

To The Moon

Project Proposal

COMP3900-W18A-TO-THE-MOON

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Problem Statement

Problem Domain

Currently, stock portfolio management applications on the market offer robust features to users such as customisable stock charts and news feeds, delivered through straightforward user interfaces. However, few existing applications leverage emerging technology such as machine learning to augment the user experience and notably lack social interaction within the apps. Thus, our team proposes:

“To develop a web application which leverages machine learning methods, social forums, and intuitive UI features, to aid our users in researching, managing, and initiating new investment portfolios.”

Four notable portfolio management apps with similar aims include: Yahoo Finance, Raiz, Investing.com, and MetaTrader 4. The strengths and weaknesses of each of these apps have been analysed below, with the strengths built upon, and the weaknesses removed or modified. Using an attractive and intuitive UI, To The Moon (TTM) will seek to provide an improved form of existing successful features, with the addition of new social and predictive features.

Yahoo Finance



Out of all the comparison companies, Yahoo Finance (YF) boasts the most comprehensive platform for everything finance. YF is a web app (also accessible as a mobile app) that lists numerous securities, has extensive news coverage, and provides articles, calculators and videos for everything from taxation to retirement.

YF provides many features common to the other companies discussed below, such as portfolio creation, watchlists, alerts, analysis, and stock statistics. However, YF's competitive advantage comes from offering its users an unparalleled amount of securities and news, organising it all with an intuitive, multilayered screening system. Users can quickly and easily layer screeners, each with numerous metrics, such that an initially huge pool of securities are distilled to a select few fitting their parameters.

Users can use broad screeners such as market screeners (e.g. futures, bonds, cryptocurrencies, etc) or industry screeners (e.g. energy, healthcare, consumer cyclical, etc). The precision of these screeners is left to the user, as each of them can be further refined by adding additional screeners from the 'add screener' options.

All Screeners / New Unsaved Screener* expires in a few days, please save your screener.

Build Stocks screener with filters below Currency in USD

Market Cap (Intraday) is	<input type="button" value="Small Cap"/> <input type="button" value="Mid Cap"/> <input type="button" value="Large Cap"/> <input type="button" value="Mega Cap"/>	Estimated results 1
Total Assets greater than	<input type="text" value="1000000"/>	<input type="button" value="X"/>
Sector is	<input type="button" value="Basic Materials"/> <input type="button" value="+"/>	<input type="button" value="X"/>
Industry is	<input type="button" value="Chemicals"/> <input type="button" value="Lumber & Wood Production"/> <input type="button" value="Building Materials"/> <input type="button" value="+"/>	<input type="button" value="X"/>
Region is	<input type="button" value="Australia"/> <input type="button" value="+"/>	<input type="button" value="X"/>
Total Revenue greater than	<input type="text" value="3000000"/>	<input type="button" value="X"/>
<input type="button" value="Add another filter"/>		
<input type="button" value="Find Stocks"/> <input type="button" value="Save Filters"/>		

Yahoo Finance stock screener example

However, YF's all inclusive platform does come with serious drawbacks. While the screeners are intuitive and easy, the news and home pages are not. In a bid to display the extensive information available on the site, the home page is packed with news articles, watchlist highlights, alerts, ticker symbols and hot stocks. Combine this with the fact that there are 3 to 4 advertisements on each page, and the user is met with a confusing and overwhelming UI.

The screenshot shows the Yahoo Finance homepage with a dark header bar. On the left, there's a large banner with a photo of a person walking and the headline "Stock futures open mixed after selloff, with Treasury yields creeping higher". Below the banner, there's a section for "U.S. MARKETS" with tickers for Dow, S&P 500, and Nasdaq. To the right of the banner, there are several news cards: one about Feb jobs reports, one about California's vaccine distribution, and one about Costco's Q2 results. Further down, there are video thumbnails featuring Federal Reserve Chairman Powell and a discussion about luxury homebuyers. The overall layout is very busy and visually overwhelming.

Yahoo Finance's cluttered home page

YF also has little to no social features. Most news articles simply link to the news source, driving the user's conversation to other platforms. On July 23, 2020, Yahoo! officially suspended all comments "in order to improve our community experience" (Distractify, 2020).

The screenshot shows the Yahoo Finance website. At the top, there is a search bar with the placeholder "Search for news, symbols or companies". To the right of the search bar are icons for "Austin" (with a notification count of 9+), a bell icon, and an envelope icon labeled "Mail". Below the search bar is a navigation menu with links to "Finance Home", "Watchlists", "My Portfolio", "Screener", "Markets", "News", "Personal Finance", "Videos", "Industries", "Tech", and "...". Under the "News" section, there is a link to "Latest News". The main content area features a section titled "Financial & Business News" with a sub-section "World" from Reuters. An article titled "WRAPUP 1-Myanmar diplomatic revolt against junta widens after violent crackdown" is displayed, followed by a photo of two people walking on a beach. Below this is an advertisement for "3 Free Dividend Stock Picks" from The Motley Fool Australia. Another news item from Bloomberg about the Bank of Japan's share price surge is shown, followed by a photo of a large building. To the right, there is a vertical sidebar with a dark background and white text, advertising "随时随地, 随心交易" (Trade anytime, anywhere) for CMC Markets, featuring links to 股票 | 外汇 | 股指 | 大宗商品 | 加密货币 and a "了解更多" button.

Yahoo news page

For users looking specifically for a portfolio management app, YF's numerous other features (e.g. mortgage calculators, retirement page, etc) become irrelevant and distracting. Additionally, the portfolio management features are entirely average, with no unique abilities above the competition.

YF's exceptional ability to sift through huge amounts of securities and information makes them a contender as the app of choice for the novice/intermediate level portfolio manager. However, poor UI, disorganised (or nonexistent) social platforms, and average portfolio management features hurts their ability to cater to the portfolio manager. YF excels at information organisation more so than portfolio management, thus leaving their competitors specialisation opportunities.

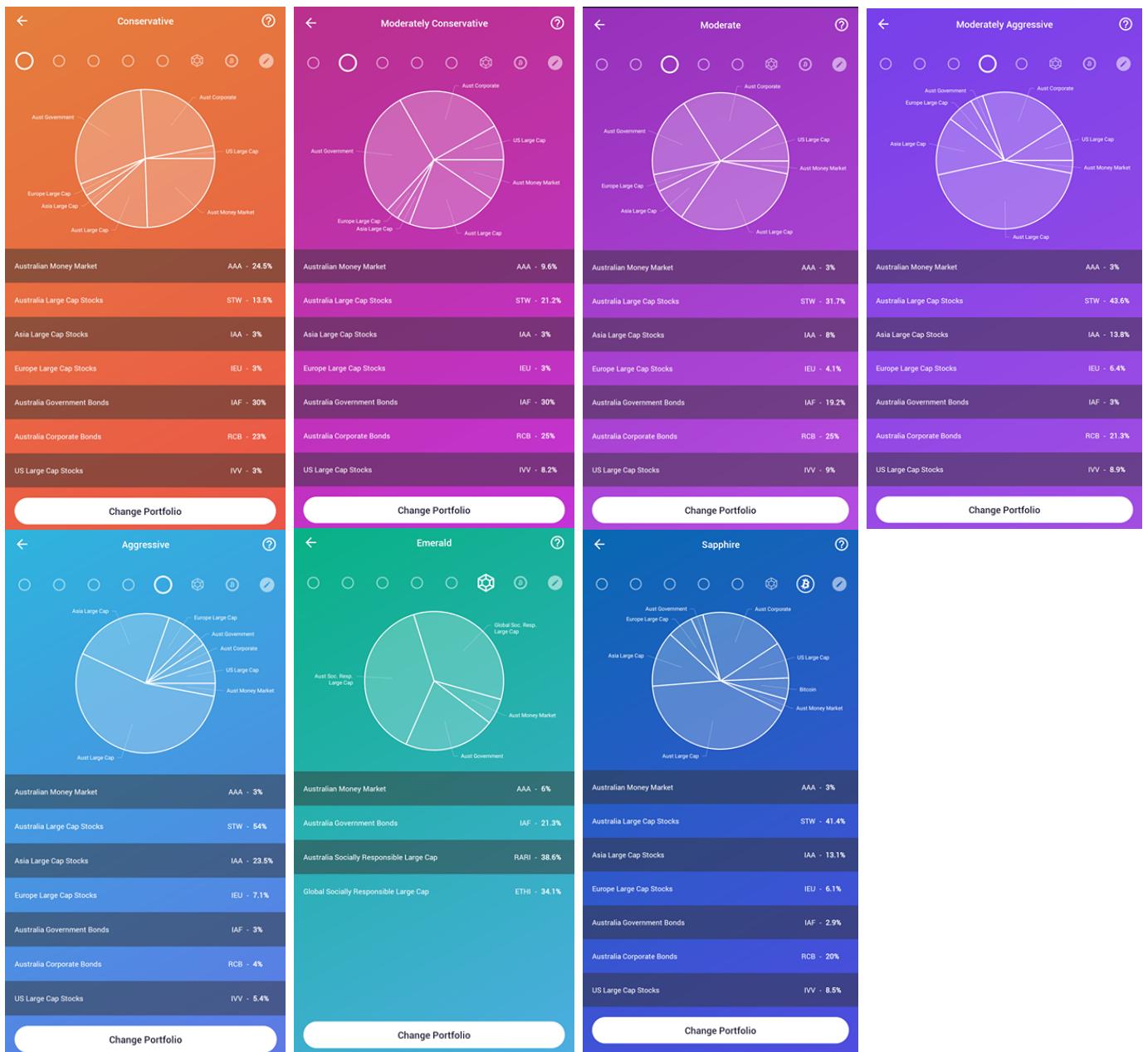
Raiz



Raiz is a micro-investing mobile app which caters towards novice investors looking for a low cost passive income. Raiz works by rounding up your monthly expenditures to the nearest dollar until the round up amount reaches some set threshold. Once this threshold is met, the app

transfers this small sum into the users chosen investment plan. Users can also make monthly lump sum investments to add to their account (Raiz, 2021).

