Stage 1: Detailed Project Description

Project Title
NextHousing

Project Summary:
NextHousing is a comprehensive web platform tailored for students and young professionals, aiming to transform the often daunting task of finding the ideal living space into a streamlined, enjoyable experience. Recognizing the unique challenges and preferences of this demographic, NextHousing aggregates a comprehensive array of rental listings and enriches them with in-depth insights, user-generated reviews, and real-time data on critical living factors such as neighborhood safety, amenities, and cost of living. Our intuitive interface simplifies the search and comparison process, enabling users to make informed housing decisions efficiently and stress-free.

Project Description:
NextHousing seeks to address the specific challenges faced by students and young professionals in finding suitable housing. Recognizing the complexities of this task—scattered information, varying quality of listings, and the need for detailed insights into potential homes—NextHousing offers a solution that is both comprehensive and user-friendly. The platform is designed to be a one-stop shop for housing search, where users can:

- Search and Compare: With an extensive database of rental listings, users can filter results based on their unique preferences, compare different properties, and make informed decisions.
- Gain Insights: Each listing is enriched with detailed information, including high-resolution images, user reviews, and data on local amenities and living conditions, providing a 360-degree view of each property.
- Interactive Exploration: The map-based search feature and the live chat bot, HomeHelper, offer interactive ways to explore housing options. Users can visually navigate through neighborhoods on the map and receive real-time assistance and recommendations from HomeHelper.
- Stay Informed: The smart alerts system ensures that users are promptly notified about new listings or changes in their preferred listings, helping them stay ahead in the fast-paced housing market.

Creative Components:

Map-Based Housing Search:

Description: We are set to revolutionize the property search experience by introducing a map-based search feature on the NextHousing platform. This feature allows users to interactively select a geographic area on the map and instantly view available homes within a user-specified radius. Each property will be displayed with essential details and photos directly on the map, providing a user-friendly and visually oriented search method.

Implementation Strategy: To bring this feature to life, we plan to integrate a powerful mapping API, such as Google Maps or Mapbox, which will serve as the foundation for our interactive map interface. Coupled with this, we will utilize geospatial databases to efficiently process and retrieve property data based on the geographic queries made by users. This approach ensures that property search results are not only accurate but also contextually relevant to the user's specified location or points of interest, offering a seamless and intuitive map-based search experience.

Live Chat Bot - HomeHelper:

Description: HomeHelper, the live chat bot in NextHousing, is designed to redefine user interaction and support during the housing search process. As a friendly and intelligent digital assistant, HomeHelper provides instant responses to user inquiries, offers personalized property recommendations, and assists users in navigating the platform. This feature aims to make the search for the perfect home not just easier but also more engaging and tailored to individual user preferences.

Implementation Strategy: The intelligence of HomeHelper stems from advanced technologies such as natural language processing (NLP) and machine learning. These technologies enable the chat bot to understand and process user queries in a conversational manner and learn from each interaction. Over time, HomeHelper will become more adept at providing accurate and contextually relevant advice, continually enhancing the user experience. The implementation of this feature requires careful integration of NLP and machine learning models, ensuring that HomeHelper remains responsive, insightful, and genuinely helpful to users at every step of their home-finding journey.

Usefulness

NextHousing is incredibly useful because it simplifies and personalizes the process of finding a home, especially for UIUC students, catering specifically to the needs of students and young professionals. Here's why we think it's beneficial and what it offers:

Basic Functions

- Property Search: Users can search for rentals using filters like location, price, and number of bedrooms, ensuring a targeted and efficient search process.
- Detailed Property Insights: Access comprehensive details about properties, including photos, amenities, and reviews.
- Favorites Management: Save and manage a list of preferred properties for easy access and comparison.

Complex Features:

- Live Chat Bot (HomeHelper): Offers real-time assistance, answering queries and providing personalized recommendations.
- Interactive Maps: Visualize property locations and explore nearby amenities, ensuring users find homes in their preferred surroundings.
- Smart Alerts: Receive notifications about new listings or changes in listings that match user preferences.

Comparison with Existing Solutions

While there are established platforms like Zillow, Apartments.com, and Rent.com, NextHousing differentiates itself in several ways:

- Targeted Audience: Unlike generic rental platforms, NextHousing is specifically tailored for UIUC students and young professionals, addressing their specific concerns, lifestyle, and housing preferences.
- Local Integration: NextHousing collaborates closely with local real estate websites, offering a more localized and comprehensive collection of listings that are highly relevant to the UIUC community.
- Smart Matchmaking: Uses AI to not only match listings with user preferences but also predict and suggest future listings.
- Interactive User Experience: Incorporates advanced features like an AI-powered chatbot and an intuitive map search, enhancing user interaction and decision-making.

