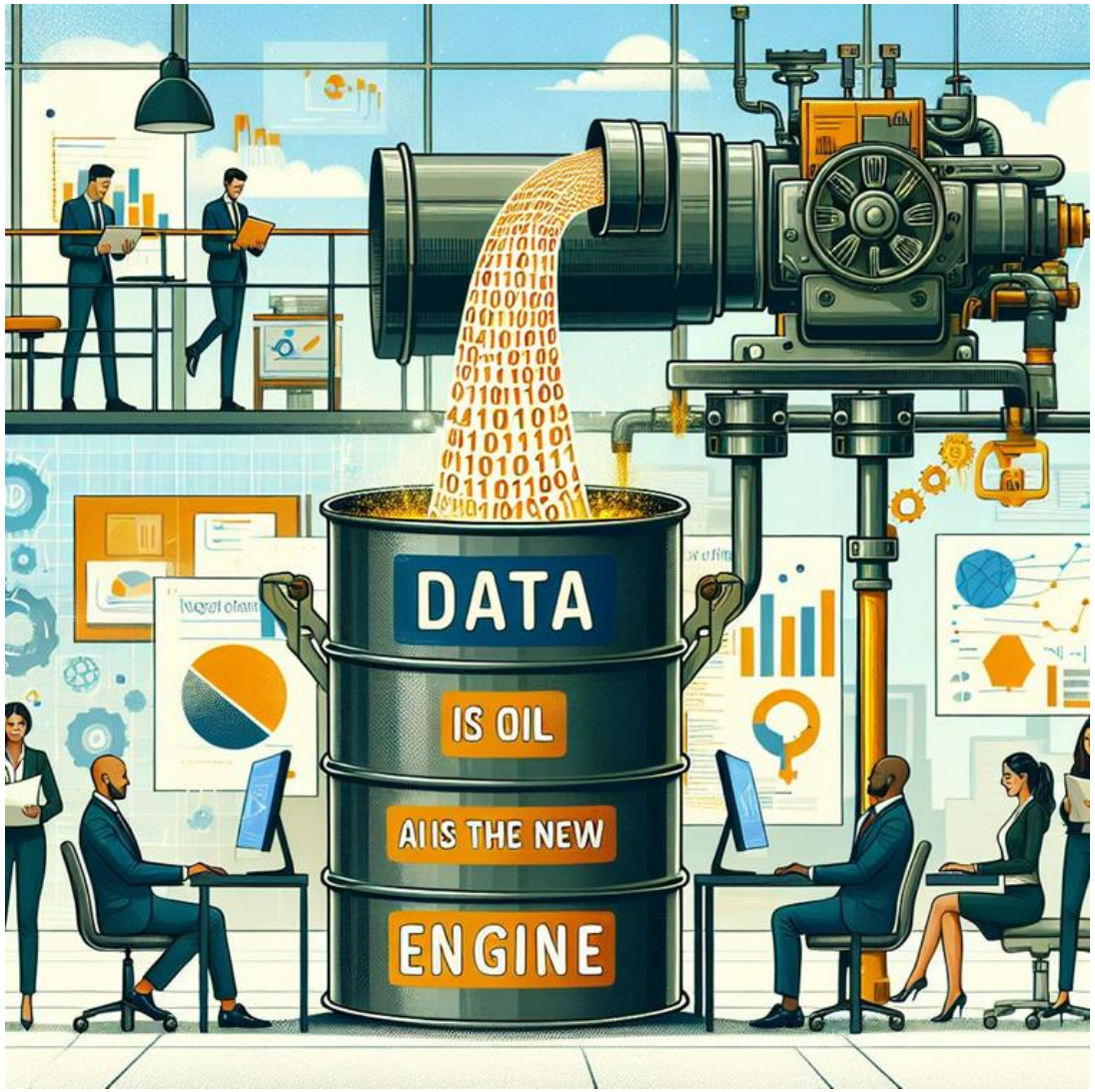
AI in Finance Summit

When Not to Use (Generative) AI

Zhang Zhang, CFA

polen capital

Motivation and Vision – Part 1



Source: Microsoft Copilot

Motivation and Vision – Part 2

Source: @histoftech. (2024, October 23). Post content. Mastodon. https://mastodon.social/@histoftech/110712567796610184

