



Artificial Intelligence in Financial Services: Impacts for management processes and capital allocation

Nicolas Chapados, PhD, CFA

Co-Founder and Chief Science Officer, Element AI

chapados@elementai.com @NicolasChapados



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E L E M E N T^{A I}



Co-Founded by Deep Learning pioneer Yoshua Bengio and veteran AI entrepreneur JF Gagné

We transform **large organizations**

around the **world, by translating**

cutting-edge research into

customizable, scalable, and

human-centric solutions.



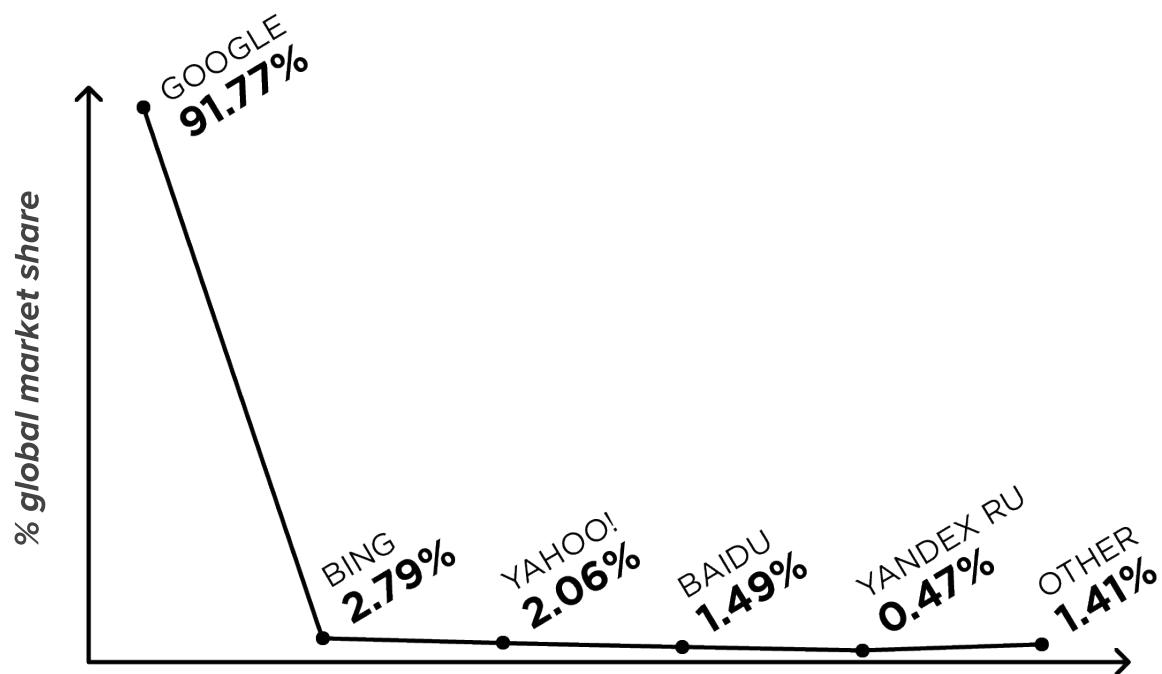
Specialized in financial services and supply chain, and financed with \$100M Series A



From 8 to 350+ employees in 20 months with offices in North America, Europe, and Asia

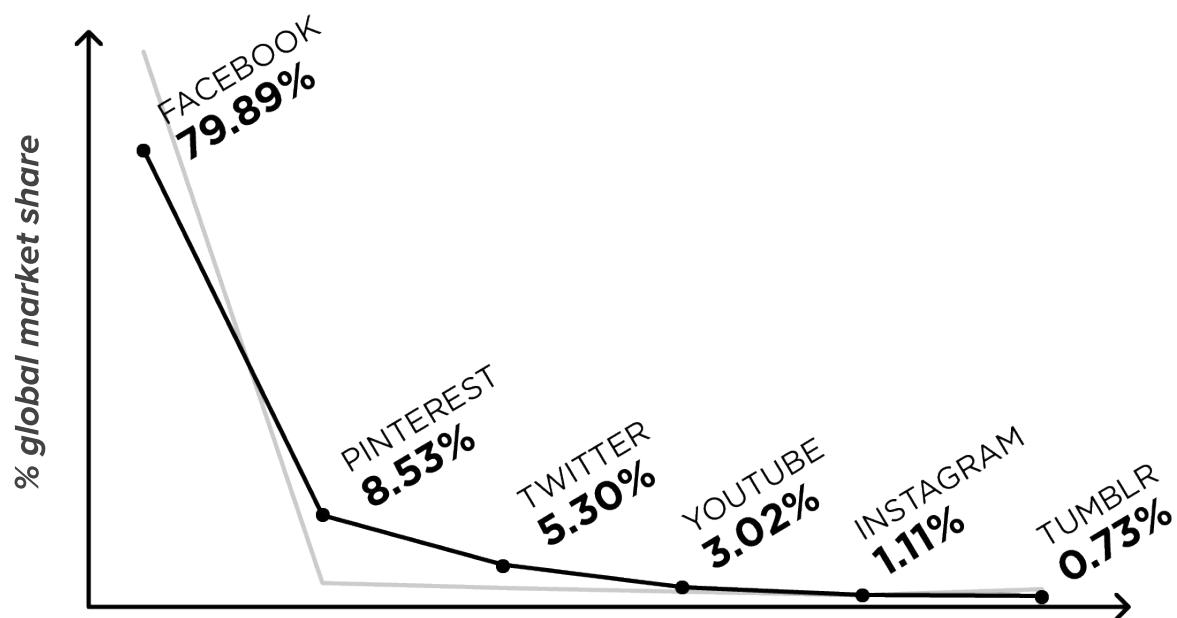
The era of “winner-take-most” power curves