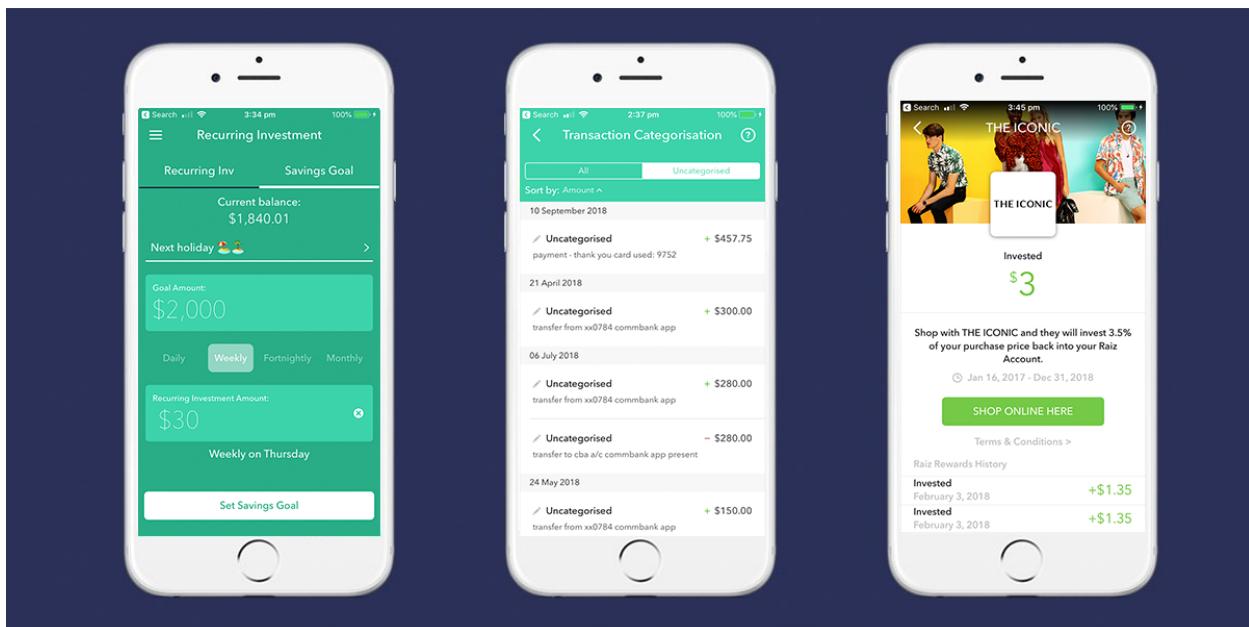
Raiz requires no initial investment knowledge from the user, requiring only that they select one of the 7 different portfolio's. 5 of these portfolios are ranked from conservative to aggressive, and consist of the same investment vehicles, with the only difference being the proportions of the portfolio capital invested into each (Raiz, 2021). Conservative portfolios have higher amounts of low-risk low-reward stock, and aggressive portfolios with higher proportions of high-risk high-reward stocks. Raiz also sells an Emerald portfolio which holds shares in government bonds and shares in socially responsible companies. The last portfolio available is called Sapphire, a portfolio heavily invested in large cap australian stocks and Bitcoin.



Raiz's 7 different portfolio options

The benefit of such a simple investment app is that anyone can use it if they simply understand the differences between the portfolios, and understand how much risk they can take. Raiz removes users from the knowledge and time commitments of active portfolio management.

Since Raiz requires such little user input, they can keep the UI sleek and simple. Unlike other apps there is no news feed, no social platforms, no alerts or watchlists, and no active trading. The interface is dominated by 3 main pages, each labeled Past (the users portfolio and investment history), Today (overview of the portfolios last 24 hour performance), and Future (a forecast of the users investment account on their current financial commitment and chosen portfolio).



Screenshots from the left: Investment page with recurring investment and savings goal info, transactions from and to the Raiz app, snapshot of round-up amounts (at the bottom).

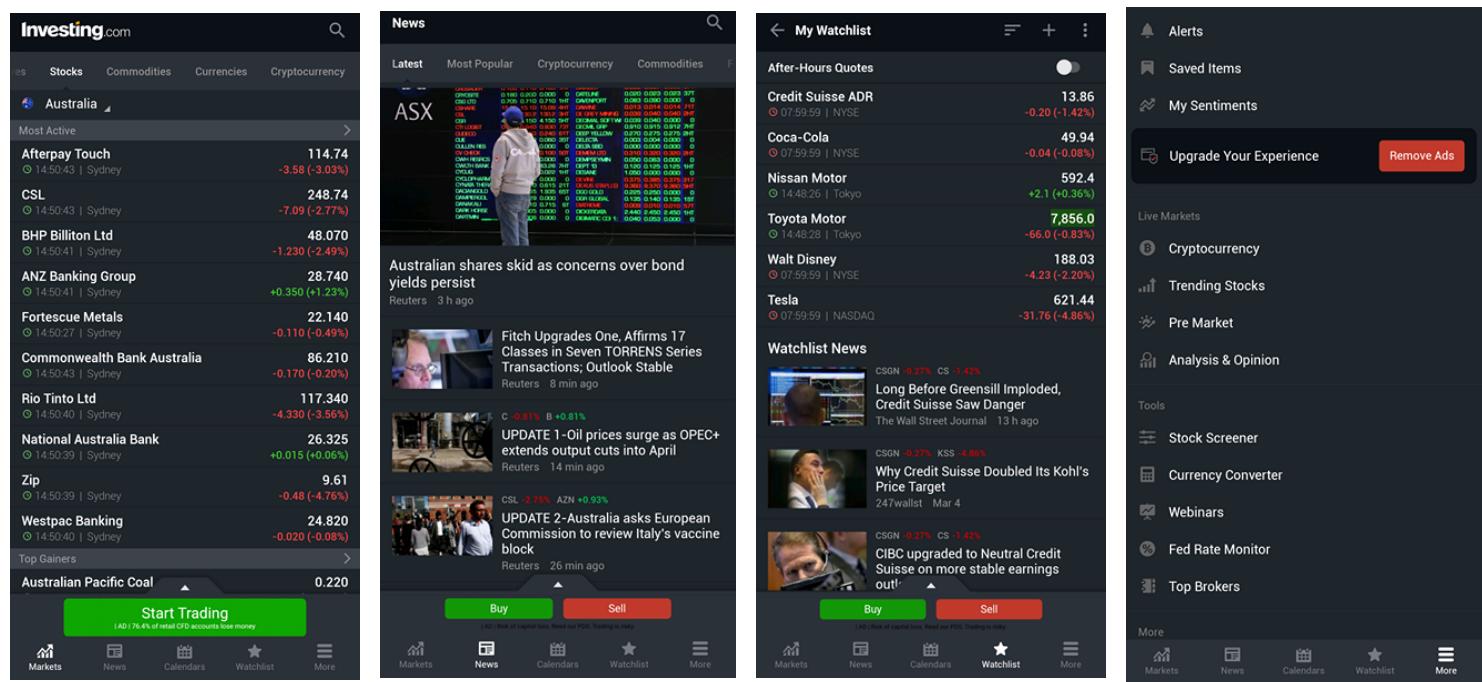
However such a low maintenance app will deter those more hands-on, intermediate and above level investors who are looking for tools that aid their portfolio management, rather than taking them away.

Raiz users are also completely removed from other users as evident in their lack of social platform. Additionally the performance forecast seems to assume past performance and monthly payments continue. The forecast does not make informed guesses about the direction of the underlying investments (Raiz, 2021). Thus it is a useless tool to the active investor looking for a new opportunity.

Investing.com

Juxtaposed to Raiz's passive user experience, we have Investing.com. Investing.com's mobile app, simply called Investing, gives its users complete control over their portfolio. The app supports basic portfolio management abilities (portfolio overview, adding stocks to the portfolio, creating new portfolios etc), new feeds, and a basic social platform (Investing.com, 2021).

Investing.com has become very popular because its simple UI arms users with all the necessary basic functions to facilitate effective investment research and execution. Users can start their investment research using the companies stock screener, which filters companies on numerous criteria (anything from country of operation, to PE ratio, to technical indicators). Each stock on the app has a collection of pages labeled: Overview, Technical, News, Analytics, Profile, Historical data, Financials, Earnings, Dividends, Comments, and Chart.



From the left: Market Home page, News page, my watchlist with relevant news, additional features of Investing.com

Beyond just the basic research and trading tools, the app also provides analysis from industry experts, and organises webinars which connect company representatives, security analysts and investors.

However, there are features which Investing.com provides that have significant room for improvement and reinvention. For example, the only information under 'Community sentiment' is the proportion of investors believing the stock will go up, and the proportion that believe the

stock will go down. There is no explanation to the new user as to why other investors feel this way.

This problem is also exacerbated by the comment sections which are only sorted by recency. A more effective comment section should be sorted by some function of the popularity of the comment, and the commenters credibility. This way the most informed and community backed opinion is easily accessible to the new investor seeking financial information or community sentiment.

Another area of improvement is the Analysis and Technicals sections for the stocks. Analysis includes articles by industry professionals exploring the fundamentals of a stock. Meanwhile the Technicals section only includes a list of technical indicators on the companies price chart. An improvement could be some combination of a technical model in the Analysis section. That way portfolio managers could view the predictions of machine learning models, not just industry analysts. The Historical data section could then be expanded to present the user with the average accuracy of the prediction model over some period of time, thus indicating the level of confidence investors should have in this A.I. analyst.

MetaTrader 5



MetaTrader 5

MetaTrader 5 (MT5) is a desktop application which markets itself to seasoned traders, brokerage firms, and professional portfolio managers. The platform offers extremely customisable and complex versions of the basic trading tools. MT5's custom features allow professionals to tailor their trading experience to their investment strategy and personal taste.

One of MT5's standout features is its convenient screen management system and customisable charts. Managing chart tabs used to be an issue for professional traders, so MT5 responded by allowing users to have up to 100 charts opened at any one time (MetaQuotes, 2021)

. Users can easily manage these screens because each chart is displayed on its own movable tab. This allowed traders with multiple screens to view multiple market charts simultaneously.

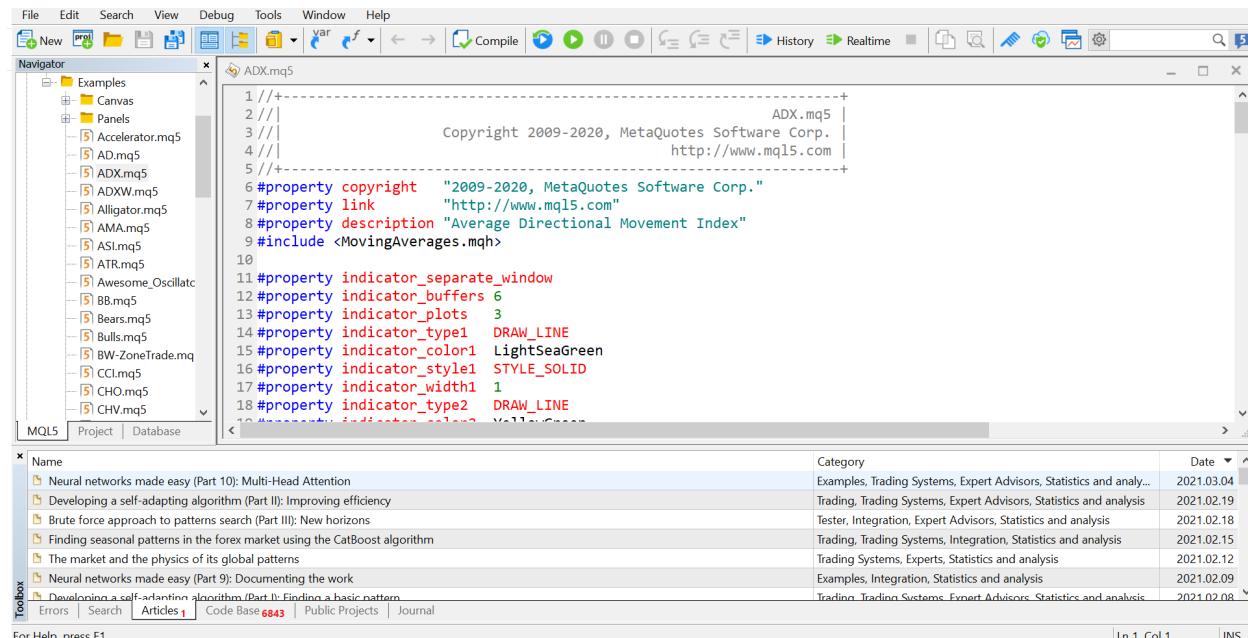
Each of these charts offers extensive customisation features. For example, MT5 offers timeframes anywhere from one minute to one month with 21 timeframes being available (MetaQuotes, 2021). Users can change everything in the charts, from colours (e.g. colours in the candlesticks, background colour), to background grid lines, to chart style (e.g. candlestick chart or line chart). Each chart's customisation is unique, allowing users to customise different charts with different features. MT5 charts can also display any number of the 80 built-in

technical indicators and technical objects (MetaQuotes, 2021). Additional technical indicators can be purchased on the MQL5 Market (a website where traders create and sell software for their Metatrader account) (mql5, 2021) .



