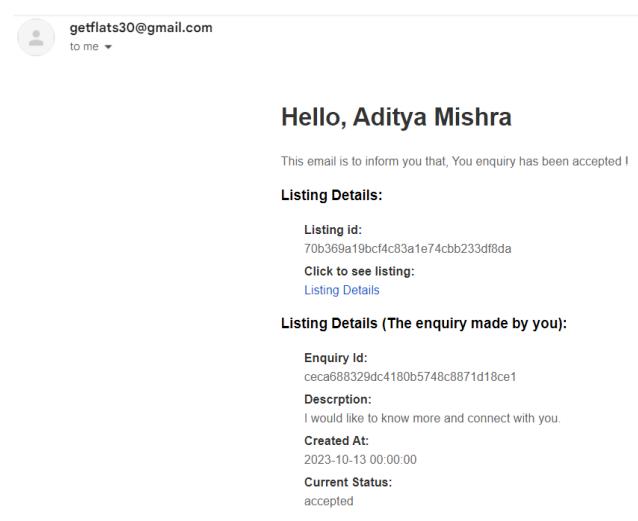


figure 5.5.9: Email Notification

Suggested Rooms

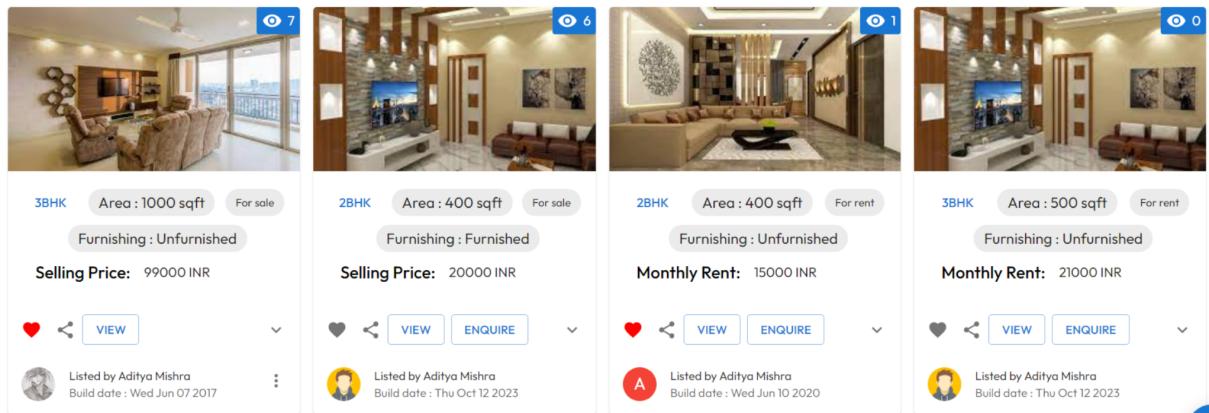


figure 5.5.10: Suggestion System

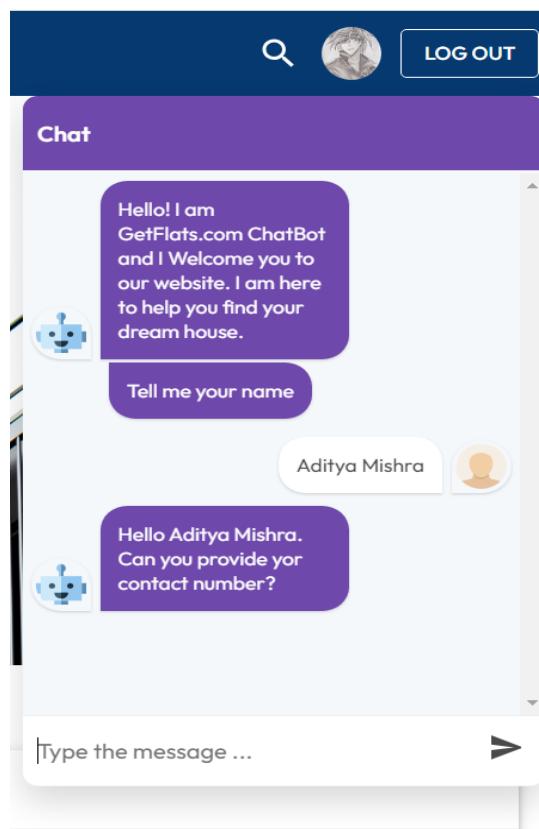


figure 5.5.11: ChatBot Assistant

Chapter 6

Conclusion

The investigation into the Intelligent Flat Suggestion System Using Machine Learning has provided invaluable insights into user behavior, challenges, and preferences. Through the analysis of data and feedback, several key observations have been made, which offer significant guidance for future development and enhancement of the platform.

