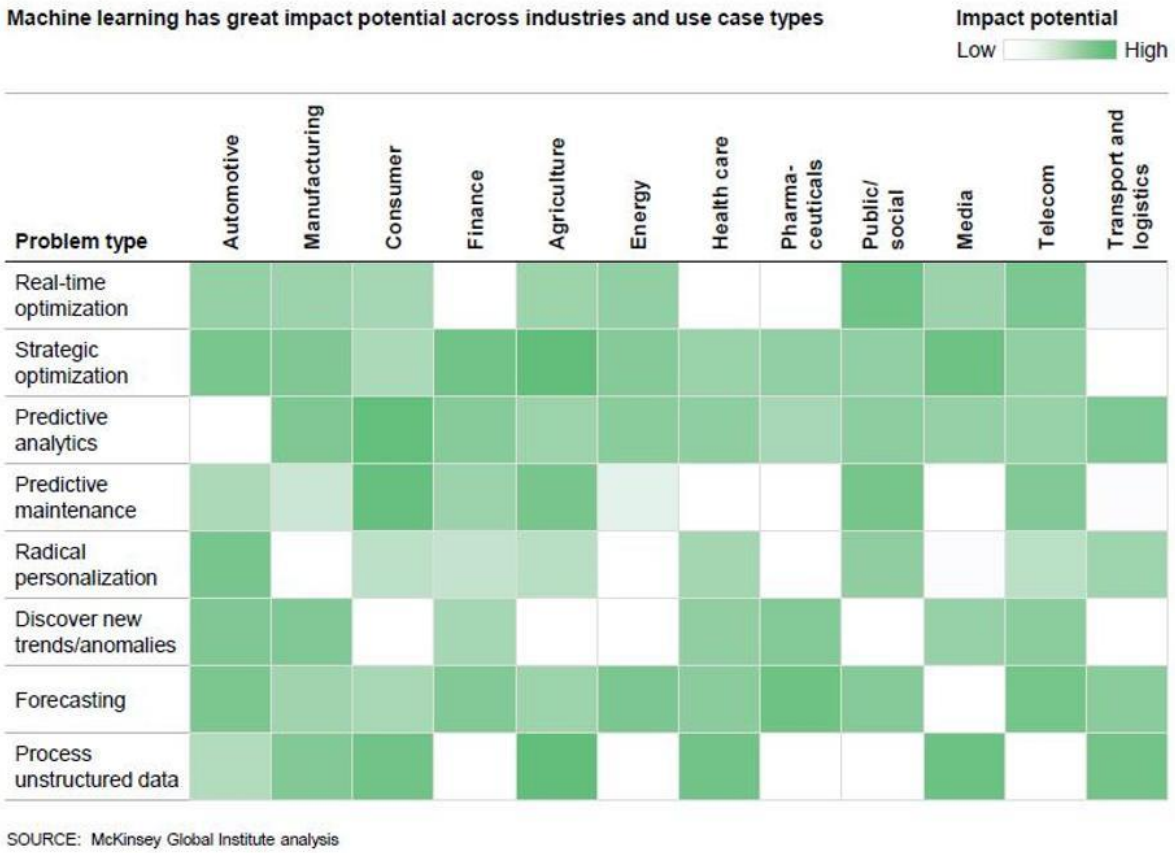
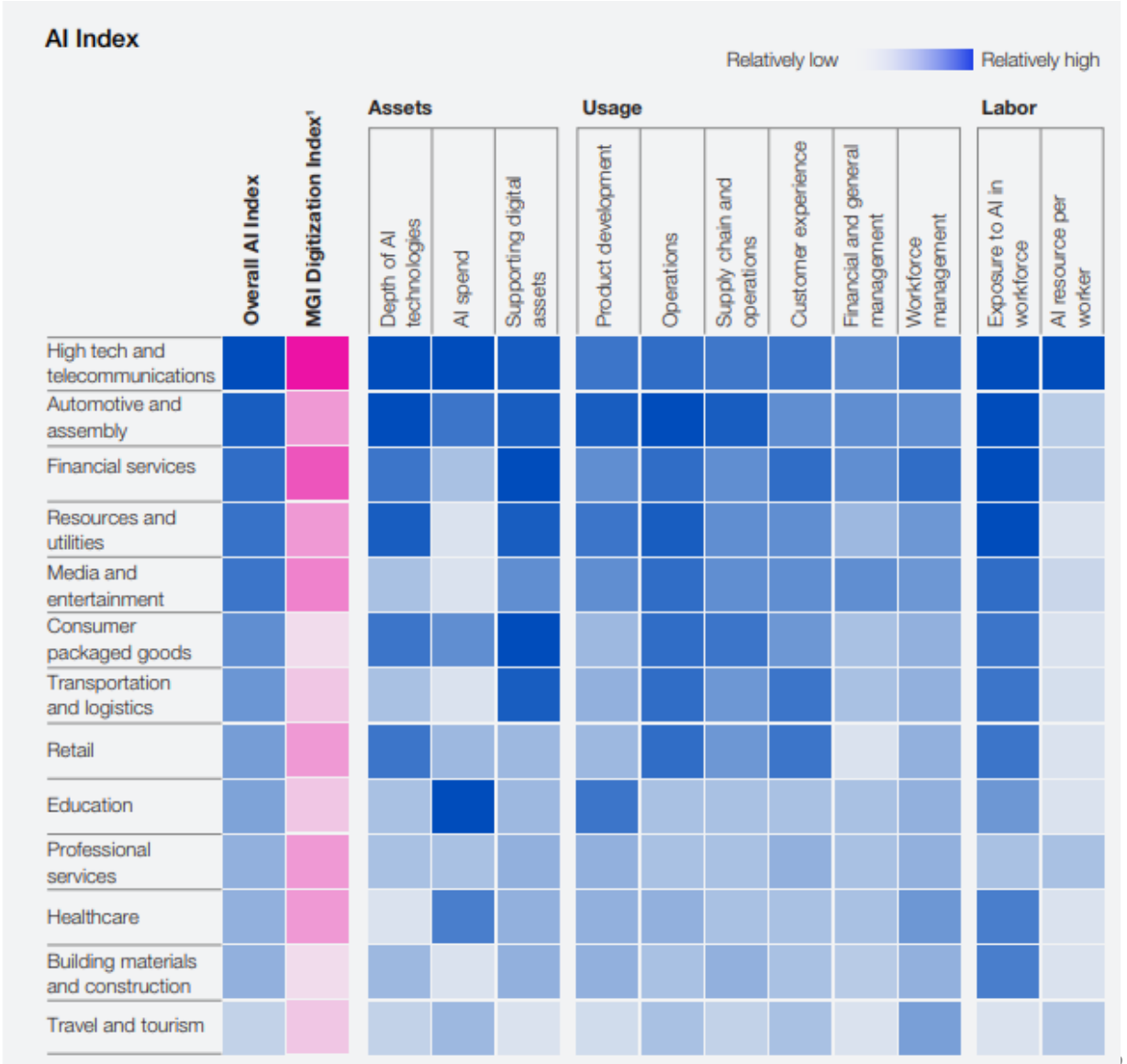
Applications of AI & ML

