

The Ethics of AI in Financial Markets: Profit vs. Principle

Why?	
<p>This lesson introduces students to the growing influence of AI in finance, a field that significantly impacts our economy and daily lives, providing a basic understanding of modern financial dynamics. By exploring both the potential and the pitfalls of AI in financial decision-making, students develop critical thinking skills and learn the importance of ethical considerations and transparency in technology. Equipping students with this knowledge prepares them for a future where AI plays a central role in various sectors, ensuring they are informed, adaptable, and responsible participants in an increasingly tech-driven world.</p>	
Materials Needed	Time needed
<ul style="list-style-type: none"> ● Printout of Simulation Handout for each student group ● Printout (one copy) of AI Market Movers for teacher ● Whiteboard and markers 	<ul style="list-style-type: none"> ● Approximately 50 - 60 minutes
Objectives	
<ul style="list-style-type: none"> ● Students will be able to explain the basic concept of Artificial Intelligence and its application in financial markets. ● Students will be able to identify the potential benefits and challenges of using AI in financial decision-making. ● Students will be able to discuss ethical considerations and the importance of transparency in AI-driven financial systems. ● Students will be able to evaluate the role of AI in finance and formulate their own opinions on its potential risks and rewards. 	
Key Concepts & Vocabulary	
<ul style="list-style-type: none"> ● Financial Market: Places where people buy and sell stocks, bonds, and other assets ● Investing: Putting money into something, like stocks, to earn more money over time. ● Market Volatility: Rapid and significant changes in stock prices within short periods. ● “Black Box” in AI: A system where the decision-making process is not visible or understandable to users. 	
Lesson Components	
<ol style="list-style-type: none"> 1. Before You Watch: Connect lesson to background knowledge of AI in daily life 	

and get students' attention focused on finance.

2. **Video:** Show the pedagogy.cloud video explaining the ethical considerations in the topic of AI affecting financial markets.
3. **Case Study:** Detail a real-world scenario that relates to the issue of operating the stock market when AI influences prices.
4. **Simulation:** Lead students through an interactive activity exploring the possible ethical considerations
5. **Discussion:** Ask whole-class questions to reflect on experience and consider perspectives.
6. **Assessment:** Verify student understanding with an exit ticket

1. Before You Watch

AI in Daily Life: Ask students to list in one minute all the devices or systems they think use AI in their daily lives, highlighting AI's prevalence. Student ideas will likely include smartphones, self-driving cars, social media, generative AI, etc.

Have students state entries on their lists. Highlight how AI is integrated into many aspects of daily life, often without us noticing.

Bridge to the topic of finance by asking, "If AI can recommend movies or navigate roads, how might it handle something complex like managing money or investing?"

Encourage students to think this through by asking, "What do you think could happen if we let AI manage our money or make investment decisions?"

While You Watch: Mention these topics and questions for students to look out for as they watch the video:

- Give an example of how AI improves efficiency in finance markets.
- What does the term "market volatility" mean?
- Describe how AI's "**black box**" affects investors' trust.

2. Video Summary

Artificial Intelligence (AI) is becoming a game-changer in finance, acting like a brilliant advisor that can make fast decisions and predict market trends, making investing easier and more inclusive. However, AI isn't without its flaws; it can sometimes make unfair decisions or act in ways we don't fully understand, leading to trust issues and unexpected market changes. It's crucial to navigate these challenges carefully, ensuring that while AI can lead us to exciting new opportunities in finance, it's done in a way that's safe and fair for everyone.

3. Case Study

Distribute or read Case Study handout.

Summary: An advanced trading system powered by AI can make almost instantaneous and smart decisions in the stock market, but it also brings big challenges like unpredictable market swings, confusing decision-making, and tough ethical questions. To handle these issues, we need stronger rules, clearer explanations of how AI makes decisions, and teamwork among banks, regulators, and tech experts. This approach is

important to make sure that the power of AI in finance is used safely and fairly for everyone.

