Design Thinking Project Workbook

Don't find customers for your product but find products for your customers

1. Team

Stock Price Prediction using Machine Learning

Team Name: TradeSmart

Team Members:

- 1. Shaik Sameer Farhad 2320030239
- 2. Abhinav M 2320030238
- 3. Mahati M 2320030401

2. Problem/Opportunity Domain

Domain of Interest:

The domain of interest revolves around AI-driven stock price prediction, a key area within financial technology (FinTech) and machine learning. This field focuses on leveraging advanced AI models, data analytics, and quantitative techniques to forecast stock market trends, optimize trading strategies, and enhance investment decision-making. By analyzing historical price data, technical indicators, fundamental financial reports, and market sentiment through Natural Language Processing (NLP), AI-driven models help investors make more informed decisions. The domain also intersects with areas like algorithmic trading, risk management, and robo-advisory services, making it a crucial aspect of modern financial markets. The specific industry or field where your innovative idea will be applied.

Description of the Domain: The stock market is a dynamic and volatile financial sector where investors seek to maximize returns. Predicting stock prices accurately is challenging due to market fluctuations, economic changes, and investor sentiment. Traditional analysis methods, such as fundamental and technical analysis, have limitations, and traders often rely on guesswork. With advancements in AI and machine learning, predictive models can provide valuable insights, improving decision-making for investors. Additionally, sentiment analysis using Natural Language Processing (NLP) helps assess market mood by analyzing news, financial blogs, and social media trends. Machine learning models, including Linear Regression, Random Forest, and advanced Deep Learning architectures like Long Short-Term Memory (LSTM) networks, play a significant role in predicting future stock movements. However, challenges such as market volatility, data reliability, regulatory compliance, and algorithmic biases make accurate forecasting complex. Despite these challenges, stock price prediction is widely used in retail and institutional trading, high-frequency trading (HFT), risk management, and AI-powered robo-advisors, helping investors make data-driven decisions while managing financial risks.

Why did you choose this domain?:

- Market Potential: The global stock market is vast, with billions of transactions daily, creating a significant demand for accurate predictions.
- Solving a Real-World Problem: Investors struggle with uncertainty; an AI-powered prediction system can help them make informed decisions and reduce financial risks.
- Data-Driven Insights: The use of historical data, trends, and AI algorithms enhances forecasting accuracy.
- Passion for Finance and Technology: Combining AI with financial markets presents a fascinating challenge.

3. Problem/Opportunity Statement

Problem Statement:

Stock price fluctuations are highly unpredictable due to market volatility, economic conditions, and investor sentiment, making it difficult for traders and investors to make informed decisions. There is a need for an AI-driven predictive model that can analyze historical trends, technical indicators, and sentiment data to provide more accurate forecasts.

Problem Description:

Many investors lack access to reliable predictive tools, relying on outdated or insufficient methods. This results in missed opportunities and poor investment decisions. Traditional stock market prediction methods often fail to account for complex, non-linear patterns in financial data. Existing models either rely heavily on historical trends or fundamental analysis, missing real-time market sentiment and macroeconomic impacts. By integrating AI and machine learning, a more accurate and dynamic forecasting system can be developed to improve investment strategies and risk management.

Context:

The problem arises during periods of market volatility, economic uncertainty, or major financial events that disrupt traditional prediction models. Investors, traders, and financial institutions struggle to make timely and informed decisions, especially in fast-moving or high-risk market conditions. Additionally, retail investors often lack access to advanced analytical tools, putting them at a disadvantage compared to institutional traders who use AI-driven strategies.

Alternatives:

Existing solutions or actions taken by customers to address the issue. Customers rely on traditional stock analysis methods, such as technical analysis (moving averages, RSI, MACD), fundamental analysis (earnings reports, financial statements), or expert advice from financial analysts. Some investors use algorithmic trading models or follow social media sentiment to predict market movements. Others diversify their investments or adopt a long-term strategy to mitigate risks.

Customers:

The primary affected groups include retail investors, institutional traders, hedge funds, financial analysts, and portfolio managers. Retail investors, in particular, struggle with making data-driven decisions due to limited access to advanced AI-based analytical tools.

Emotional Impact:

Customers often experience frustration, anxiety, and uncertainty due to unpredictable market movements. Fear of financial losses leads to stress, while missed investment opportunities cause disappointment. Inexperienced investors may feel overwhelmed by the complexity of market data, leading to hesitation or impulsive decision-making.