Agenda

1. AI: The Appearance of Intelligence

2. Pitfalls of Uncritical AI Adoption

3. A More Balanced Approach

An Appearance of Intelligence

Chatbots
- Pretrained content
- **Appearance** of creativity & understanding

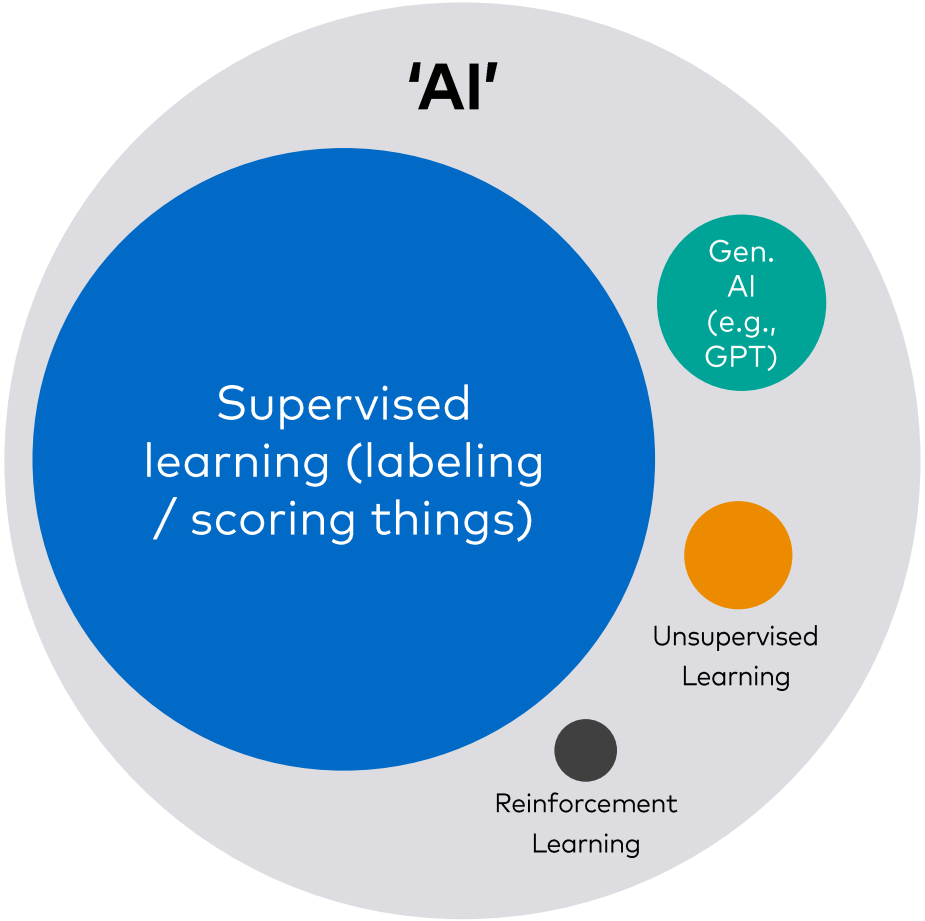
Copilots / Assistant Tools
- Beginning of data/process integration
- Complete short tasks only
- **Appearance** of knowledge

Destination Applications
- Integration of broader domains of data/process
- **Appearance** of reasoning/cognition

"Agents"
- Longer tasks completed independently
- **Appearance** of metacognition

Definition and Prevalence of AI Today

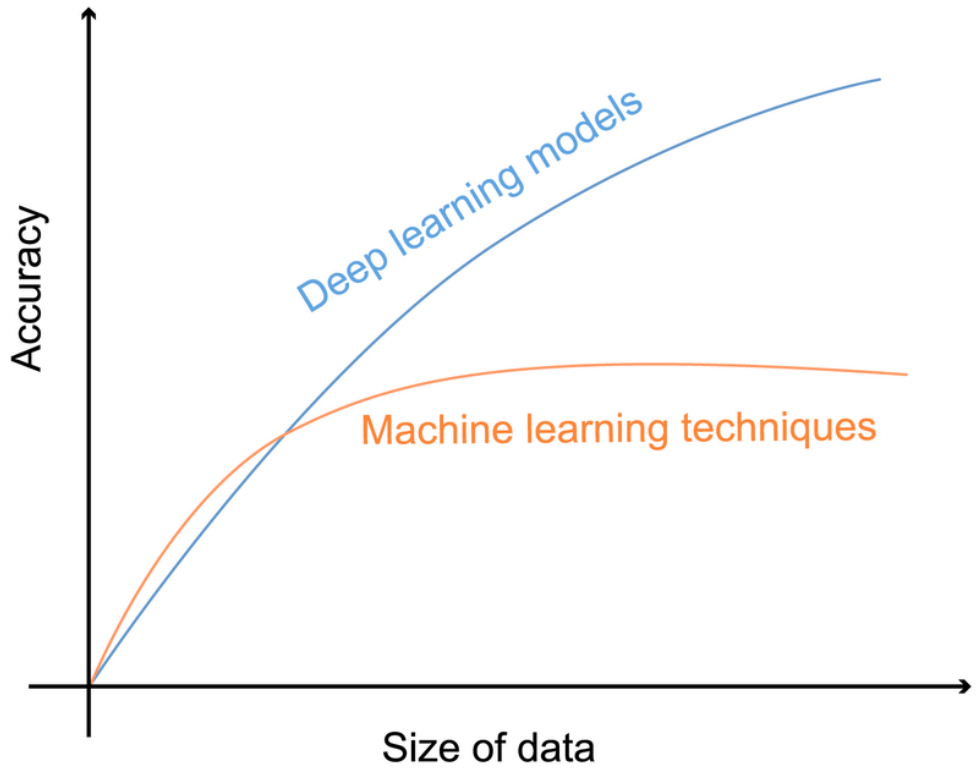
AI is a set of diverse tools designed for perform complex tasks using machine learning



Source: Andrew Ng, "Generative AI for Everyone." October 2023

- **Hype:** attention is primarily on Generative AI (including prompt-based large language models), but traditional supervised machine learning continues to dominate real world use cases, new investment, and value created.
- **Accessibility:** The key opportunity in business adoption of generative AI is a much shorter build time, with development to deployment in hours to days, vs months for traditional AI. This is because the models are pre-trained.
- **Room to grow:** Unique to certain large models including most generative AI, large models continue to become more effective with scale and data.
- **ROI:** Unlike other projects, successful generative AI applications start with a narrow & concrete use case, not open-ended design.