Search Engine Market Share



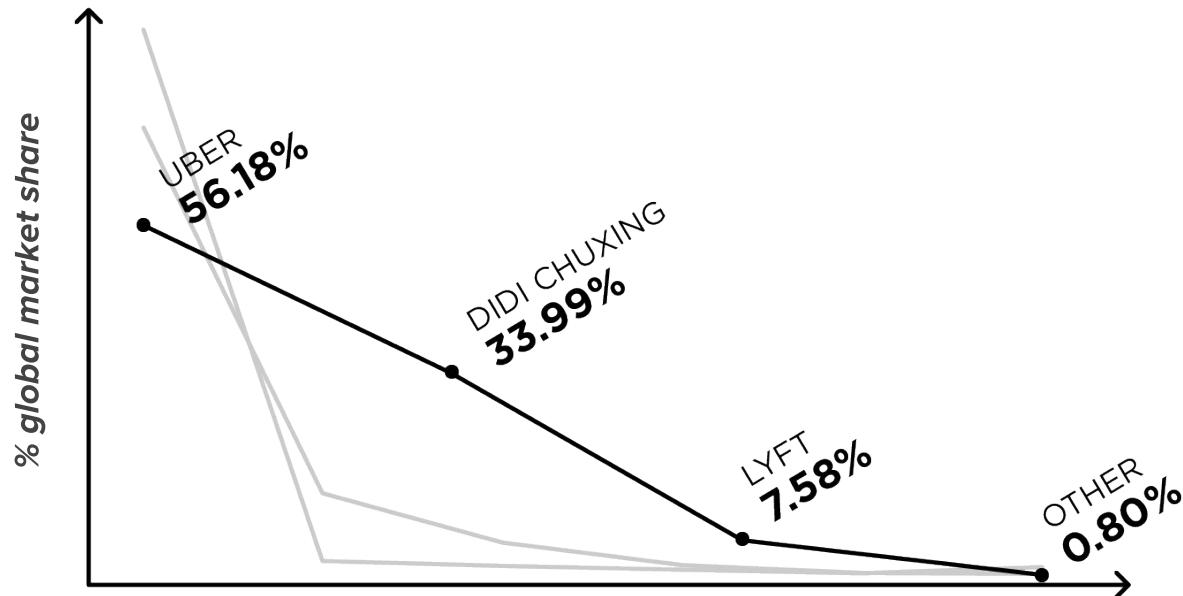
The era of “winner-take-most” power curves

Social Media Market Share



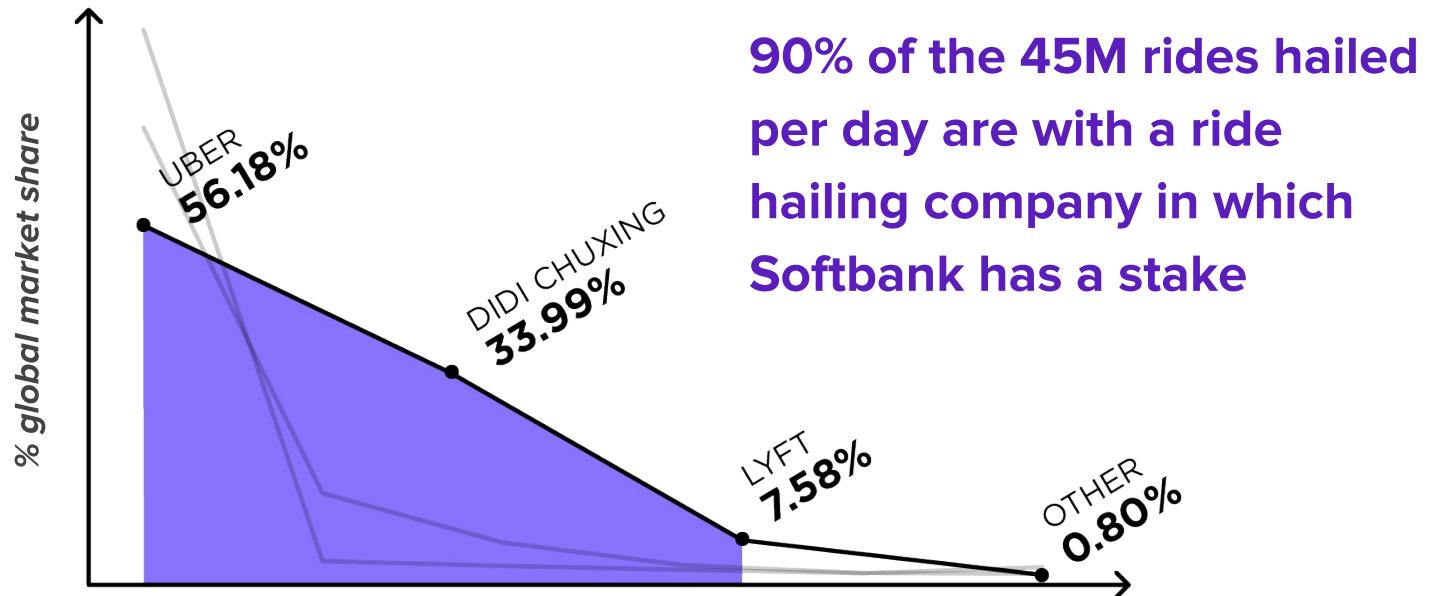
The era of “winner-take-most” power curves

