Stock Picker
Project Part 2: Specification

University of Nevada Reno

Computer Science and Engineering

CS 425 - Software Engineering

Team 30: Colin Comstock, Eugene Eom, Loren Parvin, Nicholas Rinehart, Henry Shi

Dr. Sergiu Dascalu, Vinh Le, Devrin Lee, Mitchell Martinez, Yifan Zhang

External Advisor: Michael Isaac

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Stock Picker Application

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2. Introduction:

Our stock picker application aims to simplify and streamline the investment process. Previous forms of investing software have a lack of consideration for simplicity and newer investors. Our end product will be capable of elegantly suggesting stocks to the user in an intuitive way. The user will input parameters in the form of risk tolerance, geographic location, and much more; allowing the application to analyze their preferences, and provide them with the right stock for them. An example of this is if the user doesn't like a government or industry they can opt out of certain industries, practices, policies and invest knowing they aren't doing something wrong. Providing suggestions based on preferences would also enable users to focus on only their desired stocks, which would filter out the noise of the enormous number of options in the market. Additionally, by having the application itself provide suggested trades, users will have a more in-depth understanding of the fundamentals of each trade, and have more confidence in their actions. Further functions can be expanded upon if the user insists but it will start out small and grow as the user becomes more comfortable. By interpreting previous data sets and other stock exchange news the program will be able to provide users with an informative and hands-on experience.

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3. Summary of Stakeholder's Interviews:

User 1: The first potential user that was interviewed was Loren Parvin, who is a member of the team.

1. **Would you consider yourself an experienced investor?**

   He says yes, he has a few years of active experience trading using both complex and simple investment strategies.

2. **Where do you find educational resources for trading?**

   He says while he doesn't have any formal education, he has used a combination of Google, Investopedia, and Youtube videos from various sources to get his information.

3. **How much time do you spend researching before placing a trade?**

   He indicated that some of his trades are based on gut feeling, some are based on limited research 1-3 days, and some are based on longer term research that ranges anywhere from several weeks to several years.

4. **Do you feel comfortable with trading options contracts?**

   Yes, but more recently he has been trending towards high volume short term stock holdings in order to minimize risk.

5. **What are some features that you look for in an investment platform?**

   He looks for low commission fees and a combination of nice UI and complex graph information available.

6. **Which app do you currently use to trade on and why?**

   He mainly uses Think or Swim for the reliability and complexity available.

7. **Do you ever feel overwhelmed with data and amount of choice in your current platform?**

   At first he did, but after a long time of researching and learning he feels very comfortable on the platform.

8. **Do you prefer to have one option or multiple options recommended to you?**

In general, multiple options are his preference, but sometimes he also enjoys having one option to reduce the anxiety associated with having too many choices.

9. **Does the look of a website change how likely you are to use it?**

   He said absolutely, it is a huge factor in the apps and websites he chooses to use.

10. **Would you make an investment that was suggested to you by an algorithm?**

    He said yes, that would not deter him from making the investment. In fact, that might make him feel more comfortable placing the order as long as the algorithm being used is sound.

11. **How often do you check on your investment portfolio?**

    He checks on it very frequently, usually at least once a day especially if he is making short term investments that he does not plan on holding

12. **How much loss are you willing to accept before you sell a stock?**

    He says he has a pretty high risk tolerance but will usually sell after a 20% loss on a stock position, and 50% on an options position.

13. **How long do you usually hold on to a stock before selling?**

    For long term plays he will hold for at least 6 months, but short term positions can sometimes only be held for a few hours.

User 2: The second stakeholder that was interviewed was our external advisor, Michael Isaac.

1. **Would you consider yourself an experienced investor?**

He says yes.

2. **Where do you find educational resources for trading?**

   He goes onto yahoo finance for information like that.

3. **How much time do you spend researching before placing a trade?**

   He says it depends. Anywhere from several hours to weeks depending on the company.

4. **Do you feel comfortable with trading options contracts?**

   He says he does, hesitantly.

5. **What are some features that you look for in an investment platform?**

   Some features he looks for are low fees and limits per trade.

6. **Which app do you currently use to trade on and why?**

   He uses Etrade because it was one of the first platforms he tried out and it suits his needs as an investor.

7. **Do you ever feel overwhelmed with data and amount of choice in your current platform?**

   He said yes, confidently. There is a lot to look at. It feels like a vomit of information when he is usually looking for very specific things.

8. **Do you prefer to have one option or multiple options recommended to you?**

   Michael likes multiple options usually.

9. **Does the look of a website change how likely you are to use it?**

He says yes, and has a background in web development so this is very important to him.

10. **Would you make an investment that was suggested to you by an algorithm?**

    He says yes, as long as the track history from previous investment portfolios has a positive yield in the long term.

11. **How often do you check on your investment portfolio?**

    He says daily, but he does not make day trades often.