Screenshot of four uniquely customised charts, each with their own technical indicators and movable window

For more advanced users with programming and trading experience, MT5 offers users the ability to automate trading with their own programming language, MQL 5. Users can program in MQL 5 to create trading robots (called Expert Advisors on MT5) which use stock data, technical indicators, and trading features (e.g. Stop-Loss and Take-Profit alerts) to make predictions and execute trades.



Screenshot of MQL 5's IDE (launched from the MT5 app)

MT5's Expert Advisors (EA's) offer users an alternative to manual trading that comes with unique opportunities. EA's can monitor hundreds of markets simultaneously, 24 hours a day, making them an extremely efficient timesaver. EA's can quickly incorporate lots of information in their trading strategy, which can make many models highly flexible and versatile. MT5 also offers automated backtesting of EA's to assist users in producing highly accurate prediction models (MetaQuotes, 2021). By distilling trading into logic based decision making, EA's also allow for emotionless trading. This can alleviate investors of stressful decisions that would otherwise be unavoidable to the manual trader.

The screenshot shows the MQL5 Market place interface. At the top, there is a banner advertising a 60% bonus on deposits with a 'Get Bonus' button and the ACY SECURITIES logo. The main navigation bar includes links for Forum, Market, Signals, Freelance, Quotes, WebTerminal, Calendar, VPS, Articles, CodeBase, Log in, Create an account, and language and search icons. On the left, a sidebar lists categories for MetaTrader 5: Experts, Indicators, Libraries, Utilities, MetaTrader 4, Widgets, and Rules, along with a statistic of 11,234 purchases per month. The main content area displays a grid of trading products. One product, 'Painting Deals', is highlighted with a green 'Add product' button. Other visible products include 'Reindeer Scalp...', 'EA Gold Stuff m...', 'Redshift MT5', 'Cairo MT5', and 'Blueshift MT5'. Each product listing includes a thumbnail image, the product name, a star rating, and the price.

Product	Description	Price
Painting Deals	Trading robots trade in the markets automatically, while indicators are used to analyze quotes and identify patterns in price changes. With these trading applications, you will make more informed trading operations and capture more trading opportunities.	10 USD
Reindeer Scalp...		449 USD
EA Gold Stuff m...		149 USD
Redshift MT5		399 USD
Cairo MT5		349 USD
Blueshift MT5		399 USD

Screenshot of MT5's MQL5 market place, where users can buy and sell customised Expert Advisors (automated traders), Scripts, and technical indicators.

The complex features on the MT5 platform makes their product an attractive option for the experienced traders, but could discourage the novice trader. The extensive charting abilities and technical indicators would be irrelevant if the user did not already know technical analysis. Additionally, EA's have the potential to lose the uninformed investor lots of money. Thus new traders cannot safely or effectively utilise the EA's since they require extensive prerequisite knowledge of programming and trading.

These problems are exacerbated by the lack of tutorials or learning material on the MT5 platform. MT5 does have a learning curve since the burden of learning how to use the charting tools or EA's is put entirely on the user. These barriers to entry could deter novice investors who are just looking for an easy portfolio management platform.

Summary

Observed Feature	Yahoo Finance	Raiz	Investing.com	MetaTrader 5
Platform layout and general UI	<p>Navigation menu is clear and easy to navigate.</p> <p>Home pages are cluttered with ads and articles. The website has slow loading times and there is a high chance for misclicks.</p>	<p>Navigation menu is clear enough.</p> <p>Home pages are attractive and simple.</p> <p>Everything you need is no more than 3 clicks away.</p>	<p>Pages have a clear and neat structure.</p> <p>Navigation menus include useful features, but are slightly convoluted. E.g some platform features are located in the navigation bar, but the rest are separately located in the drop down menu</p>	<p>Platform's UI is predominantly customisable. The entire app is just one screen (with multiple compartments) which gives the user access to all the markets on MT5. It's up to the user to pick and customise however many charts they want. Charts are opened in new windows so the user can move them around their desktop as they want (a highly useful feature for organising lots of charts).</p>
Customisable charts	<p>YF offers modestly customisable charts.</p> <p>10 time frames to choose from, 5 chart styles, basic chart drawing functionality (e.g. zoom functionality, trading volume for each day, etc).</p> <p>Option to compare multiple charts, plotted on the same chart.</p> <p>Large selection of technical indicators.</p>	<p>There are no charts on Raiz as there are no individual securities. The only securities on the app are their 7 portfolios.</p>	<p>Investing.com offers basic charting functionality.</p> <p>11 time frames, 7 chart types, daily trading volumes. Aside from changing time frames and chart types, nothing is customisable.</p> <p>Moderate selection of technical indicators</p>	<p>Out of all these apps, MT5 has the most complex and extensive charting features.</p> <p>21 time frames to choose from. 3 chart styles, customisable chart backgrounds, all colours can be changed, charts can be drawn on, notes can be placed on charts, etc.</p> <p>Huge number of technical indicators (80). If users want more they can go to MQL5 Market place and buy them, or check MQL5 Codebase (a website where MT5 users can share MQL5 software for free).</p>
Screners	<p>YF has the most extensive screeners of these apps.</p> <p>Users can quickly screen securities by industry and sector. Complex</p>	<p>There are no screeners on Raiz as there are no individual securities. The only securities on the app are their 7 portfolios.</p>	<p>Investing.com has a stock screener similar to YF, however there are slightly less parameters (~50).</p> <p>The stock screener parameters can</p>	<p>MT5 does not have a security screener.</p>

	<p>screener can be constructed using YF's 'Create Screener' page. Users can choose from a large number of parameters (~100).</p> <p>The stock screener parameters can be selected from the categories: Share Statistics, Balance sheet, Income, Valuation Measures, Cash Flow Statement, Dividends & Splits, Short Interest, ESG Scores, Earnings, Profile, Financial Highlights, and Sector & Industry.</p>		<p>be selected from the categories: Industry, Equity Type, Ratios, Price, Volume & Volatility, Fundamental, Dividends, and Technical Indicators</p>	
Automated trading / predictive models	There are no automated traders or predictive models on YF.	There are no automated traders or predictive models on Raiz.	There are no automated traders or predictive models on Investing.com.	<p>One of MT5's main features is the MQL5 language, which users can use to construct technical indicators, scripts and predictive models.</p> <p>These predictive models can be used to automatically execute trades (automatic traders are called Expert Advisors on MT5).</p> <p>Users can share EA's for free on MT5's Codebase website. Users can buy and sell EA's on MT5's Market website.</p>
Social forums	Ever since the YF comment sections have been suspended, there are no social features.	There are no social features on Raiz.	<p>Investing.com has small comment sections on articles and securities.</p> <p>Comments are sorted by recency. Users can thumbs-up or thumbs-down comments.</p>	<p>There are no social features on MT5. However, MT5 does link to their MQL5 website which has many features which can connect users e.g. forums, a Market, Codebase, Freelance, etc.</p>
News feeds	<p>YF has extensive news coverage.</p> <p>News can be selected from 43 categories.</p> <p>Selecting a security will also give you news relevant to that security.</p>	<p>Raiz has no news feed.</p> <p>The closest thing to a news feed is a Blog section on the app. Blogs are written by writers hired by Raiz.</p>	<p>Investing.com does have a news feed. Most of the articles are fully featured on the app (good for keeping users on the platform), but some articles just link to the news source.</p>	<p>MT5 has no news feed. Instead they have a real time feed of articles posted in the Articles page on the MQL5 website. Some of these articles are news, but many more are tutorials, opinion pieces, and relevant scientific articles (e.g. Deep</p>

	If you create a watchlist or portfolio, you will be given all the news relevant to those securities.		Selecting a security will also give you news relevant to that security. If you create a watchlist or portfolio, you will be given all the news relevant to those securities.	Learning information for Expert Advisors).
Watchlists/Portfolios	<p>YF has customisable watchlists and portfolios (found in the same section) which the user can add any security to. YF also allows users to customise how they view these watchlists/portfolios. Users can view them through the 'summary' page, they can view them through their 'Holdings', or they can 'Create New View' and change information given on each security in their watchlist/portfolio.</p> <p>YF also creates their own watchlists which contain preselected stocks fitting some theme e.g. Most Active Penny Stocks, Cannabis Stocks, Video Game Stocks, etc.</p>	<p>There are watchlists on Raiz. The only portfolios are the 7 options they offer on their app.</p>	<p>Investing.com has a simple watchlist section which allows creation and editing of new watchlists. The stocks in the watchlist are listed with company name, stock price, and daily percentage change.</p> <p>There are no watchlist summary or viewing options. Purchased shares can also appear in these watchlists.</p>	<p>MT5 has a market watch feature where any security on the platform can be tracked (essentially the same as a watchlist).</p> <p>While MT5 doesn't have portfolio creation features, it does have a 'Trading' tab which offers a summary of the currently open trades.</p>

Purpose and Features

Core Features

The system will display a **landing page** that will show a brief overview of the functionality and contents of the system. The landing page will inform the user of finance related news and trending investments, so they may have the freedom to further explore the system with either the given front page information or allow the user to search for anything specific.

Facilitating management of individual investments will also be included in the system allowing the **creation and management of portfolios** (list of investments). Similarly to other observed portfolio systems, the user will be able to add, remove, observe their different securities and observe their overall portfolio performance. Allowing visitors to become users in the system will grant users their own profiles with their own portfolios, with further customisation and preferences becoming available. This helps bring forth a more personalised experience, where the user can operate and navigate the system however it benefits them.

Users will be provided with **detailed information on individual stocks and their overall portfolio** in the system. Visualisations of investment information will be given as a time series graph that will allow the user to see the overall performance of a security. . Time controls are given to provide more historical price data, illustrating past trends for effective portfolio management. A customisable dashboard interface will keep the user informed on the performance and volatility of their portfolio.

The system will also provide **assistive and suggestive capabilities** such as **screener**s, **watchlists** and **notifications**. Screeners will assist the user in finding particular securities that may match a criteria they are interested in. Watchlists will grant users customisable collection of investments that can be both made and curated to benefit other users. A notification feature will also be in place to assist the user with staying up to date on financial news and security performance. These core features will assist the user in discovering different securities and will help the user stay up to date with their financial decisions.

Further information is provided by the system with the feature of **news and current affairs** on investments. Selected stocks will have a collated news section and individual stocks will have accompanying financial news to help the user understand a stock's performance. This feature gives the user accompanying information other than visualisations and security data, to help further their understanding on different security's performances.