Ride Hailing Market Share



The era of “winner-take-most” power curves

Ride Hailing Market Share



3 Consecutive Megatrends (Driven by Network Effects)

1

**Network
effects of
digital
platforms**



2

**Cyber-
physical
convergence
(IoT)**



3

**Artificial
Intelligence**



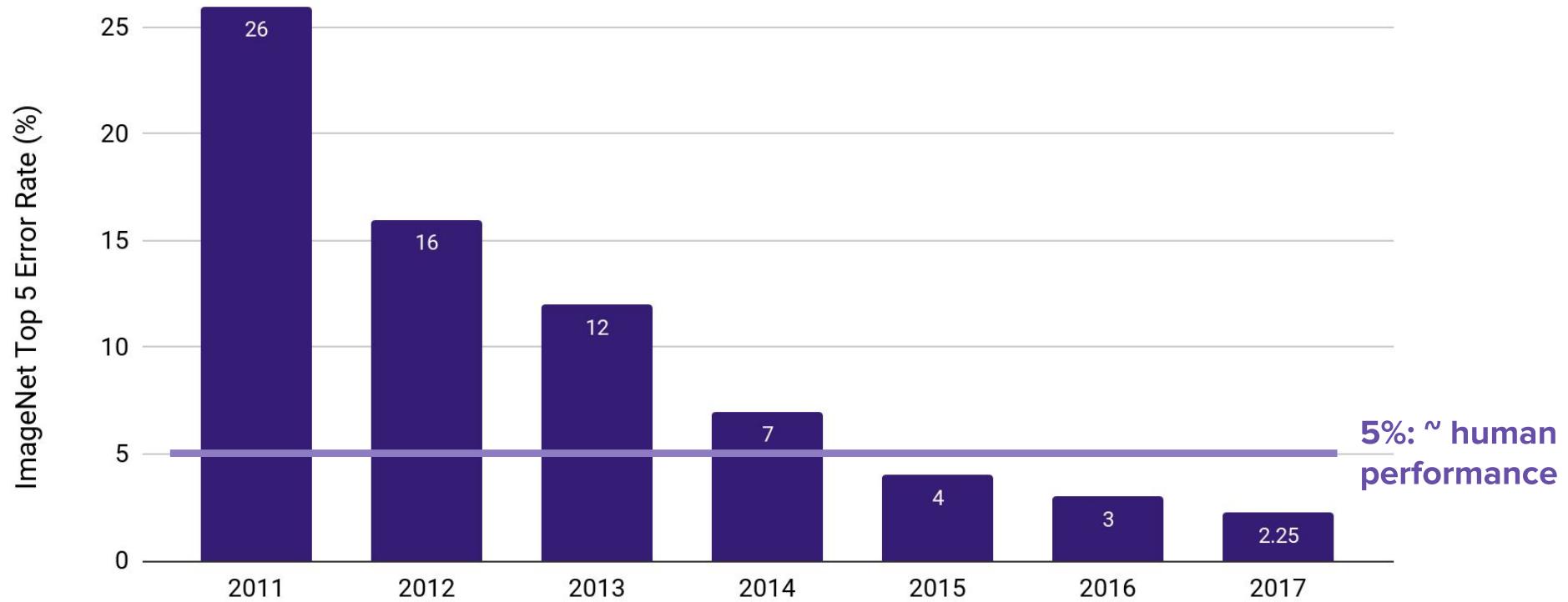
Artificial intelligence enables machines to

See better, hear better, understand better



See better

Computer Vision Progress (ImageNet LSVRC)



Example application: Sentiment analysis to catch subtle signals and possible untruths in earnings calls

EXAMPLE REVIEWS

SENTIMENT

Reading the reviews, this book seemed to be too simplistic, but after reading it, I would have to say that it is very detailed and provides appropriate depth.

Positive

I was told this book would be an excellent resource, but after reading the first few chapters, I would have to disagree.

Negative



Example application: Report Summarization for Equity Analysis and Commercial Due Diligence on contracts

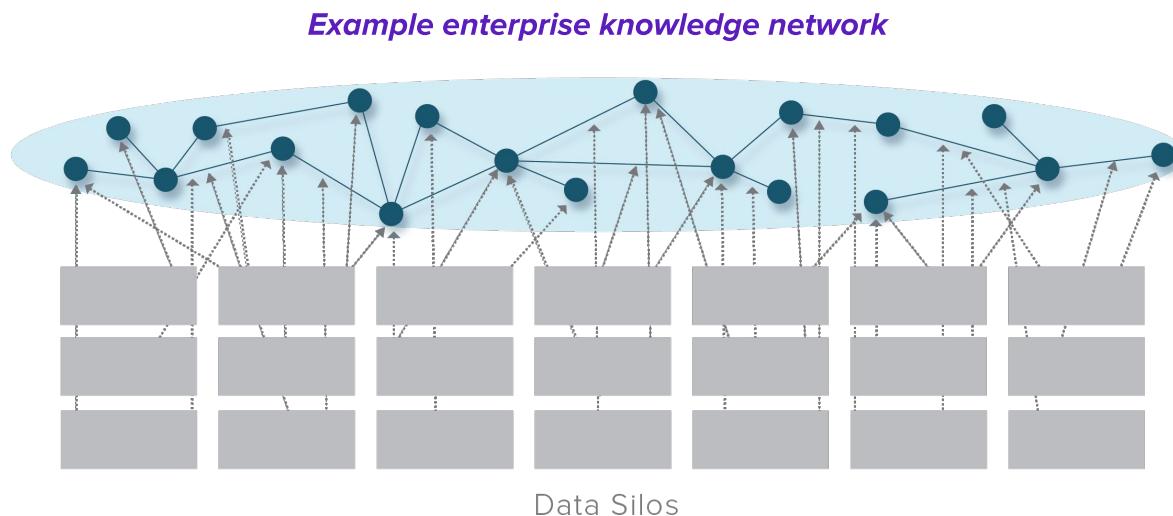
The bottleneck is no longer access to information; now it's our ability to keep up.

AI can be trained on a variety of different types of texts and summary lengths.

A model that can generate long, coherent, and meaningful summaries remains an open research problem.

The last few decades have witnessed a fundamental change in the challenge of taking in new information. The bottleneck is no longer access to information, now it's our ability to keep up. We all have to read more and more to keep up-to-date with our jobs, the news, and social media. We've looked at how AI can improve people's work by helping with this information deluge and one potential answer is to have algorithms automatically summarize longer texts. Training a model that can generate long, coherent, and meaningful summaries remains an open research problem. In fact, generating any kind of longer text is hard for even the most advanced deep learning algorithms. In order to make summarization successful, we introduce two separate improvements: a more contextual word generation model and a new way of training summarization models via reinforcement learning (RL). The combination of the two training methods enables the system to create relevant and highly readable multi-sentence summaries of long text, such as news articles, significantly improving on previous results. Our algorithm can be trained on a variety of different types of texts and summary lengths. In this blog post, we present the main contributions of our model and an overview of the natural language challenges specific to text summarization.