12. **How much loss are you willing to accept before you sell a stock?**

    Michael says he has a somewhat lower risk tolerance than others, and buys safe investments. A 5% loss on a position would cause him to sell.

13. **How long do you usually hold on to a stock before selling?**

    He says he likes to hold for a while, anywhere from a few months to a few years.

User 3: The third potential user interviewed was another UNR student, Miles Comstock.

1. **Would you consider yourself an experienced investor?**

   He says he has 3 years experience.

2. **Where do you find educational resources for trading?**

   He has used youtube, investopedia, and other various websites he can't remember.

3. **How much time do you spend researching before placing a trade?**

   He laughed and said not much.

4. **Do you feel comfortable with trading options contracts?**

   He said he is highly comfortable and places them often.

5. **What are some features that you look for in an investment platform?**

   He said he wants one that is easy to use, has information if desired, good fill times, and clean UI.

6. **Which app do you currently use to trade on and why?**

   He currently uses TD Ameritrade and Robinhood.

7. **Do you ever feel overwhelmed with data and amount of choice in your current platform?**

   He said that Robinhood is quite easy to understand and although TD is complicated he has learned to use it well.

8. **Do you prefer to have one option or multiple options recommended to you?**

   He said choices are always better.

9. **Does the look of a website change how likely you are to use it?**

   He said that while design plays a large role in initial trust, that he will accept poor UI if it means a good service.

10. **Would you make an investment that was suggested to you by an algorithm?**

    He said he is tentative but interested in what it would output. He would probably want to know a decent amount about it first.

11. **How often do you check on your investment portfolio?**

He says daily and sometimes multiple times per day.

12. **How much loss are you willing to accept before you sell a stock?**

    He laughed and said that he has taken some larger losses and would rather not talk about it.

13. **How long do you usually hold on to a stock before selling?**

    He said that with stocks he will hold for quite a while but options are usually a shorter term trade for him.

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4. Technical Requirements Specification:

Table 1: Functional Requirements with Level and Descriptions

Functional Requirements		
Requirement	**Level**	**Description**
FR01	1	Stock Picker will allow a user to create an account and delete accounts.
FR02	1	Stock Picker will allow users to log in and out.
FR03	1	Stock Picker will prompt a user with a stock.
FR04	1	Stock Picker will use a database in order to see options.
FR05	1	Stock Picker will ask for a parameterized search.
FR06	1	Stock Picker will give suggestions for search.

FR07	1	Stock Picker will use minimal buttons.
FR08	1	Stock Picker will warn users of risk level.
FR09	1	Stock Picker will allow users to view previous trades.
FR10	1	Stock Picker will use a text box for inputs on parameters.
FR11	1	Stock Picker will allow for users to leave comments or thoughts to the developers.
FR12	1	Stock Picker can buy and sell stocks.
FR13	2	Stock Picker will compare users and suggest stocks based on similarity and score.
FR14	2	Stock Picker will give the user error messages when the program fails.
FR15	2	Stock Picker will allow for users to compare their gains to other users.
FR16	2	Stock Picker will allow for the cancelation and alteration of trades.
FR17	3	Stock picker will review economic journals and look for mention of the stock.
FR18	3	Stock Picker will allow for users to chat and comment on stocks.
FR19	3	Stock Picker can be customized heavily.

Table 2: Non-Functional Requirements with Level and Description

Non-Functional Requirements		
Requirement	**Level**	**Description**
NFR1	1	Stock Picker will have an easy to use interface.
NFR2	1	Stock Picker will run on all new and common operating systems.
NFR3	1	Stock Picker will be built with python or c++.
NFR4	1	Stock Picker will be scalable using multiple files and programs.
NFR5	1	Stock picker website will handle large traffic
NFR6	2	Stock Picker website will be mobile compatible.
NFR7	3	Stock Picker shall run with near perfect resource use.

