Bilkent University
Department of Computer Engineering

Senior Design Project

T2333

Stock Vision

Analysis and Requirement Report

21802713 Remzi Tepe remzi.tepe@ug.bilkent.edu.tr
21802228 Ekrem Polat ekrem.polat@ug.bilkent.edu.tr
21703049 Abdulkadir Erol abdulkadir.erol@ug.bilkent.edu.tr
21802520 Mert Atakan Onrat atakan.onrat@ug.bilkent.edu.tr
21702301 Nihat Bartu Serttaş bartu.serttas@ug.bilkent.edu.tr

Supervisor: Shervin Rahimzadeh Arashloo
Course Instructors: Erhan Dolak and Tağmaç Topal

13.11.2022

This report is submitted to the Department of Computer Engineering of Bilkent University in partial fulfillment of the requirements of the Senior Design Project course CS491/2.

Contents

Analysis and Requirement Report

Project Short-Name: Stock Vision

1. Introduction

The cryptocurrency market has evolved significantly over the last decade. As of 2022, the market cap has reached over $1.00 trillion, and over 300+ million people use/own cryptocurrencies [1]. This huge demand led to much research regarding the stock market for users to learn about it. Even so, reaching for trustworthy information about the market and analyzing the stock market have always been struggles for users. Many so-called economists have emerged and tried to direct people with some controversial or even incorrect concepts about the market. It takes a lot of time for beginners to choose which cryptocurrencies to use and how to invest, while there are limitless ideas. Moreover, many cryptocurrencies arise and fail due to a lack of security, weak teams, scamming, etc.. This thriving industry has become very risky, especially for beginners who need to learn what and how to invest their money.

Therefore, in the project, we aim to design a hands-on experience simulation app where users can invest the application's fake currency (given in any real currency such as Bitcoin or even dollars) and get AI-based results and tips in real time. This way, users can learn the fundamentals of investing in cryptocurrencies without losing money or relying on anyone.

In this specifications report, we describe our project, the constraints, the professional and ethical issues, and the functional and non-functional requirements of our project, Stock Vision.

1.1 Description

Stock vision is a mobile application that works in iOS and Android. It provides a real-time stock/ETF simulation using past stock/ETF data and allows users to make investments using our application’s fake currency and get real-time results/tips about their

investments. At first, the user will sign up, if not signed yet, and then log in to the system. After logging in, users can see and search real-time stock/ETF values. Stock market graphs of each cryptocurrency can be seen daily, weekly, monthly, or even yearly. Users can go through these cryptocurrencies and see the data provided and read the tips given by our AI algorithms. More importantly, each user will start with a specific amount of fake currency and be able to use this fake currency to invest in stocks/ETFs. When users make investments, they can see tips from our AI on how to invest their money, the probability of values increase/decrease, and receive real-time results when gaining or losing money. With these tips, users can practice their graph reading abilities and see the results in real time. If the users run out of the application's fake currency, they can start over with the initial fake currency.

Furthermore, Stock Vision has graph reading algorithms using reliable stock graph patterns and providing a tipping mechanism for the graphs in real time. Analyzing stock values will be done with image processing, and a wide range of datasets of stock graph patterns will be used. Moreover, users' investments will be stored in our database, and the analysis of the user data will be done. Some tips and results will be provided after these analyses.

2 Current System

The purpose of this application is to provide an education and practice before the users start to invest a coin. Without knowing any knowledge about graphs, old values, and forecasts of the coins before starting to invest a coin can be risky and it can cause huge amounts of loss. In order to prevent this loss and reduce the risk of losses, it is very important to make these investments by practicing and training first. Thus, it is necessary to make accurate forecasts in order to reduce risk and profit from these investments. This application aims to teach investors how to make predictions with high accuracy. Most people invest with the advice they receive from crypto influencers on social media channels such as Twitter and YouTube. Many people have lost a lot by following these influencers.

However, investing is an individual responsibility. With the right education and practice, people can create their own foresight and adjust their investments in this way, without being influenced by others. There are currently some applications that provide trading practice services such as Stock Trainer: Virtual Trading and Stock Market Simulator [2][3]. However, these applications only allow users to practice trading at current prices. They do not provide any service in providing education and tips. On the other hand, Stock Vision offers its users a prediction by using the graph, previous values and current value of the coin that they will invest with the help of machine learning and artificial intelligence. Thus, users have the opportunity to develop their predictive capabilities regarding whether the coin they will invest will increase or decrease when certain graphic movements occur. In this way, they get practice and training before entering the real market.

3 Proposed Systems

3.1 Overview

Stock Vision is going to be a mobile application that provides an educational environment for people who are interested in the stock market. The application will allow individuals to buy/sell coins with StockV's own currency which enables them to invest comfortably without risking any money loss. The most important feature of the application is that it gives investment tips to the user with the help of machine learning algorithms by reading the graphic values of the coin selected by the user. The user can invest by considering these tips that the application gives him, and more importantly, by learning these tips, he can have a much better idea of how to invest better. He can make profitable investments by putting these tips learned in practice into real life. In this regard, to increase the probability of giving correct tips to users, Stock Vision will collect feedback from the users which will be used to check the corresponding algorithm's correctness.

In Stock Vision, in addition to regular users, there will be users with premium memberships. While StockV's currency will be provided to regular users only once, the premium users will be able to receive these currencies every month. Also, while the premium users will be able to benefit from all the algorithms of the application for the tips,

regular users will have restrictions on some particular algorithms.

Overall, Stock Vision will consist of three parts.

- A database system that will store all the persistent data
- A front-end design to interact with the user
- A back-end implementation that provides communication between the front-end and database system of the application. The back-end part of the application will also include the machine learning algorithms which will generate investment tips for the user.

3.2 Functional Requirements

- Users must log in or register to the system before using the application.
- The system should define some amount of fake coins to users for investing in the market.
- The system must give advice to users by evaluating users' investments/transactions with AI.
- The system must give tips to users by evaluating the previous data about the currencies.
- The system must have two types of accounts: Free and Premium. Premium users can get more detailed tips and fake coins to invest in the market.
- The system must show users extended graphs related to predictions on currencies.
- The system must save all information about the currencies' progress, predictions, and graphs in the database so other users can benefit from it.
- Users can save their favorite currency pairs to see their progress.
- Users can change/delete their profile and related data in the database.

3.3 Non-functional Requirements

3.3.1 Accessibility

- Android Jelly Bean, v16, 4.1, and iOS 8 or newer versions are required in order for users to use the system.

3.3.2 Availability

- The application will use past and present cryptocurrency data from reliable stock market sites. Unless these websites are down (it is very rare), the application can be used properly.

3.3.3 Performance

- Displaying the home screen to users should be under 5 seconds.
- Updating users' data on investments should take under 1 second.

3.3.4 Reliability

- Authentication is required in order to join the system.
- A server crash or power outage should not result in data loss.

3.3.5 Scalability

- The servers can be extended easily.
- Many other features can be added easily without losing performance.

3.3.6 Security

- A unique sign-up/log-in process will be done.
- The data will be put in reliable servers like Firebase, so data loss will not be encountered.

3.3.7 Usability

- The GUI of the application will be very user-friendly since the users are not expected to be an expert in using mobile applications.
- Any problems encountered by users can be reported so that sustainability can be managed and the bugs can be fixed.

3.3.8 Portability

- If the newer Android or IOS is installed, the system should not cause any errors.

3.4 Pseudo Requirements

- Version Control
    - The version control and the tracking process will be done by using Git.
- External API's and Libraries
    - The information of the coin to be traded will be obtained by using the Binance API and TradingView REST API in order to make the transactions on the correct and current prices, and also to examine and analyze the historical data.
    - Libraries such as Numpy, TensorFlow, PyTorch, Pandas, Matplotlib will be used in machine learning and artificial intelligence algorithms.
- Implementation
    - Flutter Software Development Kit will be used for front end using DART programming language. Flutter was chosen because it offers the option to develop in both Android and iOS devices.
    - MySQL database will be used for the storage of the data.
    - Python programming language will be used in the backend part of the application since it is easy to use and has many useful libraries in the fields of machine learning and artificial intelligence.
- Target Platform
    - The application Stock Vision will be available for both Android and iOS devices.

3.5 System Models

3.5.1 Scenarios

Scenario 1 Sign Up

Actors: User

Entry Conditions: The user opens the app and clicks the “Sign Up” button.

Exit Conditions: The user closes the app OR clicks the “Sign Up” button to Log in.