Potential applications: map out complex relationships between entities in a defined network to detect illegal activities, e.g., money laundering; identity theft; insider information leaks, etc.



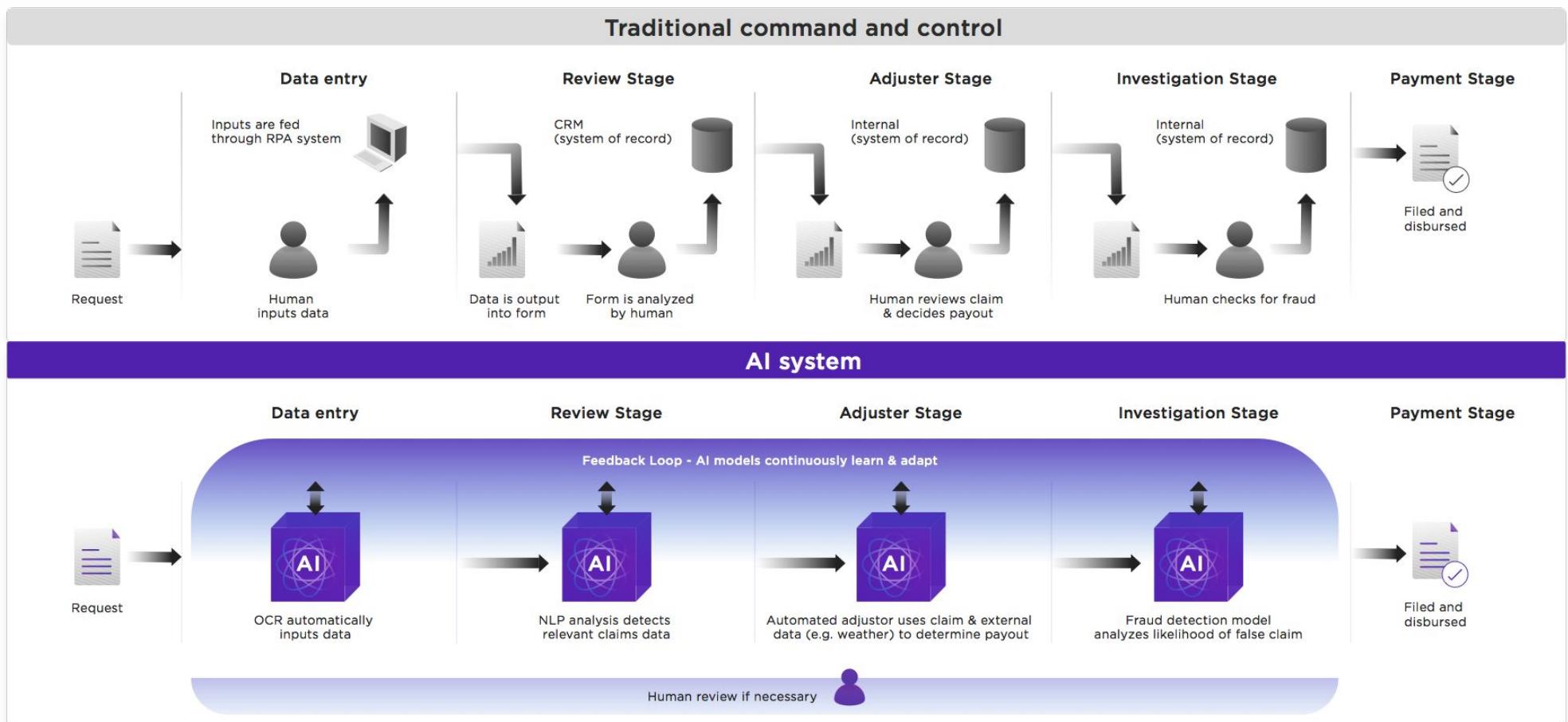
Used to analyze social, communication and information networks **to identify patterns, evolutionary characteristics and anomalies**

“The program detected over 800 accounts related to the problematic borrower. The banks originally thought there were four.”



Businesses must move from command and control software to self-adapting AI systems to survive