5. Use Case Modeling

Detailed Use Cases -

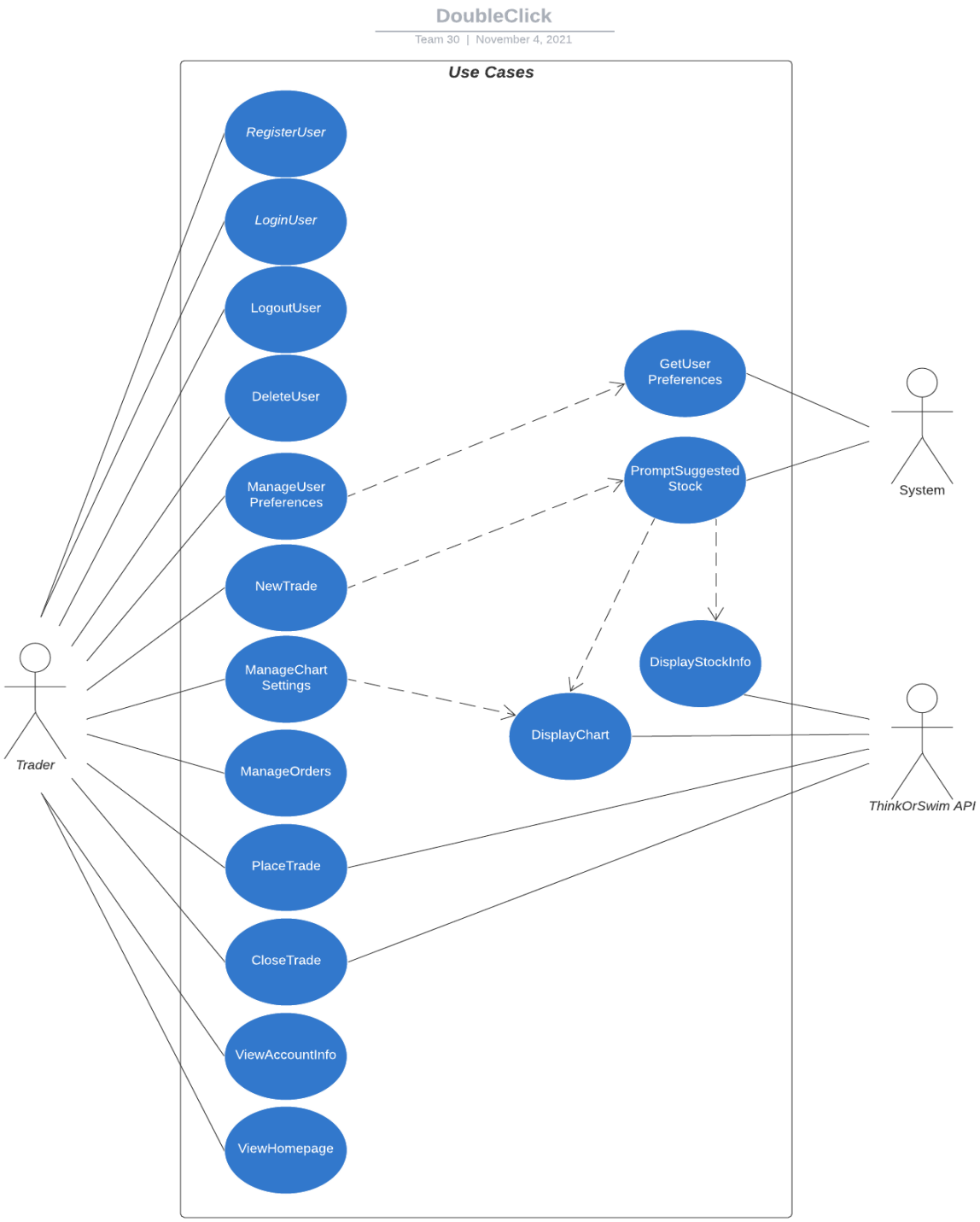

Figure 1: Use Case Diagram with Use Cases and Actors

Table 3: Use Case Descriptions

Use Case Descriptions		
Requirement	**Name**	**Description**
UC01	DataStorage	User data will be stored into a secure database like Firebase.
UC02	CreateUser	User will be able to create an account.
UC03	LoginUser	User will be able to log into a preexisting account.
UC04	LogoutUser	User will be able to log out of an account that they are currently logged into.
UC05	GetUserPreferences	User will be able to see their current preference settings on their account.
UC06	ViewHomepage	User will be able to go back to their homepage from anywhere in the application.
UC07	ViewAccountInfo	User will be able to view account information such as current balance and details.
UC08	ManageUserPreferences	User will be able to manage their preference settings on their account.
UC09	DisplayStockInfo	System will get and display the information for the selected stock.
UC10	PlaceTrade	User will be able to buy/sell to open a suggested trade.
UC11	CloseTrade	User will be able to close out of a previously opened trade.

UC12	ManageOrders	User will be able to view, cancel, or replace any active and pending orders.
UC13	NewTrade	User will be able to request a new suggested trade.
UC14	PromptSuggestedStock	System will prompt the user with suggested trades based on their preferences.
UC15	DisplayTradeInfo	System will get and display the trade information for the suggested trade.
UC16	DisplayChart	System will display chart data for the given stock.
UC17	ManageChartSettings	User will be able to adjust basic chart settings including length, color, and type.
UC18	DeleteUser	User will be able to delete an account they have access to.

Detailed Use Cases -

Table 4: UC08 ManageUserPreferences

Actors	Stock trading user
Description	The user may edit their trading preferences, edit risk tolerance, edit preferred market sector. The information can be saved to their account and future possible trades will reflect these saved changes.
Data	Personal Preference Information
Stimulus	User command to edit, make changes, and save
Response	Notification banner to confirm that changes have been saved
Comments	User must be logged in to make preference changes

Table 5: UC14 PromptSuggestedStock

Actors	System
Description	Sends the user a stock trade suggestion based on the preferences listed in UserPreferences. This suggestion is thus based on risk tolerance, market section, geographic location, and pseudo randomly generated.
Data	Personal Preference Information, and Stock Market data.
Stimulus	User receives a suggested stock trade upon switching to the Homepage view or when the user presses/calls the NewTrade button.
Response	System displays the suggested stock and its related information.
Comments	PromptSuggestedStock is only called when the user goes to the Homepage view or the NewTrade button/function is called. The user must be logged in first to activate this function.