The Flow of Events:

1. Clicks the “Sign Up” button on the Log In screen
2. The Sign Up screen is opened.
3. The user fills in the required information to register to the system.
4. The user clicks the “Sign Up” button.
5. The system creates an account for the user with provided information and initializes the user’s wallet with a predetermined amount of app money.

Scenario 2 Log In

Actors: User, System Administrator

Entry Conditions: The user opens the app.

Exit Conditions: The user closes the app.

The Flow of Events:

1. The user fills in the required information to log in to the system.
2. The user clicks the “Login” button.
3. The system checks the information of the user.
4. The user is navigated to the Home Screen

Scenario 3 Add a Coin

Actors: System Administrator

Entry Conditions: The user clicks on the “Plus (+)” icon next to the Coins title on the Home Screen.

Exit Conditions: The user closes the app OR clicks the “Add” button OR clicks the “Back” button.

The Flow of Events:

1. The user fills in the required information to add a stock to the system.
2. The user clicks the “Add Coin” button at the bottom of the popup screen.

Scenario 4 Remove Coin

Actors: System Administrator

Entry Conditions: The user clicks on the “Minus (-)” icon next to the Coins title on the Home Screen.

Exit Conditions: The user closes the app OR clicks the “OK” button OR clicks the “Cancel” button

The Flow of Events:

1. The user selects the coin to be removed from the dropdown menu and clicks the “Remove Coin” button at the bottom of the popup screen.

Scenario 5 Buy Coin

Actors: User

Entry Conditions: When the user clicks on the corresponding Coin’s button on the Home Screen, that Coin Screen is opened, and the user clicks on the “Buy” button on this screen.

Exit Conditions: The user closes the app OR clicks the “Back” button OR clicks the “Buy” button.

The Flow of Events:

1. The user provides the amount he/she wants to buy.
2. The user clicks the “Buy” button.
3. The user clicks the “Ok” button on the confirmation popup screen.
4. The system updates the user’s wallet and his/her coin amount.

Scenario 6 Sell Coin

Actors: User

Entry Conditions: When the user clicks on the corresponding Coin’s button on the

dashboard, that Coin Screen is opened, and the user clicks on the “Sell” button on this screen.

Exit Conditions: The user closes the app OR clicks the “Back” button OR clicks the “Sell” button.

The Flow of Events:

1. The user provides the amount he/she wants to sell.
2. The user clicks the “Sell” button.
3. The user clicks the “Ok” button on the confirmation popup screen.
4. The system updates the user’s wallet and his/her coin amount.

Scenario 7 Get Premium

Actors: User

Entry Conditions: The user clicks on the “Get Premium” button.

Exit Conditions: The user closes the app OR clicks the “Back” button OR clicks the “Upgrade” button.

The Flow of Events:

1. The user selects the premium plan she/he wants to subscribe to.
2. The user provides his/her card information.
3. The user clicks on the “Upgrade” button.
4. The system receives the payment and upgrades the user’s membership, and assigns the features brought by the premium membership to the user.

Scenario 8 View the Tips

Actors: User

Entry Conditions: The user clicks on the “View Tips” button from the corresponding Coin Screen.

Exit Conditions: The user closes the app OR clicks the “Back” button.

The Flow of Events:

1. The user views the tips of the coin the app gives and can determine the steps to be taken according to these tips.

Scenario 9 Add/Remove Coin To/From Favorites

Actors: User

Entry Conditions: The user clicks on the “Star” icon from the corresponding coin.

Exit Conditions: The user closes the app OR clicks the “Back” button.

The Flow of Events:

1. The system adds/removes the coin to/from the user’s favorite coin list.

3.5.2 Use-Case Model

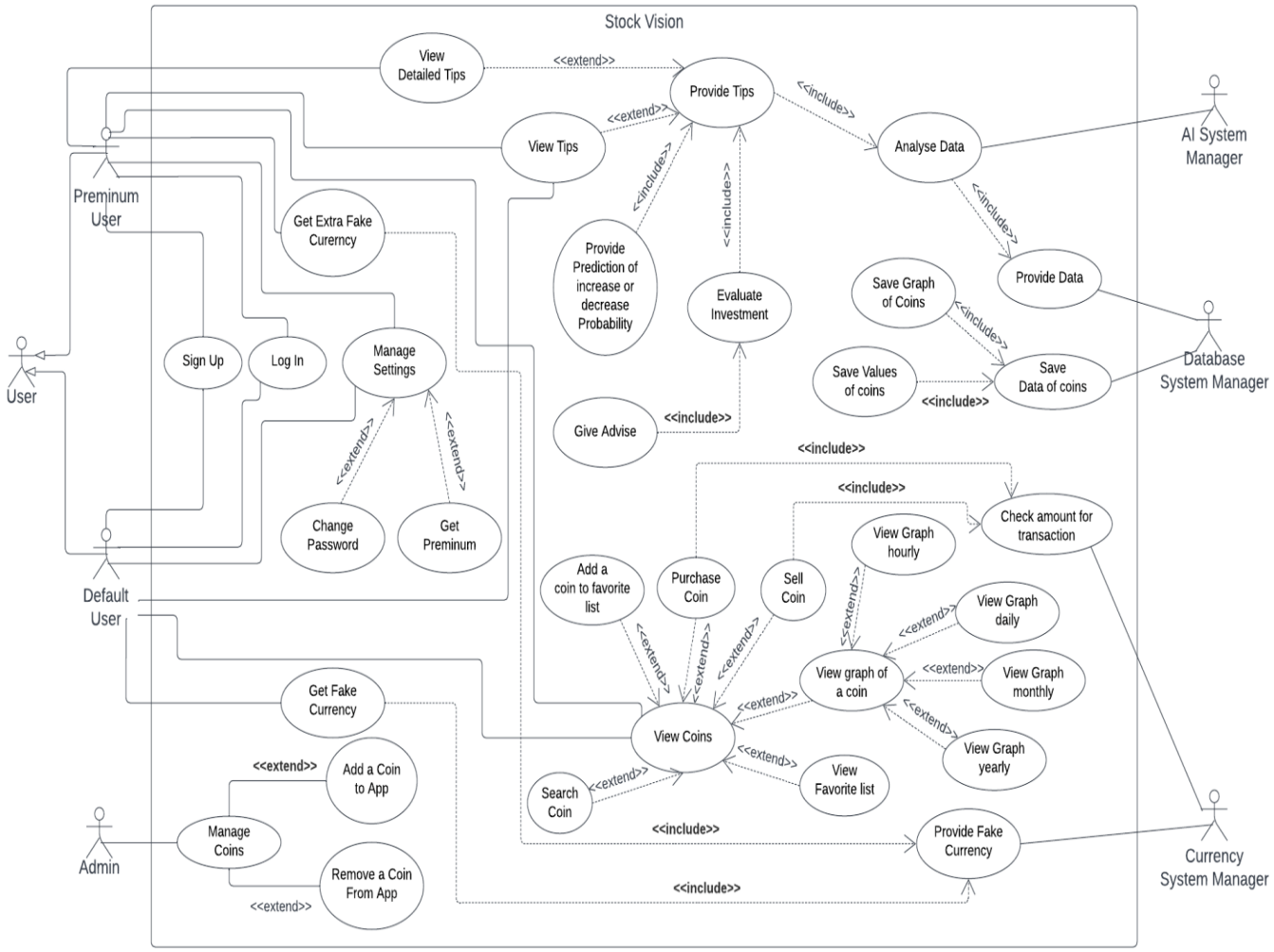

Figure 1: Use Case Diagram for Stock Vision

3.5.3 Object and Class Model

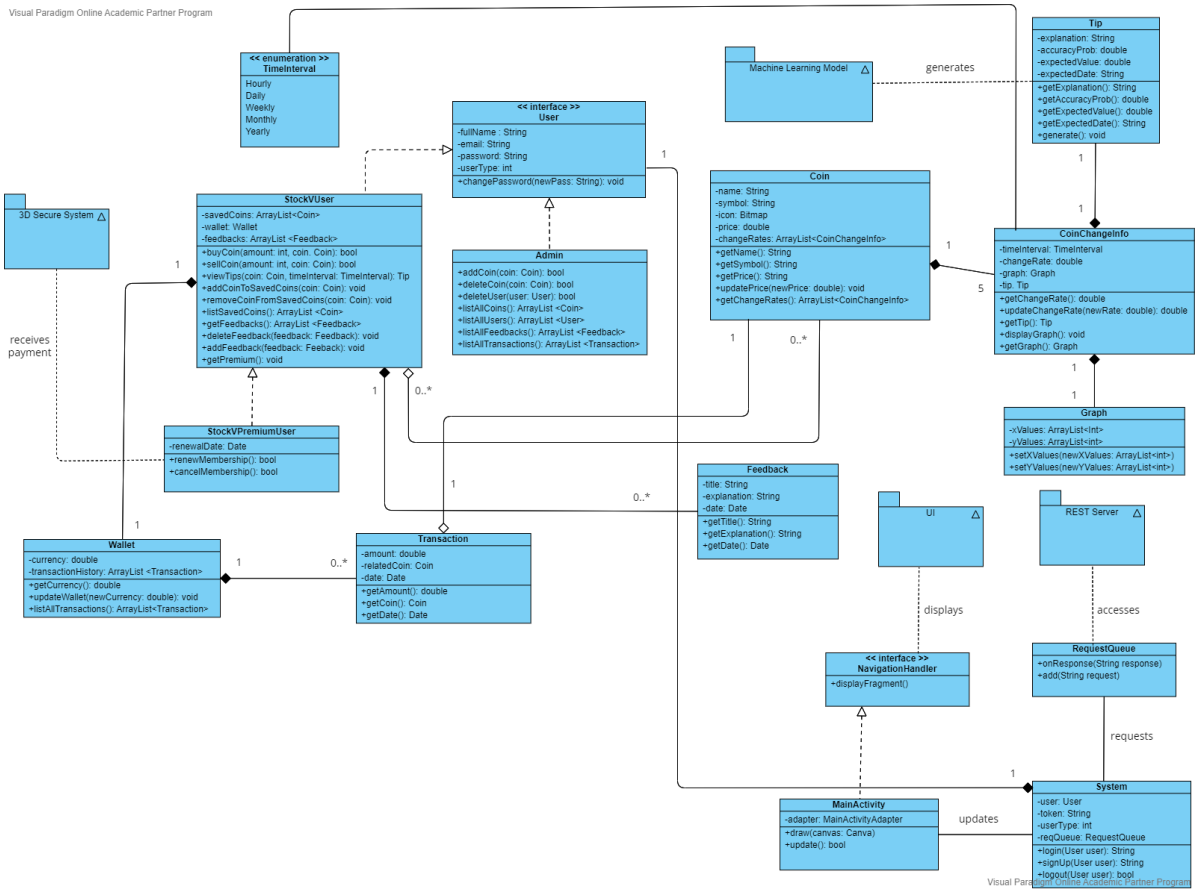

Figure 2: Object and Class Model for Stock Vision

3.5.4 Dynamic Models

3.5.4.1 Sequence Diagram

3.5.4.1.1 Sign Up and Authentication

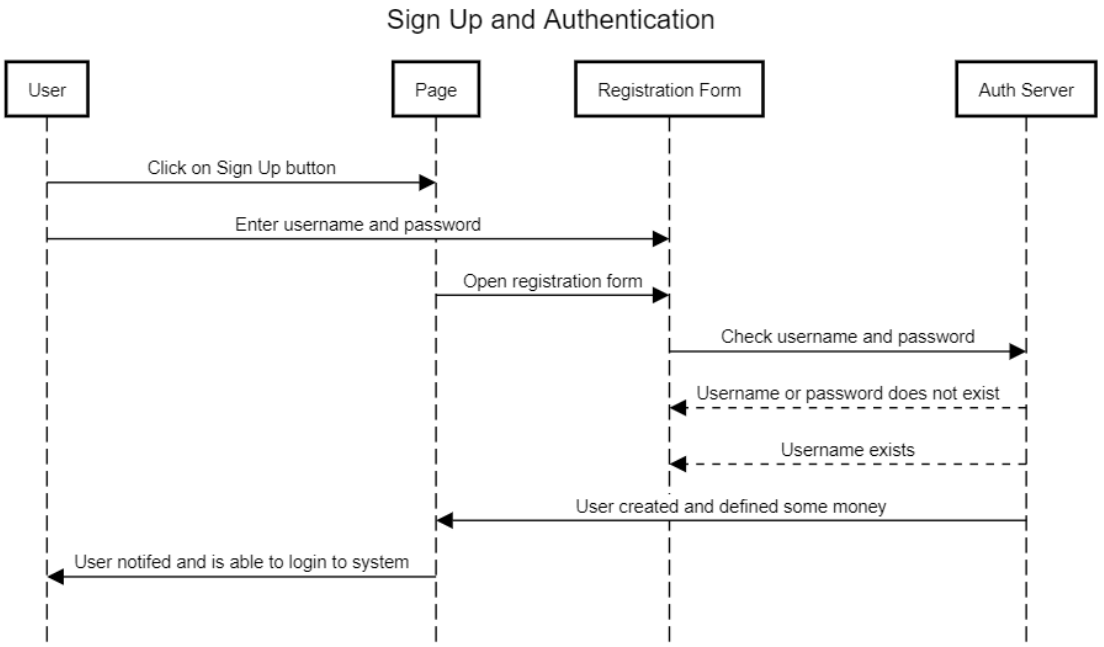

Figure 3: Sequence diagram for sign up

3.5.4.1.2 Log In

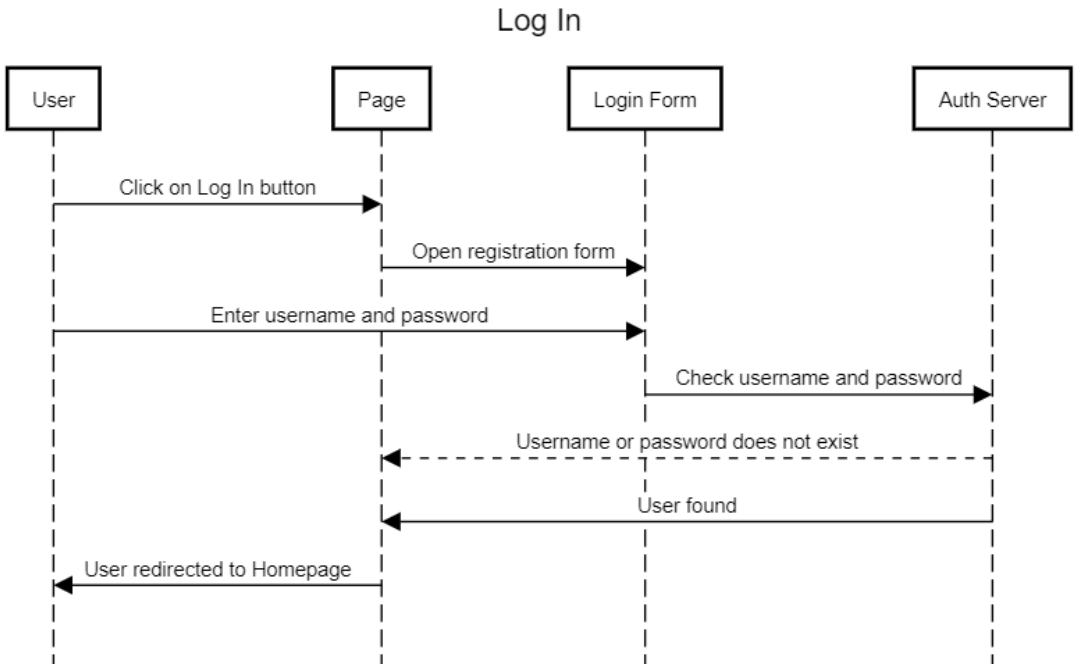

Figure 4: Sequence diagram for log in

