Group Project: BlueWave

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MISY3322 System Analysis & Design

Section: 101

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Prototype link: BlueWave - Proto.io editor

Prototype Video link: BlueWave Proto.io - YouTube

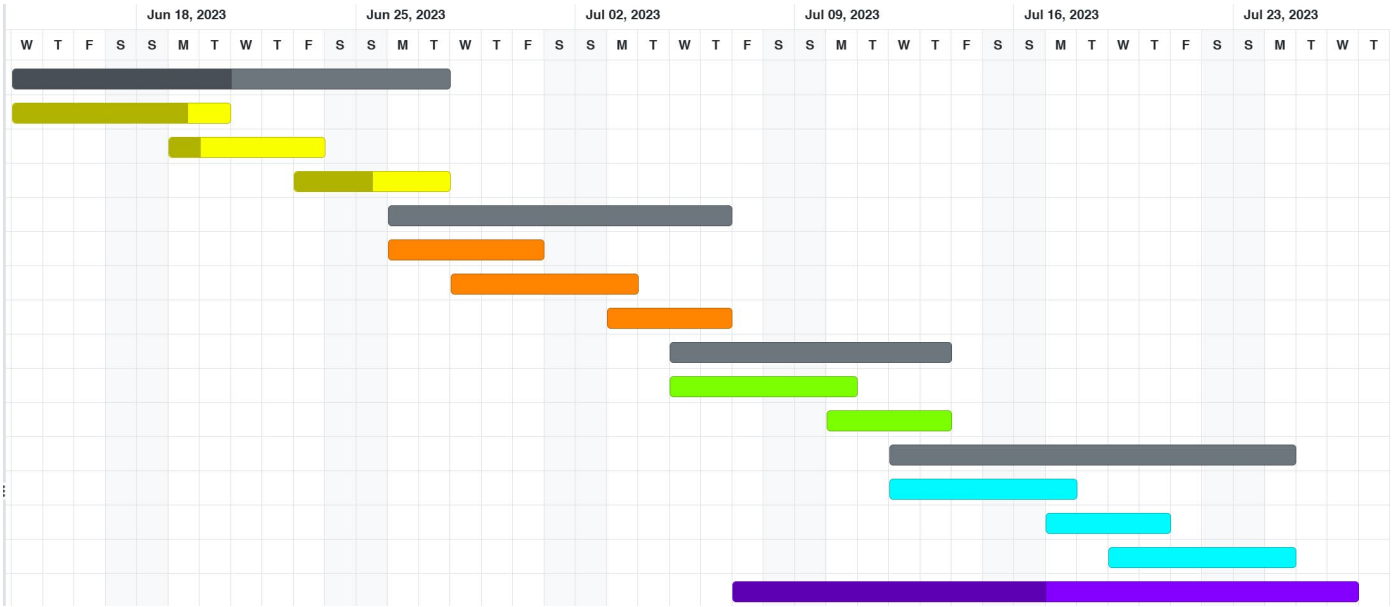
Contents

Abstract:

BlueWave is an innovative stock forecast system designed to empower financial analysts in making informed investment decisions. Leveraging advanced AI technology, BlueWave offers a wide range of user-friendly features to retrieve stock data, predict future stock prices, assess risks, identify patterns, and present data in a comprehensible format. The system comprises two key actors: BlueWave AI, responsible for data analysis, and Financial Analysts, the end-users who utilize the AI's insights. By providing real-time information and accurate predictions, BlueWave aids analysts in navigating the complexities of the stock market and executing trades based on their analyses. The system's adoption has been positively received by leading financial analysis firms, enhancing their capabilities and fostering operational efficiency. BlueWave's continual advancements promise to reshape the financial industry, promoting trust, transparency, and success for investors and analysts alike.

Project Management:

Name	Start Date	End D...	Duration	Color
Planning	Jun 14, 2023	Jun 27, 2023	10 days	
Scope Definition	Jun 14, 2023	Jun 20, 2023	5 days	
Stakeholder Identification	Jun 19, 2023	Jun 23, 2023	5 days	
Milestone Setting	Jun 23, 2023	Jun 27, 2023	3 days	
Analysi	Jun 26, 2023	Jul 06, 2023	9 days	
Requirement Gathering	Jun 26, 2023	Jun 30, 2023	5 days	
User Persona Creation	Jun 28, 2023	Jul 03, 2023	4 days	
Use Case Identification	Jul 03, 2023	Jul 06, 2023	4 days	
System Request	Jul 05, 2023	Jul 13, 2023	7 days	
Formal Document Creation	Jul 05, 2023	Jul 10, 2023	4 days	
Stakeholder Alignment	Jul 10, 2023	Jul 13, 2023	4 days	
Use Case Mapping Phase	Jul 12, 2023	Jul 24, 2023	9 days	
Use Case Definition	Jul 12, 2023	Jul 17, 2023	4 days	
Prioritization	Jul 17, 2023	Jul 20, 2023	4 days	
Use Case Diagrams	Jul 19, 2023	Jul 24, 2023	4 days	
Prototype	Jul 07, 2023	Jul 26, 2023	14 days	