Dec 2018

Many articles written on impact of AI & ML across industries





https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/an-executives-guide-to-ai

You can see a wide variety of Kaggle competitions…

Passenger Screening Algorithm Challenge — **$1,500,000**
Improve the accuracy of the Department of Homeland Security's threat recognition algorithms — 89 teams
Featured · 5 months to go

Zillow Prize: Zillow's Home Value Prediction (Zestimate) — **$1,200,000**
Can you improve the algorithm that changed the world of real estate? — 1,425 teams
Featured · 6 months to go

Planet: Understanding the Amazon from Space — **$60,000**
Use satellite data to track the human footprint in the Amazon rainforest — 840 teams
Featured · 9 days to go

Instacart Market Basket Analysis — **$25,000**
Which products will an Instacart consumer purchase again? — 1,307 teams
Featured · a month to go

Flavours of Physics: Finding τ → μμμ
10 entries in team For great justice.

Caterpillar Tube Pricing
10 entries in team You have no chance to survive make your time.

Grasp-and-Lift EEG Detection
8 entries in team all your carpal tunnel are belong to us

Liberty Mutual Group: Property Inspection Prediction
10 entries in team 君達の基地は、全てMIKEKIMがいただいた。

ICDM 2015: Drawbridge Cross-Device Connections
37 entries in team all your ieee are belong to us

Avito Context Ad Clicks
150 entries in team all your adrev are belong to us

There are many inspiring stories…

- **Predictive Policing:** https://en.wikipedia.org/wiki/Predictive_policing
- **Genome Sequencing:** https://www.techemergence.com/machine-learning-in-genomics-applications/
- **Self-correcting Machines**: https://www.ge.com/reports/ge-takes-predix-cloud-edge/
- **AlphaZero:** https://www.extremetech.com/extreme/260215-alphazero-new-chess-champion-harbinger-brave-new-world-ai
- **Self-Driving Cars:** https://en.wikipedia.org/wiki/Autonomous_car

Great. I understand that there are many applications across industries. But then how do I practically use it in my business context?