Quantifiable Impact:

- o Financial losses due to poor investment decisions or market misjudgments.
- Time wasted in analyzing complex financial reports and charts without reliable insights.
- o Decreased trading efficiency due to delays in decision-making.
- Lower portfolio returns compared to AI-driven investment strategies used by institutional traders

Alternative Shortcomings:

- o Technical Analysis: Relies heavily on historical patterns, which may not always be predictive of future movements in volatile markets.
- Fundamental Analysis: Long-term oriented and ineffective for short-term trading decisions.
- o Expert Advice: Subjective, inconsistent, and often influenced by biases.
- o Social Media Sentiment: Unreliable and prone to manipulation by market influencers or misinformation.
- Algorithmic Trading Models: Often inaccessible to retail investors due to high costs and complexity.

4. Addressing SDGs

Relevant Sustainable Development Goals (SDGs):

The most relevant SDGs for this work are:

SDG 8 - Decent Work and Economic Growth

- Machine learning for stock prediction can contribute to more efficient and stable financial markets
- Better prediction models can help reduce market volatility and support sustainable economic growth
- Improved investment decisions can help protect jobs and promote economic stability

SDG 9 - Industry, Innovation and Infrastructure

- This research represents technological innovation in the financial sector
- Machine learning applications advance financial infrastructure and market systems
- The work promotes the integration of technology and finance, supporting financial industry modernization

SDG 17 - Partnerships for the Goals

- The research uses multiple data sources (NSE, Yahoo Finance, RBI, etc.), demonstrating the importance of data partnerships
- Financial market stability supported by better prediction tools can strengthen global economic cooperation
- Technology transfer and knowledge sharing in financial technology supports developing nations' market systems

While other SDGs might be indirectly affected, these three are the most directly impacted based on the paper's focus on financial technology innovation, economic stability, and market infrastructure development. The research primarily addresses economic and technological advancement rather than social or environmental goals.

How does your problem/opportunity address these SDGs?:

SDG 8 - Decent Work and Economic Growth

- The machine learning models help create more stable and predictable financial markets by providing better price forecasting tools, which supports sustainable economic growth
- By combining multiple data sources (historical prices, financial statements, economic indicators, and sentiment data), the system helps investors and financial institutions make more informed decisions, reducing market volatility
- More accurate stock predictions can help protect retirement funds and investments that many workers depend on, supporting decent work and economic security
- Better market prediction tools can help prevent major market crashes that negatively impact jobs and economic stability

SDG 9 - Industry, Innovation and Infrastructure

- The research advances financial technology infrastructure by developing novel machine learning approaches (Linear Regression and K-Means Clustering) for market analysis
- The integration of diverse data sources (NSE, Yahoo Finance, Moneycontrol, RBI, Google News) demonstrates innovation in financial data infrastructure
- The project contributes to the modernization of financial services through advanced analytics and AI, making markets more efficient
- The scalable and adaptable nature of the ML models supports continuous technological improvement in financial infrastructure

SDG 17 - Partnerships for the Goals

- The research leverages partnerships between different data providers and financial institutions, showing how collaboration can advance market technology
- The open research approach contributes to knowledge sharing in financial technology, which can benefit developing markets and economies
- The combination of national (RBI, NSE) and international (Yahoo Finance) data sources demonstrates global partnership in financial markets

• The technology and methods developed could be shared with developing nations to help strengthen their financial markets and economic systems

These contributions are significant because they:

- 1. Make financial markets more stable and predictable
- 2. Advance financial technology infrastructure
- 3. Promote collaboration between different market participants
- 4. Support knowledge sharing in financial technology
- 5. Help protect investments and economic stability

The research directly supports these SDGs by providing practical tools and methods that can be implemented to improve financial market operations and stability.

5. Stakeholders

1. Who are the key stakeholders involved in or affected by this project?

Investors and traders

Financial analysts and institutions

Machine learning researchers and developers

Regulatory authorities

Stock market exchanges

Data providers (Yahoo Finance, RBI, Google News API)

Project team (developers, data scientists)

End-users (retail investors, portfolio managers)

2. What roles do the stakeholders play in the success of the innovation?

Investors use predictions to make better trading decisions.

Financial analysts validate and integrate findings into market strategies.