Table 6: UC13 NewTrade

Actors	Stock trading user
Description	The user may click the “New Trade” button to have a new trade be shown to the user. This will cause the current trade to be discarded and will invoke UC14 to PromptSuggestedStock.
Data	Personal Preference Information and Stock Market Data
Stimulus	User command to generate new trade
Response	Visual feedback of the card moving to the discard stack and a new card appearing
Comments	The user must be logged in and on the homepage to activate this function.

Table 7: UC09 DisplayStockInfo

Actors	System
Description	System displays a description about the stock to the user. This description includes info about the company related to the stock, specifically where the company is based, the industry the company is in, policies that the company uses.
Data	Stock Market Data
Stimulus	Displayed when PromptSuggestedStock is called.
Response	Displays a description section about the noted stock where the common identifiers are industry, location, popularity, etc.
Comments	This is only called when the user is logged in.

Table 8: UC02 CreateUser

Actors	User
Description	User will be prompted to enter their email, password, and login information for their brokerage (ThinkorSwim). The data will then be verified with the database, and if the checks pass then the user account will be created and the user has an account on the website.
Data	User personal information including sensitive passwords and logins
Stimulus	User inputs required data and hits the input to create the account
Response	User is logged in and taken to the home screen with a functional account
Comments	If validation errors did occur, the submission should be rejected with an appropriate error message.

6. Requirement Traceability Matrix:

Table 9: Requirement Traceability Matrix

	UC1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
FR1		■																■
2			■	■														
3													■	■	■			
4	■																	
5					■			■										
6					■													
7						■												
8															■			
9							■											
10					■			■										
11									■						■			
12										■	■							
13							■		■						■			
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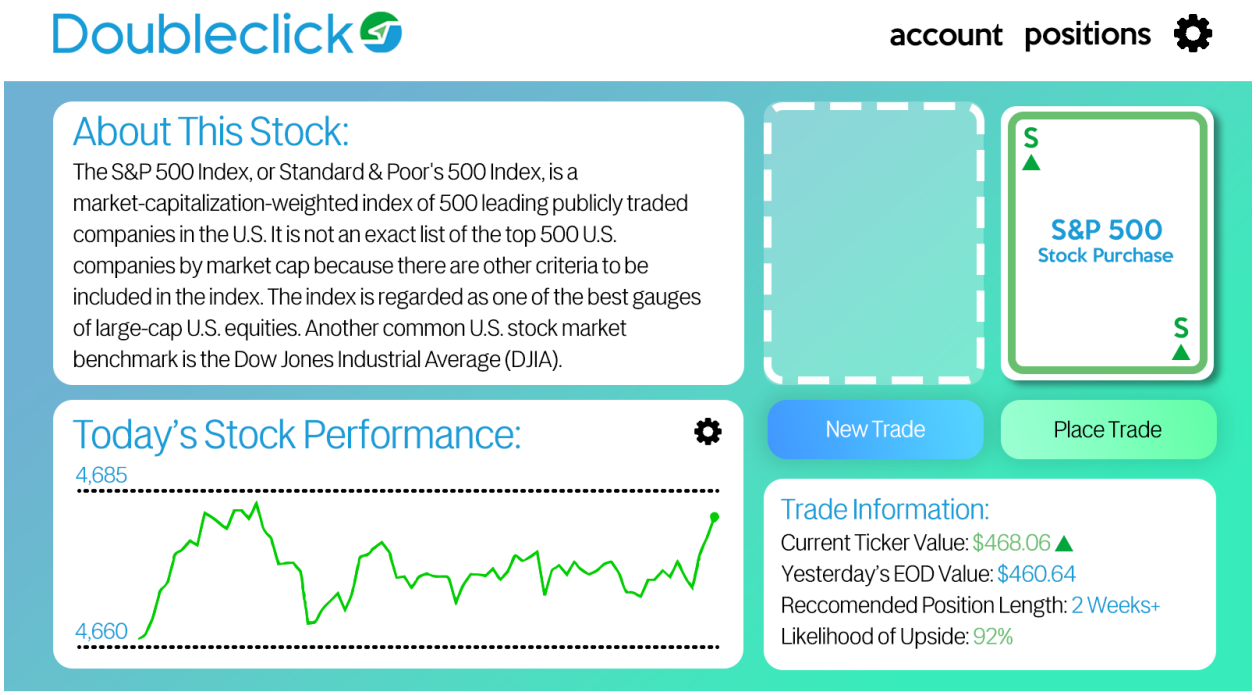
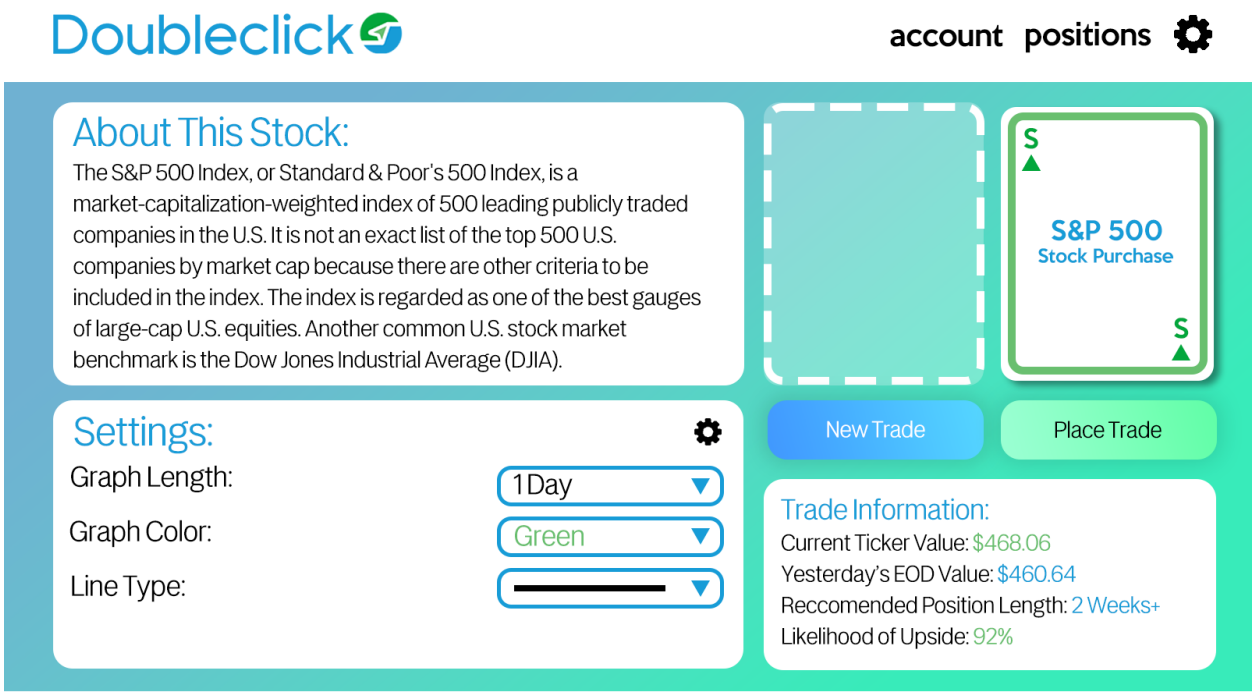
16												■						
17															■			
18									■									

