Project Plan Senior Project

Real Ease: Comprehensive Real Estate Insights Platform

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Client: Fitzroy Nembhard, Advisor

Date(s) of Meeting(s) with the Client for developing this Plan

Date's of Meetings with the Client

Project Goals:

We aim to streamline the home search process by delivering clear, accessible information that enables users to make well-informed decisions. RealEase provides a robust platform that empowers buyers and investors to confidently and accurately identify their ideal home by leveraging our advanced home comparison tools, real-time ROI calculator, and Neighborhood Insights Dashboard.

Our motivation:

Neighborhood insight platforms often need help with significant challenges, including high entry costs, poor user experience, and inadequate or outdated information. Many platforms impose substantial fees or require premium subscriptions to access comprehensive data, creating financial barriers for users seeking affordable solutions. Additionally, existing platforms frequently need more convenient interfaces that make it easier for users to access and interpret crucial information easily. Furthermore, users often need more accurate neighborhood data, which limits their ability to make well-informed decisions about potential investments or home purchases. Our platform addresses these issues by offering an affordable, user-friendly solution that prioritizes cost-effectiveness and data accuracy. We provide detailed, real-time neighborhood insights through an intuitive interface, ensuring users can easily access the most current and comprehensive information. We empower users to make informed decisions without financial constraints or usability challenges by focusing on these areas.

Approach (key features of the system):

Neighborhood Insights Dashboard:

The user can explore in-depth neighborhood data with the Neighborhood Insights Dashboard. This core feature aggregates and presents essential information about local neighborhoods, including schools, crime rates, demographics, nearby food options, entertainment venues, hospitals, and libraries.

The user can also access detailed information on local infrastructure, such as public transportation and safety services. This data is available through an interactive map or comprehensive reports, allowing users to effectively evaluate the quality and suitability of various neighborhoods. By offering a centralized source of localized information, the dashboard significantly enhances the user's ability to make informed decisions regarding where to live or invest.

Detailed House Comparison:

The user (home buyer) can compare multiple houses side-by-side using the Detailed House Comparison feature. This functionality lets the user input and view detailed information about various properties, including price, square footage, number of bedrooms and bathrooms, and unique features.

The user can quickly evaluate and contrast the attributes of different homes, facilitating the identification of which property best aligns with their needs and preferences. This feature streamlines decision-making by providing a comprehensive overview of potential options in one centralized location.

Real-Time ROI Calculator:

The user (investor) can evaluate the financial potential of a property using the Real-Time ROI Calculator. This tool enables the user to input various parameters to compute the expected return on investment.

With real-time feedback, the user can swiftly assess potential ROI, gaining immediate insights into the financial viability of a property. The ROI Calculator provides valuable information by analyzing how different variables impact profitability. Inputs include the property's purchase price, down payment, closing costs, property taxes, insurance, maintenance costs, rental income, the sale price of the property, and holding period.

By offering instant calculations of net profit, annualized ROI, cash-on-cash return, break-even point, and internal rate of return (IRR), this feature equips the user with the necessary insights to make informed investment decisions regarding various properties in their area.

Novel features/functionalities:

Our application offers unique features that distinguish it from mainstream platforms like Zillow or Realtor.com. By integrating advanced APIs, RealEase provides users with up-to-date insights into communities or cities of interest that aren't present in one location on many of these major platforms. RealEase also aims to streamline the UI, allowing users to navigate the site and get the most out of the information we provide them. The Neighborhood Insights Dashboard delivers comprehensive ratings for restaurants, entertainment options, schools, and more, along with walkability scores, all readily accessible to users. This enables potential homebuyers to assess whether an area aligns with their lifestyle preferences.

Additionally, the web application includes a detailed home comparison tool, allowing users to evaluate up to four local properties side-by-side. The Real-Time ROI Calculator allows property investors to analyze various properties, assessing the potential risks and benefits of buying, holding, or renting a house. This feature equips investors with critical data to determine the viability and profitability of their investment decisions.

Algorithms and tools:

We will employ the MERN stack to develop the website, including both frontend and backend components, comprising HTML, CSS, JavaScript, MongoDB, Express, React, and Node.js. Additionally, Javascript will retrieve housing data, location information, school details, reviews, and more by querying APIs such as HomeHarvest, Google Places, and Yelp. The website will be hosted on DreamHost. A collaborative filtering algorithm will be implemented to identify and display houses similar to users', enhancing their search experience. This proposal aims to create a tool that analyzes diverse public data sources, such as Property Listings (HomeHarvest API) and Sales Records(HomeHarvest API), Rental Income Data, Local Economic Indicators (Housing Data - Zillow Research), Urban Development Plans and Zoning Changes. For example, some of the public data sources we intend to use for Economic Indicators include the Bureau of Labor Statistics (BLS), Which provides data on inflation, unemployment rates, and wage growth. Federal Reserve: Offers economic data, interest rates, and monetary policy information. National Center for Education Statistics (NCES): Offers a comprehensive database of schools, including performance data. Also, some public data sources we intend to use for industry-specific data (real estate market) include realtors, Zillow, and Redfin, which provide property values, rental prices, and housing market trends.