For that, let us understand the basics…

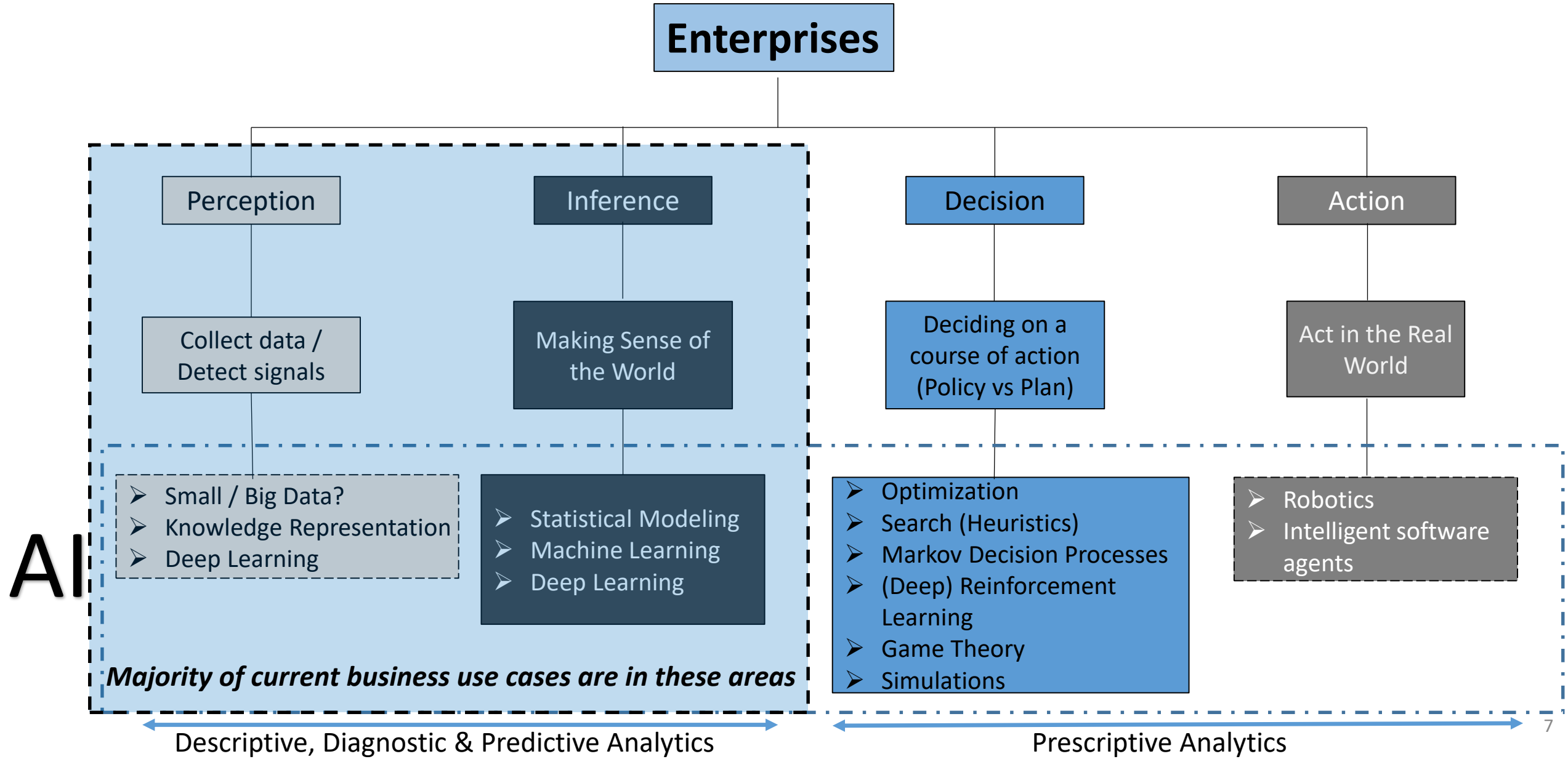
What is Artificial Intelligence?