All AI Models Have Limits



Source: Es-sabery, Hair et al., Sentence-Level Classification Using Parallel Fuzzy Deep Learning Classifier. 2021

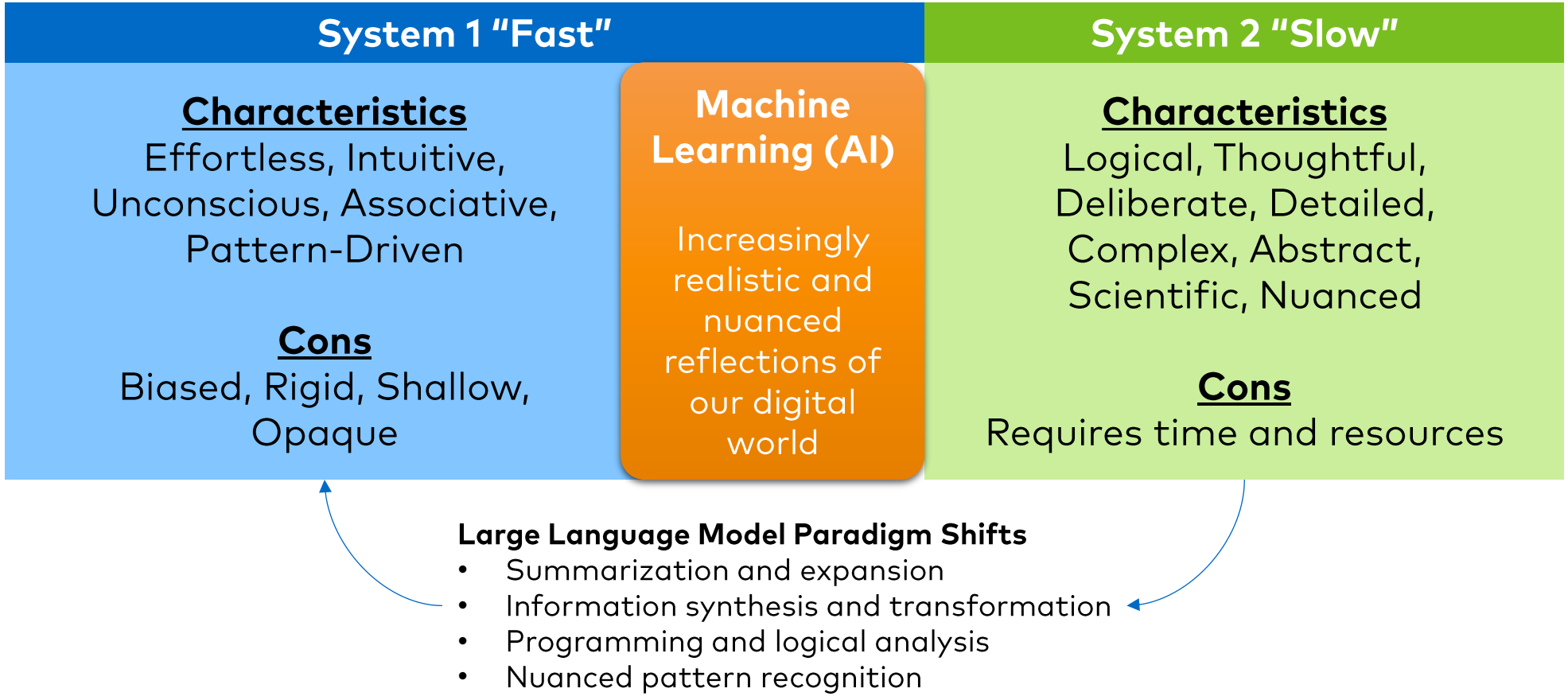
Traditional (smaller) AI models deliver specialized, limited results and taper off in effectiveness.

Larger models appear to have a much higher ceiling in effectiveness and generalist potential as more data is used to train them. The models themselves are undergoing continuous evolution.

Models reflect and simulate patterns in data, language data reflects and simulates patterns of human thought. Do language models simulate human thought?

Advanced Machine Learning Value Proposition

Redefining and Accelerating "Slow" Thinking, Building Knowledge, and Making Better Decisions



Source: Kahneman, Daniel. Thinking, Fast and Slow. Farrar, Straus and Giroux, 2011.