3.5.4.1.3 Add Coin

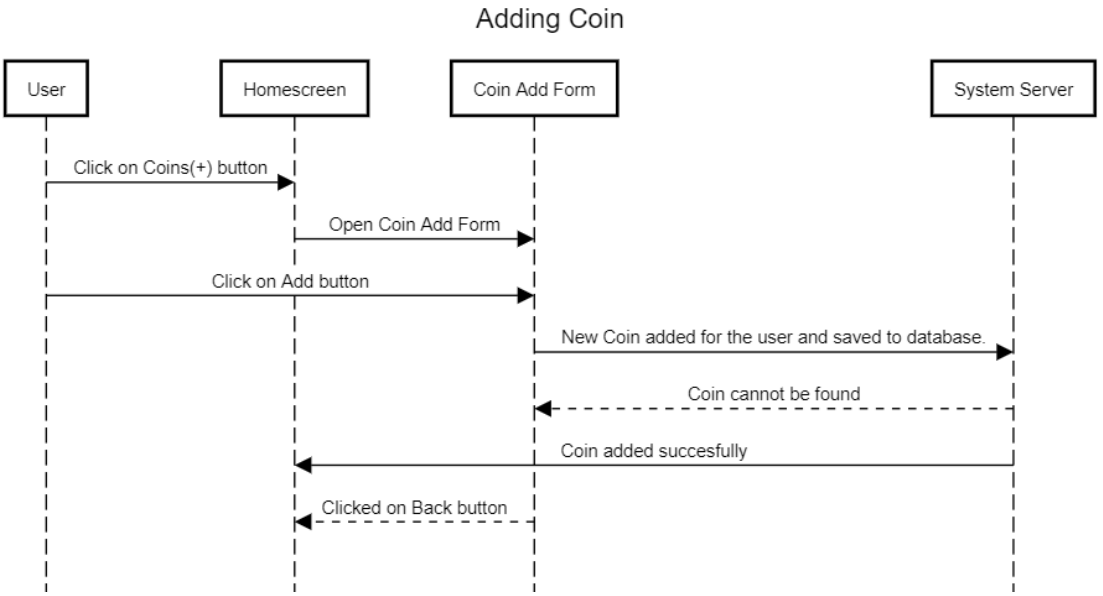

Figure 5: Sequence diagram for adding coin

3.5.4.1.4 Remove Coin

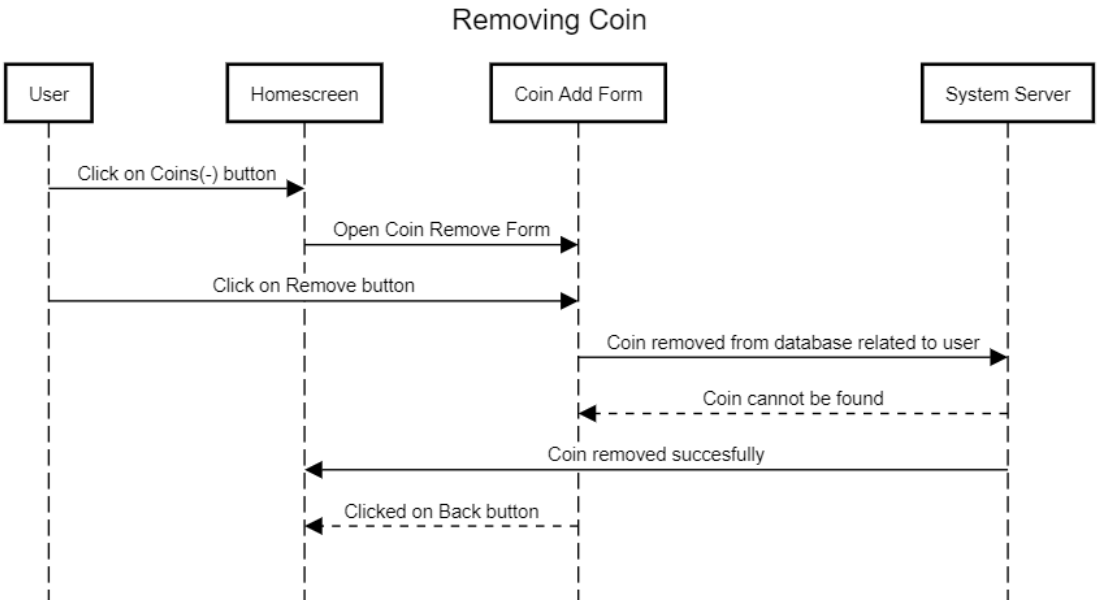

Figure 6: Sequence diagram for removing coin

3.5.4.1.5 Buy Coin

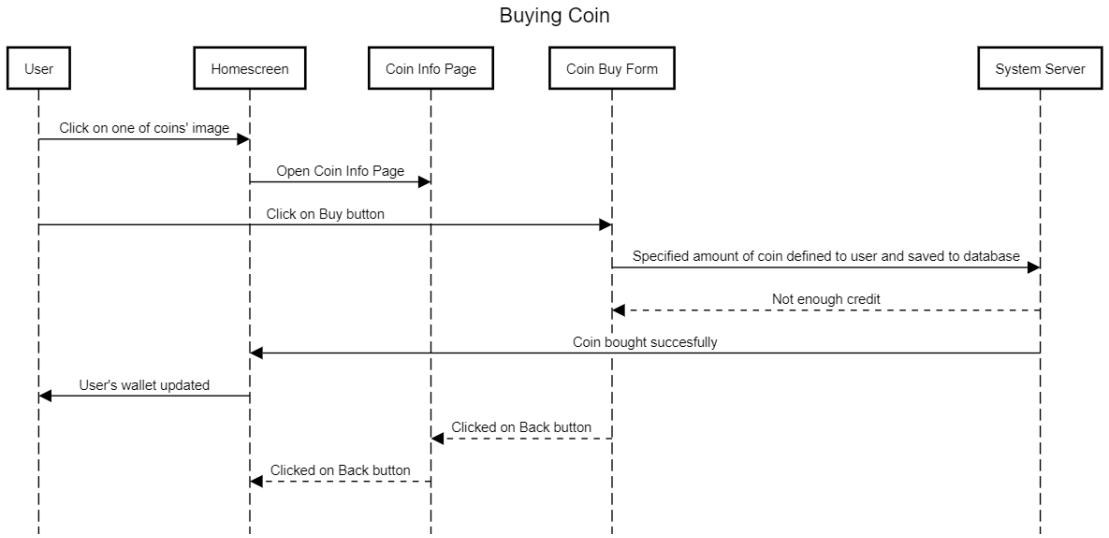

Figure 7: Sequence diagram for buying a coin

3.5.4.1.6 Sell Coin

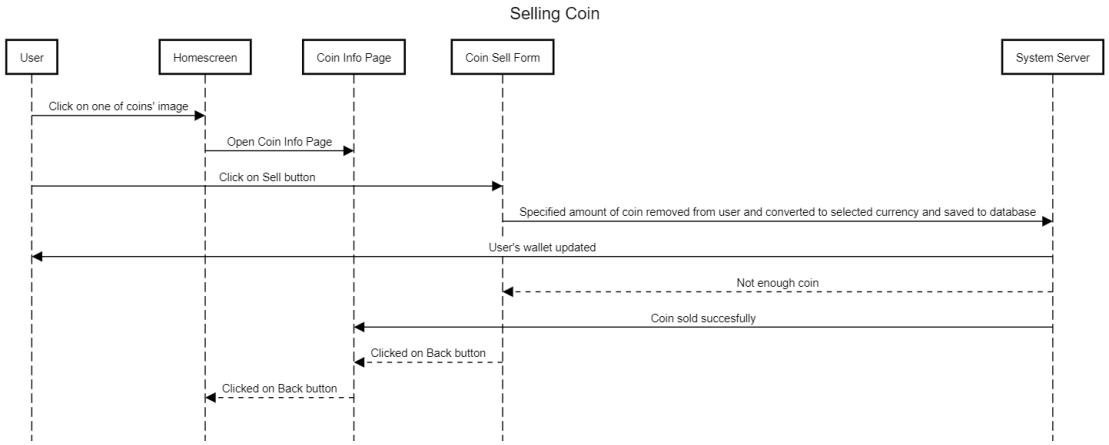

Figure 8: Sequence diagram for selling a coin

3.5.4.1.7 Add or Remove Coin from favorites

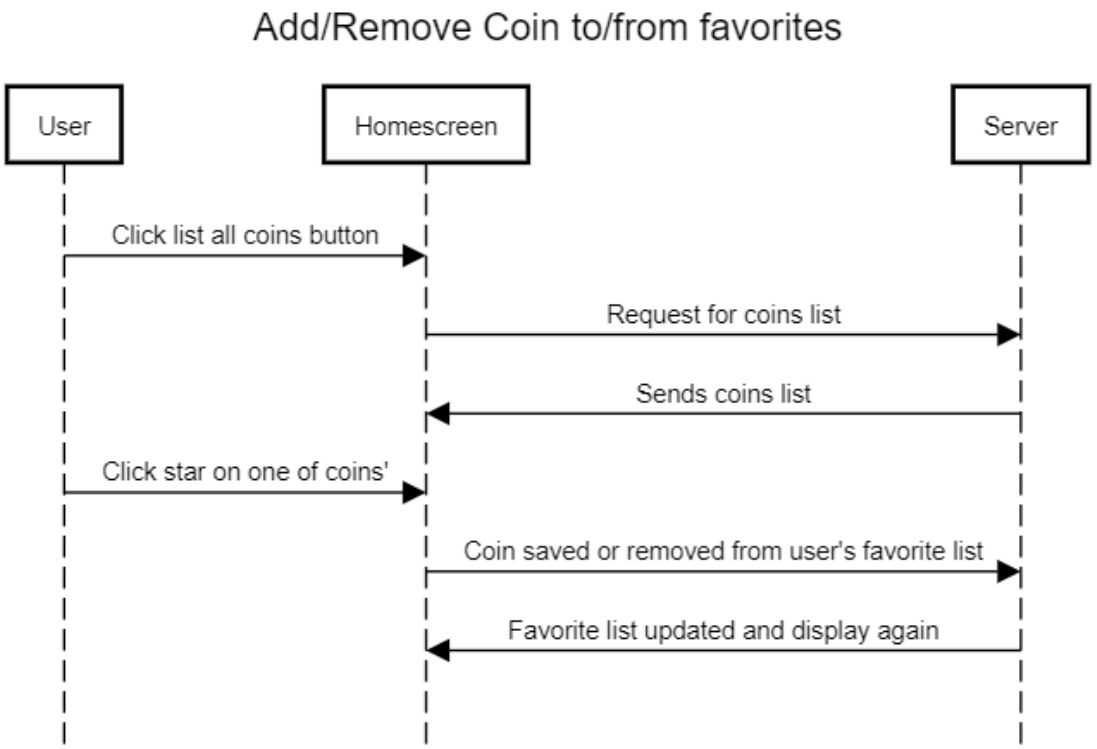