19																		

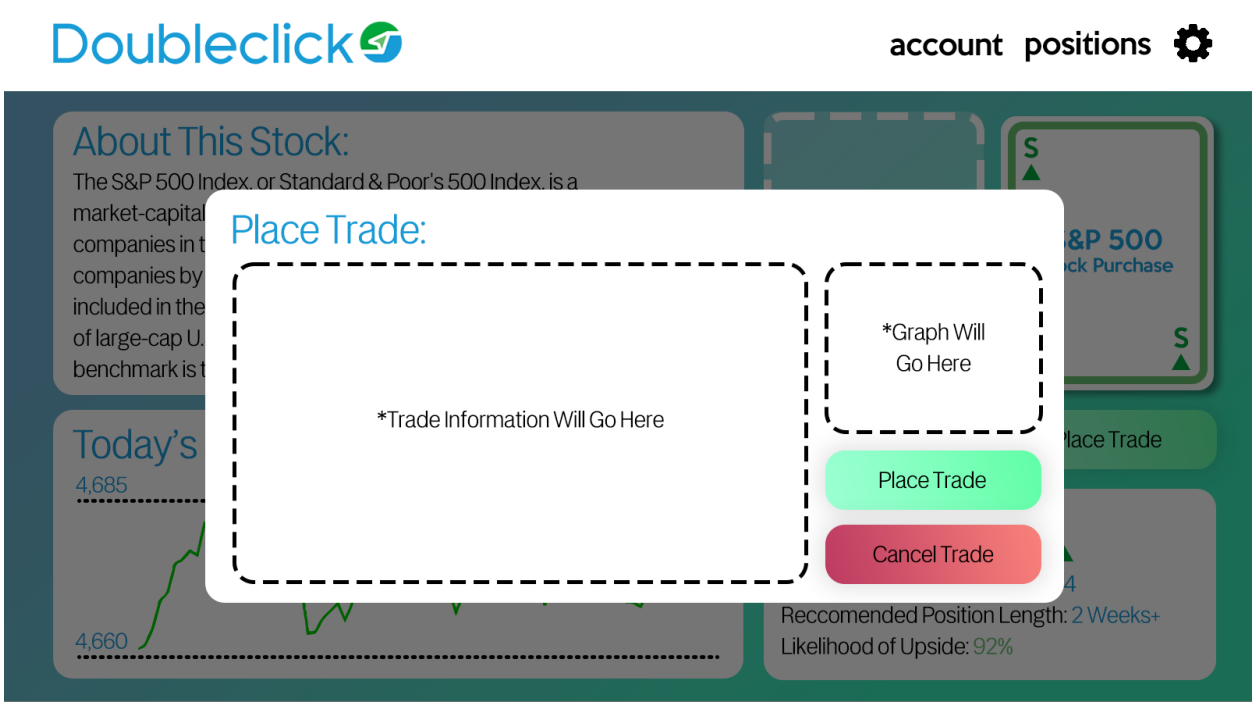
7. Initial Snapshots:



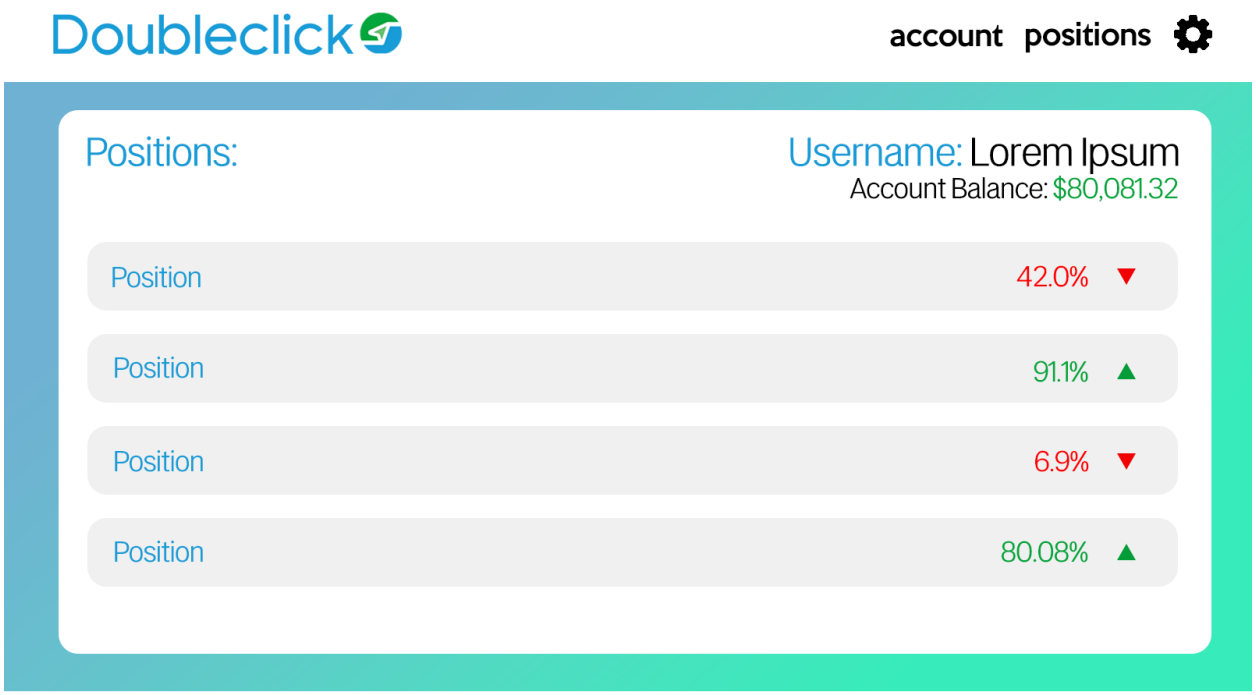
Listed Above is the Main UI for our Project. This features stock information, stock performance, potential trades, ability to place trades, and find new trades. You can also navigate to the account, positions, settings, and graph settings page.