Realness

To develop a rental website aimed at consolidating off-campus housing options, we plan to gather information from multiple sources to ensure a comprehensive database. Our strategy involves extracting rental listings from various platforms, including local real estate websites (such as jsm, university groups, green street realty) and other rental websites.

Here's the description of our data sources:

1. **Local real estate websites:**
   JSM: https://jsmliving.com/index.php/
   University Group: https://ugroupcu.com/
   Smile: https://www.smilestudentliving.com/

   Data Extraction and Format:

Extraction Method: Data will be systematically scraped from these websites, which predominantly present information in HTML format.
Post-Processing: The extracted data will be parsed and transformed into structured formats such as CSV or JSON, facilitating efficient data manipulation and integration into our database.
Data Details: Listings will include property details like address, price, number of bedrooms/bathrooms, amenities, photos, and contact information for the landlord or property manager.
Data size: The estimated cardinality of the dataset is ~1400,, and the degree is ~17.

2. **Online Rental Databases**:
   Source: Kaggle Dataset - Apartments for Rent Classified.
   Data Format: The dataset is available in CSV format.
   Data size: The cardinality of this dataset is 10000,and the degree is 22.
   Data Details: This dataset is rich in essential rental information, covering aspects such as rent price, square footage, number of bedrooms, and precise location. Additionally, it includes nuanced details like pet-friendliness and utilities included, which are pivotal in aligning listings with user preferences and requirements.

Functionality and User Interaction:

NextHousing offers a rich set of functionalities designed to streamline and enrich the housing search experience for students and young professionals. The application facilitates a range of interactions, ensuring users can navigate, utilize, and personalize their housing search effectively. Here's a detailed breakdown of the functionalities and user interactions within NextHousing:

1. Account and Profile Management

Create: Users can register and create their personal profiles, setting up preferences for their housing search.
Update: Users can update their profile details, including contact information, preferences for property types, and search criteria.
Delete: Users have the option to deactivate or delete their accounts if needed.

2. Property Listings and Management

Create: Landlords or authorized users can list new properties, providing detailed information including images, rent, amenities, and rules.
Read/View: Users can browse through the comprehensive list of properties. Each listing includes detailed descriptions, photos, amenities, user reviews, and location maps.
Update: Property owners can update their listings to reflect changes in rent, availability, or property features.
Delete: Property listings can be removed from the platform when they are no longer available or if the listing violates platform policies.

3. Search and Discovery

Keyword Search: Users can use keyword-based searches to find specific types of properties or amenities.
Advanced Filters: Users can refine their searches based on various parameters like location, price range, number of bedrooms, and specific amenities.
Map-Based Search: Users can explore properties using an interactive map, selecting areas of interest and viewing properties available in those regions.

4. User Interactions and Community Features *

Favorites: Users can save and manage a list of favorite properties for easy access and comparison.
Reviews and Ratings: Users can read and submit reviews for properties, sharing their experiences and insights with the community.
Forums and Discussions: Users can engage in community forums, discussing topics related to housing, sharing tips, or seeking advice.

Personalized User Experience

Smart Alerts: Users receive notifications for new listings that match their saved preferences or significant changes to their favorite listings.
Recommendation Engine: Leveraging user preferences and search history, the platform suggests properties that closely match the user's needs and preferences.
Live Chat Support (HomeHelper): An AI-powered chatbot provides real-time assistance, answers queries, and offers personalized property suggestions.

UI Mockup:

https://docs.google.com/presentation/d/1hD1RV-mtRvQbVJpMwlpXo2sNXo62xNvDz83Qf3xMuao/edit?usp=sharing

Project work distribution

We will host in-person weekly meetings after class on Monday 11:00 - 12:00 am

Frontend Development
Kathy: Leads UI design and implementation, focusing on creating a user-friendly interface. Additionally, contributes to API development, crafting APIs for front-end to back-end communication and defining API specifications. Also involved in integration and testing.
Vincent Lyu: Responsible for selecting and setting up the frontend frameworks like React or Vue, ensuring the application is built on robust and scalable technology. Moreover, perform compatibility testing to guarantee the app functions seamlessly across various devices.
Backend Development

Zilin Zhou: Responsible for the server-side logic and backend framework. Handles data management and data crawling, including the architectural design of databases and data gathering.
Yu Tian: Participates in developing backend interfaces and implementing functionalities for different modules on the backend side. Also involved in Database Implementation and Indexing, focusing on optimizing database structures.