ML researchers enhance prediction models and accuracy.

Regulators ensure compliance with financial laws and ethical AI use.

Stock exchanges provide necessary market data and trading platforms.

Data providers supply real-time and historical financial information.

Project team builds, tests, and refines the prediction model.

End-users utilize predictions for portfolio and risk management.

3. What are the main interests and concerns of each stakeholder?

Investors: Accuracy, reliability, and profitability of predictions.

Analysts: Integrating predictions into broader financial strategies.

Researchers: Model performance, innovation, and algorithmic transparency.

Regulators: Ethical AI use, market manipulation, and compliance.

Exchanges: Market stability, liquidity, and trading volumes.

Data providers: Data accuracy, licensing, and security.

Project team: Model development, validation, and implementation.

End-users: Ease of use, accessibility, and financial benefits.

4. How much influence does each stakeholder have on the outcome of the project?

Investors and traders have moderate influence through demand.

Analysts affect adoption by endorsing or rejecting model outputs.

Researchers shape model accuracy and innovation.

Regulators can impact legal viability and operational limits.

Exchanges provide critical data but have limited control.

Data providers directly impact model accuracy with data quality.

Project team has the highest influence through development.

End-users drive demand and feedback for improvements.

5. What is the level of engagement or support expected from each stakeholder?

Investors: Moderate engagement for market testing and feedback.

Analysts: High engagement in testing and integrating models.

Researchers: High involvement in model enhancement and innovation.

Regulators: Limited direct engagement, but significant oversight.

Exchanges: Low engagement unless directly partnered with.

Data providers: High engagement for data access and updates.

Project team: Full engagement in development and deployment.

End-users: Moderate engagement based on usability and benefits.

6. Are there any conflicts of interest between stakeholders? If so, how can they be addressed?

Investors vs. Regulators: Profit motives vs. compliance—resolved through transparency.

Data providers vs. Project Team: Licensing and cost issues—resolved with agreements.

Analysts vs. ML Models: Traditional methods vs. AI predictions—resolved through validation studies.

Exchanges vs. Investors: Market stability vs. aggressive trading—resolved through ethical AI policies.

7. How will you communicate and collaborate with stakeholders throughout the project?

Regular investor reports and feedback sessions.

Workshops and presentations for financial analysts.

Open-source contributions for researchers.

Compliance meetings with regulators.

API agreements with data providers.

Internal team meetings and agile development practices.

User-friendly interfaces for end-users.

8. What potential risks do stakeholders bring to the project, and how can these be mitigated?

Investors: Overreliance on model—mitigate with disclaimers and risk warnings.

Analysts: Scepticism—mitigate with validation and accuracy benchmarks.

Researchers: Model bias—mitigate with diverse datasets.

Regulators: Non-compliance—mitigate with early legal consultations.

Exchanges: Data access restrictions—mitigate with partnerships.

Data providers: Inconsistent data—mitigate with multiple sources.

End-users: Misinterpretation—mitigate with educational resources.

6. Power Interest Matrix of Stakeholders

Keep Satisfied	Manage Closely
Regulatory Bodies SEC, Financial Authorities	Institutional Investors Financial Analysts Brokerage Firms & Tradin Platforms
Monitor with Minimum	Keep Informed
<u>Effort</u>	AI & Data Scientists
Media & Financial Journalists	Retail Investors

• High Power, High Interest:

These stakeholders have strong influence over the project and are actively involved in its success. Regular engagement, strategic collaboration, and transparent communication are crucial.

Institutional Investors – Seek accurate predictions for better investment strategies.

Financial Analysts – Use ML insights for market assessments and decision-making.

Brokerage Firms & Trading Platforms – Integrate predictive models into trading tools and platforms.

• High Power, Low Interest: Media & Financial Journalists

Regulatory Bodies (SEC, Financial Authorities)

They hold regulatory power but may not be actively involved unless compliance issues arise.

• Low Power, High Interest: AI & Data Scientists

While they lack decision-making power, these stakeholders have a vested interest in the project's outcomes. Providing regular updates and accessible insights keeps them engaged.

AI & Data Scientists – Interested in ML model development, innovation, and performance.

Retail Investors – Use predictions to make informed investment decisions.

• Low Power, Low Interest: Regulatory Bodies

These stakeholders observe the project but do not require active engagement unless relevant information emerges. Periodic updates or press releases may suffice.