Example: Claims processing

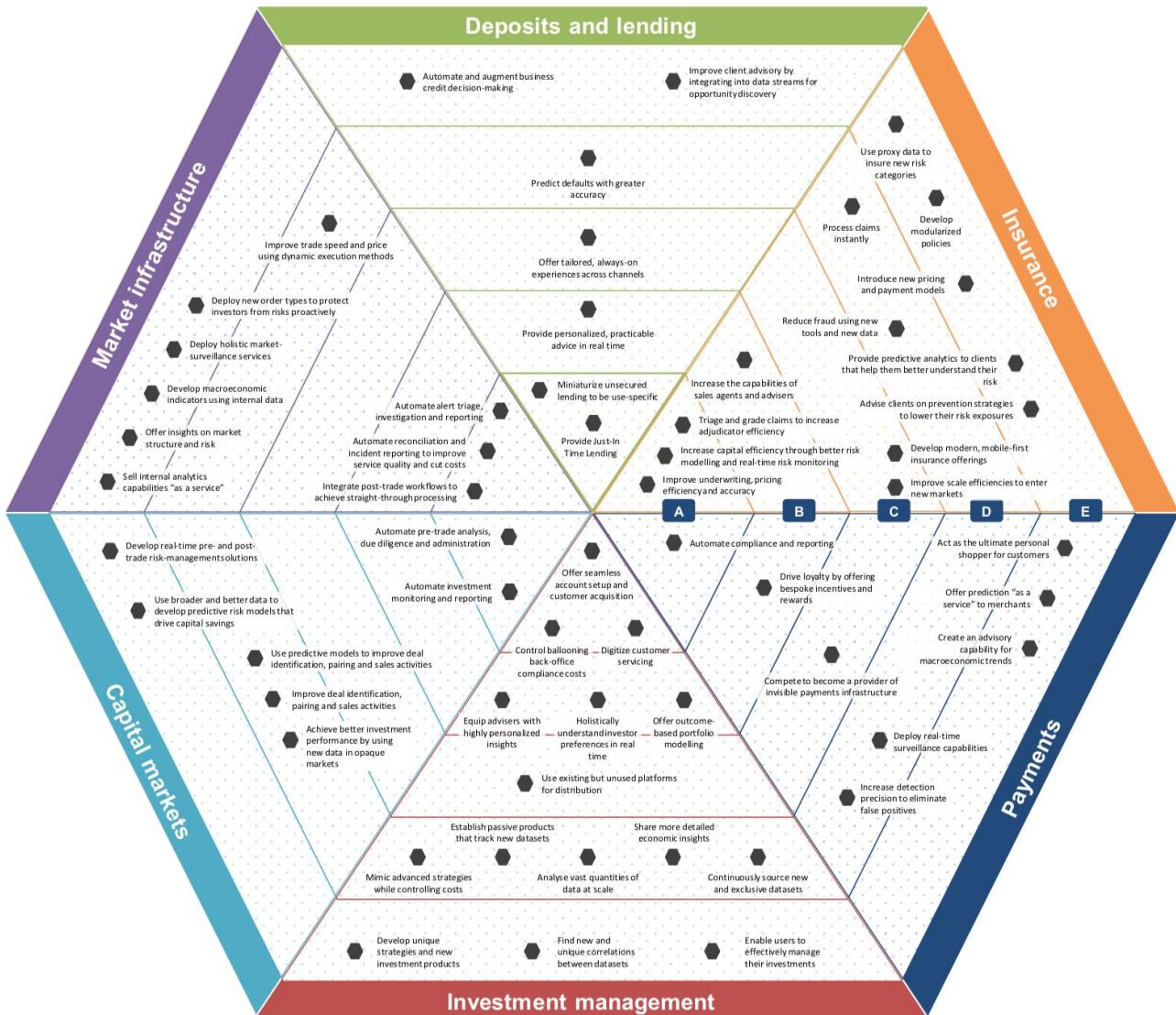
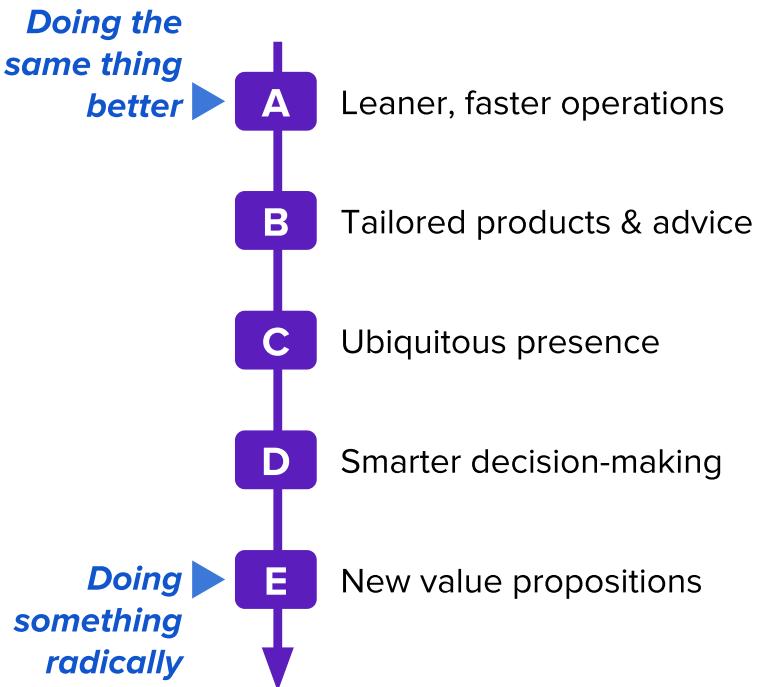


What does this mean in financial services?

In the Front, Middle, and Back Offices



A Mosaic of Possibilities



Middle & Back Offices — Streamline Efficiency & Decrease Costs

1 Legal Tech



35% of a law clerk's job is case research, which Casemine automates by retrieving all relevant statutes and case laws from data sets like **Harvard Law's digital archive** of 42,000 volumes and roughly **40 million pages**.

2 Contract Intelligence



JP Morgan Chase's COIN is automating **360,000 hours** a year spent on tasks like processing 12,000 wholesale contracts or interpreting loan agreements, and Kira Systems, a similar service, serves **4/10 top U.S. Law Firms**.

3 Automated Auditing



Fraud has surged 80% in last 10 years and yet it takes 32 months on average to detect it. MindBridge **automatically processes financial data** in order to run anomaly detection and raise flags for auditors to investigate.

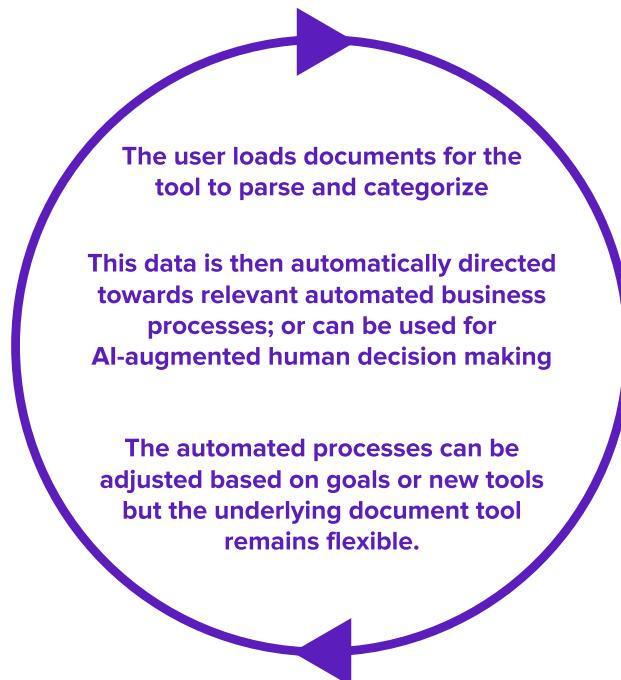
Middle & Back Offices – A Common Tool

Problem 1

From Unstructured to Structured Data

- Automating document processing requires clean data in a consistent structure
- AI tools like using optical character recognition (OCR) and natural language processing (NLP) capabilities to create a system for fast, highly accurate automated document processing.