Pitfalls of Uncritical AI Adoption

Where AI is not the (whole) answer

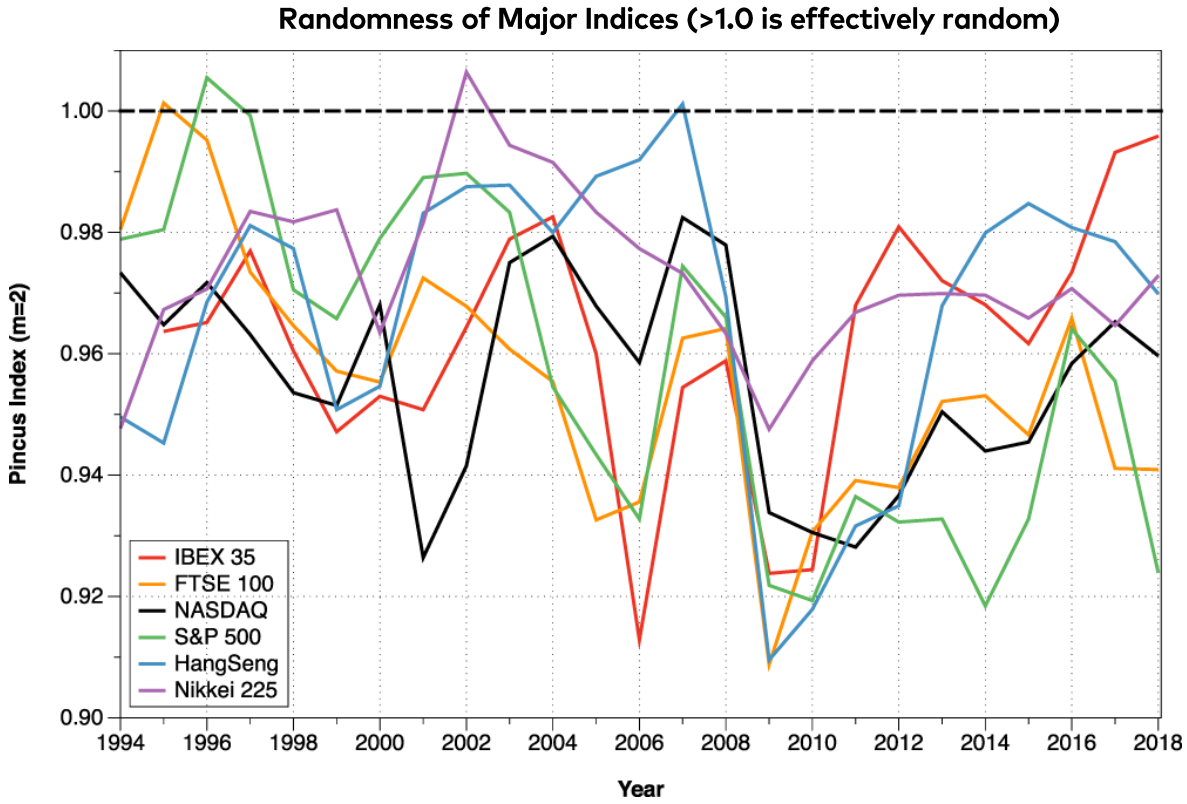
The Financial Data Dilemma

Machine learning models work well in high signal to noise domains.

- However, financial data tends to be high noise to signal, where predictability is quickly and continually absorbed by the market.

The industry is subject to a high standard of fiduciary and regulatory need for transparency.

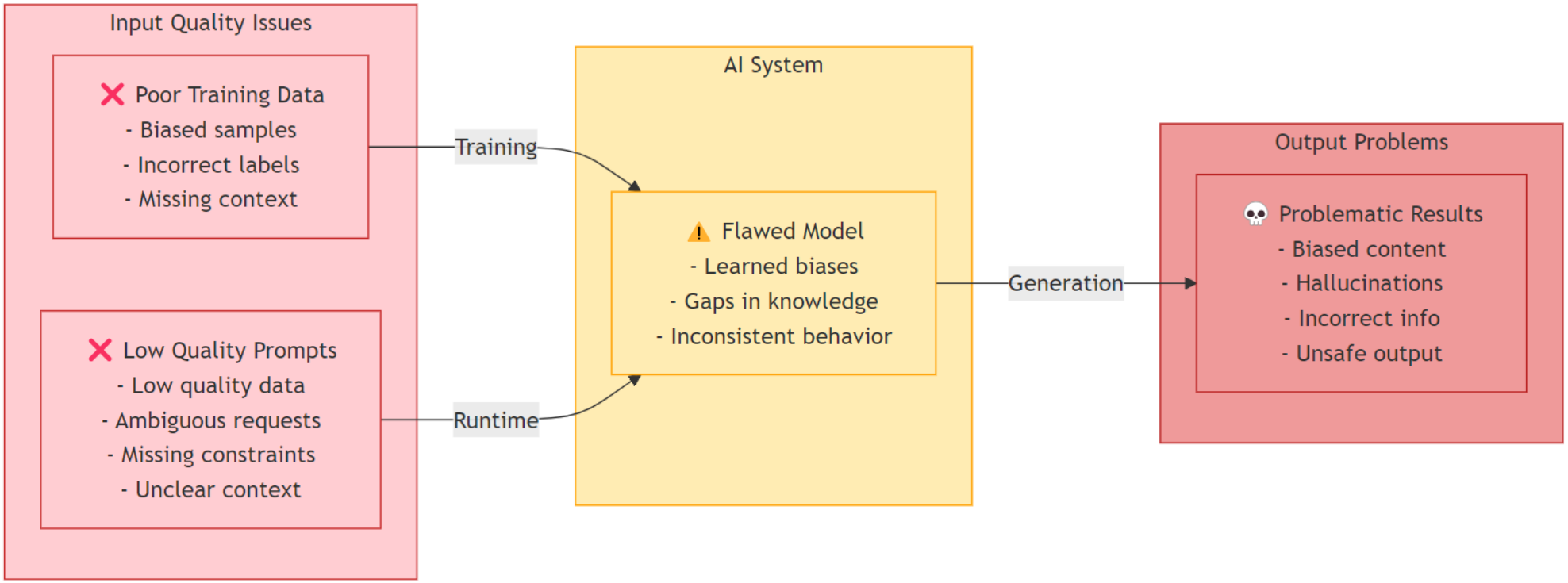
- But models are increasingly complex with evolving interpretability challenges.