Media & Financial Journalists – Report on project developments and industry impact.

7. Empathetic Interviews

I need to know	Questions I will ask	Insights I hope to gain
(thoughts, feelings, actions)	(open questions)	
Thoughts (What users think	What factors influence your	Understanding the decision-making
about stock prediction and	investment decisions?	process, trust level in existing
investments)	- Why do you trust or distrust	methods, and knowledge gaps in
	stock predictions?	stock market prediction.
Feelings (Emotions around	How do you feel when the	Identifying emotional responses like
investing and market	market is highly volatile?	stress, frustration, or fear due to
fluctuations)	- What frustrates you most	uncertainty, losses, or unreliable
	about stock predictions?	data.
Actions (What users currently	How do you currently decide	Identifying the current behavior of
do to predict stock prices)	which stocks to invest in?	investors, tools they rely on, and
	- What tools or resources do	adoption barriers for AI-driven
	you use for stock predictions?	predictions.

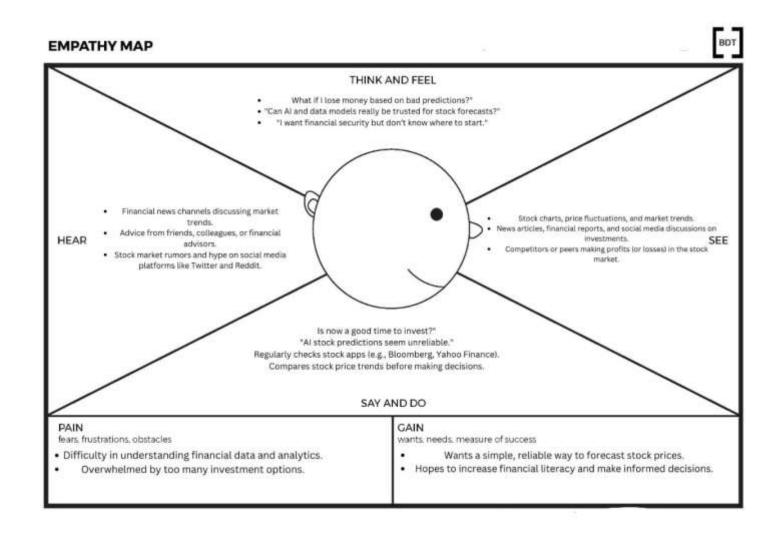
SKILLED INTERVIEW REPORT

User/Interviewee	Questions Asked	Insights gained (NOT THEIR ANSWERS)
	What do you do when the	Business owners tend to hold onto stocks
	stock market is volatile?	during market dips rather than actively
		trading.
Vinay Patel,	What frustrates you the most	Experienced traders feel that most Al
Experienced Trader	about stock market	tools lack transparency in their prediction
	predictions?	models.
Manish Kumar, Day	What strategies do you use for	Day traders rely heavily on technical
Trader	short-term trading?	indicators and are skeptical of Al-driven
		predictions.

Key Insights Gained:

- o Many retail investors depend on social media and non-expert sources for stock advice.
- o AI-driven stock prediction tools are gaining interest, but knowledge gaps exist.
- o Market volatility leads to hesitation rather than strategic decision-making.

8. Empathy Map



a. Who is your Customer?

Customer Profile

- Age Group: 20-45 years old
- Profession: Young professionals, retail investors, traders, finance students, or entrepreneurs.
- Interests: Stock market trading, financial literacy, AI-driven investments, wealth management.

Goals & Needs

- Goal: Make informed investment decisions with accurate stock price predictions.
- Needs:
 - Reliable forecasting tools to reduce financial risk.
 - o Easy-to-understand insights for beginners.
 - Real-time data to act quickly on market changes.
 - o A user-friendly platform for stock analysis.

Context of Interaction

- Uses stock prediction tools through mobile apps, web platforms, or AI-driven bots.
- Engages with financial news, trading communities, and social media.
- Seeks both short-term trading signals and long-term investment insights.

b. Who are we empathizing with?

User Characteristics

- Personality: Analytical, risk-aware, goal-oriented, but possibly uncertain or overwhelmed by market fluctuations.
- Values: Financial independence, informed decision-making, and data-driven insights.
- Responsibilities: Managing personal investments, growing wealth, and minimizing financial risks.