Figure 9: Sequence diagram for adding/removing a coin to/from favorites

3.5.4.2 State and Activity Diagram

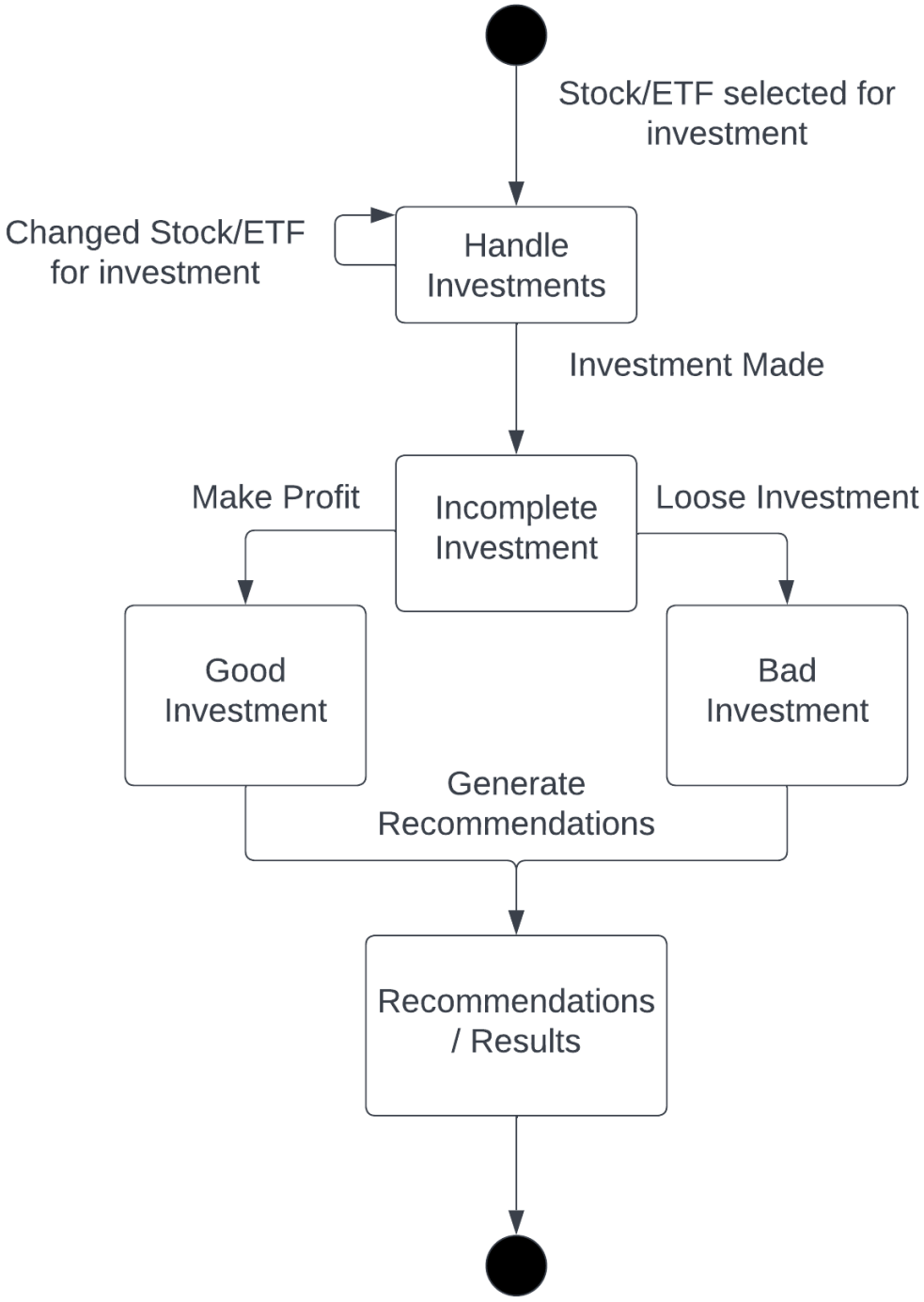

Figure 10: State diagram for simulation and investment

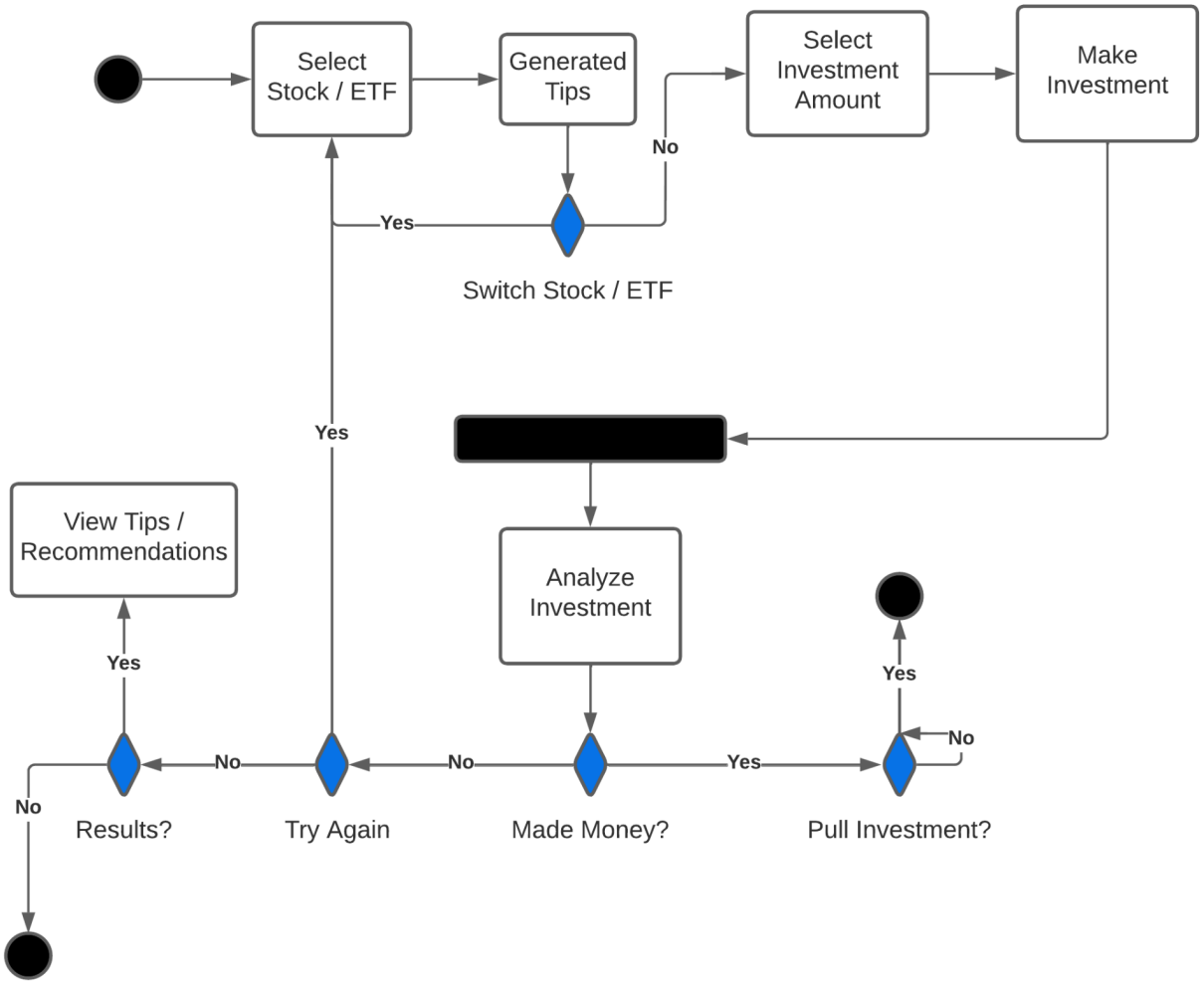

Figure 11: Activity diagram for simulation and investment

3.5.5 User Interface

Figure 12. Log In Screen

When the application is launched for the first time, the Login screen pops up. Users can log in from this screen if they already have an account. If users do not have an account, they can click the sign-up link to create a new account.