Novel Features

The system will contain **share price predictions** which allow the user further help regarding suggestions on the buying or selling of investments. This novel feature opens up an intelligent

prediction system that is unique compared to other similar portfolio applications, and strives to help users as an optional feature to benefit their trading strategies.

Social interaction and discussion will be a novel feature of the system, allowing users to engage in community discussion. Community sentiment will be shown visually with a percentage scale to demonstrate the likability of a stock. Verified users will also be given further weighting and a visual acknowledgement to help present their opinions. This social feature allows users to interact with other users, facilitating meaningful discussion to change or reinforce investment knowledge.

Personalised information features will be included in the role of a **chatbot and note taking**. The chatbot feature will allow the user assistive help in making investment decisions as well as allowing the user to learn more about the system and the functionality available. Users can utilise the chatbot to learn about investment opportunities or answer questions on details and predictive analysis on stocks. The system will also include a personal note taking feature designed to give the user a personal outlet for information that they may want to refer back to. These features will allow users to navigate investment decisions and further details across the system that they may need to refer to at any given point.

User Stories and Sprints

Types of Users

- **Anonymous User:** A user who is not logged in, but is able to access a restricted set of the application's features.
- **Investor:** A user who is logged in, and able to access the application's full set of features including portfolio management, prediction and social interaction.
- **Verified Investor:** An Investor who has undergone the process of verifying their identity and employment. Their input in social features may be weighted higher.
- **Site Manager:** An administrator of To The Moon, who primarily manages watchlists that are prescribed to users.

User Stories

In order to achieve project objectives and build an appealing, feature-rich product, our team has defined a series of Epics. Each Epic encapsulates its relevant user stories and their associated acceptance criteria. More implementation details for later epics will be refined during sprint planning sessions.

Landing Page (KE3900-3)

This epic requires primarily frontend development of the landing page of our product. The main purpose of the landing page will be to provide information about the platform, finance-related news, and to incentivise the user to sign up to the product. Backend functionality required for this epic would be endpoints to serve relevant news and for popular investments on the platform. The size of this epic is estimated to be 1 week.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-3

Landing Page

 Attach

 Create issue in epic

 Link issue

▼

...

Description

When a new user visits our website, the first page they will see is the landing page.

It should have:

- an 'About Us' section - what is the product? what does it achieve? how can I use it?
- a 'News & Articles' section - finance and business related news/articles
- a 'Trending Investments' section - popular investments that current users of the product are investing in

Issues in this epic

... +

0% Done

	KE3900-18 As an investor, I want to learn about the platform on the lan...			
	KE3900-19 As an investor, I want to view finance-related news on the la...			
	KE3900-20 As an investor, I want to learn about trending investments s...			

User Stories:

- [KE3900-18] As an investor, I want to learn about the platform on the landing page so I can understand what it's used for.
- [KE3900-19] As an investor, I want to view finance-related news on the landing page so I can stay informed even without logging into the platform.
- [KE3900-20] As an investor, I want to learn about trending investments so that I might become interested in using the platform.

User Signup/Login (KE3900-17)

This epic requires mainly backend development with minimal frontend development. The purpose of this epic is to provide functionality to the user to signup for an account with our product and login with such an account. Backend development required for this epic would be registration and login functionality. The size of this epic is estimated to be 1 week.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-17

User Signup/Login

 Attach

 Create issue in epic

 Link issue

▼

...

Description

There should be an option for new/existing users to:

- Login - Either using username/password or Google/Facebook SSO
- Sign up - Provide user details such as name, age, email, password and other information to register an account

Issues in this epic

... +

0% Done

- | | | | | |
|---|---|---|---|-------|
|  | KE3900-21 As a new investor, I want to create an account so that I can ... |  |  | TO DO |
|  | KE3900-22 As an existing investor, I want to login to my account so that... |  |  | TO DO |

User Stories:

- [KE3900-21] As a new investor, I want to create an account so that I can monitor potential and real investments and remember my trading preferences.
- [KE3900-22] As an existing investor, I want to login to my account so that I can see my existing investments and change my preferences.

Portfolios (KE3900-5)

The purpose of this epic is to implement the fundamental functionality of stock portfolio management. This epic requires both frontend-heavy and backend-heavy development. Backend development required for this epic would be creation, modification, storage, retrieval and deletion of user portfolio data. Once that is complete, frontend development will be required to display data to the user and enable interactivity. The size of this epic is estimated to be 2 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-5

Portfolios

 Attach

 Create issue in epic

 Link issue

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Description

Portfolios are lists of investments that a standard (logged in) user can manage. A user typically performs actions:

- Create new portfolios
- Add and remove investments to existing portfolios
- View the performance of individual portfolio investments
- Delete portfolios

Issues in this epic

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 KE3900-23	As an investor, I want to create a portfolio so that I can itemi...			TO DO
 KE3900-24	As an investor, I want to edit the details of a portfolio such a...			TO DO
 KE3900-25	As an investor, I want to delete an existing portfolio that I n...			TO DO
 KE3900-26	As an investor, I want to add investments to an existing port...			TO DO
 KE3900-59	As an investor, I want to view the performance of an invest...			TO DO
 KE3900-27	As an investor, I want to remove investments from an existin...			TO DO

User Stories:

- [KE3900-23] As an investor, I want to create a portfolio so that I can itemise the list of investments I want to or have already made.
- [KE3900-24] As an investor, I want to edit the details of a portfolio such as the name so that I can label groups of investments.
- [KE3900-25] As an investor, I want to delete an existing portfolio that I no longer have a use for so that I track only investments I am interested in.
- [KE3900-26] As an investor, I want to add investments to an existing portfolio so that I can monitor a particular investment I am interested in.
- [KE3900-59] As an investor, I want to view the performance of an investment in a portfolio so that I can gauge its health.
- [KE3900-27] As an investor, I want to remove investments from an existing portfolio so I can ensure my list remains relevant to the investments I want to keep track of.

Portfolio Performance (KE3900-6)

The purpose of this epic is to implement additional functionality to the portfolio management feature. This epic requires mainly frontend development to display aggregate investment returns data for a single/multiple portfolios. The size of this epic is estimated to be 5 days.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-6

Portfolio Performance

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 Create issue in epic

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Description

Users should be able to see the overall performance of a single/multiple portfolios in a single view.

Issues in this epic

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 KE3900-28 As an investor, I want to see the collective performance of t...   

User Stories:

- [KE3900-28] As an investor, I want to see the collective performance of the investments in my portfolio so that I can monitor the financial health of the securities in my portfolio and make further investment decisions on them.

Customisable Dashboard (KE3900-7)

The purpose of this epic is to implement a novel ‘customisable dashboard’ feature, which allows users to create their own views containing information such as news and stock graphs. This epic requires mainly frontend development to present complex and customisable views that the user is able to change and save. The size of this epic is estimated to be 2 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-7

Customisable Dashboard

 Attach

 Create issue in epic

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Description

Develop a highly customisable dashboard with portfolio performance, financial news, specific stock graphs, watchlist summaries, social panels and other information.

Issues in this epic

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- | | | | | |
|---|--|---|---|-------|
|  KE3900-29 | As an investor, I want to see the overall performance of my ... |  |  | TO DO |
|  KE3900-30 | As an investor, I want to customise the dashboard so that I c... |  |  | TO DO |

User Stories:

- [KE3900-29] As an investor, I want to see the overall performance of my portfolios on a dashboard so that I can track all securities and relevant information that I am interested in within a single context.
- [KE3900-30] As an investor, I want to customise the dashboard so that I can include specific stock graphs, news, portfolio summaries and other information.

Current Securities Information (KE3900-8)

The purpose of this epic is to serve data on security investments, such as capital stock. This epic requires both frontend and backend development to reliably serve up to date data which can be refreshed by the user. The size of this epic is estimated to be 2 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-8

Current Securities Information

 Attach

 Create issue in epic

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Description

Both authenticated and unauthenticated users should be able to search and view information (such as current/historical share price and relevant news) on any security that our product supports.

Issues in this epic

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|---|---|---|---|-------|
|  | KE3900-31 As an investor, I want to view the current/historical price and... |  |  | TO DO |
|  | KE3900-32 As an investor, I want to refresh the current price of a securit... |  |  | TO DO |
|  | KE3900-33 As an investor, I want to view relevant news to a security so ... |  |  | TO DO |

User Stories:

- [KE3900-31] As an investor, I want to view the current/historical price and other information for securities so that I may make informed decisions when investing.
- [KE3900-32] As an investor, I want to refresh the current price of a security so that I receive up to date and relevant information.
- [KE3900-33] As an investor, I want to view relevant news to a security so that I can make up to date and informed decisions when investing.

Historical Investment Price (KE3900-9)

The purpose of this epic is to provide graph visualisations for the feature implemented in KE3900-8. This epic requires mainly frontend and some backend development to serve historical data in an interactive format. The size of this epic is estimated to be 3 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-9

Historical Investment Price

 Attach

 Create issue in epic

 Link issue

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Description

Develop interactive graphs for historical investment value data over set periods of 1 day, 1 week, 1 month, 6 months, 1 year, 5 years and max time.

Issues in this epic

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|---|--|---|---|-------|
|  KE3900-34 | As an investor, I want to view the historical share price data ... |  |  | TO DO |
|  KE3900-35 | As an investor, I want to interact with visual representations ... |  |  | TO DO |

User Stories:

- [KE3900-34] As an investor, I want to view the historical share price data for a security in visual format so that I can understand price changes, current trading price, historical highs and lows, indicators and other information.
- [KE3900-35] As an investor, I want to interact with visual representations of historical share price data so that I may view a stock's performance over certain periods.

Screeners (KE3900-10)

The purpose of this epic is to implement rich filters called 'screeners' which allows users to find new investments under chosen criteria. The size of this epic is estimated to be 1 week.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-10

Screeners

 Attach

 Create issue in epic

 Link issue

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Description

Screeners are rich filters that users can apply to discover new potential investments.

Issues in this epic

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- | | | | | |
|--|---|---|--|-------|
|  KE3900-36 | As an investor, I want to search for securities that match cho... |  |  | TO DO |
|  KE3900-37 | As an investor, I want to track lists of securities that match c... |  |  | TO DO |

User Stories:

- [KE3900-36] As an investor, I want to search for securities that match chosen criteria so that I can find new stocks to potentially invest in.
- [KE3900-37] As an investor, I want to track lists of securities that match chosen criteria so that I may monitor their position and better inform financial decisions.

Notifications (KE3900-11)

The purpose of this epic is to add push notifications to our platform that users can subscribe to, which will keep them up to date on the latest financial news and updates on their portfolios. The size of this epic is estimated to be 5 days.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-11

Notifications

Attach Create issue in epic Link issue ...

Description

The application should allow authenticated users to subscribe to push notifications (if they choose), informing them about financial news and portfolio performance updates.

There should be options for email or mobile notifications.

Issues in this epic

...

 KE3900-38 As an investor, I want to receive email/mobile notifications a... 	 TO DO
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User Stories:

- [KE3900-38] As an investor, I want to receive email/mobile notifications about financial news and performance updates on certain securities so that I may stay up to date and make informed financial decisions.