Problems and statements:

Problem Statement, Opportunity, or Directive	Urgency	Visibility	Priority or Rank	Proposed Solution
Outdated or Incomplete User Information	High	High	1	Implement a data validation and update mechanism to ensure accurate and up-to-date user information.
Limited Stock Data Sources	High	High	2	Expand integration with multiple reliable stock data providers to enhance data coverage and accuracy.
Inefficient Stock Price Prediction Models	High	High	1	Enhance the AI algorithms and models used for stock price prediction to improve accuracy and efficiency.
Vulnerabilities in Data Security	High	High	2	Conduct regular security audits and implement robust encryption and data protection measures to secure user data.
Complex and Confusing User Interface	Medium	Medium	3	Redesign the user interface to be more intuitive, user-friendly, and visually appealing for better user experience.
Lack of Education Resources for Financial Analysts	Medium	Medium	4	Develop educational materials and resources to help Financial Analysts understand and utilize the system effectively.
Inadequate Customer Support	Medium	Medium	4	Strengthen customer support services to address user inquiries, resolve issues promptly, and provide timely assistance.

Matrix:

CAUSED AND EFFECT ANALYSIS		SYSTEM IMPROVEMENT OBJECTIVE	
Brief Statement of Problem, Opportunity or Directive	**Causes and Effective**	**System Objective**	**System constraint**
Outdated or Incomplete User Information	• Limited resources for data validation • Inadequate user data update mechanisms	Improve data accuracy and user experience	• Limited data validation capabilities • High costs associated with data validation upgrades
Limited Stock Data Sources	• Insufficient integration with data providers • Lack of real-time data updates	Enhance data coverage and accuracy	• Dependency on external data providers • Resource limitations for establishing real-time updates
Inefficient Stock Price Prediction Models	• Outdated algorithms and models • Insufficient historical data for training models	Improve prediction accuracy and efficiency	• Resource-intensive computational requirements • Limited storage capacity for extensive historical data
Vulnerabilities in Data Security	• Inadequate encryption and data protection • Lack of regular security audits and vulnerability assessments	Enhance data security and user trust	• Compliance with data security regulations • Regulatory restrictions on certain security measures
Complex and Confusing User Interface	• Poor user interface design • Inconsistent navigation and layout	Enhance user experience and system usability	• Resource and time constraints for redesign • Compatibility challenges with legacy system components
Lack of Education Resources for Financial Analysts	• Absence of educational materials and support • Inadequate training programs for analysts	Empower Financial Analysts with knowledge	• Resource constraints for educational content • Limited budget for training and educational initiatives
Inadequate Customer Support	• Insufficient support staff and training • Slow response times and resolution	Improve customer satisfaction and retention	• Limited support team capacity • Technological limitations for real-time customer support

Slow Performance during Peak Usage	• Inefficient system infrastructure • Insufficient server capacity and network bandwidth	Optimize system performance and scalability	• Technical limitations for real-time processing • Cost and resource constraints for infrastructure upgrades

List of requirements:

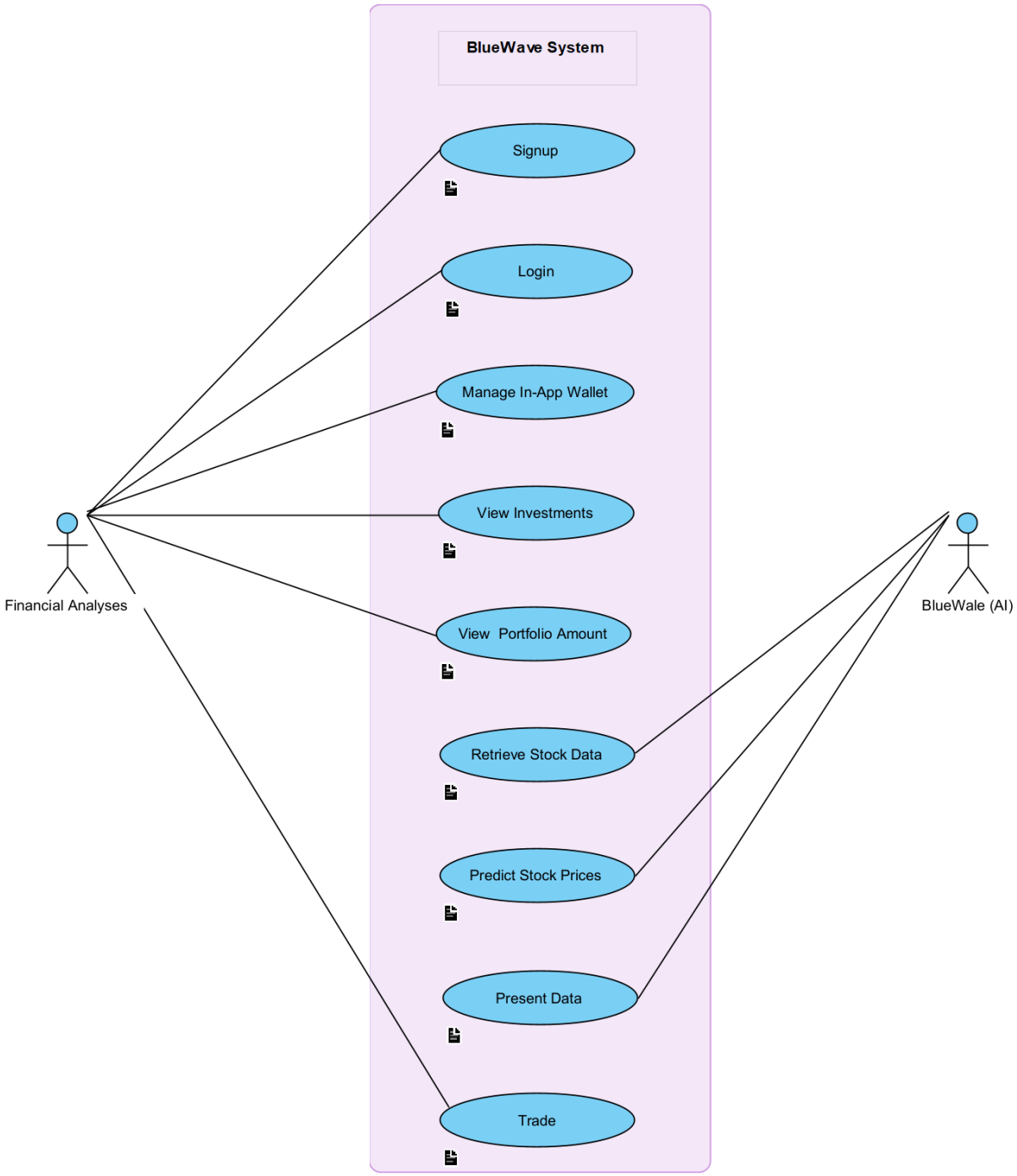
Requirement	Classification	Description
User Registration and Login	Functional	The system should allow Financial Analysts to sign up with their details and securely log in to access their accounts.
User Profile and Portfolio Creation	Functional	The system should create user profiles for Financial Analysts and enable them to create and manage their investment portfolios.
Web Accessibility and Security	Non-functional	The system should be accessible over the web and implement strong security measures to safeguard user data and financial information.
Personal Information Management	Functional	Financial Analysts should have the ability to view and manage their personal information within the system.
User Profile Update	Functional	Financial Analysts should be able to update their profile information, including in-app wallet details, when necessary.
Stock Data Retrieval	Functional	BlueWave AI should be able to retrieve real-time and historical stock market data from reliable sources to use in its analysis.
Stock Price Prediction	Functional	BlueWave AI should apply various forecasting techniques to predict future stock prices based on the retrieved data.
Presentation of Stock Data	Functional	BlueWave AI should present the stock market data, including historical trends and predictions, in a clear and easily understandable format for Financial Analysts.
Trade Execution	Functional	Financial Analysts should have the ability to execute buy and sell orders based on the predictions and insights provided by BlueWave AI.
In-App Wallet Management	Functional	Financial Analysts should be able to deposit funds into their in-app wallet for trading purposes and withdraw funds when needed.
Investment Tracking	Functional	The system should track and display the status of investments made by Financial Analysts, including current holdings and investment returns.

Real-Time Updates	Non-functional	The system should provide real-time updates for stock market data, predictions, and other relevant information to keep Financial Analysts informed with the latest data.
Data Privacy and Security	Non-functional	The system should use encryption and robust security measures to protect sensitive user and financial data, ensuring data privacy and compliance with regulations.
User Support and Notification System	Functional	The system should offer user support to assist Financial Analysts and provide notifications for important updates and news related to their investments.
User-friendly Interface	Non-functional	The system should have an intuitive and user-friendly graphical interface for easy navigation and interaction with the platform.