https://www.aqr.com/Learning-Center/Machine-Learning/Machine-Learning-Why-Finance-Is-Different
Delgado-Bonal, A. Quantifying the randomness of the stock markets. *Sci Rep* **9**, 12761 (2019). https://doi.org/10.1038/s41598-019-49320-9

Situations Where Data or Process Quality is Unacceptable

Garbage In, Garbage Out x2



Situations Requiring Nuanced Human Judgement

Complex problems are often ill-defined from start to goal, and require dynamic human judgement*

Complex Problem Solving (CPS):	Characteristics of Complex Problems:	Limitations of AI in CPS:	Importance of Human Judgment:
• CPS involves overcoming barriers between a given state and a desired goal state through behavioral and cognitive, multi-step activities. • The process is dynamic, with changing and often opaque elements.	• Complex problems are characterized by their dynamic nature, intransparency, and the need for adaptive strategies. • These problems often require a deep understanding of context and the ability to adjust strategies as new information emerges.	• AI systems may lack the **flexibility** and **adaptability** needed to handle the dynamic and often unpredictable nature of complex problems. • While AI can assist in certain aspects, it cannot fully replace the nuanced judgment and adaptability of human problem solvers.	• Human expertise is crucial in CPS due to the **complexity and variability** of problems. • AI may struggle with the nuanced understanding required for these tasks, highlighting a need for human intervention.

*Dörner, Dietrich, and Joachim Funke. “Complex Problem Solving: What It Is and What It Is Not.” *Frontiers in Psychology*, vol. 8, 2017, https://www.frontiersin.org/articles/10.3389/fpsyg.2017.01153/full

Two Kinds of Opportunity

Suppose you had a limitless supply of enthusiastic students who:

- Have read almost all digitized text and books in the world in all major languages (and remember a tiny part of it)
- Can work tirelessly, around the clock
- Know nothing about your motivations and specific goals
- Perform well without guidance 80% of the time, but are spectacularly wrong 20% of the time

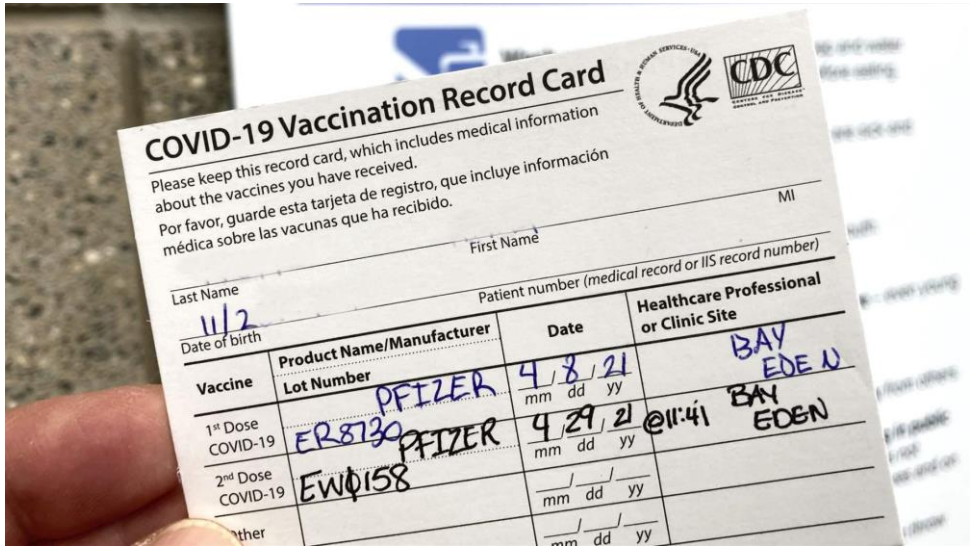
Would you trust them to:

A) Work independently on long, open-ended, and complicated processes

B) Work in parallel on short, specific tasks that can be critiqued, or where flawed results are acceptable, but breadth is valuable

Two Kinds of Opportunity

Example: Multi-modal models and new use cases



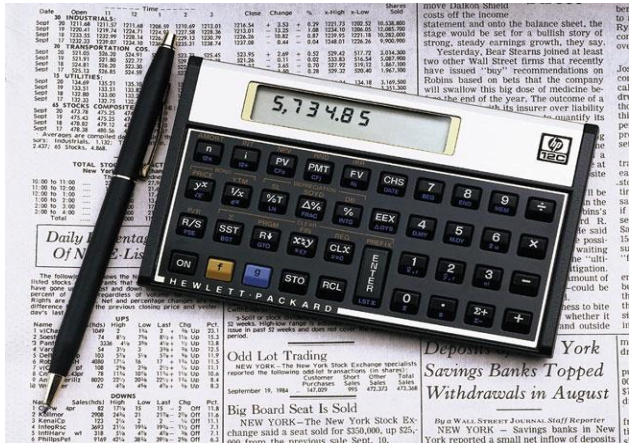
Output the contents as a table.