Watchlists (KE3900-12)

The purpose of this epic is to add curated and published portfolios known as 'watchlists', which track groups of investments chosen by users. The size of this epic is estimated to be 1 week.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-12

Watchlists

 Attach

 Create issue in epic

 Link issue

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Description

To share knowledge on the best investments, users and site managers should be able to publish curated portfolios in the form of 'watchlists', portfolios which simply track certain securities without investing in them.

Issues in this epic

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- | | | | | |
|---|--|---|---|-------|
|  KE3900-39 | As an investor, I want to publish portfolios to the public so t... |  |  | TO DO |
|  KE3900-40 | As a site manager, I want to publish portfolios to the public ... |  |  | TO DO |

User Stories:

- [KE3900-39] As an investor, I want to publish portfolios to the public so that I can share information on the investments I believe have potential to other investors.
- [KE3900-40] As a site manager, I want to publish portfolios to the public so that other users can receive curated suggestions on which (groups of) investments to make.

Share Price Predictions (KE3900-13)

The purpose of this epic is to develop machine learning prediction models that provide share price ‘forecasts’ over time periods up to 30 days. The size of this epic is estimated to be 5 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-13

Share Price Predictions

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 Create issue in epic

 Link issue

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Description

Develop a range of prediction models that will predict the share price of an investment over pre-set ranges (e.g. 1 day, 7 day, 30 days) of time. A user can also execute simulated trades according to predictions.

Issues in this epic

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- |  | KE3900-41 | As an investor, I want to predict the future value of a certain i... |  |  TO DO |
|---|-----------|--|---|---|
|  | KE3900-42 | As an investor, I want to see predictions from a preset range ... |  |  TO DO |
|  | KE3900-43 | As an investor, I want to select from a range of different pred... |  |  TO DO |
|  | KE3900-44 | As an investor, I want to execute simulated trades on a certai... |  |  TO DO |

User Stories:

- [KE3900-41] As an investor, I want to predict the future value of a certain investment so that I can decide how much of this investment I wish to buy or sell, or if I would like to add additional value to the investment.
- [KE3900-42] As an investor, I want to see predictions from a preset range of durations (e.g. 1D day, 7 day, 30 days) so that I can make both short term and long term decisions on a particular investment.
- [KE3900-43] As an investor, I want to select from a range of different prediction models so that I can compare predictions and their methodologies and use them to refine my predictions.
- [KE3900-44] As an investor, I want to execute simulated trades on a certain investment so that I can test and gauge the effectiveness of my trading strategies.

Social Forum (KE3900-14)

The purpose of this epic is to develop our application into a platform for active social interaction, using features such as comments and community sentiment. The size of this epic is estimated to be 4 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-14

Social Forum

 Attach

 Create issue in epic

 Link issue

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Description

Social interaction via comments and community sentiment provide the user a sense of connection with the finance & investing community. The comment section should function similar to Reddit and verified users can have more weighting to their inputs.

Issues in this epic

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 KE3900-45	As an investor, I want to submit comments on securities so t...			TO DO
 KE3900-46	As an investor I want to edit my comments on securities so t...			TO DO
 KE3900-47	As an investor I want to remove my comments on securities s...			TO DO
 KE3900-48	As an investor, I want to view comments on securities by oth...			TO DO
 KE3900-49	As an investor, I want to 'upvote' or 'downvote' a comment s...			TO DO
 KE3900-50	As an investor, I want to vote on my sentiment of a security s...			TO DO
 KE3900-51	As an investor, I want to view the community sentiment so th...			TO DO
 KE3900-52	As a qualified/notable investor, I want to verify my account s...			TO DO
 KE3900-53	As a verified investor, I want to submit highlighted comment...			TO DO

User Stories:

- [KE3900-45] As an investor, I want to submit comments on securities so that I can share opinions on current standings.
- [KE3900-46] As an investor I want to edit my comments on securities so that I can correct or clarify my statements after submission.
- [KE3900-47] As an investor I want to remove my comments on securities so that I am able to remove any statements I am no longer happy with.
- [KE3900-48] As an investor, I want to view comments on securities by other investors so that I can interact with other users of the platform.
- [KE3900-49] As an investor, I want to ‘upvote’ or ‘downvote’ a comment so that I can influence the visibility of comments depending on their relevance and popularity.
- [KE3900-50] As an investor, I want to vote on my sentiment of a security so that I can contribute to the overall community sentiment.
- [KE3900-51] As an investor, I want to view the community sentiment so that I can have an understanding of the confidence of fellow investors.
- [KE3900-52] As a qualified/notable investor, I want to verify my account so that I can contribute with more weight to community sentiment votes and comment submissions/voting.
- [KE3900-53] As a verified investor, I want to submit highlighted comments on securities so that I can contribute meaningful and visible opinions to the community.

Chatbot (KE3900-15)

The purpose of this epic is to add a chatbot to our application for guiding new users on how to use the platform, and helping experienced users to find new investments and explore predictions implemented in KE3900-13. The size of this epic is estimated to be 3 weeks.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-15

Chatbot

 Attach

 Create issue in epic

 Link issue

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Description

Develop a chatbot which assists new and experienced investors alike in finding new investment opportunities. It should primarily be a tool for assisting new investors in getting started with the platform and answering any queries they have. The chatbot is also delivers predictions implemented in  KE3900-13: Share Price Predictions .

Issues in this epic

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0% Done

- |  | KE3900-54 As a new investor, I want to receive tips from a chatbot on g... |  |  TO DO |
|---|---|---|---|
|  | KE3900-55 As a new investor, I want to send messages to a chatbot so I ... |  |  TO DO |
|  | KE3900-56 As a new investor, I want to receive messages from a chatbot... |  |  TO DO |
|  | KE3900-57 As an experienced investor, I want to receive share price pred... |  |  TO DO |

User Stories:

- [KE3900-54] As a new investor, I want to receive tips from a chatbot on getting started with investing so that I can make my first investments whilst making informed decisions.
- [KE3900-55] As a new investor, I want to send messages to a chatbot so I can ask questions I may have about investments.
- [KE3900-56] As a new investor, I want to receive messages from a chatbot so that I may be directed to new learning opportunities about investments.
- [KE3900-57] As an experienced investor, I want to receive share price predictions from a chatbot so that I can easily enquire about predictions for multiple investments.

Note Taking (KE3900-16)

The purpose of this epic is to implement a basic note taking feature which helps users to track personal thoughts and decisions when investing. The size of this epic is estimated to be 1 week.

Projects /  3900-W18A-Ali-To-The-Moon /  KE3900-16

Note Taking

 Attach

 Create issue in epic

 Link issue

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Description

To do away with notebooks and auxiliary note-taking tools, we want to integrate notes into our stock management portfolio to allow the user to track their thoughts and decisions in text format.

Issues in this epic

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 KE3900-58 As an investor, I want to have a system of tagging my invest...   

User Stories:

- [KE3900-58] As an investor, I want to have a system of tagging my investments and portfolios with notes so that I can keep track of my previous investment decisions and mark investments that I want to action or watch closely.

Sprints

The first three sprints will last for 2 weeks each to allow application infrastructure to be planned and core features to be developed. The fourth and final sprint will be 1 week long, coinciding with the week before the demonstration deadline, to perform necessary bug fixes and refine the finished product. It will also be used to complete advanced auxiliary features.

Sprint	Sprint Start Date	Sprint End Date	Sprint Objectives
1	03/03/2021	16/03/2021	A product with basic functionality, capable of login authentication with the data and presentation layers set up. It should include user profiles, information retrieval and visualisation for individual investments and portfolio creation and editing.
2	17/03/2021	30/03/2021	This sprint will add additional features to the product including dashboards, expanded historical data, investment search and notifications as well as basic social interaction features (commenting and notetaking). It will also consist of establishing the prediction platform through providing basic models for short term price prediction and trend prediction.
3	31/03/2021	13/04/2021	This sprint will round out the social media features with sentiment data and sentiment analysis, adding additional user mechanisms for “trusted opinions” (12d-e, 12h). It will also implement advanced prediction models for trades > 30 days and model selection. A basic chatbot for notifications and information retrieval should also be included.
4	14/04/2021	20/04/2021	This sprint will be used to add simulated paper trading, more advanced models and making recommendations “intelligent” and automated through the chatbot. The final solution should be polished to its MVP state in the sprint.

In order to meet our sprint objectives, we have identified the following User Stories in scope for the first sprint:

KE3900 Sprint 1 16 issues			
<input checked="" type="checkbox"/> As an investor, I want to learn about the platform on the landing page so I can understand what it's used for.	Landing Page	KE3900-18	↑ 2
<input checked="" type="checkbox"/> As an investor, I want to view finance-related news on the landing page so I can stay informed even without logging in.	Landing Page	KE3900-19	↑ 4
<input checked="" type="checkbox"/> As an investor, I want to learn about trending investments so that I might become interested in using the platform.	Landing Page	KE3900-20	↑ 5
<input checked="" type="checkbox"/> As a new investor, I want to create an account so that I can monitor potential and real investments and remember my trading preferences.	User Signup/Login	KE3900-21	↑ 6
<input checked="" type="checkbox"/> As an existing investor, I want to login to my account so that I can see my existing investments and change my preferences.	User Signup/Login	KE3900-22	↑ 2
<input checked="" type="checkbox"/> As an investor, I want to create a portfolio so that I can itemise the list of investments I want to or have already made.	Portfolios	KE3900-23	↑ 4
<input checked="" type="checkbox"/> As an investor, I want to edit the details of a portfolio such as the name so that I can label groups of investments.	Portfolios	KE3900-24	↑ 3
<input checked="" type="checkbox"/> As an investor, I want to delete an existing portfolio that I no longer have a use for so that I track only investments I am interested in.	Portfolios	KE3900-25	↑ 2
<input checked="" type="checkbox"/> As an investor, I want to add investments to an existing portfolio so that I can monitor a particular investment I am interested in.	Portfolios	KE3900-26	↑ 6
<input checked="" type="checkbox"/> As an investor, I want to view the performance of an investment in a portfolio so that I can gauge its health.	Portfolios	KE3900-59	↑ 3
<input checked="" type="checkbox"/> As an investor, I want to remove investments from an existing portfolio so that my list remains relevant to the investments I care about.	Portfolios	KE3900-27	↑ 2
<input checked="" type="checkbox"/> As an investor, I want to see the collective performance of the investments in my portfolio so that I can monitor my overall financial health.	Portfolio Performance	KE3900-28	↑ 2
<input checked="" type="checkbox"/> As an investor, I want to view the current/historical price and other information for securities so that I make informed decisions.	Current Securities Information	KE3900-31	↑ 3
<input checked="" type="checkbox"/> As an investor, I want to refresh the current price of a security so that I receive up to date and relevant information.	Current Securities Information	KE3900-32	↑ 2
<input checked="" type="checkbox"/> As an investor, I want to view relevant news for a security so that I can make up to date and informed decisions.	Current Securities Information	KE3900-33	↑ 3
<input checked="" type="checkbox"/> As an investor, I want to view the historical share price data for a security in visual format so that I can analyze trends.	Historical Investment Performance	KE3900-34	↑ 6

User Stories:

- [KE3900-18] As an investor, I want to learn about the platform on the landing page so I can understand what it's used for.
- [KE3900-19] As an investor, I want to view finance-related news on the landing page so I can stay informed even without logging into the platform.
- [KE3900-20] As an investor, I want to learn about trending investments so that I might become interested in using the platform.
- [KE3900-21] As a new investor, I want to create an account so that I can monitor potential and real investments and remember my trading preferences.
- [KE3900-22] As an existing investor, I want to login to my account so that I can see my existing investments and change my preferences.
- [KE3900-23] As an investor, I want to create a portfolio so that I can itemise the list of investments I want to or have already made.
- [KE3900-24] As an investor, I want to edit the details of a portfolio such as the name so that I can label groups of investments.
- [KE3900-25] As an investor, I want to delete an existing portfolio that I no longer have a use for so that I track only investments I am interested in.
- [KE3900-26] As an investor, I want to add investments to an existing portfolio so that I can monitor a particular investment I am interested in.
- [KE3900-59] As an investor, I want to view the performance of an investment in a portfolio so that I can gauge its health.
- [KE3900-27] As an investor, I want to remove investments from an existing portfolio so that my list remains relevant to the investments I want to keep track of.