Artificial Intelligence refers to the theory and development of computer systems & machines with the ability to perform tasks normally requiring human intelligence

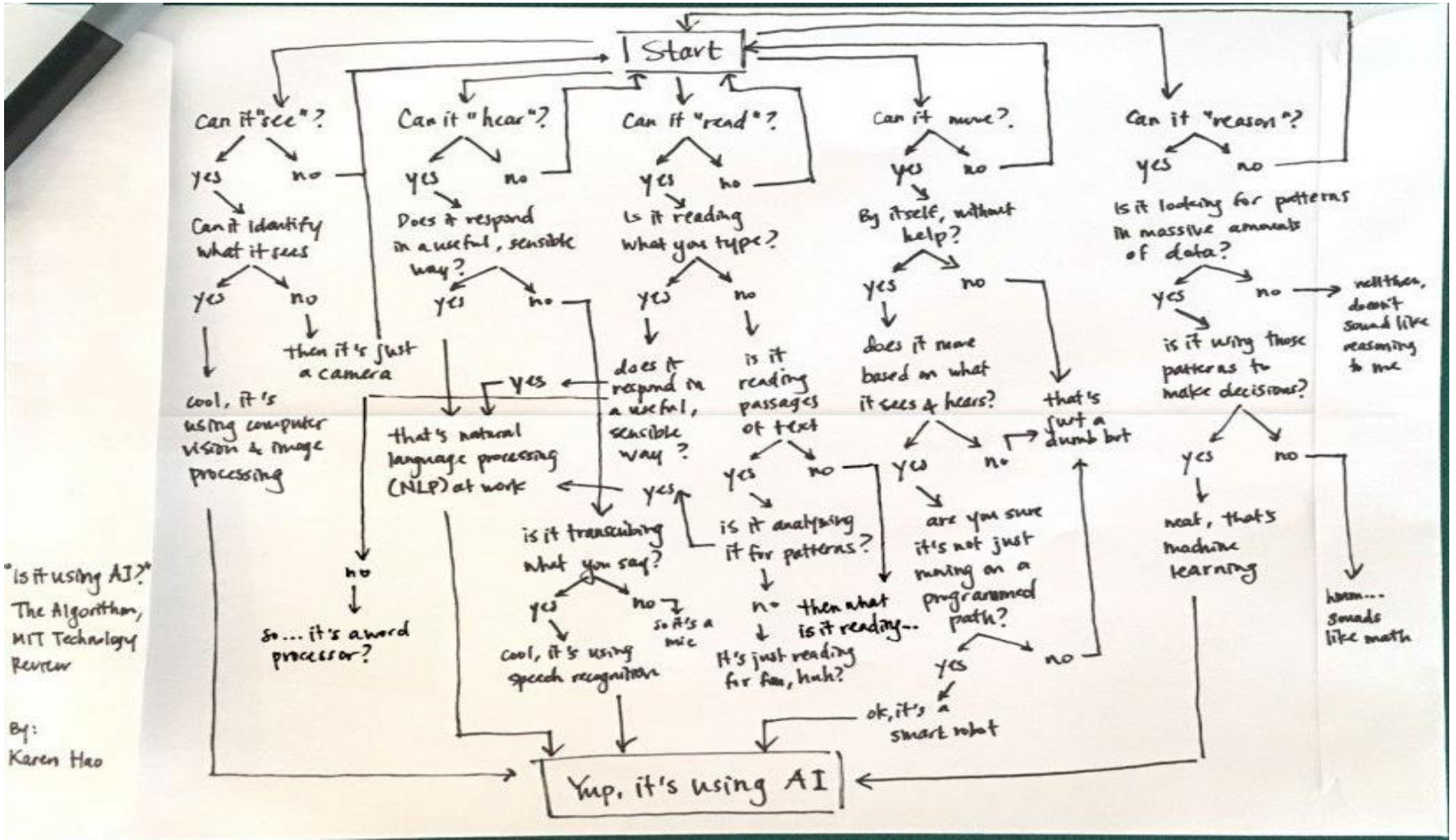
What constitutes Human Intelligence?