Here's the content of the COVID-19 Vaccination Record Card in a table format based on what's visible in the image:

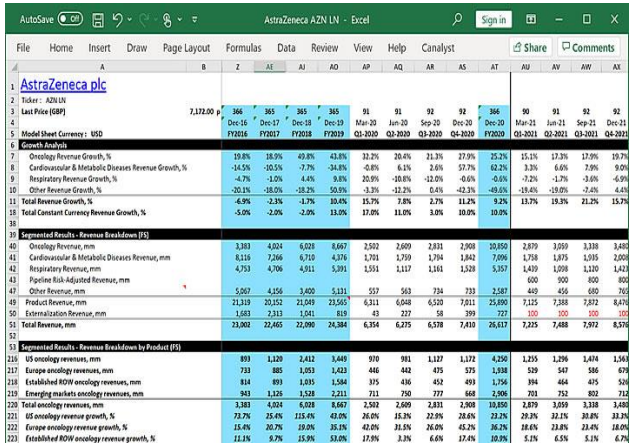
Vaccine	Product Name/Manufacturer	Lot Number	Date	Healthcare Professional or Clinic Site
1st Dose	Pfizer	ER8730	4/8/21	BAY EDEN
2nd Dose	Pfizer	EW0158	4/29/27	BAY EDEN @11:41

Positioning on the Technological Curve

Generative (Language) AI is to words as calculators are to numbers



When will adoption help drive faster or better decisions?
Are there dependencies that justify earlier adoption? Are there false leads that justify waiting?