- [KE3900-28] As an investor, I want to see the collective performance of the investments in my portfolio so that I can monitor the financial health of the securities in my portfolio and make further investment decisions on them.
- [KE3900-31] As an investor, I want to view the current/historical price and other information for securities so that I may make informed decisions when investing.
- [KE3900-32] As an investor, I want to refresh the current price of a security so that I receive up to date and relevant information.
- [KE3900-33] As an investor, I want to view relevant news to a security so that I can make up to date and informed decisions when investing.
- [KE3900-34] As an investor, I want to view the historical share price data for a security in visual format so that I can understand price changes, current trading price, historical highs and lows, indicators and other information.

Satisfaction of Project Objectives and Novel Features

All project objectives and novel features have been satisfied by our proposed user stories. The relevant Epic and User Story ID is linked to each feature below:

Project Objectives

1. Portfolio creation and editing
 - User Signup (KE3900-17/21-22)
 - Portfolios (KE3900-5/23-27,59)
2. Investment information visualisation
 - Portfolio Performance (KE3900-6)
 - Securities Information (KE3900-8/31-33)
 - Historical Investment Data (KE3900-9/34-35)
3. Investment information
 - Securities Information (KE3900-8/31)
 - Historical Investment Data (KE3900-9/34-35)
4. Investment news and current affairs
 - Landing Page (KE3900-3)
 - Performance Dashboard (KE3900-7/29-30)
 - Securities Information (KE3900-33)
 - Notifications (KE3900-11/38)
5. Create user profiles
 - Landing Page (KE3900-3/18-20)
 - User Signup (KE3900-17/21-22)
6. Create opportunities to find new potential investments
 - Screeners (KE3900-10/36-37)
 - Watchlists (KE3900-17/21-22)
 - Social Forum (KE3900-14/48)
 - Chatbot (KE3900-15/56)
7. Investment Predictions and Online Trading
 - Share Price Predictions (KE3900-13/41-44)
 - Social Forum (KE3900-13/51-53)
8. Social interaction
 - Social Forum (KE3900-13/45-50)
 - Watchlists (KE3900-12/49-50)
9. Customisable dashboard
 - Watchlists (KE3900-12/49-50)
 - Dashboard (KE3900-7/29-30)

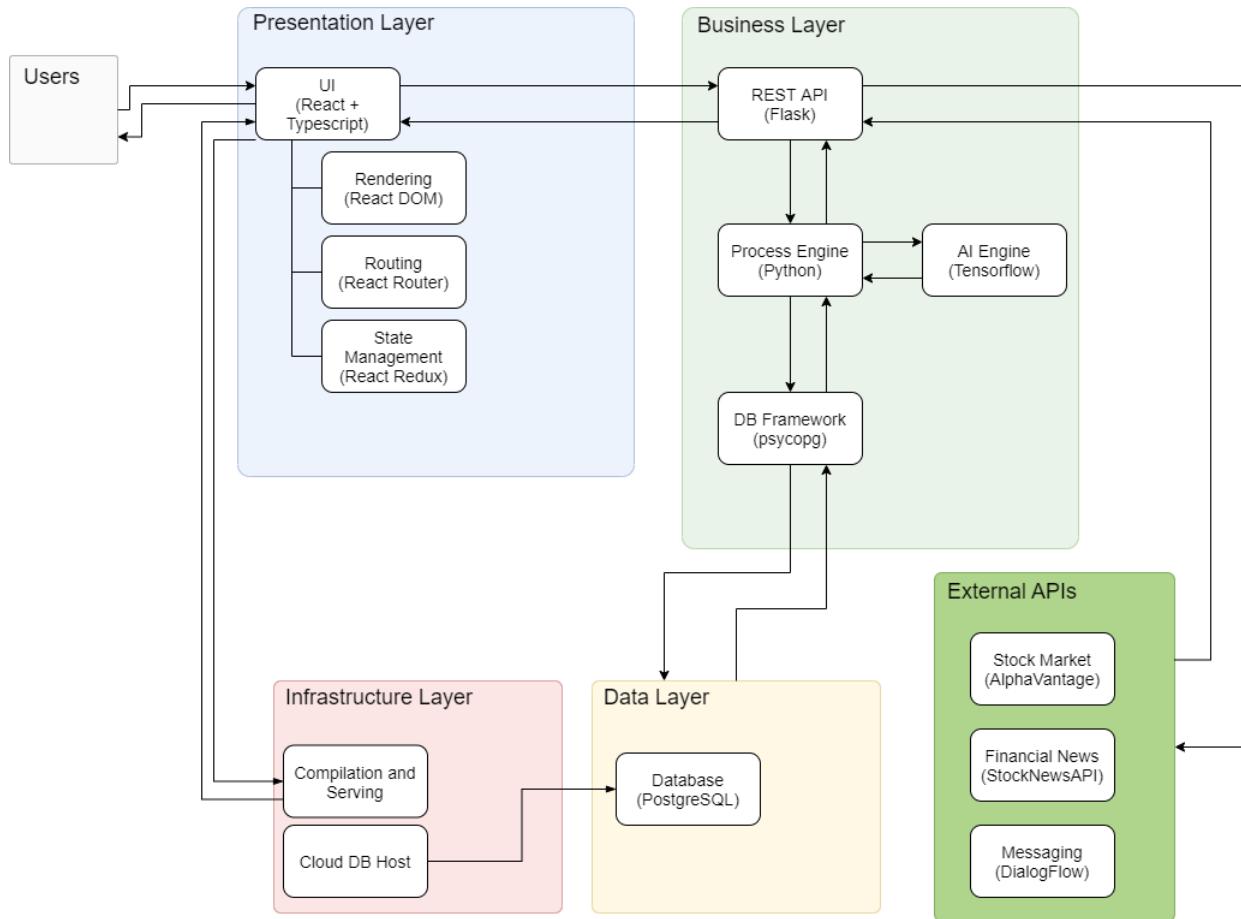
Novel Features

1. Complex visualisation modes
 - Securities Information (KE3900-8/31-33)
 - Portfolios (KE3900-5/ 23)

- Historical Investment Data (KE3900-9/34-35)
 - Dashboard (KE3900-7/29-30)
2. Targeted news and current affairs
 - Securities Information (KE3900-8/33)
 - Notifications (KE3900-11/38)
 3. Investment Recommendations
 - Screeners (KE3900-10/36-37)
 - Chatbot (KE3900-15/56)
 - Notifications (KE3900-11/38)
 4. Automatic suggestions and trading
 - Share Price Predictions (KE3900-13/41-44)
 - Social Forum (KE3900-13/51-53)
 5. Forum mode and commenting
 - Social Forum (KE3900-13/45-50)
 - Watchlists (KE3900-12/49-50)
 6. Customisable dashboard
 - Watchlists (KE3900-12/49-50)
 - Dashboard (KE3900-7/29-30)

Software Architecture

Overview



External Actors (Users)

The application will implement four user types:

1. Anonymous: this allows use of select features of the application such as viewing investments and news only without a login.
2. Standard (“Investor”): this allows the use of all standard features including viewing investments and news, portfolio management, predictive features and use of the forum.
3. Verified (“Verified Investor”): this allows the use of features available to a standard user, but will be allowed special adjustments to forum interactions in stock sentiment analysis. Receiving this status will require site operator approval via an authentication mechanism such as proof of identity.
4. Administrator (“Site Manager”): this allows the user of all features offered by the application, as well as additional administrative operations such as forum moderation and curated watchlist publishing.

Frontend

The presentation layer will be built on the React framework. React uses fast, event-driven DOM rendering which should allow for a performant and responsive UI (React, 2021). React also has better support for external libraries and third party integration compared to frameworks for ready-made applications like Angular.

React offers both plain Javascript and type-checked variants such as Flow and Typescript. We will use its Typescript flavour to enforce better code structure and minimise type errors by enforcing explicit data types at compile time (SitePoint, 2021). Typescript also appears to be better supported than Flow (React, 2021).

Our team is also planning to use React-Bootstrap to construct ready-made, responsive UI elements, and Highcharts for visualising stock data due to its native support for graphing time-series financial data (Highcharts, 2021). For handling routing within our Single Page Application, we will use React Router, which can easily handle nested views and the progressive resolution of views. To predictably handle frontend state within our application, our team will use React Redux to centralise state management.

Backend

The project will implement a Python-based backend. The Python language was selected for its clear syntax and easy to understand structure. More importantly, it has well integrated support for the data science and machine learning libraries required to implement the prediction features. It is not as well suited for concurrent processing compared to languages like Golang or Java, but performance issues can be mitigated and supporting machine learning models on those other platforms would require more effort on integration.

To expose backend functions to the UI we will implement a REST API, accepting requests and responses over HTTP. We opt for the Flask application framework with Celery for asynchronous requests (Stack Overflow, 2015) due to its gentle learning curve and greater flexibility compared to Django , a more rigid and resource-heavy framework (Singh, 2021).

AI models will be built with a combination of libraries appropriate for the type of prediction or inference required, including scikit-learn for non-DL and statistical models and Keras/Tensorflow for constructing high-level prototyping. A high-level API like Keras is good for experimenting with different model architectures and will be employed for model development. For production, we implement models in the lower-level library (Tensorflow) directly for performance optimisations that would be critical in a high-use production environment.

Data Layer

The data layer will be implemented with a PostgreSQL database backend. PostgreSQL uses an object relational model which can suitably express the relationship between stocks, portfolios

and user interactions and user profiles better than document models. It also has balanced performance on read and write operations suitable for the scale of the application and good concurrency, data typing and third party library support. The performance improvement of recent PostgreSQL implementations also compares favourably to more lightweight SQL flavours such as MySQL that have historically performed better on read-only operations (Hristozov, 2019). Database development will take place locally and eventually be hosted on a cloud service such as Google Cloud SQL or Amazon RDS.