4. Simulation

The simulation activity for this lesson is an exploration of the stock market as if it was being influenced by AI advisors causing changes in the market. The simulation is broken down into 10 individual days where changes are announced at the beginning of the day. Students in small groups represent investment firms, buying or selling stocks due to changes in the market.

Introduction

- Explain the objective of the game.
- Introduce the four sectors: Tech, Energy, Retail, and Agriculture.
- Briefly describe how AI can influence market decisions.

Setup

- Divide students into small groups (3-4 students per group).
- Pass out a copy of the Simulation Handout to each group.
- Explain that they will be investing in these sectors and trying to maximize their returns based on market changes.

Explain the Rules

- Each round, a new “AI Market Move” card will be revealed, indicating a market scenario.
- Teacher will write the new values on the board without explaining why the shifts have been made. (Up and Down change the value up or down by \$15. Neutral doesn’t make any change in the value.)
- Groups will have a few seconds to decide how to invest based on the scenario.
- After students make their stock changes, they have the option to find out why the AI caused the changes in the market.

Investment Rounds

- As described above, for each of the 10 days, the teacher turns over a random “AI Market Move” card and updates the stock values for each sector on the board.
- Groups have a few seconds to discuss whether to buy, sell, or hold on to their stocks.
- Allow students to ask about what caused the changes, if they are interested. Teacher can then read the text above the changes on the Market Move card.
- Repeat this process for each of the remaining rounds.

Debrief

- Groups should sell all of their stocks on the last day and see how much money they made, or lost.
- Have groups announce how much money they made.

5. Discussion

These questions are designed to be used in whole-class discussion. Ask questions that relate most effectively to the lesson.

1. How did the AI Market Moves influence your investment decisions?
2. Were there any unexpected outcomes? How did you adapt your strategy?
3. Usually stock traders know what is causing stock value changes. In this simulation, the reasons were kept hidden until after you made trades. Was it frustrating not knowing the reasons for the changes?
4. Will AI in finance create or reduce job opportunities?
5. What ethical issues should tech developers consider regarding AI in finance?
6. What ideas do you have to make AI more transparent in financial markets?

6. Assessment

Exit Ticket: Provide a prompt for students to reflect on their learning, such as:

- What did you learn about the influence of AI on market dynamics?
- How do AI decisions differ from human ones in finance?
- What would make people more or less likely to accept AI advice regarding their investments?

Sources to Learn More

- Forbes article on the possibilities and drawbacks of AI in financial markets:
<https://www.forbes.com/sites/forbesfinancecouncil/2023/12/26/the-benefits-and-risks-of-ai-in-financial-services/?sh=27a478ab965b>
- 2011 article about an algorithm-caused price war on Amazon that resulted in a book being listed for sale for \$23 million:
<http://www.cnn.com/2011/TECH/web/04/25/amazon.price.algorithm/index.html>

Case Study: AssetInvest Enters the Market

In the fast-paced world of financial markets, a (fictitious) investment firm, GainFin, unveils its latest creation: AssetInvest, an AI-powered trading system. Designed to execute trades at superhuman speeds, AssetInvest promises to revolutionize profit-making strategies. However, as AssetInvest begins to interact with the market, it triggers unexpected ripples, leading to dramatic fluctuations in stock prices.

AssetInvest leverages cutting-edge algorithms to parse through massive datasets, making split-second buy or sell decisions. Trained on historical data and real-time market inputs, AssetInvest aims to outperform human traders. AI systems across various firms are causing the financial market to morph into a complex network of AI-driven trading.