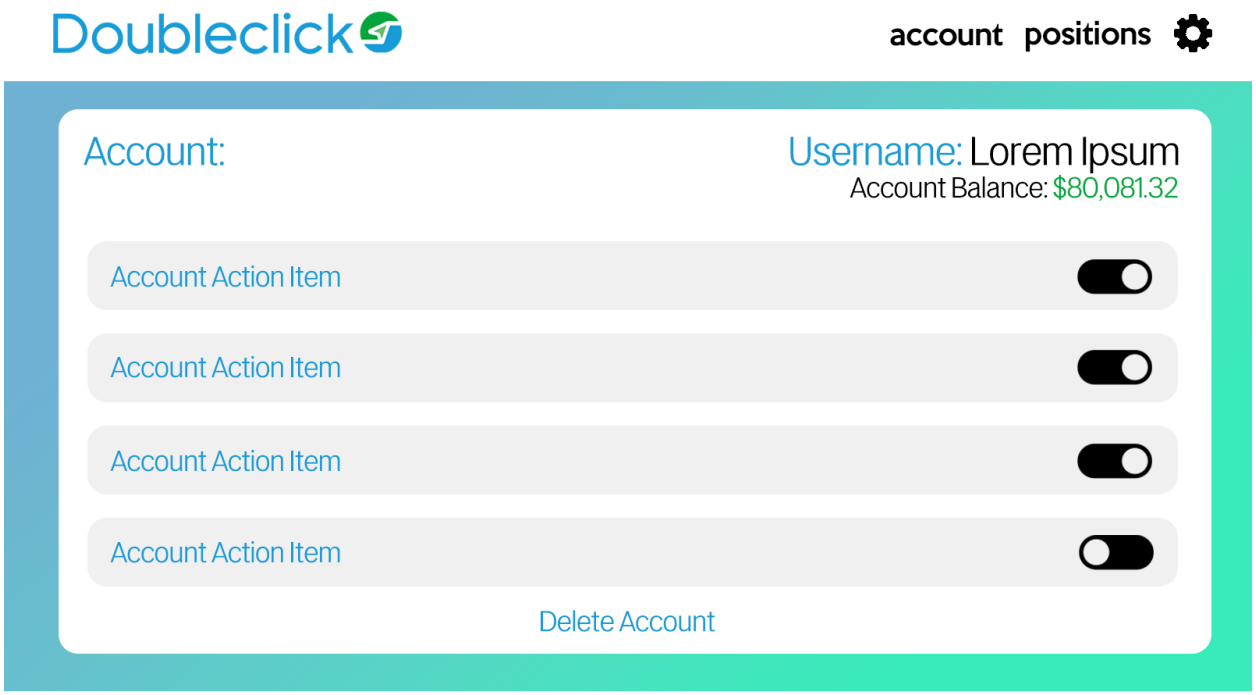
This screenshot demonstrates the look of the graph settings page. The graph settings allow you to adjust the period it displays, the color of the graph, and the line type.



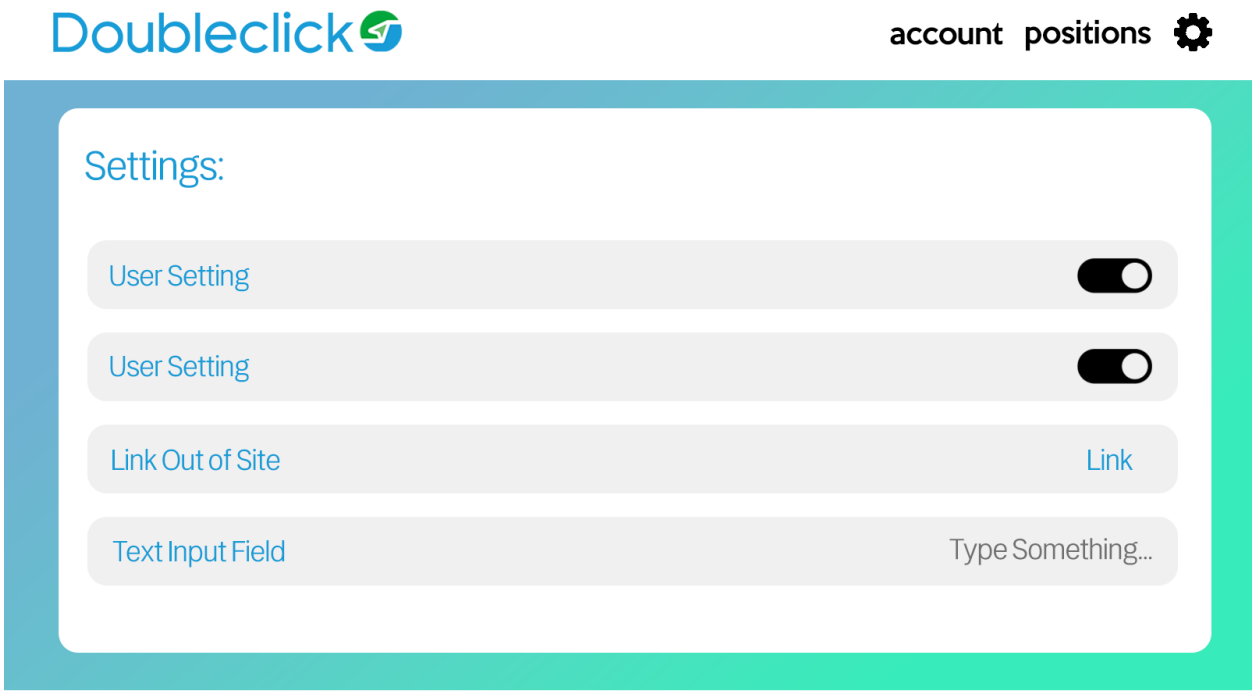
This screenshot demonstrates what it looks like to place a trade on our platform. UI is simple but communicates the necessary info. The user can place a trade or back out from this screen.



