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:

Our goal is to simplify the home search process by providing clear, easy-to-understand information that empowers users to make informed decisions. With our detailed home comparison tools, Real-Time ROI calculator, and Neighborhood Insights Dashboard, we offer a comprehensive platform that helps buyers and investors find the perfect home with confidence and clarity.

Our motivation:

Many homebuyers and investors need help with the current real estate process, with scattered information and limited tools to make informed decisions. Existing platforms often need more transparency, making it easier to compare properties effectively or understand the actual value of a potential investment. Our app addresses these frustrations by offering a streamlined experience with precise, comprehensive data, making it easier for users to navigate the complexities of the market and find the best opportunities.

Approach (key features of the system):

Neighborhood Insights Dashboard:

The user (agent) can explore in-depth neighborhood data with the Neighborhood Insights Dashboard. This main feature aggregates and displays essential information about local neighborhoods, including Schools, Neighborhoods, Crime, Demographics, Nearby Food Options, Entertainment, Hospitals, and Libraries.

The user also has access to local infrastructure information including; Public transportation and Public safety. The user can access this data through an interactive map or detailed reports, enabling them to assess the quality and suitability of various neighborhoods before making a decision. By providing a centralized source of localized information, the dashboard enhances the user's ability to make informed choices about 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 allows users to input and view detailed information about various properties, including price, square footage, number of bedrooms and bathrooms, and unique features.

Users can easily evaluate and contrast the attributes of different homes, making it easier to identify which property best meets their needs and preferences. This feature streamlines the decision-making process by providing a comprehensive overview of potential options in one place.

Real-Time ROI Calculator:

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

The user, with real-time feedback, can calculate potential ROI, enabling quick access to the financial viability of a property. By offering instant insights into how different variables impact profitability, the ROI Calculator supports users in making sound investment decisions. The inputs include; Purchase price of the property, Down payment, Closing costs, Property taxes, Insurance, Maintenance costs, Rental income, Sale price of the property, and Holding period.

With this feature, the user will be able to gain insight in terms of Net Profit, Annualized ROI, Cash-on-Cash return, Break Even point, and the Internal rate of return (IRR). These instant insights would allow the user to make informed decisions on different houses in their area.

Novel features/functionalities:

Our application delivers features that are not mainstream to apps like Zillow or Realtor.com. By integrating APIs, RealEase will be able to provide the user with updated insights surrounding the community of interest or city. Our neighborhood insights dashboard will offer ratings for restaurants, entertainment, schools, and more in your local areas, along with a walkability score that are all within the user's reach. While browsing for a home the user can get a sense of whether the area fits their lifestyle or not. On top of this our web application will allow users to create a detailed home comparison tool, where they choose between 4 local homes to compare. Our ROI calculator will provide property investors with the chance to analyze properties and determine if the risk of buying a house is worth the potential upside of owning a house / holding a house / renting a house.

Algorithms and tools: potentially useful algorithms and software tools

In order to create the website (frontend and backend) we will be using MERN full-stack development process, which includes: HTML, CSS, Javascript, MongoDB, Express, React, and Node. Along with this we will be utilizing python to retrieve housing data, location data, schools, reviews, and more by querying APIs (homeharvest, google places, yelp). To host the website, we will use DreamHost. By using a *collaborative filtering* algorithm, we will be able to find similar houses that can be displayed to the user.

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			
Provide small ("hello world") demo(s) to evaluate the tools for			
Resolve technical challenges:			
Compare and select collaboration tools for software development			
Compare and select tools for financial calculations and specifically what information the user will enter.			
Design and Requirements			
Test Plan			

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: _____