Use-cases glossary:

Use-Case Name	Use-Case Description	Participating Actors and Roles
Signup	Financial Analyses can create a new account on BlueWave system.	Financial Analyses (Initiator)
Login	Financial Analyses can log into their BlueWave account.	Financial Analyses (Initiator)
Manage In-App Wallet	Financial Analyses can manage their in-app wallet.	Financial Analyses (Initiator)
View Investments	Financial Analyses can view their current investments.	Financial Analyses (Initiator)
View Portfolio Amount	Financial Analyses can view the total amount in their portfolio.	Financial Analyses (Initiator)
Retrieve Stock Data	BlueWave AI fetches up-to-date stock data for analysis.	BlueWave AI (Initiator)
Predict Stock Prices	BlueWave AI predicts future stock prices using ML algorithms.	BlueWave AI (Initiator)
Present Data	BlueWave AI presents analyzed stock data and predictions.	BlueWave AI (Initiator)
Trade	Financial Analyses can execute stock trades based on predictions.	Financial Analyses (Initiator)

Use-Case Model Diagram (UMD):



Use Case Narratives:

1. **Use-Case Name:** Signup

Information:

- Rank: High
- ID: UC-01
- Status: Active
- Justification: Financial Analysts need to create an account to access BlueWave system features.
- Primary Actors: Financial Analyses
- Supporting Actors: None

Scenario:

1. The Financial Analyst navigates to the BlueWave system's signup page.
2. The system presents a form prompting the Financial Analyst to enter their required information, such as name, email, and password.
3. The Financial Analyst fills in the necessary details.
4. The system verifies the provided information and checks for any duplicate accounts.
5. If the information is valid and unique, the system creates a new account for the Financial Analyst.
6. The system confirms the successful account creation and redirects the Financial Analyst to the login page.

Details:

- Level: User Goal
- Summary: Financial Analysts create a new account to access BlueWave system.
- Complexity: Low
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: The BlueWave system is accessible, and the Financial Analyst has a stable internet connection.

- Post-conditions: The Financial Analyst has a registered account on the BlueWave system.
- Author: BlueWave development team
- Assumptions: The provided information is valid and accurate.

2. **Use-Case Name:** Login

Information:

- Rank: High
- ID: UC-02
- Status: Active
- Justification: Financial Analysts need to log into their accounts to access BlueWave system features.
- Primary Actors: Financial Analyses
- Supporting Actors: None

Scenario:

1. The Financial Analyst navigates to the BlueWave system's login page.
2. The system presents a login form requesting the Financial Analyst's credentials, such as email and password.
3. The Financial Analyst enters their login credentials.
4. The system verifies the provided credentials against the stored user data.
5. If the credentials are valid, the system grants access to the Financial Analyst's account.
6. The system redirects the Financial Analyst to the BlueWave system's dashboard.

Details:

- Level: User Goal
- Summary: Financial Analysts log into their BlueWave accounts.
- Complexity: Low
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: The Financial Analyst has a registered account on the BlueWave system.
- Post-conditions: The Financial Analyst gains access to their BlueWave account.
- Author: BlueWave development team
- Assumptions: The provided login credentials are correct.

3. **Use-Case Name:** Manage In-App Wallet

Information:

- Rank: Medium
- ID: UC-03
- Status: Active
- Justification: Financial Analysts need to manage their funds and perform transactions within the BlueWave system.
- Primary Actors: Financial Analyses
- Supporting Actors: None

Scenario:

1. The Financial Analyst navigates to the BlueWave system's wallet management section.
2. The system displays the Financial Analyst's current wallet balance and transaction history.
3. The Financial Analyst selects the desired action, such as adding funds, withdrawing funds, or performing other financial transactions.
4. The system prompts the Financial Analyst to enter the necessary details, such as the transaction amount and recipient information.
5. The Financial Analyst provides the required information.
6. The system validates the transaction details and checks for sufficient funds.
7. If the transaction is valid and feasible, the system updates the wallet balance accordingly and records the transaction in the history.
8. The system confirms the successful completion of the transaction and provides a relevant notification.

Details:

- Level: User Goal
- Summary: Financial Analysts manage their in-app wallet within the BlueWave system.
- Complexity: Medium
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: The Financial Analyst has a registered account on the BlueWave system and sufficient funds in their wallet.

- Post-conditions: The Financial Analyst's wallet balance is updated, reflecting the performed transaction.
- Author: BlueWave development team
- Assumptions: The provided transaction details are valid, and the Financial Analyst has sufficient funds for the intended transaction.

4. **Use-Case Name:** View Investments

Information:

- Rank: Medium
- ID: UC-04
- Status: Active
- Justification: Financial Analysts need to monitor their current investments within the BlueWave system.
- Primary Actors: Financial Analyses
- Supporting Actors: None

Scenario:

1. The Financial Analyst accesses the BlueWave system's investment overview section.
2. The system presents the Financial Analyst with a list of their current investments, including relevant details such as asset names and quantities.
3. The Financial Analyst reviews the displayed investment information.
4. The system provides options to filter and sort the investment list based on specific criteria, such as asset type or performance.
5. The Financial Analyst applies thefiltering or sorting options as desired.
6. The system updates the displayed investment list accordingly, reflecting the selected criteria.

Details:

- Level: User Goal
- Summary: Financial Analysts view their current investments within the BlueWave system.
- Complexity: Medium
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: The Financial Analyst has a registered account on the BlueWave system and existing investments.
- Post-conditions: The Financial Analyst gains insights into their current investments.
- Author: BlueWave development team

- Assumptions: The investment data is up-to-date and accurately reflects the Financial Analyst's portfolio.