Technical Challenges:

One of the main challenges is integrating real-time data from various public sources, such as housing records, economic indicators, and neighborhood statistics. This requires managing multiple APIs, handling different data formats, and ensuring that data is accurate and up-to-date. As we are still gaining experience with complex data engineering and API management, this could be a significant hurdle in our development process.

Creating a Real-Time ROI Calculator involves developing complex financial algorithms and designing a user-friendly interface that effectively integrates these algorithms. While we are confident in our ability to develop the algorithms, our limited experience with JavaScript and web programming may present challenges in building a smooth, functional interface that meets user needs.

Ensuring our application remains responsive and performs well as it scales is another challenge, particularly as we plan to use MongoDB as our backend database. Optimizing the application for scalability and performance will be crucial as the user base and data volume grow. Given our relative inexperience with MongoDB and managing large-scale systems, this could pose a significant technical challenge for our project.

Milestone 1 (Sep 30) Itemized Tasks:

Compare and select technical tools for

- Research and choose tools for front-end-development (React, Angular, etc.)
- Select a backend framework (Node.js, Express, etc.)
- Choose a database (MongoDB)
- Evaluate the API's that what were going to use and how we are going to integrate them together
- Compare and select tools for financial calculations and specifically what information the user will enter.

Provide small ("hello world") demo(s) to evaluate the tools for

- Create basic demos for front-end frameworks to assess ease of use
- Set up a backend with MongoDB
- Test integration of API's for neighborhood data (sandbox)

Resolve technical challenges:

- Address challenges with data aggregation from multiple APIs
- Resolve initial issues with MongoDB setup and data schema design
- Tackle front-end and back-end integration challenges

Compare and select collaboration tools for software development

- Choose software development tools (Github)
- Google Workspace
- Collaboration and Project management tools (Jira)

Design and Requirements

- Document all user requirements for each feature (Neighborhood Insights Dashboard, ROI Calculator, and Scoring Algorithm)
- Define technical requirements and constraints
- Gather input from potential users and stakeholders
- Outline the architecture of the application, including front-end, back-end, and database structure
- Design the data flow for each feature, including API interactions
- Develop a testing strategy for each feature, including unit tests, integration tests, and user acceptance tests

Milestone 2 (Oct 28) Itemized Tasks:

Neighborhood Insights Dashboard:

- Implement the data aggregation layer, pulling in data from APIs.
- Develop the user interface for displaying neighborhood insights.
- Test data accuracy and user interface functionality.
- Demo the working dashboard to stakeholders.

Real-Time ROI Calculator:

- Build the backend algorithms for calculating ROI based on user input and real-time data.
- Integrate the ROI calculator with the user interface.
- Conduct extensive testing for financial accuracy.
- Demo the ROI calculator to potential users for feedback.

Scoring Algorithm for House Recommendations:

- Develop the scoring algorithm to rank houses based on user-defined criteria.
- Implement the user interface that allows users to input preferences and view recommendations.
- Test the algorithm for accuracy and relevance.
- Demo the scoring feature to stakeholders.

Milestone 3 (Nov 25): Itemized Tasks:

Final Integration of All Features:

- Integrate the Neighborhood Insights Dashboard, ROI Calculator, and Scoring Algorithm into a cohesive user interface.
- Ensure seamless interaction between features, including data flow and user experience.

Full System Testing:

- Conduct end-to-end testing of the application, covering all features.
- Perform load testing on MongoDB to ensure scalability under high user demand.
- Run usability tests with real users to gather feedback on the overall experience.

Optimization and Performance Tuning:

- Optimize the application's performance, focusing on load times and data processing speeds.
- Fine-tune the database for faster queries and data retrieval.
- Optimize the front-end for responsive design across different devices.

Final Demo and Feedback Collection:

- Present the complete application to stakeholders, showcasing all features.
- Gather feedback and make any necessary final adjustments.
- Prepare for deployment, ensuring that all systems are ready for real-world use.

Documentation and User Guide Creation:

- Create detailed user guides for each feature.
- Document the technical architecture and codebase for future reference.
- Prepare a final project report summarizing the development process, challenges, and outcomes.

Task matrix for Milestone 1

Task	Jonathan	Donovan	Enrique
Compare and select Technical Tools	Integration and Test	Backend Plan	GUI UX/UI
Provide a small demo to evaluate the full stack process to fetch data and bring it to the UI.	Process housing data.	Cache data and test full stack integration.	Front-end dev and functional javascript code.
Resolve technical challenges:	60%	20%	20%
Compare and select collaboration tools for software development	15%	70%	15%
Compare and select tools for financial calculations and specifically what information the user will enter.	70%	10%	20%
Design and Requirements	30%	40%	30%
Test Plan	15%	70%	15%

Approval from Faculty Advisor

"I have discussed with the team and approved this project plan. I will evaluate the progress and assign a grade for each of the three milestones."

Signature: _____ Date: _____