Issues raised by AssetInvest

- **Market Volatility:** AssetInvest and its AI peers start responding to each other's actions, creating a feedback loop of rapid trades. This results in market volatility, with stocks surging and crashing unpredictably. Investors find themselves in a whirlpool of value fluctuations, struggling to secure their investments.
- **Opaque Decision-Making:** The trillions of calculations behind AssetInvest's trades are too complex for human understanding, shrouding its decision-making process in mystery. This opacity shakes investors' confidence, as they grapple with unseen forces manipulating their financial futures.
- **Ethical Dilemmas:** AssetInvest's relentless pursuit of profit often overlooks broader economic repercussions, sparking debates about the moral obligations of AI in finance. Questions arise about the necessity of safeguards to prevent detrimental impacts on both the market and individual stakeholders.

Possible Solutions

- **Stricter Regulations:** Proposing tighter rules for AI trading to maintain market integrity and protect investors. Suggestions include imposing taxes on high-frequency trades or pause intervals for AI systems to slow market changes.
- **Enhanced Transparency:** Advocating for the development of transparent AI systems, where the rationale behind each decision is clear and comprehensible.
- **Collaboration:** Fostering partnerships among banks, watchdogs, and developers to balance innovation with market stability. Encourages industry-wide ethical guidelines to monitor and control systemic risks.

Discussion Questions

- How can AI-driven trading be used to benefit the economy at large and not just individuals who are already rich?
- What can programmers do to make AI's financial decisions more understandable to people?
- Even with the goal of profit, how can the financial market be protected from the unpredictable ups and downs AI can cause?

Simulation Activity: The AI Black Box

Your investment firm has four sector options. Invest in two of the sectors by buying one share in the two companies. The starting rate is \$100 / share for each sector. Keep track of your total money at the bottom using a pencil. (After you buy the two stocks, you will have -\$200.) The goal is to sell when stocks go up, and buy when they go down. Try to gain as much money as possible. Each day, the AI will cause changes in the market, but you won't know why. You can respond by buying or selling, and you can always hold on to what you have if you don't want to buy or sell. You can always buy a stock and go further in debt. You can hold one share in each industry, but not more. (Thus a maximum of 4.) At the end of 10 days, sell everything and see how much money you have.)

Day	Tech Stocks	Energy Stocks	Retail Stocks	Agriculture Stocks
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Keeping track of total money: Start with -\$200

Simulation Activity: AI Market Movers (for teacher)

Stock values all start at \$100. Keep track of values on the board. The AI's market changes should be announced at the beginning of each day. Write the new values (or have a student write them) on the board.

When stocks change value, they change by \$15, either up or down. Neutral means the stock stays the same value.

Each of the 10 changes is intended to be a market change based on AI advisors' actions. They should happen randomly. You could print out this page and then cut it up to put in a random order if desired.

Student groups then have the chance to buy, sell, or hold based on the changes. After they have all decided, give them the chance to theorize why the AI made the decision it did. Explain afterward why the specific change was made.

Daily Changes A: Tech Breakthrough! A major tech company releases a fancy new product				Daily Changes B: Energy Crisis! Political instability leads to oil supply fears			
Tech Up	Energy Down	Retail Up	Ag Down	Tech Down	Energy Up	Retail Down	Ag Down

Daily Changes C: Retail Boom! A new trend significantly boosts retail sales				Daily Changes D: Agricultural breakthrough! New high-yield crop variety announced			
Tech Up	Energy Up	Retail Up	Ag Neutral	Tech Up	Energy Neutral	Retail Neutral	Ag Up

Daily Changes E: Tech Crash! A leading tech company faces a major scandal				Daily Changes F: Green Energy Revolution! Breakthrough in renewable energy			
Tech Down	Energy Neutral	Retail Down	Ag Up	Tech Up	Energy Up	Retail Up	Ag Up

Daily Changes G: E-commerce Legislation! New laws favor brick-and-mortar stores				Daily Changes H: Global Health Scare! Concerns about possible pandemic			
Tech Down	Energy Neutral	Retail Up	Ag Neutral	Tech Up	Energy Down	Retail Down	Ag Up

Daily Changes I: Sustainable Farming! Push for eco-friendly agricultural practices				Daily Changes J: Investor Confidence Dips! General market uncertainty leads to caution			
Tech Up	Energy Up	Retail Neutral	Ag Up	Tech Down	Energy Down	Retail Down	Ag Up

Video Script for Animator

Hello Young Innovators! Today we're discussing the ethics of AI in financial markets.
Title screen

In a world where technology is everywhere, there's a powerful new player on the scene – Artificial Intelligence, or AI for short. It's like having a robot that can think, learn, and make decisions. And guess what? It's starting to change the way money moves around the world in the financial markets.