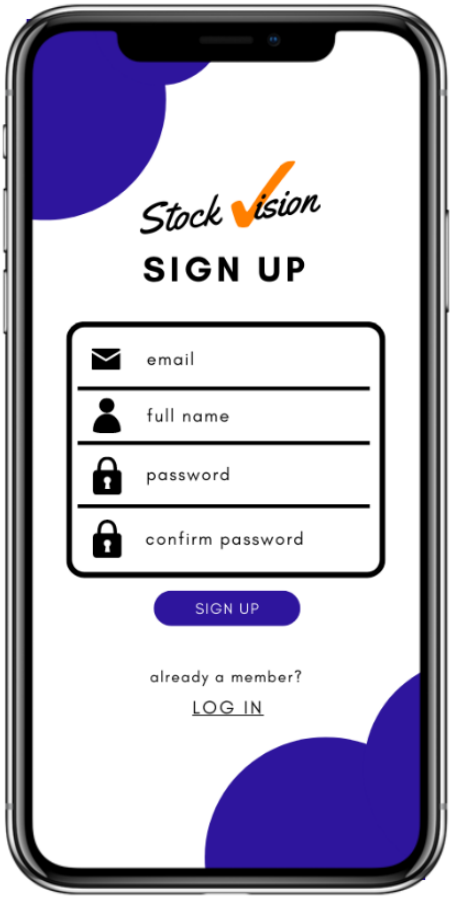

Figure 13. Sign Up Screen

If users do not have an account, they can sign up from this screen by filling email, full name, and password and confirm password. After the sign up button is clicked, users will be directed to the log-in screen, and users will get a confirmation email to their email. The email must be unique, and the password must be at least 8 characters long.

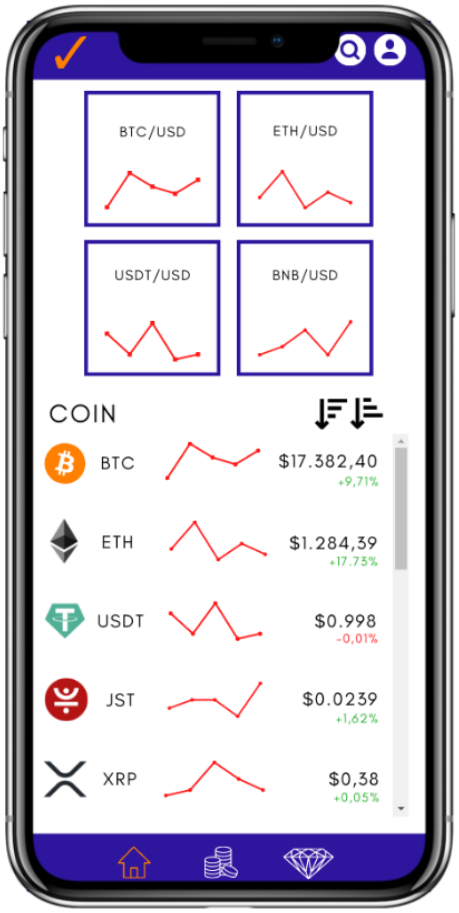

Figure 14. Home Screen

When users log in once until they click the log-out button, they will be logged in, and “Home Screen” will be their opening screen. On this screen, users can see some of the top trends coins at the top and the rest at the bottom. In this list, coins have their graphs, current values, and percentage increase/decrease. Users can sort coins according to their value (highest to lowest or lowest to highest) and filter coins according to their favorite coins. From the coins list, users can click on the coins to see the details of the coin (Figure 15). Moreover, users can search through coins or edit their profile (Figure 21) from this screen.

Figure 15. Coin Screen

This screen is dedicated to giving details of a coin. Users can see the coin's current value and percentage increase/decrease from here and on the home screen. The details of the graphs can be seen on this screen according to hourly, daily, weekly, monthly, and yearly options. Users can add/remove the coin to/from their favorite coins from the star symbol at the top right. Moreover, users can click on the buy (Figure 16) and sell (Figure 17) buttons to exchange fake coins in their wallets.

Last but not least, users can click the view tips (Figure 20) to have some insightful information on the graphs provided by our AI algorithms with different patterns.

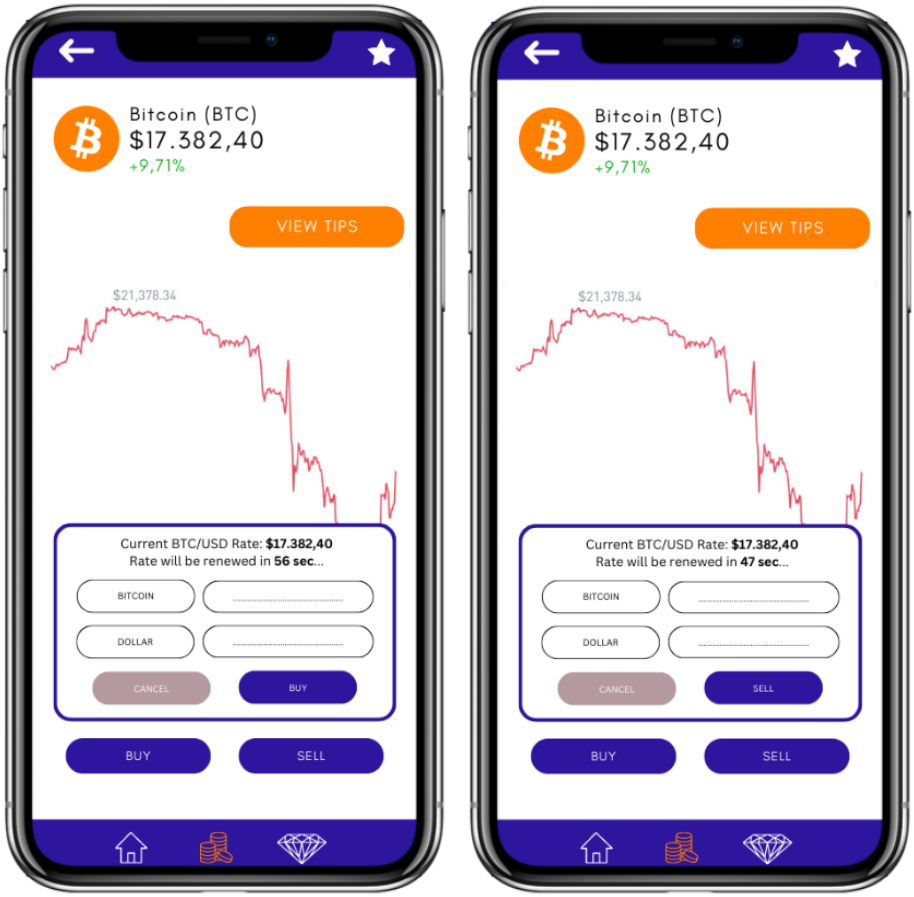

Figure 16 and Figure 17. Buy and Sell Screen

Users can buy and sell coins with their given amount of money. Whether the users have enough currency will be controlled while doing an exchange. The exchange screen will be refreshed after an adequate amount of time because it changes continuously.