5. **Use-Case Name:** View Portfolio Amount

Information:

- Rank: Medium
- ID: UC-05
- Status: Active
- Justification: Financial Analysts need to know the total value of their investment portfolio within the BlueWave system.
- Primary Actors: Financial Analyses
- Supporting Actors: None

Scenario:

1. The Financial Analyst navigates to the BlueWave system's portfolio overview section.
2. The system retrieves the Financial Analyst's investment portfolio data.
3. The system calculates the total value of the Financial Analyst's portfolio by summing the individual asset values.
4. The system displays the total portfolio amount to the Financial Analyst.

Details:

- Level: User Goal
- Summary: Financial Analysts view the total amount in their investment portfolio within the BlueWave system.
- Complexity: Medium
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: The Financial Analyst has a registered account on the BlueWave system and existing investments.
- Post-conditions: The Financial Analyst gains insights into the total value of their investment portfolio.
- Author: BlueWave development team
- Assumptions: The investment data is up-to-date and accurately reflects the Financial Analyst's portfolio.

6. **Use-Case Name:** Retrieve Stock Data

Information:

- Rank: High
- ID: UC-06
- Status: Active
- Justification: BlueWave AI needs to fetch up-to-date stock data for analysis.
- Primary Actors: BlueWave AI
- Supporting Actors: None

Scenario:

1. BlueWave AI initiates the process of retrieving stock data.
2. BlueWave AI connects to reliable data sources, such as financial APIs or databases.
3. BlueWave AI requests the necessary stock data based on predefined criteria, such as ticker symbols or date ranges.
4. The data sources provide the requested stock data to BlueWave AI.
5. BlueWave AI receives and stores the retrieved stock data for further analysis.

Details:

- Level: Subfunction
- Summary: BlueWave AI retrieves up-to-date stock data for analysis.
- Complexity: Medium
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: BlueWave AI is operational and has access to reliable data sources.
- Post-conditions: BlueWave AI possesses the retrieved stock data for analysis.
- Author: BlueWave development team
- Assumptions: The data sources provide accurate and up-to-date stock data.

7. **Use-Case Name:** Predict Stock Prices

Information:

- Rank: High
- ID: UC-07
- Status: Active
- Justification: BlueWave AI utilizes machine learning algorithms to predict future stock prices.
- Primary Actors: BlueWave AI
- Supporting Actors: None

Scenario:

1. BlueWave AI analyzes historical stock data to identify patterns and trends.
2. BlueWave AI applies machine learning algorithms and statistical models to generate predictions for future stock prices.
3. BlueWave AI leverages advanced techniques, such as time series analysis or regression models, to enhance prediction accuracy.
4. BlueWave AI generates forecasted stock prices based on the trained models and the latest available data.
5. BlueWave AI stores the predictions for further processing and presentation.

Details:

- Level: Subfunction
- Summary: BlueWave AI predicts future stock prices using machine learning algorithms.
- Complexity: High
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: BlueWave AI has access to historical stock data and trained machine learning models.
- Post-conditions: BlueWave AI generates predictions for future stock prices.
- Author: BlueWave development team
- Assumptions: The historical stock data is representative of the market behavior, and the trained models are accurate and reliable.

8. **Use-Case Name:** Present Data

Information:

- Rank: Medium
- ID: UC-08
- Status: Active
- Justification: BlueWave AI presents analyzed stock data and predictions to Financial Analysts.
- Primary Actors: BlueWave AI
- Supporting Actors: None

Scenario:

1. BlueWave AI gathers and processes the analyzed stock data and predictions.
2. BlueWave AI applies data visualization techniques to present the insights effectively.
3. BlueWave AI generates charts, graphs, or other visual representations to convey meaningful information to Financial Analysts.
4. BlueWave AI prepares a comprehensive report or dashboard containing the analyzed data, predictions, and supporting information.
5. BlueWave AI delivers the presentation to Financial Analysts through the BlueWave system's interface or other communication channels.

Details:

- Level: Subfunction
- Summary: BlueWave AI presents analyzed stock data and predictions to Financial Analysts.
- Complexity: Medium
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: BlueWave AI has access to analyzed stock data and predictions.
- Post-conditions: Financial Analysts receive and access the presented data and insights.
- Author: BlueWave development team
- Assumptions: The data visualization techniques effectively communicate the insights, and the presentation format is compatible with Financial Analysts' devices or applications.