1. Perceive the world, detect signals and collect data
2. Make sense of the world using data (Insights, Inference, Predictions etc.)
3. Decide on the next course of action
4. Act in the Real World

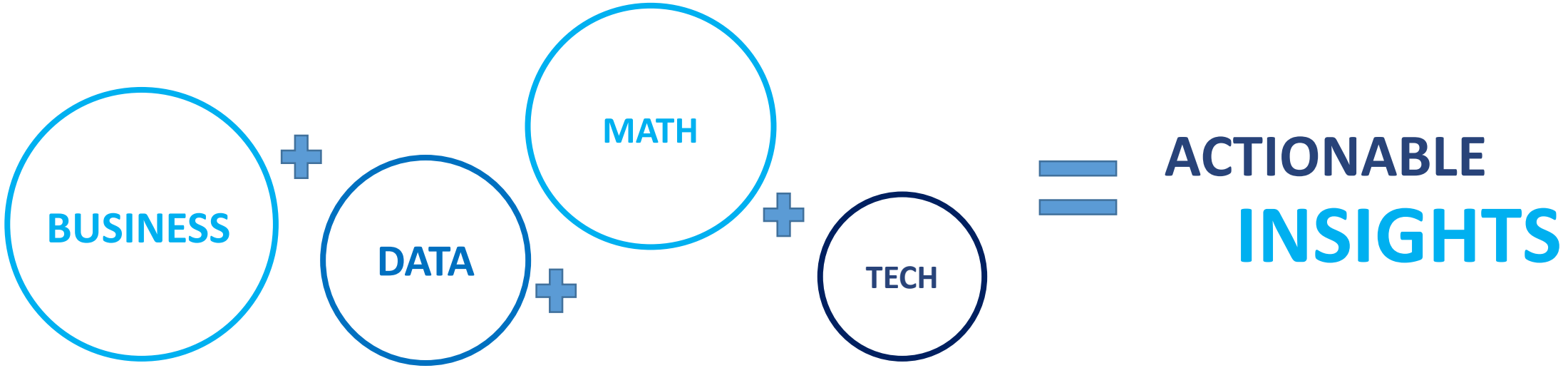
AI Techniques in Enterprises – Parallels to Human Intelligence



Is it using AI? – Find using a Flowchart



Components of any AI & ML Solution

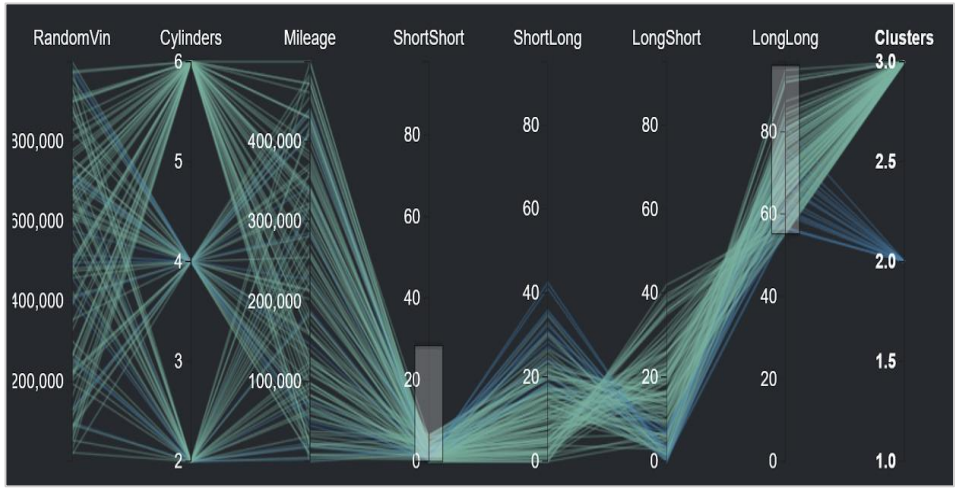


Can you bring these concepts to life with some examples from your personal experience?