External APIs

Third party APIs will be used to help implement information retrieval and user notifications. The ones we anticipate to use are:

- Stock market information: AlphaVantage. This API will be used to process time series data for monthly, daily and intraday (5 minute) stock information as well as company fundamentals and other trading data. It appears to be better maintained and provides more authoritative data than in-development alternatives from Yahoo and Google (RapidAPI, 2021).
- Financial news: Xignite or StockNewsAPI. This API will be used to retrieve related news articles on investment selections using tickers and other identifiers (Xignite, 2021).
- Messaging: DialogFlow. This API will be used to create a basic chat interface and implement the chatbot state machine and logic (Dialogflow, 2021).

Project Management and Schedules

Adopting an Agile Scrum methodology to develop the application, our team will be meeting weekly at these times to review and align on our progress:

- Monday 8:30pm (stand-up)
- Wednesday 6pm (sprint planning/retro, architecture sparring every other week)
- Friday 6pm (optional architecture sparring)

Interface and Flow

The following series of diagrams will outline the process a standard user would go through when utilising our app.

Sign Up

When a user first opens our web page, they will see a landing page, which shows a synopsis about To The Moon, News & Articles and Trending Stocks.

The user will need to sign up to access the bulk of the web app.

There are three options to Sign Up; provide required details, or log in with Google or Facebook.



Login

When a user returns to our page, they will see a landing page, which shows a synopsis about To The Moon, News & Articles and Trending Stocks.

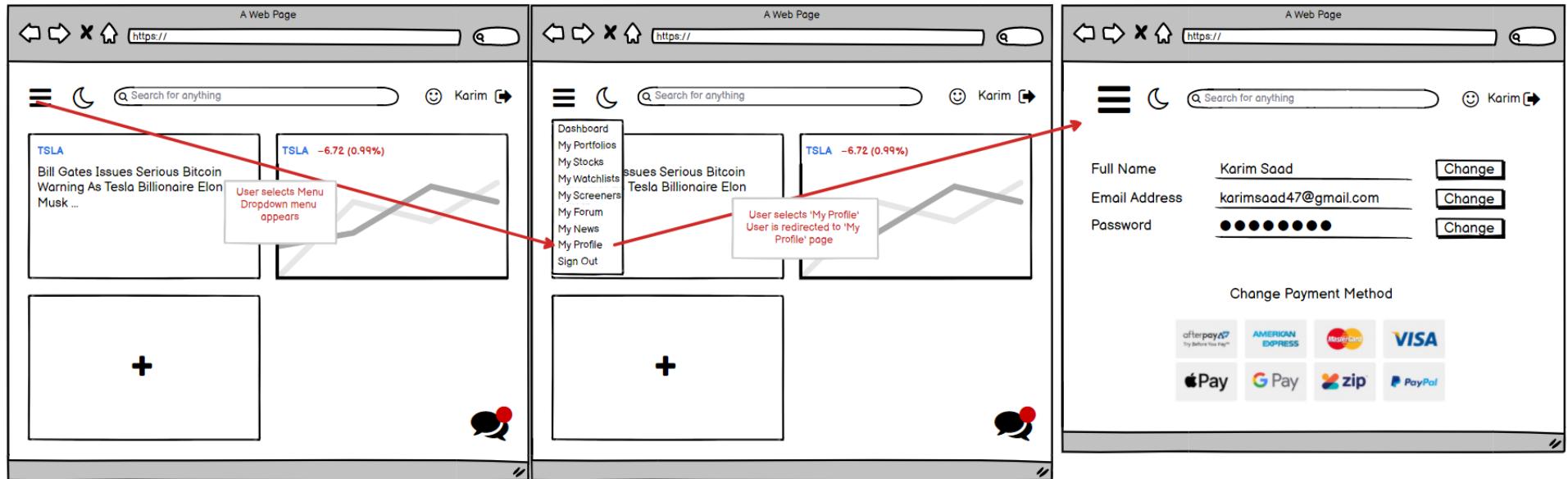
The user will need to sign in to access the bulk of the web app.

There are three options to Login; existing details, or log in with Google or Facebook.



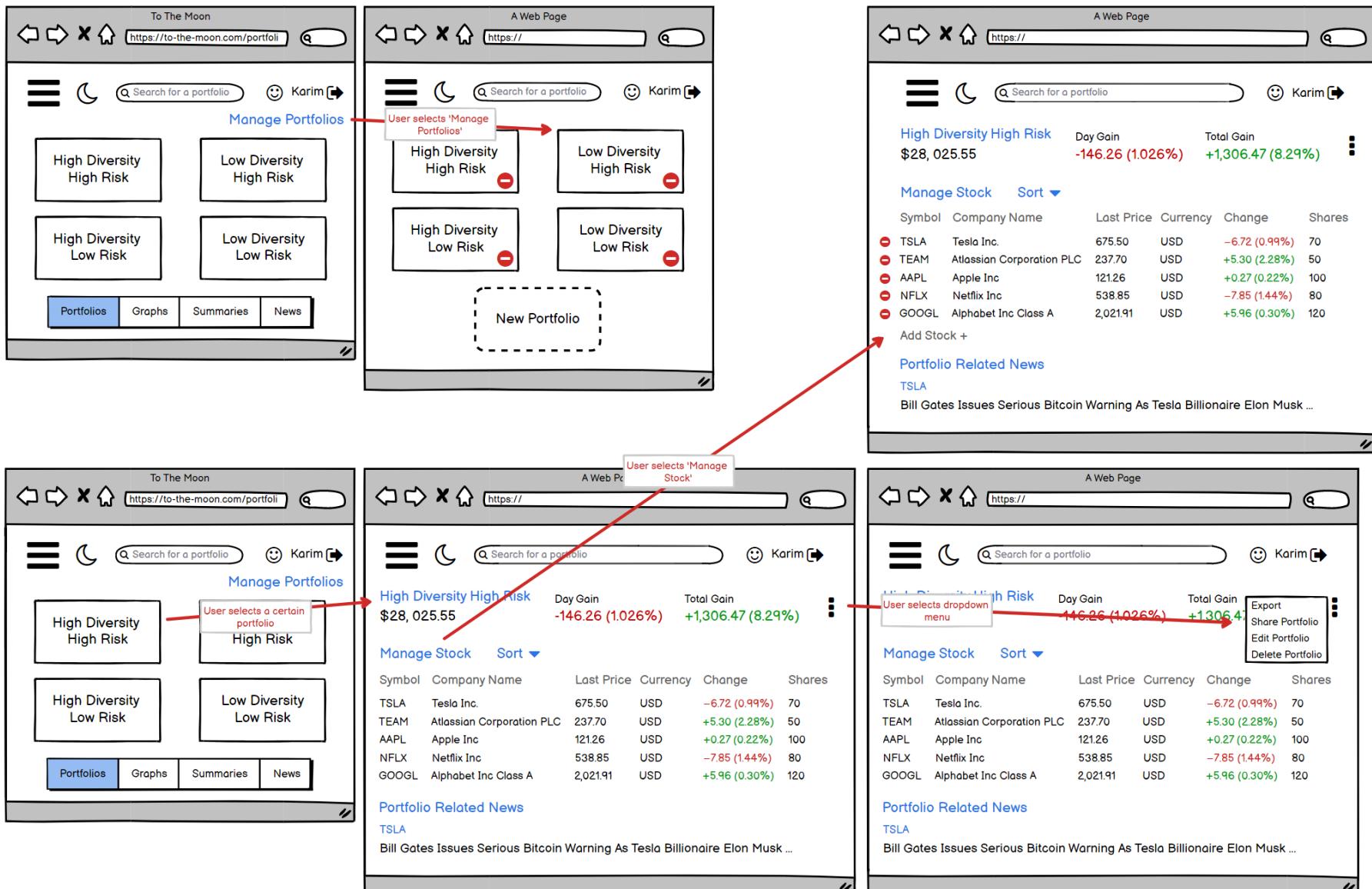
Hamburger Menu

Regardless of which screen a user is on, they can always select the hamburger menu. This specific flow shows the process to reach the 'My Profile' page, however the rest of the flows in this document can be accessed via this dropdown menu.



Portfolios

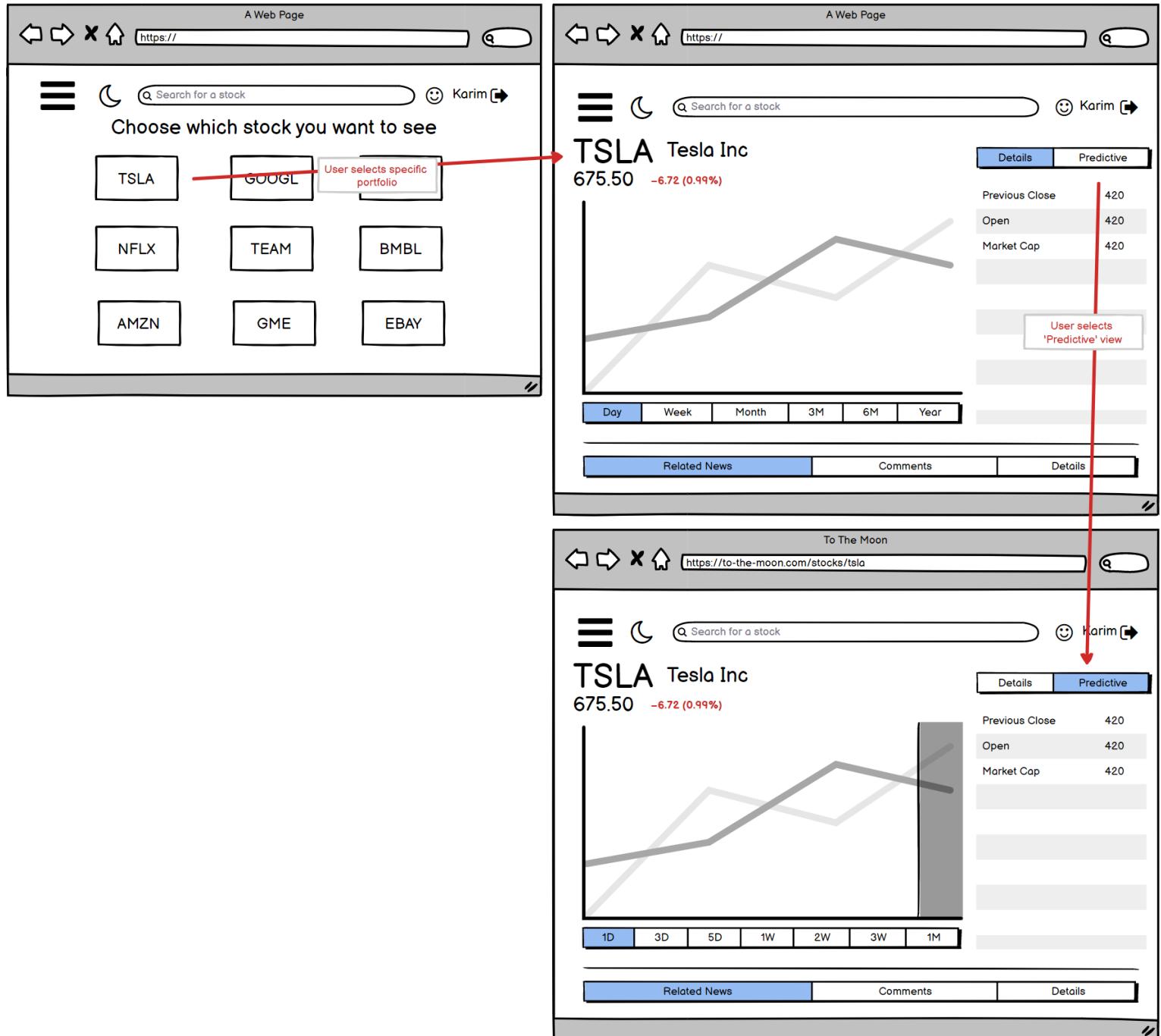
When a user is on the portfolio page, they can select 'Manage Portfolio', allowing them to rearrange, add and delete portfolios. When a user is in a specific portfolio page, they have two main options; they can select 'Manage Stock' to rearrange and delete stocks, and they can also select the dropdown menu to view more portfolio options. Users can also select a specific stock to visit, and redirects to the below stock page.