9. **Use-Case Name:** Trade

Information:

- Rank: High
- ID: UC-09
- Status: Active
- Justification: Financial Analysts execute stock trades based on predictions provided by BlueWave AI.
- Primary Actors: Financial Analysts
- Supporting Actors: None

Scenario:

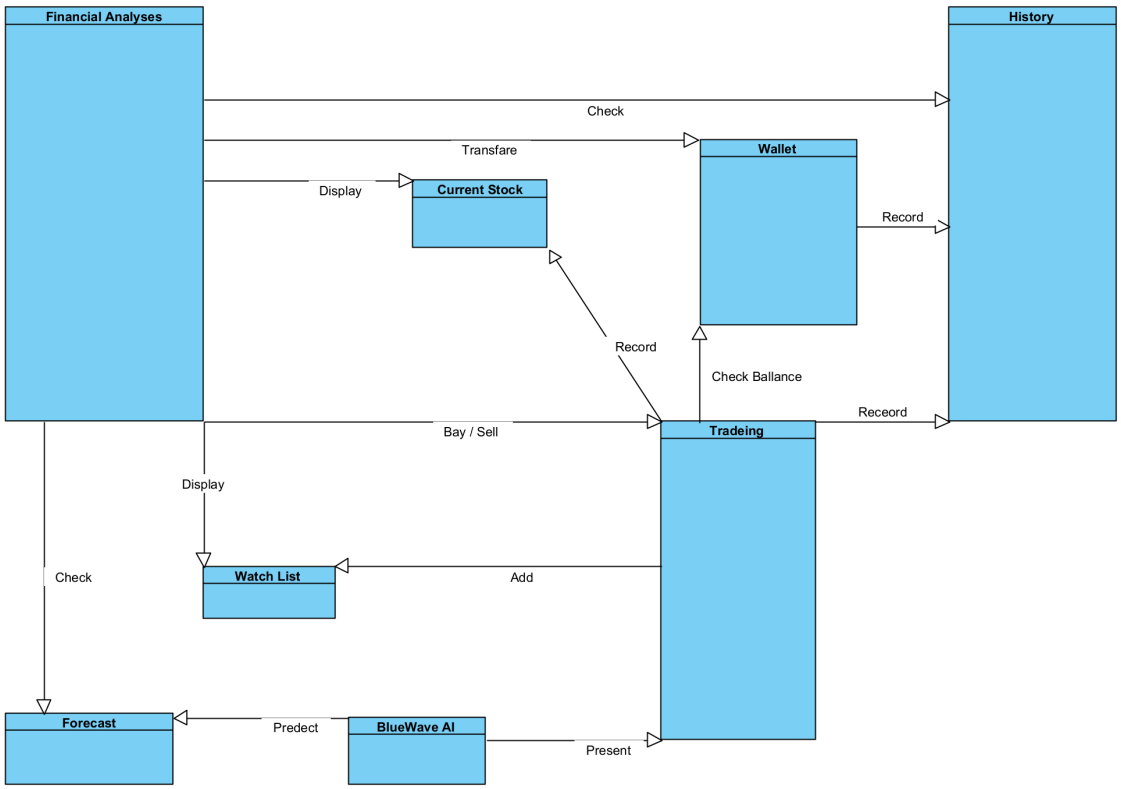
1. The Financial Analyst reviews the predictions and recommendations generated by BlueWave AI.
2. The Financial Analyst selects a specific stock or investment opportunity they want to trade.
3. The Financial Analyst enters the necessary details for the trade, such as the stock symbol, quantity, and order type (buy/sell).
4. The system validates the trade details, including available funds and market conditions.
5. If the trade is valid and feasible, the system executes the trade on behalf of the Financial Analyst.
6. The system updates the Financial Analyst's portfolio and wallet balance to reflect the executed trade.
7. The system confirms the successful execution of the trade and provides relevant notifications or trade confirmations.

Details:

- Level: User Goal
- Summary: Financial Analysts execute stock trades based on predictions provided by BlueWaveAI.
- Complexity: High
- Use Case Status: Active
- Implementation Status: Implemented
- Preconditions: Financial Analysts have access to the BlueWave system and available funds for trading.

- Post-conditions: The trade is executed successfully, and the Financial Analyst's portfolio and wallet balance are updated.
- Author: BlueWave development team
- Assumptions: The trade execution process is compliant with relevant regulations and market rules.

Domain Model:



1. **Financial Analyst:** This entity represents the users who are skilled in financial analysis. They use the system to manage their investments, view their portfolio, make trading decisions, and utilize the predictions provided by the BlueWave AI.

2. **History**: The History entity could store historical stock data, which is essential for generating predictions and analyzing trends over time. It plays a passive role in providing data to the system.

3. **Wallet:** The Wallet entity represents the in-app wallet of the Financial Analysts. It allows them to manage their funds for trading and investment. They can deposit, withdraw, and track their financial resources within the system.

4. **Current Stock:** This entity holds the current data related to stocks, including prices, market trends, and related information. It serves as a real-time data source for both the Financial Analysts and the BlueWave AI.

5. **Trading:** The Trading entity represents the functionality that enables Financial Analysts to execute buy and sell orders for stocks based on their analysis and predictions. It interacts with the Wallet and Current Stock entities to facilitate transactions.