User's Goals & Challenges

Goals:

- Predict stock prices accurately to maximize returns.
- Use AI-driven insights to make smarter trading decisions.
- Find a user-friendly, data-backed investment tool that simplifies market trends.

Challenges:

- Struggles with market volatility and uncertainty.
- Overwhelmed by too much information and conflicting predictions.
- Lacks technical knowledge to interpret complex financial data.

• Fear of financial losses due to poor investment decisions.

User's Broader Situation

- Professionally: Could be a retail investor, finance student, day trader, or a working professional looking to invest.
- Personally: Likely balancing multiple financial priorities—saving for the future, building wealth, or managing debt.
- Decision Context: Engages with stock trading via mobile apps, online platforms, and financial communities.

c. What do they need to DO?

Tasks & Actions:

- Research and analyze stock trends before making investment decisions.
- Choose the right investment strategy (long-term vs. short-term trading).
- Set stop-loss and profit targets to minimize risks.
- Keep up with economic and financial news that might affect the market.
- Use prediction models or financial tools to gain insights.

Decisions They Need to Make:

- Which stocks to buy, sell, or hold?
- How much capital to invest in a particular stock?
- When is the right time to enter or exit the market?
- Whether to trust AI-generated predictions or traditional analysis methods?

Success vs. Failure:

- Success: Makes profitable trades, minimizes losses, and grows their portfolio.
- Failure: Experiences financial losses, makes emotional trading decisions, or misses investment opportunities.

d. What do they SEE?

Physical & Digital Environment:

- Trading platforms and stock charts with price fluctuations.
- News websites, social media (Twitter, Reddit), and financial TV channels.
- Competitor investment platforms or AI-driven prediction models.
- Market trends, economic reports, and global financial events.

Trends & Competitors:

- Rise of AI and machine learning in stock prediction.
- Social trading platforms where users share investment strategies.
- Increasing influence of financial influencers and analysts.

How This Influences Them:

- They may feel pressure to act quickly based on trends.
- Seeing others make profitable trades may create fear of missing out (FOMO).
- They might compare different stock prediction models before trusting one.

e. What do they SAY?

Public Statements & Feedback:

- "Stock market predictions are never 100% accurate."
- "I need a reliable tool that actually helps me make money."
- "AI models seem promising, but I don't fully trust them yet."
- "Investing is risky, but smart strategies can pay off."

Frustrations Expressed:

- "I lost money because of false predictions."
- "Too much data, too little clarity!"
- "Markets are too volatile to predict accurately."

f. What do they DO?

Observable Actions & Habits:

- Frequently checks stock prices and trading apps.
- Watches finance-related YouTube videos or listens to podcasts.
- Reads articles from Bloomberg, CNBC, and financial newsletters.
- Participates in online forums like r/StockMarket on Reddit.
- Tries different trading strategies based on predictions.

Problem-Solving Approaches:

- Uses multiple tools to compare predictions before making decisions.
- Relies on both AI-based insights and traditional technical analysis.

g. What do they HEAR?

External Influences:

- Peers and colleagues discussing stock market trends.
- Financial influencers, YouTubers, and social media traders.
- News channels covering major market events.
- AI-driven investment platforms promising better predictions.

Channels of Information:

- Twitter, Reddit (r/StockMarket, r/Investing).
- Bloomberg, CNBC, Financial Times.
- AI-based stock trading platforms (e.g., Zacks, Seeking Alpha).

Strong Influences on Behavior:

• If a famous investor supports AI-driven predictions, they might trust them more.

h. What do they THINK and FEEL?

Fears & Worries:

- "What if I lose my money because of a bad prediction?"
- "Can I really trust AI models for stock trading?"
- "Am I missing out on a great investment opportunity?"

Motivations & Desires:

- Wants financial security and wealth growth.
- Desires a reliable system that makes trading easier.
- Prefers data-backed insights over speculation.

Internal Thoughts:

- "I should diversify my portfolio to reduce risk."
- "I need to find a balance between risk and reward."
- "This tool should help me, not confuse me more."

i. Pains and Gains

Pains (Challenges & Frustrations):

- Inaccurate or conflicting predictions.
- Market volatility making it hard to trust forecasts.
- Information overload from multiple sources.

Gains (Desired Benefits):

- A clear, easy-to-understand stock prediction tool.
- Higher confidence in investment decisions.
- Increased profits with lower risks.

