

CryptoAdvisor Implementation Summary

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The *CryptoAdvisor* application is a personalized investment platform designed to help users identify relevant stocks and cryptocurrencies based on their individual preferences and live market data. The system provides a single desktop application where users can view personalized recommendations, financial news, and community discussions. It focuses on decision support rather than direct trading, giving users a tailored dashboard that reflects their investment interests and strategies.

When a user creates an account and logs into the application, *CryptoAdvisor* collects their preferences through a questionnaire. Users can specify their asset type (stocks, crypto, or both), investment strategy (Day Trade or Long-Term), up to three industries of interest, and select their favorite cryptocurrencies. These preferences are stored in a database and drive all content shown in the app. The Home Feed displays a personalized list of recommended assets, each showing the asset name, current price, investment strategy type, confidence level, and a concise explanation of the recommendation. The feed automatically refreshes every twenty-four hours, but can also be updated manually to reflect the most recent market data.

In addition to recommendations, the app includes a live financial news section that aggregates stories from relevant industries based on the user's profile. Links to external sources allow users to read full articles directly from financial sites. A forum feature provides a space for users to create new discussion posts, reply to others, and browse community threads about specific market events or assets. Together, these modules create an integrated experience that combines data, context, and community engagement in a single interface.

CryptoAdvisor uses a multi-tier architecture with clear separation between client, server, and data layers. The front end is implemented in JavaFX, providing screens for login, registration, preferences, home feed, news, and forums. It communicates over HTTP with a RESTful API hosted on a Node.js and Express server. The backend manages user authentication and integration with external data sources. Communication between client and server is secured using JSON Web Tokens (JWT) to maintain authenticated sessions and restrict access to protected endpoints.

Persistent data is stored in a MySQL relational database hosted on AWS RDS. The schema includes tables for users, preferences, recommendations, forums, and replies. The relationships between these tables ensure that each record of user activity, from stored preferences to posts and replies, is linked to the corresponding user ID. Indices and foreign key constraints support efficient lookups and maintain data consistency.

The system relies on three major external APIs. Alpha Vantage provides real-time stock prices, CoinGecko provides cryptocurrency pricing and metadata, and MarketAux delivers financial news articles. The backend retrieves data from these sources to populate recommendation and news content. Because external APIs can experience latency and rate limitations, the server

employs caching and fallback values to ensure that information remains available even if live updates are temporarily restricted.

Two main releases completed the system's functionality. The first release established the end-to-end flow: registration, login, preference storage, personalized feed display, and forum interaction. The second release focused on generating recommendations dynamically from user preferences and real-time market data. Each recommendation record is timestamped and assigned an expiration after twenty-four hours, triggering the system to renew data as needed. The final implementation offers a complete working prototype of an investment recommendation environment where users can view personalized insights and interact with others through forums.

Testing validated the main components of the system through structured functional and integration tests. Authentication routines correctly handled account registration, login, and token validation. Preference management accurately stored and retrieved user settings, and updates were immediately reflected in subsequent recommendations. The recommendation engine generated results consistent with the chosen asset type and investment strategy, and the refresh operation worked as expected. News retrieval and filtering were verified against various configurations, while the forum module successfully supported post creation, browsing, and replies. Regression testing ensured that system updates did not disrupt existing behavior.

Our final version of *CryptoAdvisor* achieved all of our defined requirements for a working prototype. It successfully integrates secure account management, preference-based recommendations, live market data, contextual financial news, and user-driven discussions into one desktop application. The modular architecture allows for straightforward expansion, and the combination of real-time data and persistent storage ensures that users receive accurate and personalized results.

Future improvements can expand the platform's functionality and performance. Planned enhancements include the addition of broker integration for real-time trading and portfolio tracking, advanced data visualization and analytics tools, a mobile implementation, and upgraded security features such as two-factor authentication. More sophisticated AI-based recommendation models could also be added in future iterations to refine personalization and adapt to changing market conditions.

CryptoAdvisor functions as a unified investment platform that provides users with personalized, real-time recommendations, financial news, and community discussions within a single desktop application. The system securely manages user accounts and preferences, retrieves live stock and cryptocurrency data from external APIs, and generates updated recommendations every twenty-four hours or on demand. It displays this information through an interactive interface that allows users to explore assets, review current prices, read news articles, and participate in forum discussions. All components work together seamlessly to deliver an integrated and responsive experience that supports individualized investment research and information gathering.