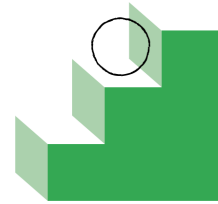


GROUP 10

User Needs + Defining Success

Chapter worksheet



Instructions

Block out time to get as many cross-functional leads as possible together in a room to work through these exercises & checklists.

Exercises

1. Evidence of user need [multiple sessions]

Gather existing research and make a case for using AI to solve your user need.

2. Augmentation versus automation [multiple sessions]

Conduct user research to understand attitudes around automation versus augmentation.

3. Design your reward function [~1 hour]

Weigh the trade offs between precision and recall for the user experience.

4. Define success criteria [~1 hour]

Agree on how to measure if your feature is working or not, and consider the second order effects.

1. Evidence of user need

Before diving into whether or not to use AI, your team should gather user research detailing the problem you're trying to solve. The person in charge of user research should aggregate existing evidence for the team to reference in the subsequent exercises.

User research summary

List out the existing evidence you have supporting your user need. Add more rows as needed.

Date	Source	Summary of findings
	https://en.wikipedia.org/wiki/Stock_market_prediction#:~:text=The%20successful%20prediction%20of%20a,information%20thus%20are%20inherently%20unpredictable.	Stock price prediction helps investors make informed decisions, optimize trading strategies, manage risks, and maximize returns by forecasting market trends using historical and real-time data.
	https://builtin.com/machine-learning/machine-learning-stock-prediction	Stock price prediction for companies enables better financial planning, investment decisions, valuation insights, and market positioning by forecasting future stock trends and identifying potential growth opportunities.
	https://www.analyticsvidhya.com/blog/2021/10/machine-learning-for-stock-market-prediction-with-step-by-step-implementation/	Fintech companies like Groww and Zerodha use stock price prediction to provide data-driven investment insights, optimize portfolio management, and help users make informed financial decisions.

Make a case for and against your AI feature

Meet as a team, look at the existing user research and evidence you have, and detail the user need you're trying to solve.

Next, write down a clear, focused statement of the user need and read through each of the statements below to identify if your user need is a potential good fit for an AI solution.

At the end of this exercise your team should be aligned on whether AI is a solution worth pursuing and why.

How might we solve_____ { **our user need** }_____?

Can AI solve this problem in a unique way?

AI probably beMer	AI probably not beMer
<ul style="list-style-type: none"> <input type="checkbox"/> The core experience requires recommending different content to different users. <input type="checkbox"/> The core experience requires prediction of future events. <input type="checkbox"/> Personalization will improve the user experience. <input type="checkbox"/> User experience requires natural language interactions. <input type="checkbox"/> Need to recognize a general class of things that is too large to articulate every case. <input type="checkbox"/> Need to detect low occurrence events that are constantly evolving. <input type="checkbox"/> An agent or bot experience for a particular domain. <input type="checkbox"/> The user experience doesn't rely on predictability. 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> The most valuable part of the core experience is its predictability regardless of context or additional user input. <input checked="" type="checkbox"/> The cost of errors is very high and outweighs the benefits of a small increase in success rate. <input type="checkbox"/> Users, customers, or developers need to understand exactly everything that happens in the code. <input type="checkbox"/> Speed of development and getting to market first is more important than anything else, including the value using AI would provide. <input type="checkbox"/> People explicitly tell you they don't want a task automated or augmented.



We think AI **cannot** help solve stock price prediction, because ML models require less computational power, which makes them faster to train and deploy, particularly beneficial when running predictions on a large scale.

It gives more interpretable and transparent predictions. Investors and analysts can understand how the model is making predictions, which is crucial for decision-making.

The stock market is filled with noise, and AI models may try to over-learn these random fluctuations. ML model focuses more on long-term trends and meaningful signals, rather than trying to capture every small fluctuation, making it more robust to noise.

2. Augmentation versus automation

Conduct research to understand user attitudes

If your team has a hypothesis for why AI is a good fit for your user's need, conduct user research to further validate if AI is a good solution through the lens of automation or augmentation.