Replace manual document process operations that are error-prone, slow and expensive

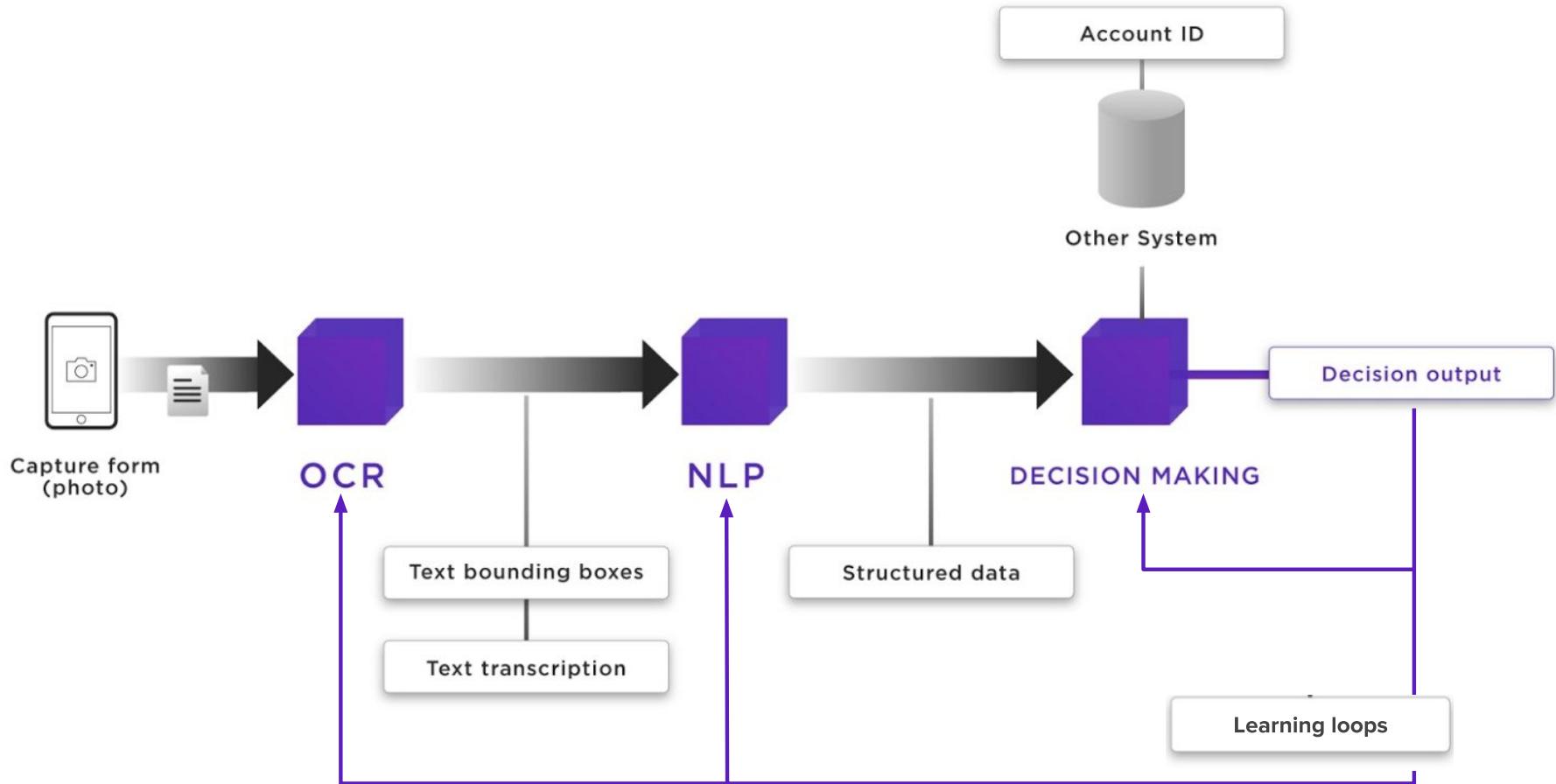


Problem 2

Relevant Information Extraction

- Extracting information from client data for predefined Robot Process Automation (RPA) or recommended (Machine Learning) structure needs its own artificial intelligence.
- Once the right representations are learned, then it can make decisions and recommendations that are informed by a larger and more comprehensive set of data with little/no human supervision

Middle & Back Offices – Automatic Document Processing & Decisioning



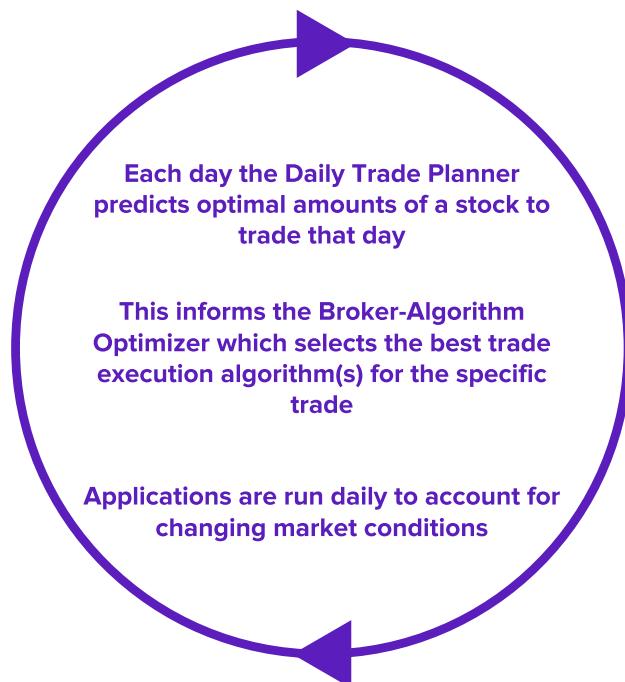
Front Office (**Micro**) — Better Buy-Side Trading Decisions