9. Persona of Stakeholders

Stakeholder Name: Anil

Demographics:

Age: 25-40 years old

Gender: Male

Income Level: \$40,000 - \$100,000 annually

Location: Urban areas with access to stock trading platforms

Education Level: Bachelor's degree or higher (Finance, Business, Tech, or Self-Taught

Investor)

Tech Savvy: Moderate to High (uses mobile apps, follows online financial trendKey characteristics of your target audience, such as age, gender, income, and location.

Goals:

Short-Term Goals:

- Make profitable stock investments using AI-driven predictions
- Reduce financial risks through accurate forecasting tools
- Gain deeper insights into market trends to make informed decisions

Long-Term Goals:

- Build financial security and independence through smart investing
- Develop a diversified investment portfolio
- Learn to rely on data-driven decisions rather than emotional trading

Challenges:

Struggles with market volatility and unpredictable trends

Overwhelmed by too much information from different sources

Finds AI predictions hard to trust without proper validation

Fear of losing money due to bad investment

Aspiration:

- Becoming financially independent by growing a successful investment portfolio
- Mastering stock market analysis using AI-powered insights
- Earning passive income through smart investing

Needs:

- Accurate and reliable stock price predictions
- User-friendly platform with clear insights
- Real-time updates to act on market changes quickly
- Educational resources to help interpret AI-driven insights

Pain Points:

- I don't know which data source to trust.
- I missed out on a great investment because I wasn't sure about the AI prediction.

Storytelling:

Anil is a young professional eager to grow his wealth through stock investments. He follows financial news, explores stock prediction models, and tries to stay ahead of the market. However, he struggles with conflicting advice—some AI models suggest buying, while others warn against it.

One day, Anil discovers an AI-driven stock prediction platform that offers real-time, data-backed insights. Unlike others, this tool provides clear probability scores, trend analysis, and risk assessments.

Using this innovation, Anil starts making informed trades, growing his portfolio confidently. Over time, he moves from hesitant investor to strategic trader, achieving his long-term goal of financial independence.

10. Look for Common Themes, Behaviors, Needs, and Pain Points among the Users

Common Themes:

- Uncertainty in Decision-Making Users struggle with making confident investment decisions due to market unpredictability.
- Trust in AI Predictions Many investors are skeptical about relying on AI-based stock predictions without clear validation.
- Information Overload Users feel overwhelmed by excessive data, financial news, and conflicting insights from various sources.
- Desire for Simplicity Investors prefer tools that provide clear, actionable insights rather than complex analytics.
- Risk Management Users seek strategies to minimize losses while maximizing profits.

Common Behaviors:

- Frequent Market Monitoring Users constantly check stock prices, market trends, and financial news.
- Cross-Checking Multiple Sources Investors compare predictions from different AI models, expert opinions, and news outlets before making decisions.
- Engagement in Online Communities Many users follow discussions on platforms like Reddit, Twitter, and trading forums for additional insights.
- Emotional Reactions to Market Changes Investors often experience fear, anxiety, or FOMO (fear of missing out) during market fluctuations.
- Experimenting with Different Strategies Users test various trading approaches, such as day trading, swing trading, and long-term investing.

Common Needs:

- Reliable and Accurate Predictions Users want AI models that provide trustworthy stock forecasts with clear probability metrics.
- Simplified Data Presentation Investors need user-friendly tools that break down complex data into actionable insights.
- Real-Time Alerts and Updates Users require instant notifications about significant market changes to make timely decisions.
- Educational Resources Many investors, especially beginners, seek guidance on how to interpret AI predictions effectively.
- Customizable Features Investors prefer tools that allow them to adjust parameters based on their risk tolerance and investment style.

Common Pain Points:

• Inconsistent AI Accuracy – Users feel frustrated when AI models produce conflicting or unreliable stock predictions.

- Difficulty Understanding AI Insights Many investors find AI-generated reports too technical or vague to be useful.
- Fear of Financial Losses The risk of losing money due to incorrect predictions is a major concern.
- Overwhelming Amount of Information Too many indicators, metrics, and sources make it hard for users to focus on actionable data.
- Lack of Personalization Investors struggle with tools that provide generic insights instead of tailored recommendations based on their goals.

