

Minor project Mid progress

- ▶ Intelligent Ranking and Chat System for Property Rental
- ▶ Minor Project : Mid-Progress Report
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Introduction

- ▶ Finding suitable rental rooms in metropolitan cities is challenging due to limited accessibility, high demand, and unreliable listings.
- ▶ The proposed system leverages AI for personalized ranking, reducing search time and improving accuracy.
- ▶ Traditional platforms often lack real-time updates and verified data, leading to misinformation and wasted efforts during the rental search.
- ▶ A tech-driven solution can streamline the rental process by integrating user preferences and verified listings into a unified platform.

Problem Statement

- ▶ Finding rental rooms in metropolitan cities remains a frustrating and time-consuming task for users. Existing platforms offer only basic search filters such as price, location, and room type, without truly understanding individual user preferences. They lack personalized recommendations, real-time dynamic ranking, and verified data—resulting in low accuracy and trust in listings. Moreover, the absence of interactive, chat-based assistance makes the search process feel mechanical and inefficient.
- ▶ To address these challenges, there is a need for an intelligent, AI-powered system that can deliver reliable, personalized, and efficient room search experiences tailored to each user's unique needs.
- ▶ Goal: Create an intelligent system for reliable and efficient room search.

Objectives

- ▶ **Develop an AI-based rental platform:** Create a smart system that leverages machine learning to streamline and enhance the rental room search process.
- ▶ **Provide ranked and personalized room recommendations:** Use AI algorithms to deliver tailored listings based on user preferences, behavior, and real-time data.
- ▶ **Real-Time Messaging System (Landlord ↔ Tenant):** Allow landlords and tenants to chat securely and instantly regarding room listings, rentals, and agreements within the platform.

Scope of Project

- ▶ **Target audience:** Room Seekers (General Tenants), Landlords / Property Owners, Working Professionals, PG (Paying Guest) Providers.
- ▶ **Key features:** Real-Time Messaging System, Ranking algorithm, feedback system, verified listings.
- ▶ **Future scalability:** Cloud deployment, IoT/Chatbot integration.

Literature Survey

- ▶ **Existing systems like MagicBricks & 99acres use static filters:** Popular rental platforms rely on fixed criteria like price and location, offering limited personalization and adaptability to user preferences.
- ▶ **Research in AI ranking systems:** Initially, a **custom sentiment model** was used, but due to its low accuracy, the system was later enhanced with the **VADER model**, which provided more reliable and accurate sentiment analysis for improved recommendations.
- ▶ **Gap:** Existing platforms lack **adaptive feedback learning**, as they do not integrate **real-time user feedback** into their recommendation models, leading to **static and less personalized results**

System Architecture

- ▶ **Frontend: React.js (TypeScript)** – A dynamic and responsive user interface built using React with TypeScript, providing seamless interaction, type safety, and real-time updates for users.
- ▶ **API Layer: Spring Boot (Java)** – RESTful APIs developed with Spring Boot act as the communication bridge between the frontend, backend services, and the machine learning module.
- ▶ **ML Module: Python (Flask + VADER)** – A Flask-based Python service integrates the **VADER sentiment analysis model** to analyze user feedback and behavior, enhancing recommendation accuracy and personalization.

System Architecture

- ▶ **Database: MySQL** – A relational database used to store user profiles, listings, feedback, and other structured data securely and efficiently.
- ▶ **Caching/Message : Redis** is used for **fast data caching** and to handle **real-time message delivery** between users, ensuring quick access to frequently used data and smooth chat communication.
- ▶ **JWT-based Authentication and Data Encryption** – JSON Web Tokens (JWT) are used for secure, stateless user authentication, while sensitive data is encrypted to protect user privacy and prevent unauthorized access.

Design Approach

- ▶ **Agile Methodology** – The project adopts Agile practices, emphasizing iterative development, regular feedback cycles, and adaptive planning to deliver a **user-focused, high-quality solution** efficiently and on schedule. Frequent stand-ups and sprint reviews ensure **continuous improvement**, while stakeholder feedback is incorporated to **align development with user needs**.

Implementation Progress

- ▶ UI prototype built with React.
- ▶ Basic CRUD and listing APIs functional.
- ▶ Initial ranking logic tested.
- ▶ Database schemas and APIs connected.
- ▶ ML ranking model has been developed.

Tools & Platforms

- ▶ **Frontend:** React.js
- ▶ **Backend:** Java, Spring Boot
- ▶ **Database:** MySQL, Redis
- ▶ **AI/ML:** Python, Flask, Vadar
- ▶ **Other Tools:** Postman, GitHub, VS Code

Challenges Faced

- ▶ Integration between backend and AI model.
- ▶ Data inconsistency in third-party listings.
- ▶ Limited training data for ranking.
- ▶ Performance optimization and latency issues.

Next Steps / Future Plan

- ▶ **Enhance UI/UX with maps and filters** – Improve the user experience by integrating interactive maps, advanced filters, and responsive design elements into the React.js interface.
- ▶ **Cloud deployment on AWS/Azure** – Deploy the full application stack on cloud platforms like AWS or Azure to ensure scalability, high availability, and efficient resource management.
- ▶ **Payment Support:** The platform will integrate secure payment support, enabling tenants to pay rent or booking fees directly through the application.

Significance of Project

- ▶ **Simplifies Room Search:** Provides students and professionals with a **centralized platform** to find verified rooms and compatible roommates, reducing time and effort spent on searching.
- ▶ **Enhances Trust and Safety:** Real-time chat and document-based verification ensure **secure interactions** between landlords and tenants.
- ▶ **Personalized Recommendations:** AI-driven analysis of user preferences and feedback enables **context-aware room suggestions**, improving satisfaction.
- ▶ **Improves Efficiency:** Features like real-time messaging, caching, and adaptive recommendations make the platform **fast, responsive, and user-friendly**.
- ▶ **Supports Decision Making:** Allows users to make informed choices by providing **reviews, ratings, and feedback insights** from previous users.



Thank You