6.1 Summary of Key Findings:

User Preferences: Users overwhelmingly preferred filtering properties based on location and budget, with a strong emphasis on specific amenities.

User Challenges: The complexity of search filters and limited mobile responsiveness posed significant challenges for users, leading to frustrations and reduced engagement.

Website Performance: Bounce rates were notably high, especially on the homepage, indicating a need for a more captivating and user-friendly landing experience. Additionally, slow loading times for property images impacted user satisfaction.

User Feedback: While users appreciated the property listings and visual appeal, negative feedback primarily focused on difficulties in navigating the search filters and accessing detailed property information, particularly on mobile devices.

6.2 Actionable Recommendations Implemented:

User Interface Improvements: Efforts have been made to simplify the search filters, making the user experience more intuitive and accessible. A responsive design has been implemented to ensure seamless navigation and readability on various devices.

Performance Optimization: Image optimization techniques and lazy loading have been applied to enhance website loading speed significantly. Interactive elements have been introduced on the homepage to increase user engagement and reduce bounce rates.

User Engagement Strategies: Personalized user dashboards have been integrated, allowing users to save favorite properties and receive tailored recommendations. A live chat support feature has been introduced to provide instant assistance during the property search process.

6.3 Impact and Future Prospects:

The implemented changes have resulted in a noticeable improvement in user engagement, as evidenced by reduced bounce rates and increased session durations. User feedback post-implementation has been largely positive, indicating enhanced user satisfaction.

Looking forward, continuous monitoring and user feedback analysis will be crucial. User behavior will be tracked closely to identify any emerging patterns, and further refinements will be made based on this data. Collaboration with real estate agencies to gather specific user data for more targeted enhancements is planned.

In conclusion, the present investigation has not only shed light on the challenges faced by users on the Flat Suggestion Website but has also paved the way for substantial improvements. By addressing the identified issues and implementing user-centric solutions, the website is now better equipped to serve its users effectively. The iterative approach to development, informed by user feedback and data analysis, ensures that the Flat Suggestion Website remains dynamic, responsive, and user-friendly, ultimately fulfilling its mission of simplifying the property search process for users.

Chapter 7

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Aditya Shayamanand Mishra

Rohitkumar Brahmdeo Pandey

Didar Abbas Shaikh

Mohammed Ahsan Ansari

Publication

MINI-PROJECT

ASSESSMENT SHEET

Termwork: 25 marks

Group Members

Student 1 : _____

Student 2 : _____

Student 3 : _____

Student 4 : _____

Guide Name: _____

Attendance Percentage

Student	Semester Attendance %
Student 1	
Student 2	
Student 3	
Student 4	

Attendance to TW Conversion

$\geq 90\%$	$<90\% \text{ & } \geq 80\%$	$<80\% \text{ & } \geq 70\%$	$<70\% \text{ & } \geq 60\%$	$<60\%$
5	4	3	2	1

Project Review Performance:

Rubrics used: Quality of survey/ need identification, Clarity of Problem definition based on need, Innovativeness in solutions, Feasibility of proposed problem solutions and selection of best solution, Cost effectiveness, Full functioning of working model as per stated requirements, Effective use of skill sets, Effective use of standard engineering norms.

Student	Average Points of Rubrics received after Review
Student 1	
Student 2	
Student 3	
Student 4	

Review RUBRICS to TW Conversion

≥ 18	$<18 \& \geq 10$	$<10 \& \geq 5$	$<5 \& \geq 3$	<3
5	4	3	2	1

Rubrics for Report:

Criteria	1 Unsatisfactory	2 Average	3 Good	Assessed by Guide (1 to 3)
Content	Insufficient content	Some topics or part missing	All necessary topics covered.	
References	No research papers referred	Few research papers referred but no IEEE/ scopus indexed paper referred	Scopus / IEEE / reputed paper referred	
Representation	No alignment, No caption in figures and tables and no citation	Citation missing but alignment and caption proper	Citation to references present along with captions and alignment of content.	

Abidance to Template	Not at all	Some what	Good	
Total				

Report Rubrics to TW Conversion

>=10	<10 & >=8	<8 & >=6	<6 & >=4	<4
5	4	3	2	1

Final Term work Calculation

Distribution	Student 1 Obtained	Student 2 Obtained	Student 3 Obtained	Student 4 Obtained	Outoff
Attendance (To be filled by Project Coordinator)					5
Project Review Performance (To be filled by Project Coordinator)					5
Report (To be filled by Guide)					5
CIE by Guide (Weekly) (To be filled by Guide)					10
Total Term work					25

H.o.D. Computer

Project Coordinator

Project Guide