* **Mentor(s) Name : Samrat Sarkar, Silpi Ghosh.**

**TerraNest**

**~An Intelligent Property Listing Ecosystem**

* **Group Members’ Names :**

1. **Md Asad Reyaz (56)**
2. **Tanir Sahoo (61)**
3. **Sankha Sengupta (70)**
4. **Aman Kumar Shah (72)**

**Literature Survey**

* **Introduction:**

The rise of digital platforms for property listings has revolutionized the real estate market, allowing property owners to list accommodations and potential renters to search for suitable places. Traditional platforms like Craigslist, Zillow, and Airbnb provide a broad range of services, focusing on property rentals, sales, and vacation bookings.

The surge in digital transformation has prompted the development of intelligent platforms leveraging artificial intelligence (AI) and machine learning (ML) to enhance user experience, optimize search results, and ensure faster matching between listings and potential renters. Several websites cater to property listings for paying guest accommodations, shared living spaces, and rentals. Websites such as MagicBricks, 99acres, and NestAway have been leaders in India’s rental market. Globally, websites like Zillow, Realtor.com, and Rightmove offer a comprehensive range of property listing services. These websites rely on data-driven approaches, including user preferences and property attributes, to filter and present results.

The challenge lies in personalizing the search experience for users based on their unique needs, such as budget, location preferences, and the type of accommodations (paying guest, shared apartments, or entire rentals). Many platforms are adopting AI and ML to bridge the gap between available listings and users' specific needs.

**Problem and TerraNest’s Solution:**  
Many existing property listing websites, such as MagicBricks, 99acres, and NestAway, cater to a broad spectrum of real estate needs, including rentals, sales, and leasing of entire homes, apartments, and commercial spaces. However, these platforms often fail to address the specific niche of paying guest (PG) accommodations, leaving a significant gap in the market. This aligns with the challenges identified in recommendation systems, where existing solutions often provide generic or irrelevant search results, leading to user dissatisfaction [1]. TerraNest seeks to fill this gap with its focused and intelligent platform, designed exclusively for PG accommodations.

A prevalent issue in mainstream property websites is the presence of outdated or inaccurate listings, which parallels the problem of data sparsity and inconsistency seen in recommendation systems [1]. Slow updates lead to user frustration when properties are no longer available, or when incorrect information, such as pricing or availability, diminishes user trust and creates inefficiencies in the search process. TerraNest addresses this by integrating real-time updates, ensuring users have access to the latest information about available PGs. This improvement is consistent with the emphasis on ensuring data accuracy and real-time personalization in recommendation systems to enhance user trust and efficiency [2].

Mainstream property websites often lack features tailored specifically to the needs of PG seekers, echoing the inadequacy of personalized recommendations in traditional platforms. TerraNest eliminates irrelevant clutter and offers a more targeted and efficient search experience by focusing exclusively on PG listings [2].

**TerraNest Features:**

*Feature Filtering for Personalized PG Selection:*  
The filtering feature in TerraNest enables potential tenants to narrow down their search with specific preferences, a critical functionality supported by recommendation system research [1]. Advanced filtering options, such as room type, shared or private rooms, gender-specific accommodations, WiFi availability, and meal inclusion, cater to the distinct needs of students and working professionals [2]. These filters align with the emphasis on personalized recommendations and the use of machine learning to provide tailored suggestions based on user needs [1].

This advanced filtering not only enhances efficiency but also ensures user satisfaction by helping tenants find accommodations that best fit their preferences and budget. Similar to recommendation systems that prioritize personalization, TerraNest focuses on delivering a user-centric experience, resulting in better outcomes and increased user loyalty [2]. The platform's ability to save users time by eliminating irrelevant offers aligns with the goal of improving user experience through targeted recommendations [1].

The purpose of this feature is to enable users to efficiently find PGs that align with their lifestyle or specific requirements, mirroring the objective of creating a seamless and trustworthy recommendation system as described in the research papers [2].

### Smart Recommendation System through Machine Learning

Our smart recommendation feature is utilized by a machine learning model, which provides personalized property recommendations directly to users, elevating the PG hunting experience to a whole new level. This behavior-based machine model learns on data patterns about what type of properties a user is interested in through behavioral data derived from at least 100 data points regarding interactions done by a user in the past. It tracks the specific activities of a user, like attributes that were clicked on, filtering choices, or the time spent browsing each listing [2]. Based on such data, our algorithm recognizes patterns and similarities between users, thereby identifying relevant PG properties to suggest to newly registered users. For instance, when a user expresses interest in a certain type of PG after a couple of interactions, our algorithm is going to emphasize showing similar kinds of PGs so that they can make decisions faster [1]. The idea here is to simplify the browsing experience by predicting the preference of users based merely on a couple of initial interactions, thereby saving them potentially wasted time and energy. This smart, data-driven feature not only makes the experience for the users better but also results in business terms because the purchases get made faster [3].