Problem 1

Daily Trade Planner

- Rebalancing large portfolios requires trades to be broken out over several days
- AI can be used to predict the optimal amount of stock to buy or sell for the upcoming trading day and output a daily list of target trading amounts based on current and target portfolio weights

Optimal rebalancing of large portfolios in illiquid markets



Problem 2

Broker-Algorithm Optimization

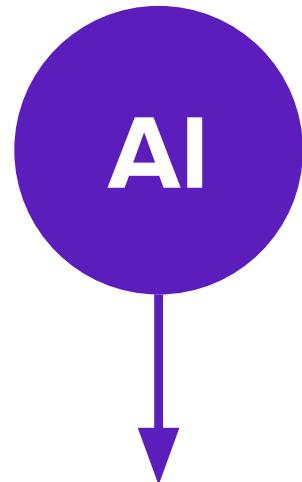
- Each algorithm performs differently based on current market conditions and the specific portfolio of stocks
- AI can be used to select the broker-provided algorithm that is most likely to achieve optimal pricing given the specific stock and conditions, such as:
 1. Market conditions
 2. Market-moving news



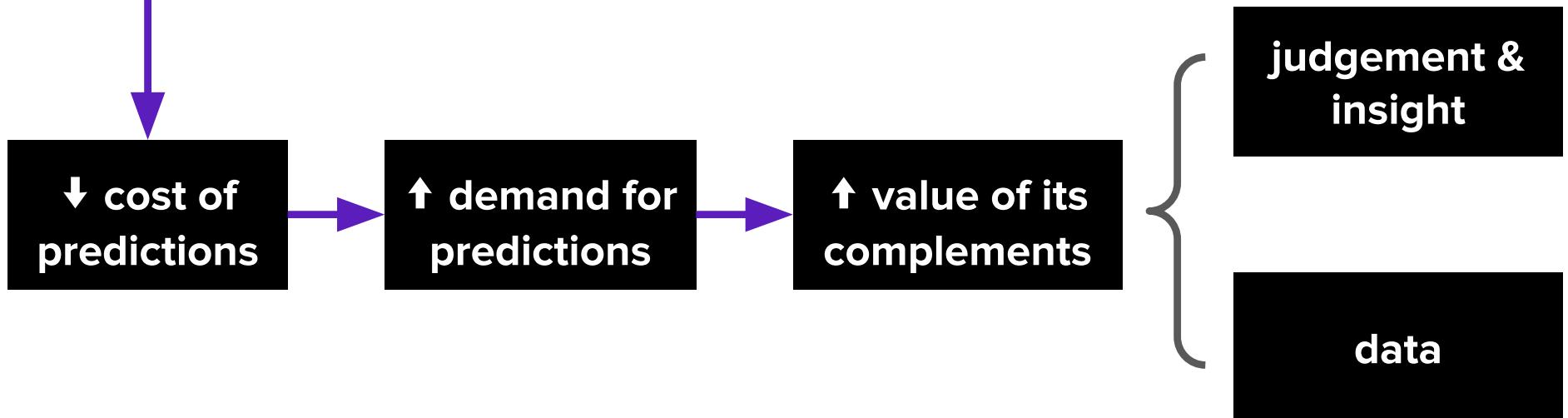
Front Office – Macro

**Raising alpha by understanding AI's
role in future portfolio winners**





The falling cost of prediction

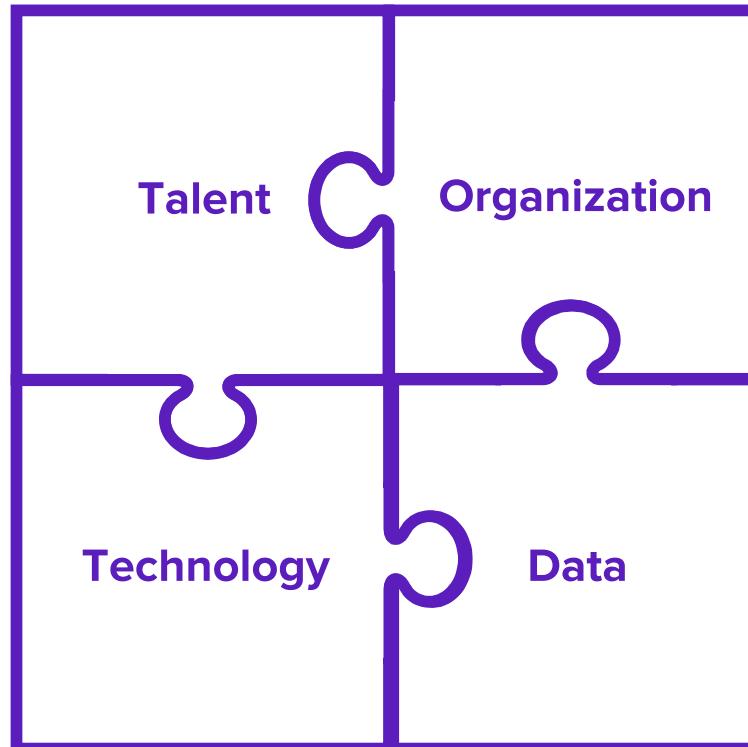


Successfully executing a strategy requires more than just AI technology

There are only about 1,000 people in the world who can define a problem for AI, the solution, and direct the team that will build it. Those who can do everything but the problem definition amount to about 20,000

The technology is progressing every day and there are numerous possibilities on the horizon. Running a lab means identifying new problems AI will soon be able to solve and assembling the other pieces for an estimated timeline.