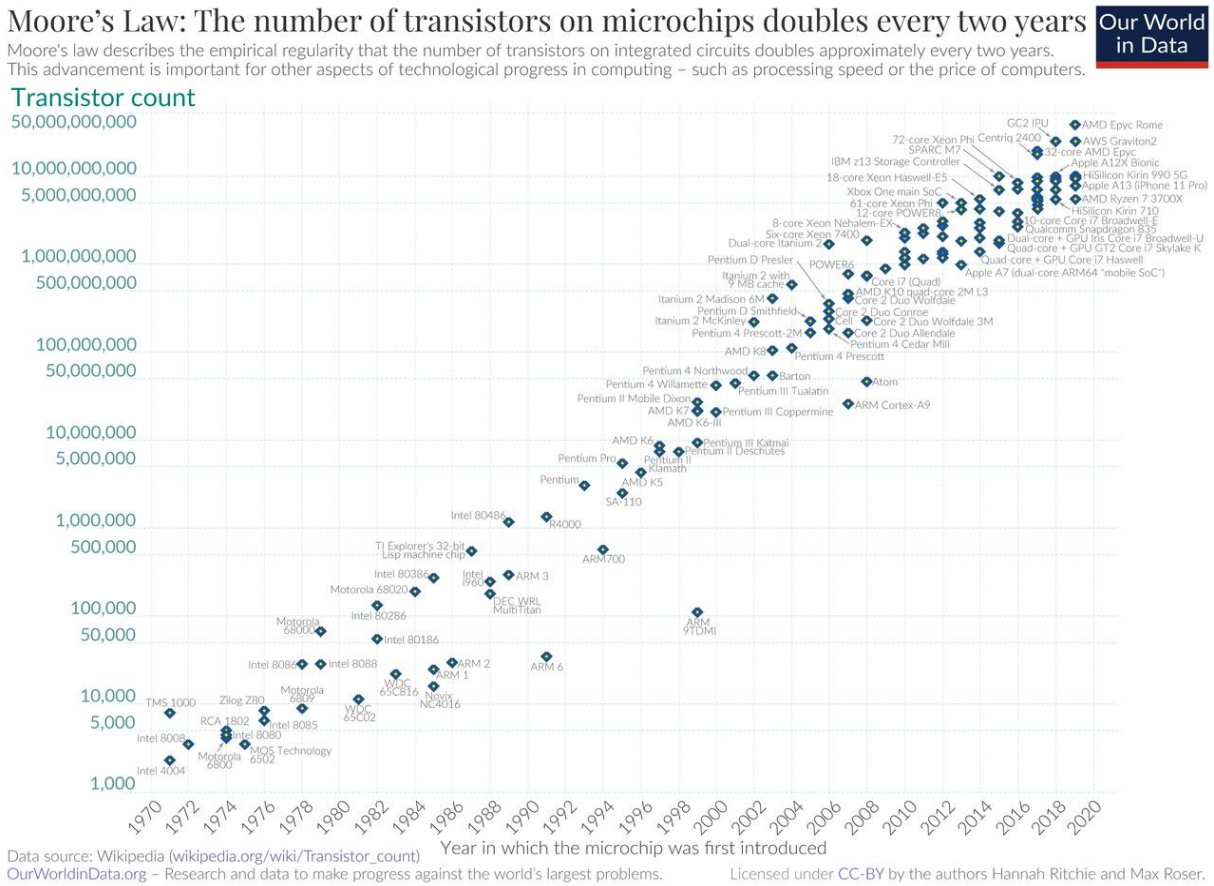


Positioning on the Technological Curve

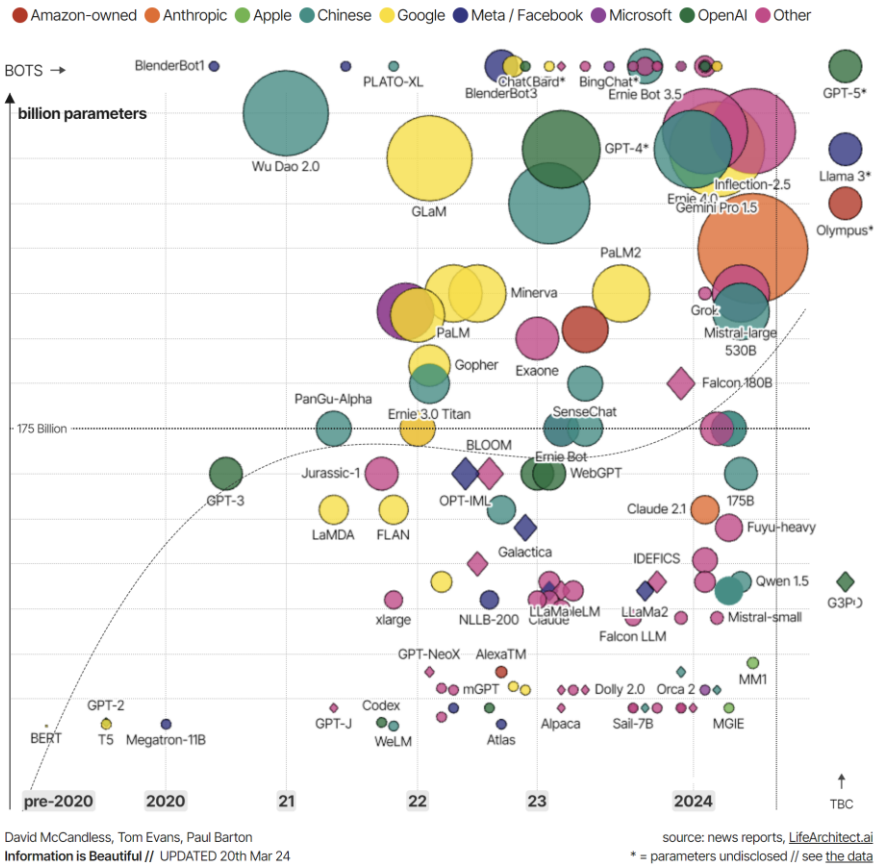
Supply growth: Computing power 2x every 2 years.

Demand growth: Biggest Language AI models >10x every 2 years.

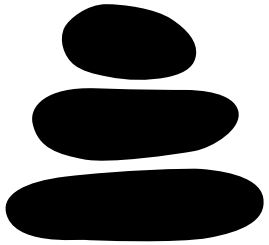
Microchip Size (Supply)



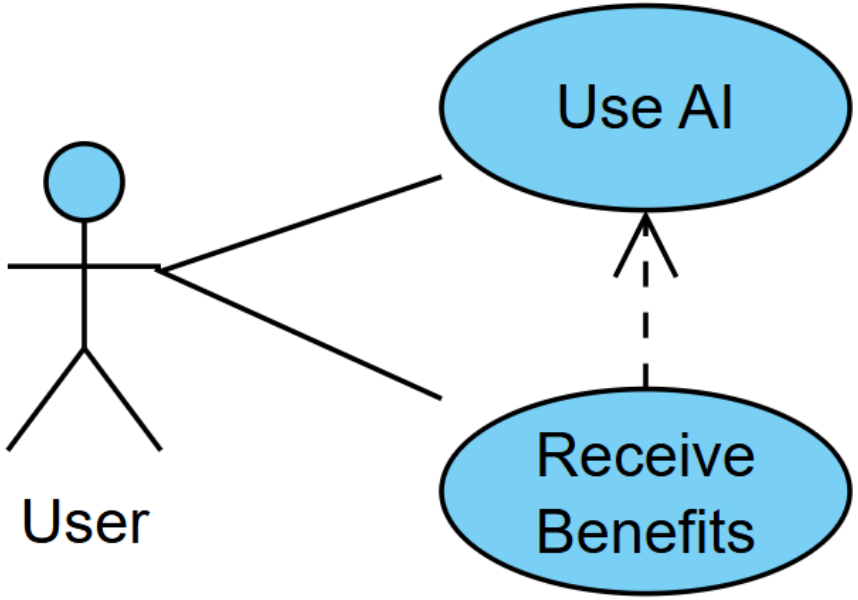
AI Model Size (Demand)



A Balanced Approach



Start with a Concrete Use Case



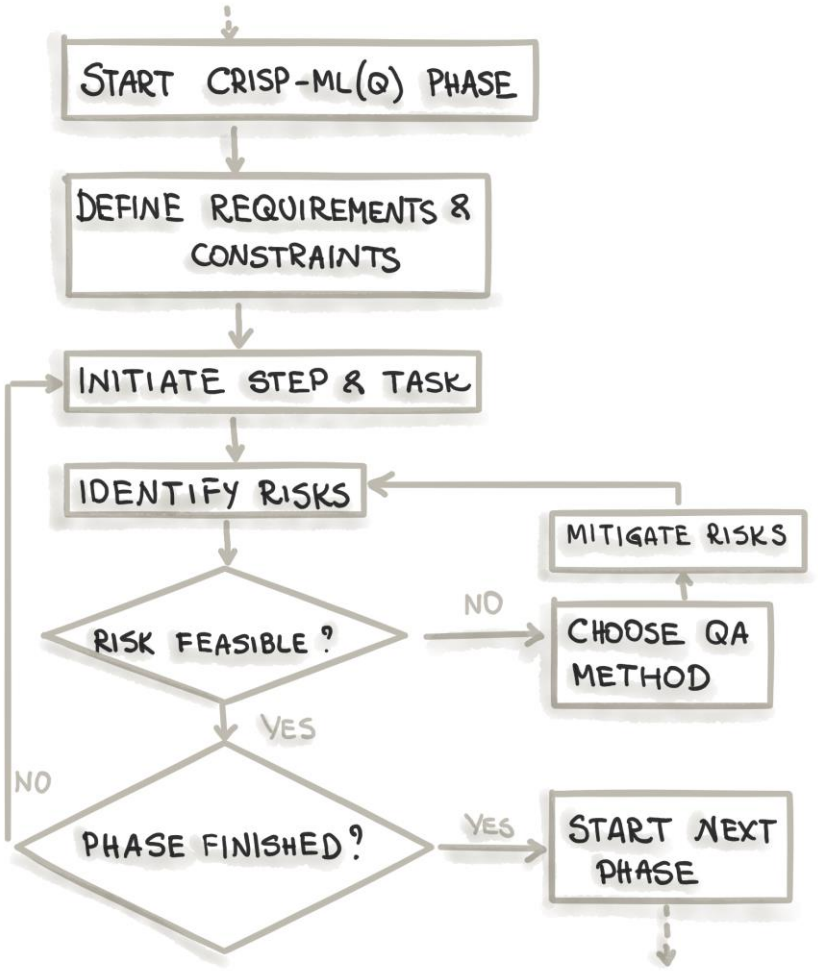
(Not a concrete AI use case)