### Roommate Compatibility Survey for the Purpose of Conflict-Free Living

Keeping this in mind, we designed our PG rental website with a roommate compatibility survey because roommates' compatibility is pretty much related to the quality of shared living. It eliminates potential conflicts and provides a harmonious life in a dwelling space by matching or aligning the preferences and personalities of current and prospective roommates [1]. A questionnaire will be issued to potential renters as an example of what they would expect and like in a roommate: cleanliness habits, sleep time, remote work needs, or other interests [2]. Current renters will also be included by specifying the kind of roommate for which they would feel most comfortable, with descriptions including social behaviors and/or common interests [1]. That is a two-sided approach on roommate preferences that will enhance compatibility and minimize interpersonal clashes. It encourages an extremely friendly environment for the PG shared accommodation, where we strive to present a better match for better roommates [3].

### Local Landmark Information for Location Context Awareness

The "Information about Nearby Landmark" feature provides users with critical contextual information about the surroundings of their potential accommodation. For each PG property listed on our website, this feature mentions the proximity to essential and popular landmarks, including hospitals, shopping malls, metro stations, bus stops, and cinema halls [1]. Knowing how far away important landmarks are will undoubtedly provide leverage to a user in making decisions over a PG property, mainly to those seeking PGs for the first time in a city, as it indeed will be at the top of their list regarding ease of access to amenities [2]. Our platform does exactly this by providing the same information in an easy-to-read format so that the users are well aware of how easy or difficult it will be to get access to important services and amenities from their chosen property [3]. This feature aims to enrich its decision-making capability for its users, as it would be able to assist them in making practical decisions regarding their daily commute and lifestyle [2]. Details of nearby landmarks included in the listing result in a more holistic listing beyond simple information about the property itself, and that leads to user satisfaction while giving a complete picture of what life would be like in a particular PG [1].

### Case Studies on Similar Platforms

Several existing platforms share similar features with "TerraNest." For example:

* **NestAway**: This platform focuses on shared and paying guest accommodations and offers a seamless search process with AI-powered filters and recommendations [2].
* **Zolo Stays**: It was founded in 2015 and quickly expanded to serve over 50,000 residents across 10 cities. The company's primary offering is affordable, fully managed shared accommodations with services like cleaning, Wi-Fi, and meals, focusing on convenience and community living [1]. Despite facing intense competition from players like NestAway and OYO Life, Zolo has remained a leader by targeting expansion to one million beds within five years. Zolo's growth has been fueled by its ability to provide reliable accommodations with a wide range of services in a competitive market [2].
* **Colive**: Colive, on the other hand, differentiates itself with its modern, tech-driven approach to co-living. Founded to create a stylish and hassle-free living experience, Colive leases entire buildings on long-term contracts, converts them into fully serviced spaces, and offers them to customers [1]. It earns revenue through fixed rentals or revenue-sharing agreements with property owners. Colive has seen rapid expansion, managing over 25,000 beds across cities like Bangalore, Hyderabad, and Chennai. It is particularly focused on tech integration, offering amenities that cater to the millennial demographic through its app [3].

### Conclusion

The development of "TerraNest" as an intelligent property listing website has the potential to disrupt the rental and paying guest markets by incorporating AI and machine learning. By focusing on user personalization, intelligent matching, and enhanced user experience, TerraNest can distinguish itself from traditional platforms. The integration of AI-driven recommendation systems and data analytics will ensure that both property owners and tenants benefit from a more efficient and effective search process [1]. Given the limitations of existing property listing websites—such as their broad focus, outdated records, lack of PG-specific features, and limited personalization—there is a clear need for a dedicated platform like TerraNest [3]. By focusing solely on the PG market and utilizing cutting-edge AI technologies, TerraNest delivers a more tailored, efficient, and reliable experience for users seeking paying guest accommodations. The platform’s real-time updates, personalized recommendations, and PG-specific features make it a much-needed solution in a market where other platforms fall short [1].

**References:**

Here are the links to research papers that you can reference for your literature survey:

1. “Recommendation Systems: Algorithms, Challenges, Metrics, and Business Opportunities.”

This paper provides an overview of recommendation systems, their algorithms, and applications, including insights into how they can be used in e-commerce-like scenarios, relevant to your PG rental project.

[Link to the paper](<https://www.mdpi.com/2076-3417/10/21/7748)【10†source】>

2. “A Survey of Recommendation Systems: Recommendation Models, Techniques, and Application Fields”

This paper focuses on recommendation models and techniques across various application fields. It is especially useful for understanding how different recommendation systems can be applied to your project.

[Link to the paper](<https://www.mdpi.com/2079-9292/11/1/141)【11†source】>

These resources should provide a strong foundation for your literature survey on the topic of recommendation systems for PG listing websites.