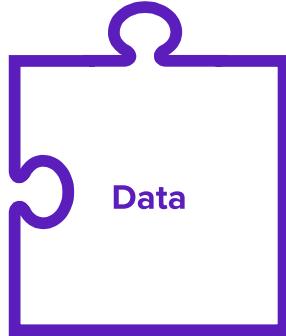
Illustrative Examples



Taking advantage of AI solutions means re-thinking how the organization is run in order to create efficient feedback loops and enable your newly-empowered workforce

Data is the lifeblood, and right now a **lot** is needed to train models effectively. We are quickly discovering many problems that AI can potentially solve, but for which the needed data does not yet exist.





Do balance sheets reflect the increasing value of data?

BUSINESS NEWS FEBRUARY 15, 2018 / 3:40 PM / 3 MONTHS AGO



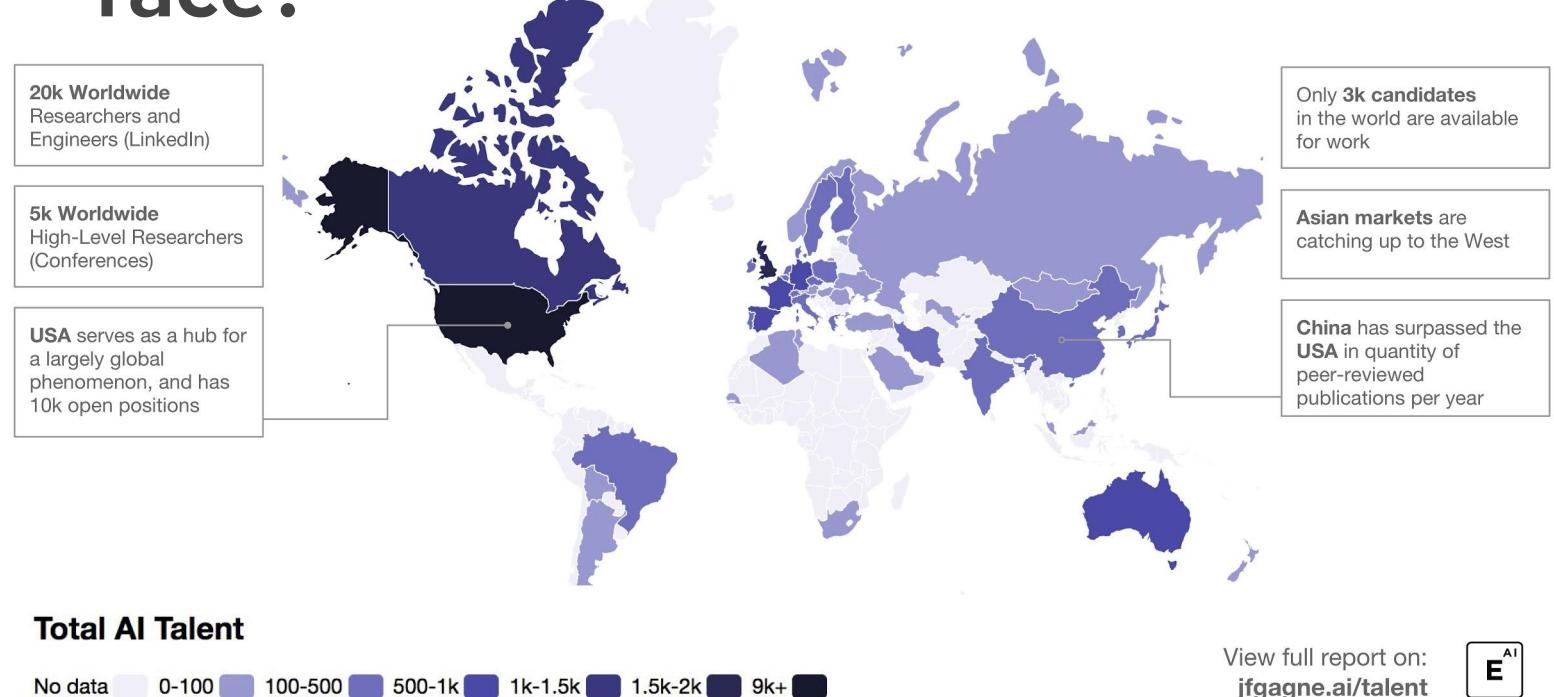
Roche to buy Flatiron Health for \$1.9 billion to expand cancer care portfolio



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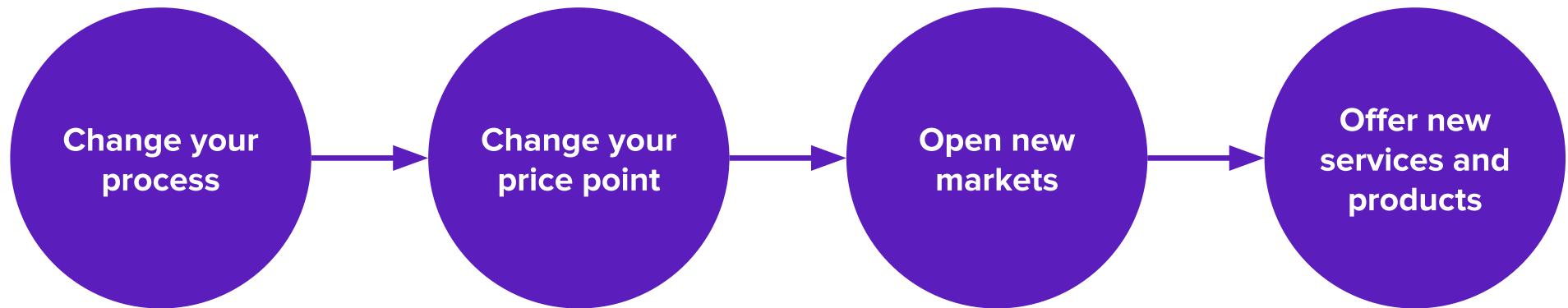
What is your edge in the AI talent race?





Look for tipping points in the impacts of technology

The domino effect of automation





**Are your organizations structuring themselves
to increase the volume of available judgement?**

UBS Trading floor



2008

2016



**“Just as electricity transformed almost everything 100 years ago,
today I actually have a hard time thinking of an industry that I don’t
think AI will transform in the next several years.”**

– Andrew Ng



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Q&A



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