11. Define Needs and Insights of Your Users

User Needs:

- Accurate and Reliable Stock Predictions Users need AI models that provide high-confidence forecasts with transparent data sources and validation.
- Simplified and Actionable Insights Investors want clear, easy-to-understand reports that highlight trends, risks, and opportunities without overwhelming complexity.
- Real-Time Market Updates and Alerts Users require instant notifications on stock price changes, trends, and significant financial events to act quickly.
- Risk Management Tools Investors need risk analysis features that help them minimize losses and optimize their portfolio based on their risk tolerance.
- Customizable and Personalized Experience Users prefer AI tools that allow them to set preferences, track specific stocks, and receive tailored investment recommendations.
- Educational Support and Guidance Many users, especially beginners, need learning resources that help them interpret AI-driven insights and improve their financial literacy.
- Seamless User Experience Investors expect a smooth, user-friendly interface that integrates with trading platforms for easy execution of investment strategies.
- Trust and Transparency in AI Predictions Users need explanations on how AI-generated insights are derived to build confidence in the model's accuracy.

User Insights

- Users feel overwhelmed by excessive data Many investors struggle to process vast amounts of financial information, leading to confusion and indecision.
- Trust in AI-driven predictions is not automatic Investors are skeptical of AI tools and require validation, clear methodologies, and historical accuracy reports before fully relying on them.
- Emotional factors impact investment decisions Fear, greed, and FOMO influence user behavior, making them seek tools that provide objective, data-driven recommendations.
- Users rely on multiple sources before making investment choices Investors frequently cross-check AI insights with financial news, expert opinions, and peer discussions.
- Real-time access to insights is critical Investors value AI solutions that provide up-to-the-minute updates to capitalize on market movements quickly.
- Users want AI tools to complement, not replace, their decision-making Most investors prefer AI as a support tool rather than fully automating their trades.
- Personalization drives engagement and satisfaction Investors appreciate AI tools that adapt to their trading style, risk appetite, and preferred investment sectors.

12. POV Statements

PoV Statements (At least ten)	Role-based or Situation- Based	Benefit, Way to Benefit, Job TBD, Need (more/less)	PoV Questions (At least one per statement)
Retail investors need a way to access accurate and reliable stock predictions because they struggle with market volatility and uncertainty.	Role-Based	Better decision- making	How might we design an AI-driven tool that provides highly accurate and transparent stock forecasts? What can we design that will enable workers to avoid getting in trouble for being late to work?
Investors need a way to personalize AI-driven stock recommendations because they have different risk tolerances, investment goals, and trading styles.	Role-Based	Tailored investmen t strategies	How might we build a customizable AI tool that adapts to individual investor preferences?

Beginner investors need a way to understand AI-driven stock insights because they find financial data overwhelming and difficult to interpret.	Role-Based	Simplified insights	How might we simplify complex financial data into actionable insights for beginner investors?
Frequent traders need a way to receive real-time stock alerts because missing key market movements can result in financial losses.	Situation- Based	Timely market reactions	How might we develop a system that instantly notifies users about crucial market changes?
Risk-averse investors need a way to minimize potential losses because they fear financial instability from incorrect stock choices.	Role-Based	Lower risk exposure	How might we create a feature that assesses and clearly communicates investment risks?
Users need a way to trust AI- driven stock predictions because they are skeptical about algorithm-based investment decisions.	Role-Based	Increased confidenc e in AI	How might we improve AI transparency and credibility in stock market predictions?
Users need a way to cross-check AI predictions with reliable market sources because they do not want to rely on a single data point.	Situation- Based	Confidenc e in AI accuracy	How might we enable users to test AI predictions against historical stock market data?

13. Develop POV/How Might We (HMW) Questions to Transform Insights/Needs into Opportunities for Design

User Need/Insight	"How Might We" Question
Users struggle with market	How might we design an AI-driven tool that provides
volatility and uncertainty	highly accurate and transparent stock forecasts to help
when making investment	users navigate market fluctuations?
decisions.	
Beginner investors find	How might we simplify complex financial data into
financial data	actionable insights that beginner investors can easily
overwhelming and difficult	understand and use?
to interpret.	
Frequent traders miss key	How might we develop a system that delivers real-time
market movements,	stock alerts and market insights to help traders act
resulting in financial losses.	quickly?