6. **Watch List:** This entity allows Financial Analysts to create and manage a list of stocks they are interested in monitoring. It helps them keep track of stocks without making actual investments.

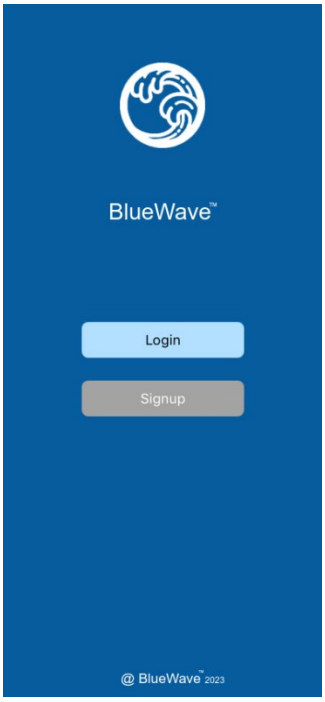
7. **BlueWave AI:** This is a crucial entity that houses the artificial intelligence system responsible for predicting stock prices. It utilizes historical data and advanced algorithms to generate forecasts for the Financial Analysts.

8. **Forecast:** The Forecast entity stores the predictions generated by the BlueWave AI. These predictions are used by the Financial Analysts to make informed investment decisions. It's a result of the interaction between the BlueWave AI, Historical data, and Current Stock data.

User interface (Prototype):

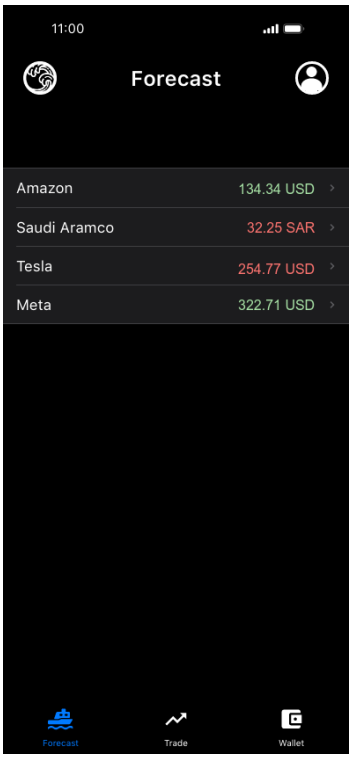
Login / Signup:

Users can either log into their existing accounts or sign up to access the features of the BlueWave system.



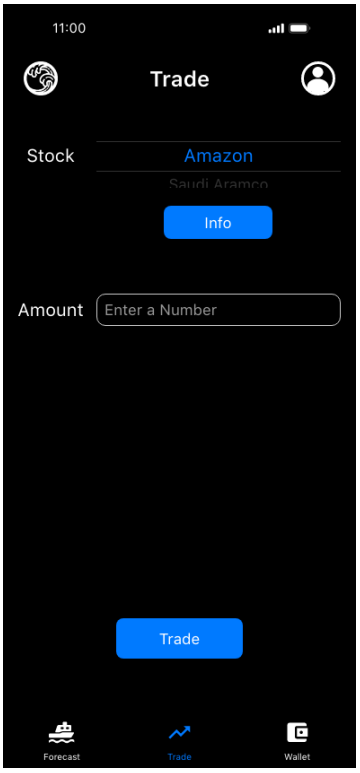
Forecast:

This page presents the AI-generated stock predictions and forecasts based on historical data and market trends.



Trading:

Financial Analysts can execute trades and manage investments using this page, leveraging the insights provided by the system.

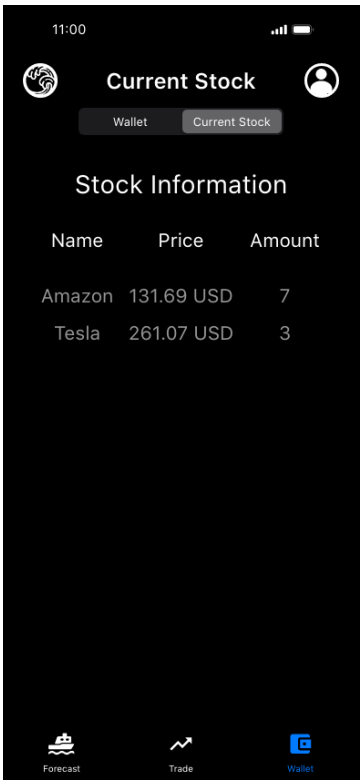


Wallet:

Financial Analysts can manage their in-app wallet, keeping track of their funds available for trading and investment purposes.