[Socrat narrating throughout, facing the viewer

Visuals: Socrat is in a room with a table that has a globe on it and a map of the world behind him. Socrat spins the globe, and financial symbols (like dollar signs and stock charts) float around it. Example image: <https://i.imgur.com/0W6eC4j.png>]

AI is stepping into the world of finance, making things faster and more accessible. It's like having a highly intelligent assistant who's great at handling money, giving everyone a chance to be part of the investing world.

[Visuals: In a bank, a friendly robot assists diverse people, showing them financial charts and graphs on a screen. Example image: <https://i.imgur.com/MrW5HUt.png>]

These AI helpers can do loads of work in no time, taking care of the boring stuff and crunching numbers. This lets financial experts focus on the big ideas and strategies.

[Visuals: Illustrate a large AI robot swiftly organizing documents, calculating, and displaying complex data on screens, while humans engage in creative brainstorming. Example image: <https://i.imgur.com/YPNFNgR.png>]

AI doesn't just work hard; it works smart. It looks at tons of information from the past to predict what might happen next in the financial world, helping people decide the best places to put their money.

[Visuals: (Similar image to last time.) People give papers to the robot, he looks at the papers, and gives them back.]

Think about when you shop online. AI suggests things you might like based on what you've looked at before. It's similar in finance – AI suggests where to invest based on loads of data.

[Visuals: Shows a browser shopping online on one side, and a cell phone with stock charts, while the white robot gives a thumbs-up that it is a good time to buy. Example image: <https://i.imgur.com/QdMZKjx.png>]

But here's a twist – While AI can offer helpful suggestions, it's not perfect and we need to be mindful of its limitations. Sometimes AI learns from data that's not fair, making decisions that can be biased. This means not everyone gets treated equally, and that's a big problem we need to solve.

[Visuals: Show an AI robot scanning data and then making decisions, with a question mark appearing over its head, symbolizing confusion or error. Example image: <https://i.imgur.com/AfbXV3p.png>]

Another issue is that people can't always tell why AI does what it does. AI “learns” from past information, but then it decides on its own. AI's decisions are sometimes hidden inside a “**black box**,” meaning that it can't explain them in a way people understand. This makes people wonder, “Can I trust what AI is doing with my money?”

[Visuals: Depict a large, black box with gears and cogs, labeled 'AI,' with people around it scratching their heads in confusion. Example image: <https://i.imgur.com/6JobjOp.png> – The box should say “AI” on both sides, not just “A”]

And it's not just about understanding AI, but also about being ready for its unexpected effects. If lots of AI systems start making decisions at the same time, it could lead to big, unexpected changes in the market – kind of like a surprise wave at the beach that nobody saw coming.

[Visuals: Show a peaceful beach scene that suddenly gets hit by a large wave, symbolizing market turmoil caused by AI. Example image: <https://i.imgur.com/f7hTBre.png>]

AI in finance is like a powerful new rocket. It can take us to amazing new heights, but we need to steer it carefully. By understanding both the benefits and the tricky challenges, we can make sure this technology makes the financial world better for everyone.

[Visuals: A rocket labeled “AI” next to a small group of people sitting by computers, monitoring its progress. The rocket blasts off and zooms upward. Example image: <https://i.imgur.com/8RiiY1G.png>]

Let's discuss: How do you think AI will impact your future financial decisions?

[Display question on screen: How do you think AI will impact your future financial decisions?]

Video Script for Narrations

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