This screenshot demos the positions screen. This is a simple page that shows all the users current positions and their relative performance.



This screenshot shows the account management screen. The user will be able to change various factors relating to their account or delete it.



This screenshot shows the settings management screen. The user will be able to change various factors relating to the service and tailor their user experience specifically to them.

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8. Glossary:

1. Database: A system of organized data allowing for alterations.
2. Python: A programming language that emphasizes readability and simplicity.
3. C++: A programing language that is an extension of C.
4. API: Allows for connection between two applications.
5. Vue.js: A javascript framework that is used for web applications.
6. HTML: A Programming language used for website development.
7. Firebase: A real time database that is cloud hosted.
8. REST: A type of API that specializes on state transfers.
9. HCI: This stands for human computer interaction.
10. Traffic: The amount of data moving through a network.
11. Login: To gain access to data that they are allowed to see and manipulate.
12. Mobile: an alternative to a desktop computer that is usually in the form of a phone.
13. GUI: A graphical user interface that relies on images to prompt a user.
14. UX: UX means how a website designs and functionality makes a user feel.
15. UI: How the user interacts with a website.
16. OOP: Object oriented programming is a style that focuses on data instead of procedures and logic.
17. Web Scraper: Searching the internet for pieces of usable and relevant data.
18. Data structure: How data is stored and organized.

19. Trade platform: A platform for monitoring and trading stocks.
20. ThinkorSwim: The trading platform we will use in our program.

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9. List of References: (MLA)

Vanstone, Bruce, and Tobias Hahn. *Designing Stock Market Trading Systems :*

With And Without Soft Computing, Harriman House Publishing, 2010. *ProQuest Ebook Central*, https://ebookcentral.proquest.com/lib/knowledgecenter/detail.action?docID=3299667.

This book is a summary of the author's strategy for trading stocks using established fundamental strategies and technical data. They use a rule based method and share many useful terms and strategies for anyone looking to brush up on stock strategies.

GOODMAN, JONATHAN, and DANIEL N. OSTROV. "BALANCING SMALL TRANSACTION COSTS WITH LOSS OF OPTIMAL ALLOCATION IN DYNAMIC STOCK TRADING STRATEGIES." *SIAM Journal on Applied Mathematics* 70, no. 6 (2010): 1977–98. http://www.jstor.org/stable/29765331.

This journal discusses trading strategies with a focus on optimizing transaction cost. On most brokerages for most trades, you will incur a small brokerage fee for each trade you place. With multi-legged trades, these can start to stack up. In a complicated trading situation journals like these are very valuable.

Hirsch, Jeffrey A., and Jeffrey A Hirsch. *Stock Trader's Almanac 2015*, John Wiley & Sons, Incorporated, 2014. *ProQuest Ebook Central*, https://ebookcentral.proquest.com/lib/knowledgecenter/detail.action?docID=1801250.

Liu, Jun, and Allan Timmermann. “Optimal Convergence Trade Strategies.” The Review of Financial Studies, vol. 26, no. 4, Oxford University Press, 2013, pp. 1048–86, http://www.jstor.org/stable/23355388.

Investopedia. (n.d.). Retrieved from https://www.investopedia.com/
Investopedia is an online encyclopedia for all investing, stocks, equities, and finance related topics. In addition to providing information on terms, it also provides a variety of news topics, stock information and data, updates on the markets, and learning resources for personal finance.

The Motley Fool Staff. (n.d.). “The Motley Fool.” Retrieved from https://www.fool.com/investing
The Motley Fool provides resources for learning about investing and stocks, resources for building investment portfolios, and gives market news and commentary on their blog. They also have a plethora of articles on a large range of investment related topics.

Tong Liu, Paolo Coletti, Anton Dignös, Johann Gamper and Maurizio Murgia “Correlation Graph Analytics for Stock Time Series Data” Advances in Database Technology, 2021 pp.666-669; https://doi.org/10.5441/002/edbt.2021.79

This article provides the use of their new novel tool in order to learn information from a graph. This article admits it is very hard to predict the stock market yet they show that it is possible. With the right parameters and right model it is feasible to find correlations in the market and this article shows how.

10. Contributions of Members:

Table 10: Time worked distribution between team members

Member	Time (hrs)	Details
Colin Comstock	6	● Initial Snapshots, Interviews, References
Loren Parvin	4	● Interview Questions, Detailed Use Cases + Use Case Descriptions, Document Formatting
Nicholas Rinehart	4	● Requirements, Glossary, Matrix
Eugene Eom	4	● Interview Questions, Detailed Use Case, Reference List
Henry Shi	4	● Use Case Diagram, Detailed Use Case, Introduction