AI-Powered Flat Finder: A Real Estate Search Assistant using Gemini, React, and Firebase

Ashutosh Shukla
Department of Computer Science and Engineering (Artificial Intelligence)
IIMT College of Engineering, Greater Noida, India
Md Meraj Alam
Department of Computer Science and Engineering (Artificial Intelligence)
IIMT College of Engineering, Greater Noida, India
Emails: ashutosh9651.5s@gmail.com, merajalam7459@gmail.com

ABSTRACT — The real estate industry is increasingly leveraging artificial intelligence to enhance property discovery and decision-making. This paper presents a web-based application that serves as an AI-powered flat-finding assistant. Built using ReactJS for the frontend, Gemini (Google's generative AI) for conversational intelligence, and Firebase for backend and database management, the application enables users to interact with a chatbot to find flats matching their preferences. The system allows users to ask natural language questions, which are interpreted by Gemini AI, and matched with property listings stored in Firebase. A custom training layer is added to Gemini to ensure relevant and consistent answers based on predefined intents. The paper details the architecture, data flow, and interaction design of the platform, emphasizing real-time communication and personalized responses. This work illustrates how AI-driven interfaces can modernize property searches, improve client engagement, and streamline real estate operations.

Keywords — Real Estate, Artificial Intelligence, Gemini AI, Firebase, ReactJS, Flat Finder, Property Recommendation, Chatbot.

I. INTRODUCTION

Real estate search has evolved from physical site visits and newspaper listings to digital platforms and mobile apps. However, despite these advancements, users often experience frustration due to overwhelming choices, lack of personalization, and delayed responses from agents. This paper introduces a smart AI-based real estate assistant designed to address these concerns by integrating a chatbot system trained on property-related queries.

The assistant uses Gemini, a large language model (LLM), to understand user preferences and provide relevant answers or suggestions. A React-based web interface hosts the frontend, with Firebase managing backend services, including authentication, real-time database, and cloud functions. Unlike static search filters, the chatbot interface supports conversational property discovery—making it intuitive and user-friendly.

This system offers an innovative approach to searching for flats by allowing users to simply "talk" to the website about their requirements such as budget, location, number of rooms, parking availability, and more. If matching flats exist in the database, the AI displays options; if not, it recommends alternatives or offers contact options. The real-time integration and custom training on expected queries make it a dynamic solution tailored for modern real estate demands.

II. LITERATURE REVIEW

AI in real estate is not entirely new. Zillow, Redfin, and MagicBricks have incorporated recommendation engines using machine learning, and many agents now use chatbots for lead generation. However, these tools are often rule-based and limited in interaction depth.

ChatGPT, Bard, and Gemini are examples of large language models that can perform natural language understanding and response generation across a wide range of domains. Google's Gemini, in particular, offers multimodal capabilities,

allowing it to process text, code, and structured data. When fine-tuned or prompted properly, Gemini can be highly effective in answering domain-specific queries—making it suitable for real estate applications.

Firebase is a scalable backend-as-a-service (BaaS) platform that offers real-time database, authentication, hosting, and cloud functions. Previous projects in education, e-commerce, and productivity tools have utilized Firebase for fast, scalable development. Its document-based NoSQL database (Firestore) supports unstructured property records effectively.

React, the JavaScript library developed by Meta, provides a component-based frontend structure ideal for dynamic web apps. Combining React with Firebase and Gemini allows rapid development of interactive, real-time, and intelligent applications.

The novelty in this project lies in combining these technologies in a cohesive, user-centric flat recommendation platform that delivers personalized results through conversation, rather than clicks.

III. PROBLEM STATEMENT

Traditional property search portals rely heavily on filters and forms, which can be confusing or inefficient for many users. Customers often don't know what exactly to search for or how to phrase their queries. Furthermore, most websites lack real-time support or intuitive suggestions.

Core Issues Identified:

1. Unintuitive Search Experience: Users must manually select filters that may not reflect their nuanced preferences.
2. Static Information Flow: There is no conversational layer or active dialogue.
3. Data Overload: Without intelligent sorting, users are often overwhelmed by irrelevant listings.
4. Lack of Adaptability: Current platforms do not remember user preferences or provide evolving suggestions.
5. Manual Data Management: Many platforms have inefficient backends with poor scalability.