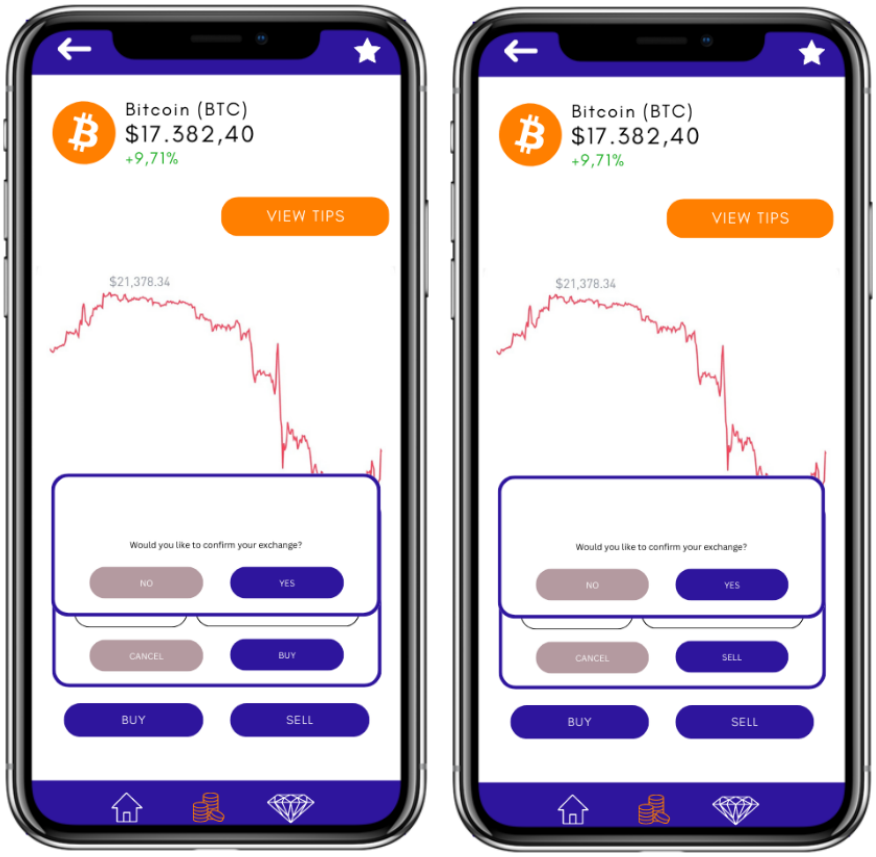

Figure 18 and Figure 19. Buy and Sell Confirmation

Users have to confirm when they want to make an exchange since this is an important stage, and confirmation will bring a double check on this process.

Figure 20. Tips Screen

On the Tips Screen, users can see the details of the graphs with some given tips. These tips will be given hourly, daily, weekly, monthly, and yearly for users to have a deeper understanding of how stocks work. While some tips will be given as free, some others will be given to premium users. Users can buy a premium packet (Figure 22) to become a premium member.

Figure 21. Profile Screen

On the Profile Screen, users can see the amount of money they have. In the beginning, it will be $1.000 dollars for users. Users can upgrade their profile to become a premium member with the get premium button (Figure 22) to have access to additional features. Moreover, users can change their password from this screen.

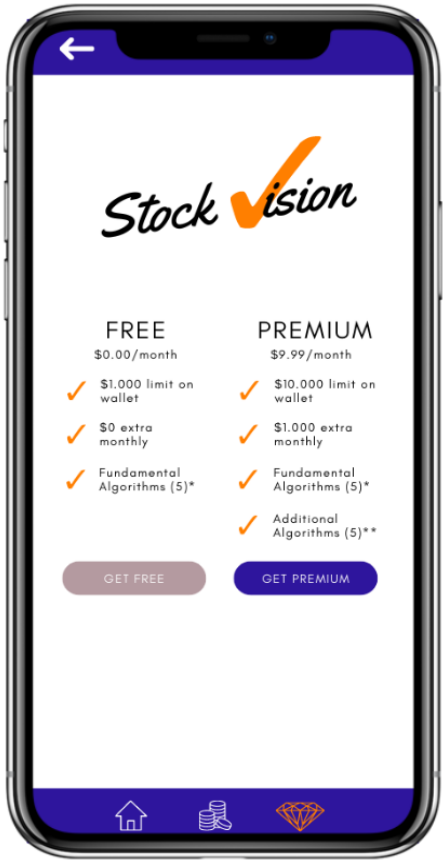

Figure 22. Premium Screen

On the Premium Screen, users can compare free and premium accounts and decide which one to use. A premium account offers more limited amounts of money in the wallet for users to exchange and adds $1.000 extra monthly. Moreover, users can have access to more patterns which will help them to have more tips.

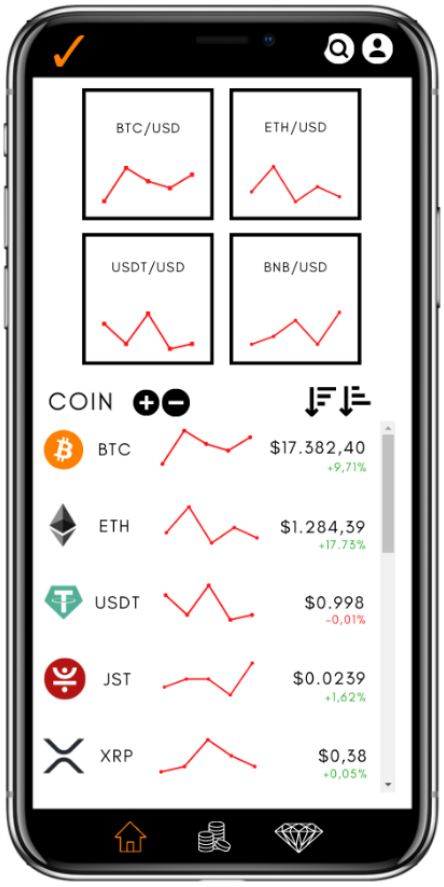

Figure 23. Admin Home Screen

On the Admin Home Screen, admins can add (Figure 24) and remove (Figure 25) coins by clicking the plus (+) button and minus (-) button respectively in addition to regular users.

Figure 24. Add Coin Screen

On the Add Coin Screen, admins can add a coin by uploading a logo, filling symbol, name, and the APIs link for graphs and values. Then, admins click the “Add Coin” button to add a coin.

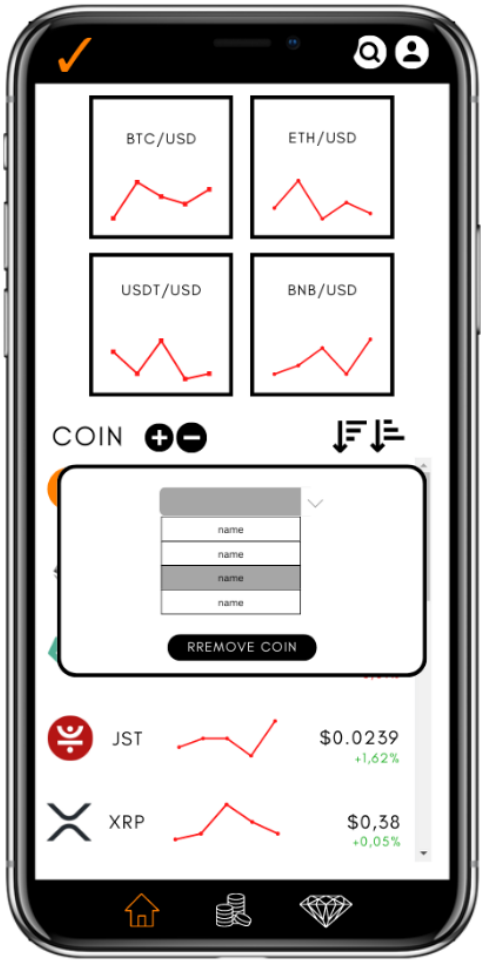

Figure 25. Remove Coin Screen

On the Remove Coin Screen, admins can remove a coin by choosing a coin from the dropdown menu and clicking the “Remove Coin” button to remove a coin.

4. Other Analysis Elements

4.1 Consideration of Various Factors in Engineering Design

Stock Vision is an application that provides investment tips for inexperienced investors and also provides the users with a real life simulation for trying out their investment skills. The first and main consideration of our project is to create an efficient algorithm for analyzing stock/ETF data and making increase/decrease predictions with their respective probabilities for stock/ETF values. The aim of creating such an algorithm is for providing realistic and feasible recommendations and tips for inexperienced investors where they can use these tips in the project's simulation.

The second consideration of the project is to create and maintain a real life simulation where users can try out their investment strategies and try out the AI's investment tips and recommendations. When users make an investment on the simulation, the project must be able to generate the real life result of the investment.

4.2 Risks and Alternatives

Since Stock Vision is an educational application and the tips and recommendations are generated by the application's AI, this creates some risks for users and inexperienced investors. They should be informed beforehand that these tips and recommendations are not of an expert but of AI, and the users are advised not to use these predictions and tips for real life investments, or use them at their own discretion since Stock Vision should not be held accountable if users end up losing real money on their investments.