As with a good hypothesis, we believe a good use case should be:

1. Testable
2. Unambiguous
3. Discrete and completable
4. Valuable

Proactive Risk Management

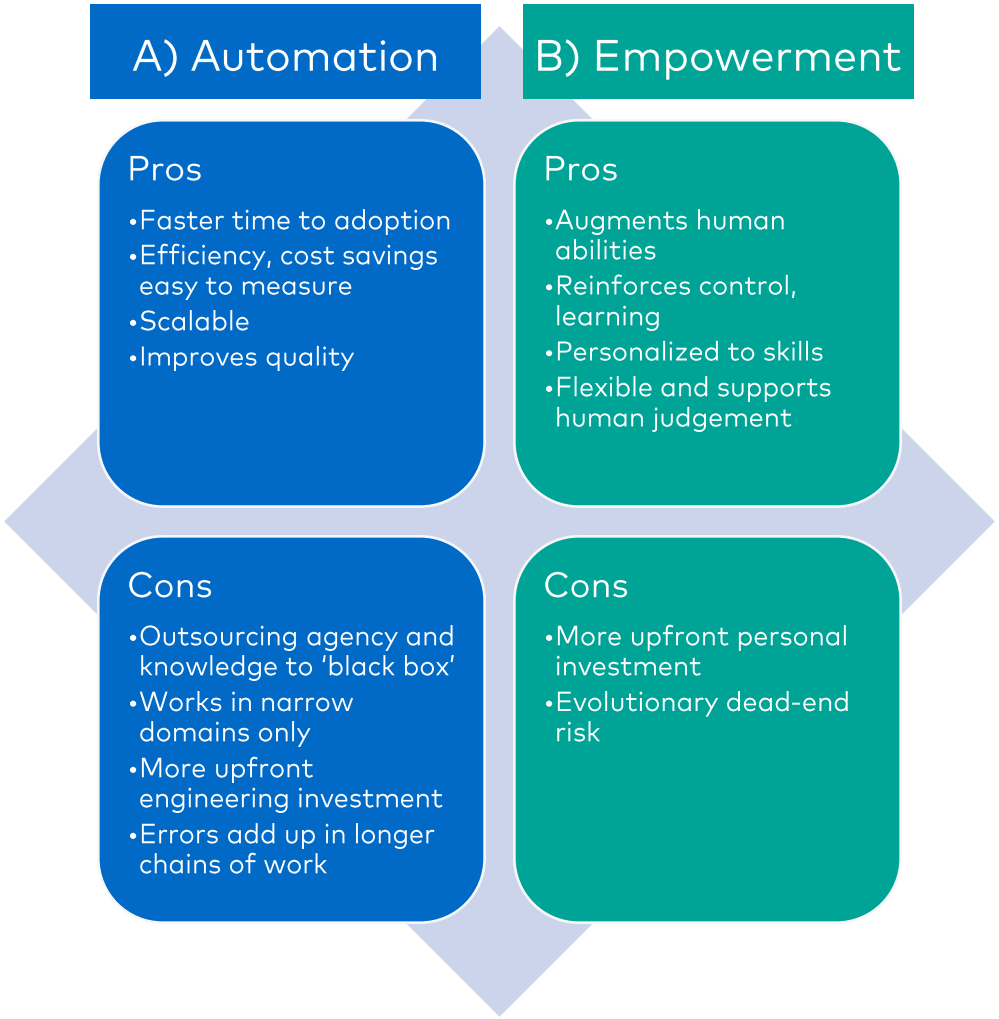
- Identify potential risks early, implement mitigation strategies where appropriate to set up guardrails
- Address and monitor proactively pitfalls such as quality, bias, and reproducibility
- We believe quality and risk management is not a one-time activity at the outset, but rather, a continuous process with feedback loops



Studer, Stefan, et al. “Towards CRISP-ML(Q): A Machine Learning Process Model with Quality Assurance Methodology.” *arXiv*, 2020, https://arxiv.org/pdf/2003.05155.

Automation vs Empowerment

Trade-off in risks, effort, and agency



In Polen's view, a nuanced approach is ideal

- Deploy AI automation for repetitive, mature, and routine tasks to improve efficiency, quality, and minimize costs, but ensure tasks are sufficiently shallow.
- Encourage training and AI empowerment to enhance human performance in areas that still require creativity, critical thinking, and nuanced decision-making.
- Beware of data and process consistency and quality, and keep the big picture in mind.

Thank You

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