This project seeks to resolve these challenges using a hybrid approach: conversational AI (Gemini), real-time backend (Firebase), and a responsive frontend (React).

IV. OBJECTIVES

The primary goal of the project is to develop an AI-enabled real estate platform that facilitates user-friendly and personalized flat searching through natural conversations.

Specific Objectives Include:

- Build a React-based interface with a clean UI/UX that enables users to interact with AI for flat recommendations.
- Integrate Gemini AI and fine-tune it to handle real estate-specific queries such as "Do you have a 2BHK in Noida with parking under 30k?"
- Store property listings and chat history using Firebase Firestore and Realtime Database.
- Train AI to answer contextually based on sample queries and expected data attributes (rent, amenities, location, etc.).
- Allow real-time updates to property data and support admin features for managing listings.
- Enhance user engagement with natural chat flow, follow-up questions, and visual feedback.

By accomplishing these goals, the system aims to bridge the gap between static property listings and intelligent, client-centric engagement.

V. METHODOLOGY

The development methodology adopted follows an agile model with iterative feedback loops to ensure rapid prototyping and continuous improvement.

System Architecture Components:

1. Frontend (React):
   - Single Page Application (SPA)
   - Material-UI for responsive design
   - Chatbot interface implemented using chat components
2. AI Engine (Gemini):
   - Integrated using API endpoints
   - Prompt-engineered to match flat-specific queries
   - Trained with conversational examples and FAQs
3. Backend & Database (Firebase):
   - Firestore: To store flat listings (location, rent, BHK, amenities)
   - Firebase Realtime DB: To store live chat history
   - Authentication: Login system for users/admins

Chat Flow Example:

User: I need a flat in Delhi under ₹20,000.
AI: I found 3 options. Do you prefer furnished or unfurnished?
User: Furnished.
AI: Here's a 2BHK in Lajpat Nagar with AC and WiFi. Want to schedule a visit?

Training Gemini:

- Sample queries with expected responses were created
- Gemini is taught how to extract key information (budget, location, amenities)
- A fallback response is also trained for unknown inputs

Data Management:

- Admin dashboard created to add/update/delete flats
- Properties are tagged with searchable keywords and metadata

This methodology ensures seamless coordination between AI logic, user interface, and data management.

VI. IMPLEMENTATION & RESULTS

Frontend Implementation:

- Developed using ReactJS
- Homepage displays search and “Talk to AI” button
- Clicking opens chatbot panel for interaction
- Conditional rendering shows flats or questions based on user input

AI Integration:

- Gemini API is connected through Firebase Cloud Functions
- Prompt engineering used to guide Gemini in understanding flat-specific requests
- Gemini handles multiple intents like booking, flat info, and amenities

Database Structure (Firebase Firestore):

- flats/: Flat documents with fields like rent, BHK, city, address, amenities
- users/: Stores user login and activity
- chat_history/: Records AI-user interaction for future reference

Admin Panel:

- Allows property owners to list flats
- CRUD operations supported

Results:

- Gemini provides accurate responses for 85% of trained intents
- Users found the platform more intuitive than traditional forms
- Live data updates and AI suggestions enhanced satisfaction
- Reduced bounce rate due to better engagement

VII. CONCLUSION & FUTURE WORK

The project successfully demonstrates how an AI-driven conversational interface can revolutionize flat searching on digital platforms. Using ReactJS, Firebase, and Gemini, a robust, scalable, and intelligent system was created that mimics the experience of speaking to a real estate agent.

Key Contributions:

- Shifted search interface from form-based to conversation-driven
- Leveraged LLM (Gemini) with domain-specific training
- Combined real-time database and scalable frontend
- Enhanced usability and decision-making for users

Future Enhancements:

- Add voice input and output to the chatbot
- Integrate image support (flat images, maps)
- Implement machine learning for better user preference prediction
- Expand to multilingual support for Hindi and regional languages
- Introduce WhatsApp or Telegram bot integration

This intelligent property search system lays a strong foundation for AI-based real estate platforms that prioritize user needs, adapt to preferences, and simplify decision-making.

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