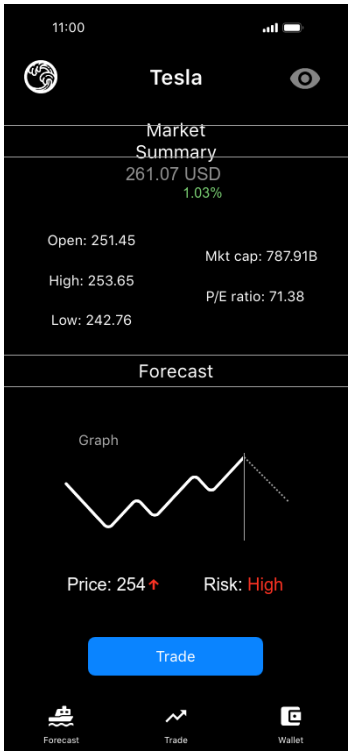
Current Stock:

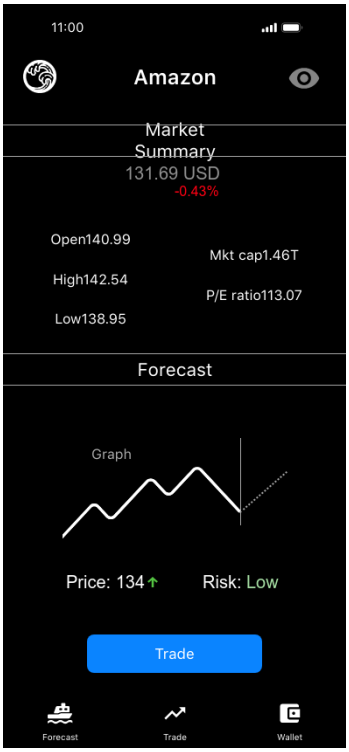
Provides real-time information on the current stock market, including indices, trends, and key indicators.

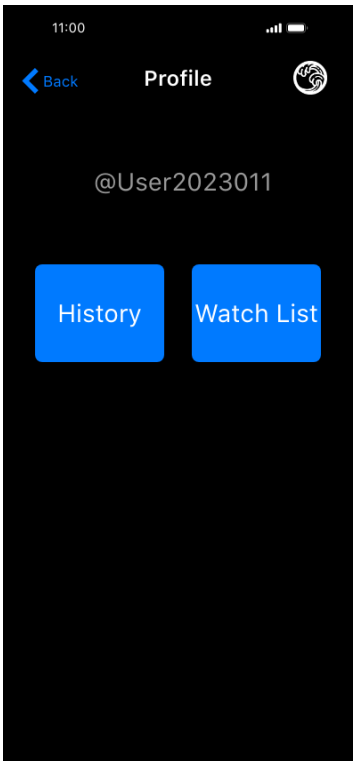


Amazon / Tesla (Stock Info):

Displays detailed information about Amazon's and Tesla's stock, including historical data, forecasts, and other relevant analytics.





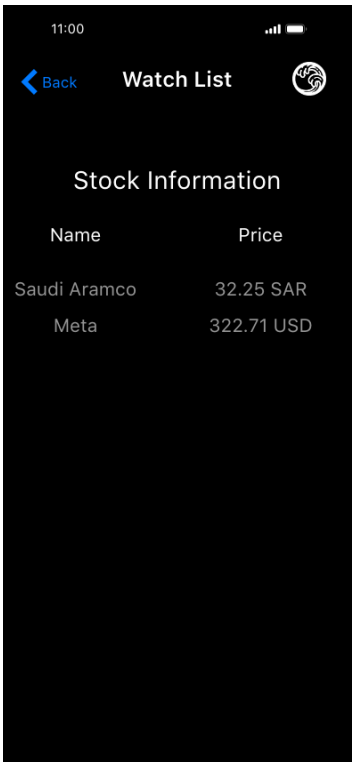


Profile:

Users can access and manage their profiles, including personal information and settings.

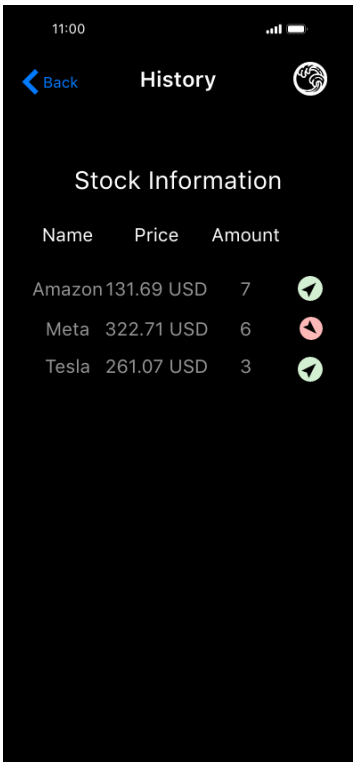
Watch List (Under Profile):

Users can curate a list of stocks they're interested in, allowing them to easily monitor and analyze these stocks.



History (Under Profile):

Offers a record of the user's trading and investment history, aiding in performance analysis and decision-making.



Purchase Completed (After Amazon/Tesla):

Users are directed to this page after completing a purchase, providing a summary of their transaction details.