Investors are skeptical	How might we improve AI credibility and trust by
about AI-driven stock	making stock prediction methodologies more
predictions and need	transparent and verifiable?
transparency.	

14. Crafting a Balanced and Actionable Design Challenge

Design Challenge:

"How might we develop an AI-powered stock prediction tool that provides real-time, transparent, and personalized investment insights to help investors of all experience levels make informed and confident trading decisions?"

15. Validating the Problem Statement with Stakeholders for Alignment

Validation Plan:

Stakeholder/User Feedback:

Stakeholder/Use	Role	Feedback on Problem	Suggestions for
r		Statement	Improvement
Retail Investor	Active	The problem is relevant	Include how the AI tool
Group	stock	as market volatility	will differentiate from
	traders	makes decision-making	existing market
		difficult.	prediction tools.
Beginner	New	The problem resonates	Consider adding an
Investor	investors	since financial data is	educational component
Community		overwhelming. AI-driven	to help beginners
		insights would be helpful.	understand predictions.
Financial	Market	The challenge is valid,	Specify how the AI will
Analyst	expert	but transparency in AI	provide explainable
		predictions is crucial.	predictions to build
			trust.
Data Scientist	AI	Feasible problem, but	Address potential biases
(AI/ML	researcher	success depends on data	in AI models and how to
Specialist)		quality and bias	mitigate them.
		management.	

Day Trader	High-	Real-time updates are	Ensure the AI provides
	frequency	critical, but speed and	actionable alerts without
	trader	accuracy need balance.	overwhelming users.

16. Ideation

Ideation Process:

Idea Number	Proposed Solution	Key Features/Benefits	Challenges/Concerns
Idea 1	AI-Powered Stock Prediction Tool	Real-time, transparent stock forecasts	Machine learning for trend analysis
Idea 2	Interactive Learning Platform for Investors	AI explains stock predictions in simple terms	Step-by-step guidance for beginners
Idea 3	AI-Powered Sentiment Analysis for Investments	Analyzes news, social media, and financial reports	Helps users gauge market sentiment

17. Idea Evaluation

Idea	Impac t (10/10 0/1000 grams)	Feasibility (10/100/1000 grams)	Alignment (10/100/1000 grams)	Total Weight
Idea 1: AI- Powered Stock Prediction Tool	1000	100	1000	2100
Idea 2: Interactive Learning Platform for Investors	100	1000	100	1200
Idea 3: AI- Powered Sentiment Analysis for Investments	1000	100	1000	2100

Solution Concept Form

1. Problem Statement:

Investors struggle to make informed stock market decisions due to the lack of real-time insights, reliable predictions, and sentiment analysis, leading to missed opportunities and financial losses.

2. Target Audience:

- o Retail investors looking for better decision-making tools.
- o Beginner traders who need simplified insights and alerts.
- o Financial analysts seeking AI-powered market sentiment analysis.
- o Institutional investors requiring automated trend detection.

3. Solution Overview:

An AI-powered stock market assistant that combines real-time stock predictions, market sentiment analysis, and personalized alerts to help investors make better, data-driven decisions.

4. Key Features:

Feature	Description
AI Stock Prediction	Uses machine learning to forecast stock trends based on historical
Model	and real-time data.
Sentiment Analysis	Analyzes news, financial reports, and social media to gauge market
Engine	sentiment.

5. Benefits:

Benefit	Descri	iption				
Better Investmen Decisions	Ŧ	AI-driven insights reduce guesswork and enhance accuracy in stock predictions.				
IIVIOTVAT		Instant alerts help investors react quickly to market fluctuations.				

6. Unique Value Proposition (UVP):

A one-stop AI investment assistant that provides real-time predictions, alerts, and sentiment analysis, helping investors make data-backed decisions with confidence.

7. Key Metrics:

Metric	Measurement			
	% of AI-generated forecasts that align with actual stock movements.			
User Engagement	Number of active users and interactions with the platform.			

8. Feasibility Assessment:

- High feasibility due to the availability of machine learning models, financial APIs, and real-time data sources.
- Challenges include ensuring high prediction accuracy, data quality, and user trust in AI insights.
- Potential partnerships with financial institutions and brokerage firms can enhance credibility.

9. Next Steps:

- o Develop and test AI prediction and sentiment analysis models.
- o Build a prototype with real-time alert functionalities.
- o Conduct user testing with retail investors and traders.