Stocks

When a user is on the stocks page, they can select a specific stock to see the further information.

The user can also choose to view a 'Predictive' view for the stock.



Watchlists

When a user is on the watchlists page, they can scan through all watchlists and select any specific ones. They will then be redirected to the specific watchlist page.

A Web Page

https://

Search for anything

Karim

Today's Top Performers

See All ← →

User selects a specific watchlist

Game Stocks
30 Stocks +420%

Game Stocks
30 Stocks +420%

Game Stocks
30 Stocks -69%

Today's Worst Performers

← →

Game Stocks
30 Stocks +420%

Game Stocks
30 Stocks +420%

Game Stocks
30 Stocks +420%

Today's Highest Movers

← →

Game Stocks
30 Stocks +420%

Game Stocks
30 Stocks +420%

Game Stocks
30 Stocks +420%

A Web Page

https://

Search for anything

Karim

Game Stocks

Symbol	Company Name	Last Price	Currency	Change	Shares
TSLA	Tesla Inc.	675.50	USD	-6.72 (0.99%)	50
TEAM	Atlassian Corporation PLC	237.70	USD	+5.30 (2.28%)	50
AAPL	Apple Inc	121.26	USD	+0.27 (0.22%)	50
NFLX	Netflix Inc	538.85	USD	-7.85 (1.44%)	50
GOOGL	Alphabet Inc Class A	2,021.91	USD	+5.96 (0.30%)	120

News

- TSLA I BTC**
Bill Gates Issues Serious Bitcoin Warning As Tesla Billionaire Elon Musk ...
- RNDM**
This is a news article which is unrelated to any of the portfolios or stocks...
- PRTF**
This is a news article related to a certain portfolio you have...
- STCK**
This is a news article related to a certain stock you have invest in...

Screener

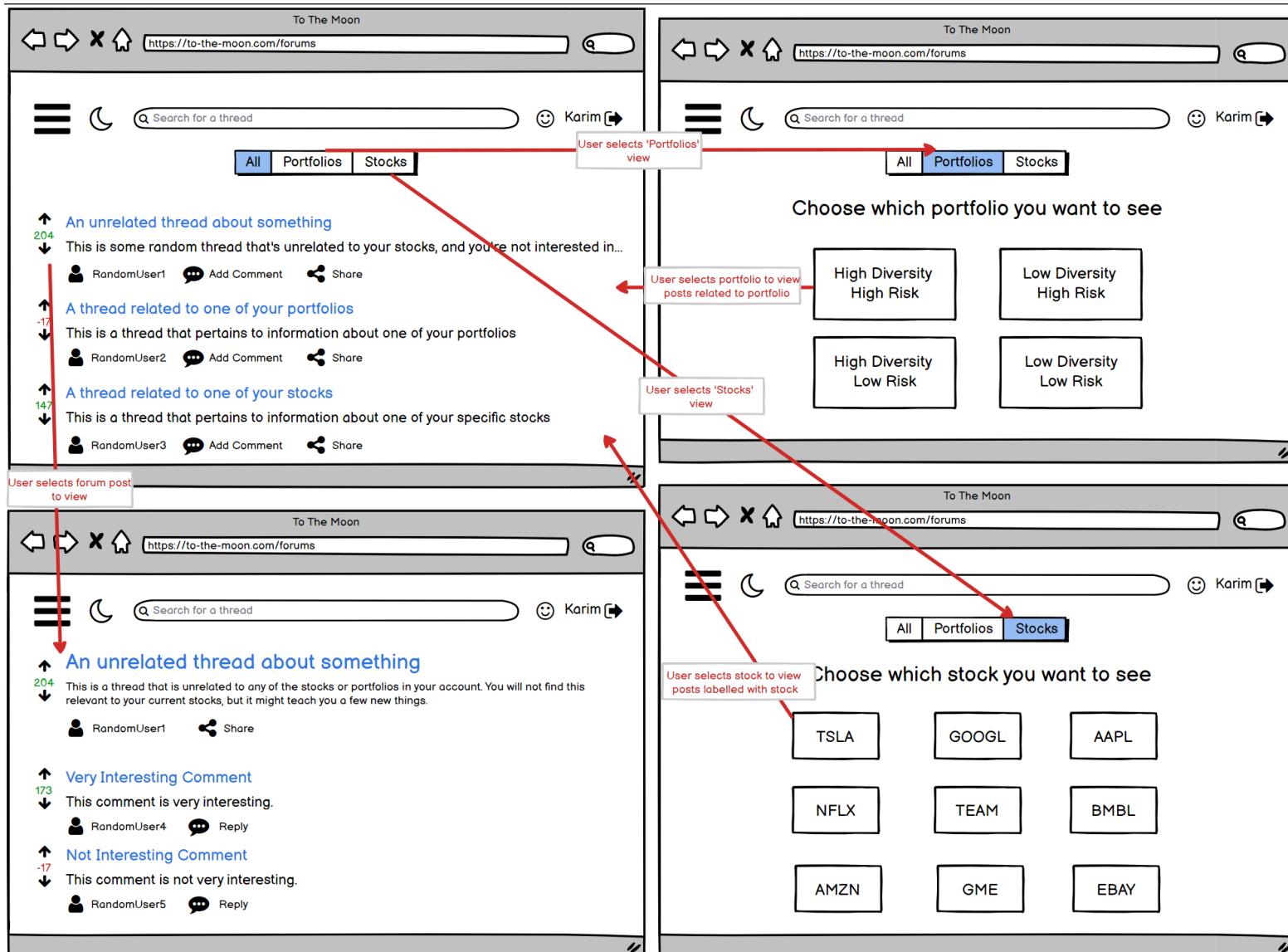
When a user is on the screeners page, they have two main options; they can create a new screener, or view an existing screener.

The image displays three wireframes illustrating the screener interface:

- My Screeners**: A list of existing screeners. One screener is highlighted with a red box and the annotation "User selected 'Create new Screener'".
- Create new Screener**: A dialog for creating a new screener. It includes sections for Filters (Market Cap, Sector, Industry, Price), a Save button, and a Cancel button.
- Austin All You Can Screen Screeners**: A specific screener page showing a table of stocks and a News section. The table includes columns: Symbol, Company Name, Last Price, Currency, Change, and Shares. The news section lists articles related to TSLA, RNDM, PRTF, and STCK.

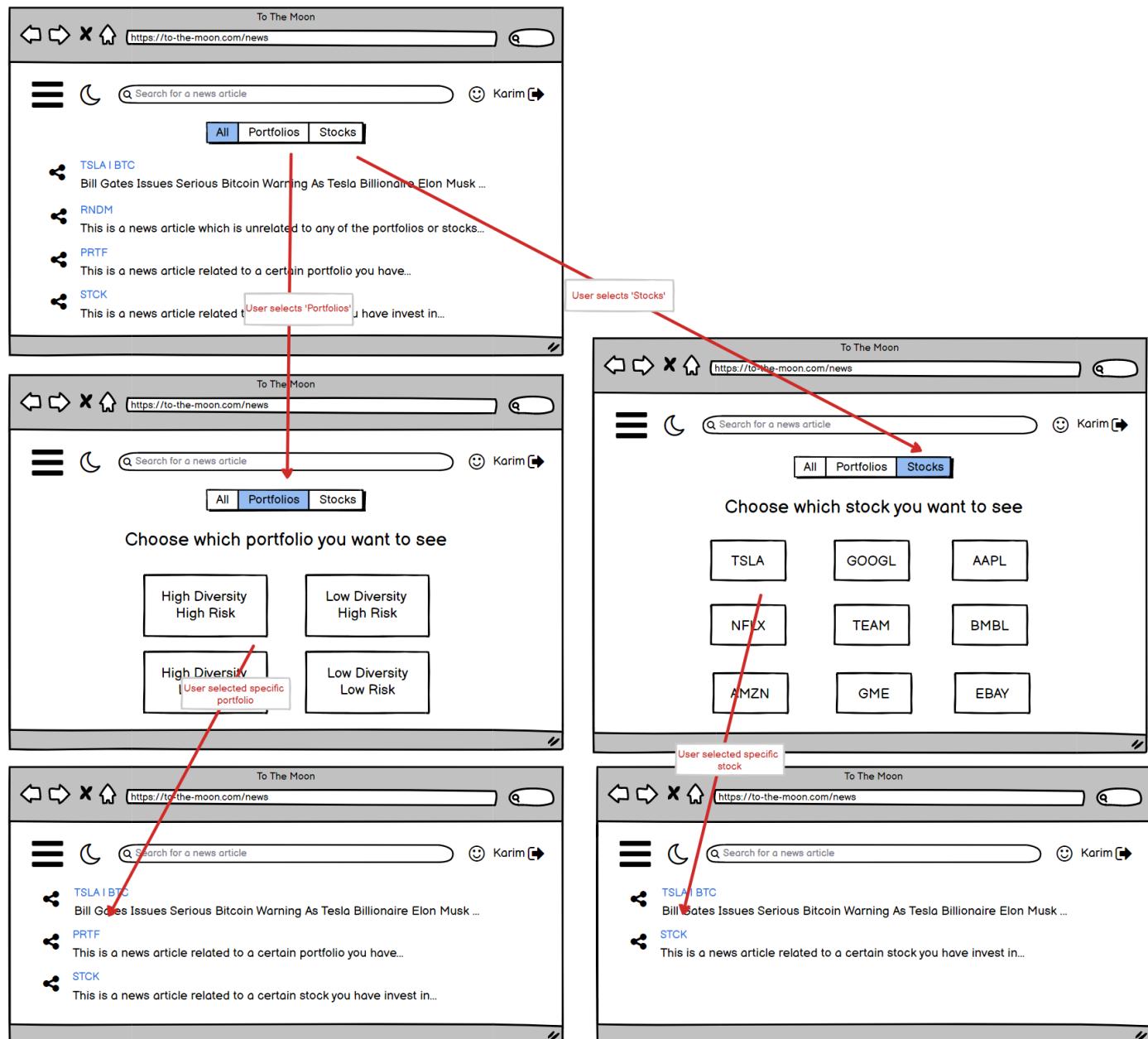
Forums

When a user is on the forums page, they can see a feed of all threads. They can also choose to filter their threads by a specific portfolio or a specific stock. A user can also select a specific thread, to view and leave comments.



News

When a user is on the news page, they can see a feed of all news articles. They can also choose to filter their news by a specific portfolio or a specific stock.



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