- AI can effectively predict stock prices, but challenges arise, such as integrating current market news and company data. While sentiment analysis of news can be used, NLP is complex. Moreover, external factors like dependencies on other companies and policy changes also influence predictions. To refine the solution, consider using various factors that can aid users in making informed investment decisions.

If your team is light on field research for the problem space you're working in, contextual inquiries can be a great method to understand opportunities for automation or augmentation.

- Contextual inquiries provide valuable insights by observing how users approach stock predictions in real scenarios. This method helps identify specific tasks users would want to automate, such as data analysis or sentiment evaluation, and areas where they seek augmentation, like AI-assisted decision-making. Conducting contextual inquiries ensures your AI solution aligns with user needs for automation or augmentation in investment strategies.

Below are some example questions you can ask to learn about how your users think about automation and augmentation.

Research protocol questions

If you were helping to train a new coworker for a similar role, what would be the most important tasks you would teach them first?

- we would first aim to understand the new coworker's interest and passion for the subject. This helps tailor the training to their motivations. Then, we'd explain the entire project idea, outlining why we are doing it and how it benefits users. we would introduce the fundamentals, starting with the problem statement, identifying the target users, explaining the proposed solution, and detailing the technologies we'll use. This holistic understanding will allow them to grasp the project's objectives and approach, making them better equipped to contribute effectively.
- Tell me more about that action you just took, is that an action you repeat:
 - As a team, we decided to make it a routine to read research papers daily related to the project's domain. This practice will enhance our domain knowledge and help us understand key factors influencing the stock market, ultimately improving our decision-making and approach to the project.
- If you had a human assistant to work with on this task, what, if any, duties would you give them to carry out?
 - If I had a human assistant for this task, I would assign them the duty of researching and compiling a comprehensive list of factors that directly and indirectly impact stock prices and the stock market. This would include economic indicators, company performance metrics, industry trends, government policies, geopolitical events, market sentiment, and external influences like interest rates or inflation. They would also review academic papers, financial reports, and news sources to ensure we cover all critical factors in our analysis.



If going to meet your users in context isn't feasible, you can also look into prototyping a selection of automation and augmentation solutions to understand initial user reactions.

- If meeting users in person isn't feasible, creating prototypes of potential automation and augmentation solutions is a great alternative. By developing prototypes, we can simulate various AI-driven features for stock price prediction, such as automated data analysis or augmented decision-making tools. These prototypes allow users to interact with the system, and we can gather valuable feedback on how they respond to the AI's assistance. This method helps refine the solution based on real user reactions, ensuring it meets their needs before full development.

The [Triptech method](#) is an early concept evaluation method that can be used to outline user requirements based on likes, dislikes, expectations, and concerns.

Research protocol questions

- Describe your first impression of this feature.
 - My first impression of the stock market prediction feature is that it holds great potential for empowering users in their investment decisions. The ability to leverage machine learning algorithms to analyze historical data, market trends, and sentiment analysis could significantly enhance the accuracy of predictions. Additionally, the feature's user-friendly interface would make complex data accessible to both novice and experienced investors. However, I also recognize that the feature must account for external factors influencing the market, such as economic shifts or geopolitical events, to ensure comprehensive and reliable predictions. Overall, it seems like a promising tool for informed decision-making in stock trading.
- How often do you encounter the following problem: [insert problem/needstatement here]?
- This problem can be encountered frequently, especially in dynamic markets where numerous variables, such as economic indicators, company news, and global events, impact stock prices. Investors and analysts often face challenges in synthesizing this information to make informed decisions. Regularly experiencing fluctuations in market performance can lead to frustration and uncertainty, highlighting the need for effective predictive tools that can consider these multifaceted influences.
- How important is it to address this need or problem?
- Addressing the need for accurate stock price prediction is highly important for several reasons. First, it enables investors to make informed decisions, potentially increasing their returns and reducing financial risk. Second, improving prediction accuracy can enhance market efficiency by ensuring that stock prices reflect all available information. Additionally, addressing this problem supports businesses and stakeholders in strategic planning and resource allocation. Ultimately, better predictive tools can empower both individual and institutional investors, fostering confidence and stability in the financial markets. Therefore, prioritizing this need is crucial for both economic and personal financial well-being.