4.3 Project Plan

Table 1: List of work packages

WP#	Work package title	Leader	Members involved
WP1	Project Specification Document	Atakan	Everyone
WP2	Analysis and Requirement Report	Ekrem	Everyone
WP3	Back-end implementation	Kadir	Everyone
WP4	First Prototype	Bartu	Everyone
WP5	Database Implementation	Remzi	Everyone
WP6	UI/UX Implementation	Atakan	Everyone
WP7	Second Prototype	Ekrem	Everyone
WP8	Final Implementation	Kadir	Everyone
WP9	Final Report	Remzi	Everyone

WP 1: Project Specification Document			
Start date: Oct 5, 22 End date: Oct 17, 2022			
Leader:	*Atakan*	**Members involved:**	*Everyone*
Objectives: *Describe the project briefly, determine the functional,non-functional requirements and constraints. Discuss some professional and ethical issues.*			
Tasks: ● ***Identify functional requirements*** ● ***Identify constraints*** ● ***Discuss professional and ethical issues*** *…*			
Deliverables: ***Project Specifications Report***			

WP 2: Analysis and Requirement Report			
Start date: Oct 20, 2022 End date: Nov 13, 2022			
Leader:	*Ekrem*	**Members involved:**	*Everyone*
Objectives: *Define the systems in terms of diagrams, consider some ethical professi issues, define work packages, draw initial mock-ups*			
Tasks: ● ***Draw class, state, activity, sequence diagrams to define the proposed systems*** ● ***Draw initial mock-up for user interface*** ● ***Consider some ethical and professional aspects of the project*** ● ***Define work packages and elaborate them***			
Deliverables: ***Analysis and Requirement Report***			

WP 3: Back-end implementation			
Start date: Nov 20, 2022 End date: Dec 15, 2022			
Leader:	*Kadir*	**Members involved:**	*Everyone*
Objectives: *Define the systems in terms of diagrams, consider some ethical professi issues, define work packages, draw initial mock-ups*			
Tasks: ● ***Design and implement neural network for AI training*** ● ***Design a pattern to connect the AI and the database*** ● ***Create the database connections and the database*** ● ***Design and implement the RESTful connections for the frontend***			
Deliverables: ***Python and SQL code and a training AI***			

WP 4: First Prototype			
Start date: Oct 5, 22 End date: TBD			
Leader:	Bartu	**Members involved:**	*Everyone*
Objectives: *Build the first prototype of the Stock Vision with some basic functionalities*			
Tasks: ● **User profile, login and registration.** ● **Home Screen.** ● **Coin Screen**			
Deliverables: ***First Prototype of Stock Vision***			

WP 5: Database Implementation			
Start date: Oct 5, 22 End date: TBD			
Leader:	*Remzi*	**Members involved:**	*Everyone*
Objectives: *Database Implementation*			
Tasks: ● **Design the database using ER diagrams** ● **Convert ER diagram entities into database schemas** ● **Write the corresponding queries**			
Deliverables: ***Database code***			

WP 6: UI/UX Implementation			
Start date: TBD End date: TBD			
Leader:	*Atakan*	**Members involved:**	*Everyone*
Objectives: *User Interface Implementation*			
Tasks: ● ***Implementation of the user interface with flutter*** ● ***Making the implementation fits with android and ios***			
Deliverables: ***User Interface code in Flutter***			

WP 7: Second Prototype			
Start date: TBD End date: TBD			
Leader:	*Ekrem*	**Members involved:**	*Everyone*
Objectives: *Build the second prototype of the Wheelancer by implementing some complex functionality*			
Tasks: ● ***Implementing some complex functions*** ● ***Fixing old functions if necessary*** …			
Deliverables: ***Second Prototype of Stock Vision***			

WP 8: Final Implementation			
Start date: Oct 5, 22 End date: TBD			
Leader:	*Kadir*	**Members involved:**	*Everyone*
Objectives: *Finalize the implementation*			
Tasks: ● ***Debugging*** ● ***Testing*** ● ***Database query optimization.***			
Deliverables: ***Final implementation and documentation***			

WP 9: Final Report			
Start date: TBD End date: TBD			
Leader:	*Remzi*	**Members involved:**	*Everyone*
Objectives: *Summarize the whole project, the requirements implemented, the improvements made. Give a user guide for the project, the details about the implementation and a maintenance plan*			
Tasks: ● ***Summarize the whole implementation process*** ● ***Write the details of the current architecture*** ● ***Write a maintenance plan*** ● ***Write a user guide for potential users***			
Deliverables: ***Final Report***			

4.4 Ensuring Proper Teamwork

As part of our senior design project, all team members of the project group are expected to contribute to the project equally. In order to achieve this goal, online communication tools such as Discord and Zoom are used. Regular meetings are organized among the team members and all upcoming assignments are analyzed and divided.

In these online meetings, members divide the workload of current assignments in a way to ensure all team members put equal effort into the assignments, and each team member reports their completed and progressing work.

Moreover, each member of the project group keeps a logbook of the project where they keep track of all the work done by individual members.

Google Drive documents are used for writing the deliverable reports regarding the project.

Finally, as a Version Control System, Github will be used throughout the implementation of the project. Each team member will be able to work on their own branches according to their responsibilities, and all the team members will be able to view, edit and merge all the working branches of the project.

4.5 Ethics and Professional Responsibilities

One of the major issues regarding our project as mentioned previously is that the application's AI has a probability of generating wrong/incomplete tips and recommendations on investment, and if the users of our application decide to use these tips on real investment they can end up losing money. Our responsibility is to make sure that when the users are signing up for our application, they are informed that our application is using an AI for generating these tips and should not be taken as real investment tips.

Another issue regarding our project is that even the AI will not be able to predict international crises such as the COVID-19 pandemic or Russia - Ukraine war. Such crisis situations have huge impacts on worldwide stock and ETF values. When users make investments on our simulation during such an event, it is highly possible for the AI to make false predictions. As the project members, we are responsible for informing our users during periods like these and maintain the simulation and the tips and recommendations accordingly.

4.6 Planning for New Knowledge and Learning Strategies

For UI design, we as the project team members have decided to use Dart/Flutter. Some of the members have past experience, and some members have little to no experience in this software language. Therefore, we will read the Flutter documentation page [4], which is very detailed and contains various information about the widgets used in Flutter. There are also sample videos in the documentation pages that show how a particular widget behaviors in a mobile app. Briefly, we will use the documentation and provided example videos to enhance our knowledge about Flutter and design our application.

For managing our backend services and AI, we will be using Python language for its simplicity and various libraries. There will be different learning points in the backend part however. One of them is the database connections. We will be using documentations and online tutorials for learning and implementing Python back end connections for creating and maintaining the database of the application. The second part is to learn the TensorFlow library available for Python, and try to create and train an AI on the stock exchange. We will be investigating and learning neural networks, AI training, and also the key features of TensorFlow for implementing our AI.

And for the last part, MySQL will be used for storing all the data regarding our application. We have learned the fundamentals of MySQL in our previous CS353 Database course, and we will be improving on our past knowledge when it is necessary for improving our application database.

5 Glossary

ETF: An exchange-traded fund is a mutual fund traded on stock exchanges. An ETF holds assets such as stocks, commodities, or bonds and often works with an arbitrage mechanism designed to keep diversions close to the net asset value.

Stock: A company's stock is all of the shares into which the ownership of the company is divided. In American English, shares are collectively known as "stocks". A single share of stock represents partial ownership of the company in proportion to the total number of shares. This usually deserves the shareholder.

Amateurs: The ones that are still learning the stock market

Flunks: The ones that are not good at stock market

Currency System: The currency system that we will provide

6 References

[1]: “63+ cryptocurrency statistics, Facts & Trends (2022),” *(2022)*. [Online]. Available: https://buybitcoinworldwide.com/cryptocurrency-statistics/. [Accessed: 17-Oct-2022].

[2] Stock Trainer: Virtual Trading. A-Life Software, LLC, Vers. 4.19 - Beta, 2013. Google Play Store, https://play.google.com/store/apps/details?id=com.alifesoftware.stocktrainer&hl=en&gl=US

[3] Stock Market Simulator. NyxCore, Vers. 1.44, 2013. Google Play Store, https://play.google.com/store/apps/details?id=com.nyxcore.stukulu&hl=en&gl=US&pli=1

[4] “Flutter documentation,” Flutter. [Online]. Available: https://flutter.dev/docs. [Accessed: 12.11.2022].