3. Design your reward function

Once your team has had a chance to digest your recent research on user attitudes towards automation and augmentation, meet as a team to design your AI's **reward function**. You'll revisit this exercise as you continue to iterate on your feature and uncover new insights about how your AI performs.

Use the template below to list out instances of each reward function dimension.

Reward function template

		Prediction	
		Positive	Negative
Reference	Positive	True Positive <div>Predict a "buy" for X firm before a positive earnings report, and the stock increased.</div>	False Negative <div>Forecast "sell" for 'X', missing a positive trend by fresh product launches.</div>
	Negative	False Positive <div>"Buy" was anticipated for 'X', but the stock fell after weak earnings.</div>	True Negative <div>Predict Sell , and stock dropped as user growth slow down</div>

Take a look at the false positives and false negatives your team has identified.

- If your feature offers the most user benefit for **fewer false positives**, consider optimizing for **precision**.
- If your feature offers the most user benefit for **fewer false negatives**, consider optimizing

Our AI model will be optimised for **precision** so that **users benefit from precise buy/sell signals while minimising losses due to false positives**

.
We understand that the tradeoff for choosing this method means our model will miss some profitable chances (false negatives),
but it will focus on generating more dependable stock forecasts. _____

Our AI model will be optimized for **recall**. For customers who value detecting all opportunities in volatile or fast-moving markets, recall helps avoid missed opportunities to act on potentially valuable signals. We _____ understand that the tradeoff for choosing this method means our model will generate inaccurate buy/sell signals, but it will prioritise ensuring that key chances are not missed

4. Define success criteria

Now that you've done the work to understand whether AI is a good fit for your user need and identified the tradeoffs of your AI's reward function, it's time to meet as a team to define success criteria for your feature. Your team may come up with multiple metrics for success by the end of this exercise.

By the end of this exercise, everyone on the team should feel aligned on what success looks like for your feature, and how to alert the team if there is evidence that your feature is failing to meet the success criteria.

Success metrics framework

Start with this template and try a few different versions:

If __{ **specific success metric** }__
for __ { **your team's specific AI driven feature** }__
{ **drops below/goes above** }__ { **meaningful threshold** }__
we will __{ **take a specific action** }__.

Version 1

If the model's accuracy in predicting future stock prices falls below 75%, we will retrain it using new data.

Version 2

If the mean absolute percentage error (MAPE) between projected and actual stock prices exceeds 10%, we will evaluate feature engineering and model parameters.

Version 3

If the model's precision in detecting successful stocks falls below 70%, we will examine the reward function and tweak parameters to increase accuracy.

Statement iteration

Take each version through this checklist:

- ☐ Is this metric meaningful for all of our users?

Yes, prediction accuracy is critical for all users, who rely on accurate stock projections to make sound judgments.

- ☐ How might this metric negatively impact some of our users?

If the model performs poorly during volatile periods, it may mislead users into making dangerous or wrong investing decisions, particularly for new investors.

- ☐ Is this what success means for our feature on day 1?

Yes, on day one, success will involve offering customers with dependable, precise projections to guide their investing plans.

- ☐ What about day 1,000?

Success on day 1,000 would be defined by a constantly evolving model that takes into consideration different market conditions, including volatility, and makes adjustments in response to user feedback and changing financial environments.

Final version

After the system is launched, if the model's F1-score falls below 0.80 or other metrics fall short of the 75% threshold, we will initiate an automated evaluation of key model hyperparameters such as learning rate and regularization. Furthermore, a reduction in MSE performance will prompt a thorough examination of our feature selection method and data pipelines. If overfitting is found, real-time cross-validation and early stop will be used to keep the model's predicted accuracy in turbulent market conditions.



Schedule regular reviews

Once you've agreed upon your success metric(s), put time on the calendar to hold your team accountable to regularly evaluate whether your feature is progressing towards and meeting your defined criteria.

Success metric review

Date: 12/05/2024

Attendees: Teammates and TA