Example 1: Utilizing sensor data to predict defects

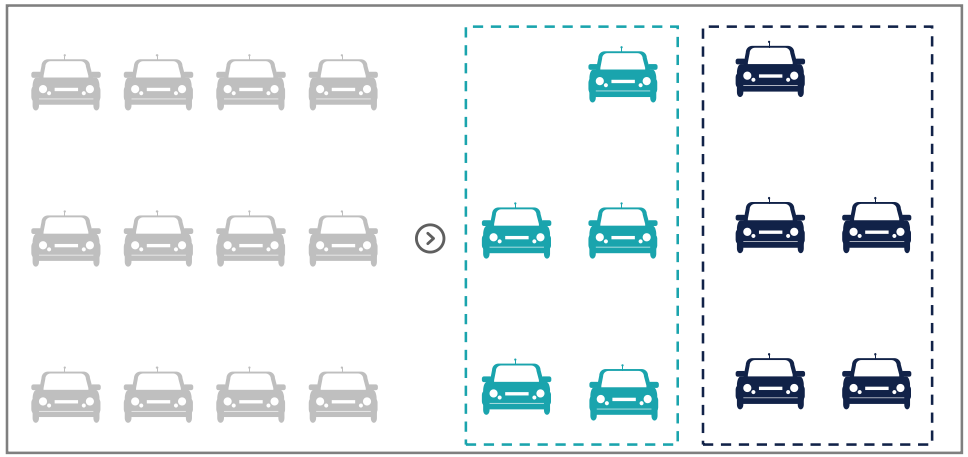
PERCEPTION

Sensor data from different countries

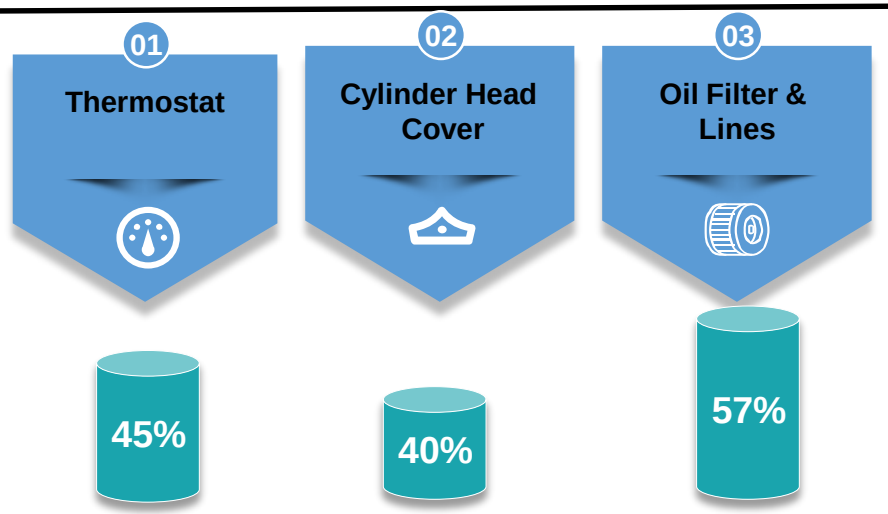


Visualization to understand the data

INFERENCE



Clustering to identify driving styles



Defects were correlated with driving styles

Example 1: Business + Data + Math + Technology

BUSINESS

For this automobile company, the warranty costs were rising year on year at an alarming rate

DATA

Semi-structured data from sensors from cars across 100+ countries (Ex: Pedal position, Oil temperature, Engine temperature…60+ parameters)

MATH

Clustering done on data to identify driving styles which is then correlated with warranty claims to predict defect probability

TECH

- Spark on the Cloud platform called Databricks for Machine Learning
- User Interface using React for self-service

Example 2: Leveraging external data to drive innovation

PERCEPTION

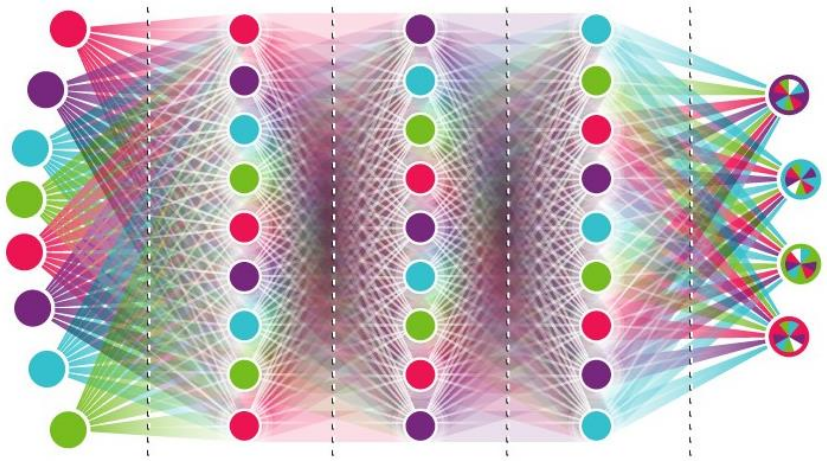
Industry Forums — Consumer Reports

+

Market Places — The Home Depot, a

+

Brand Websites — LG, Whirlpool



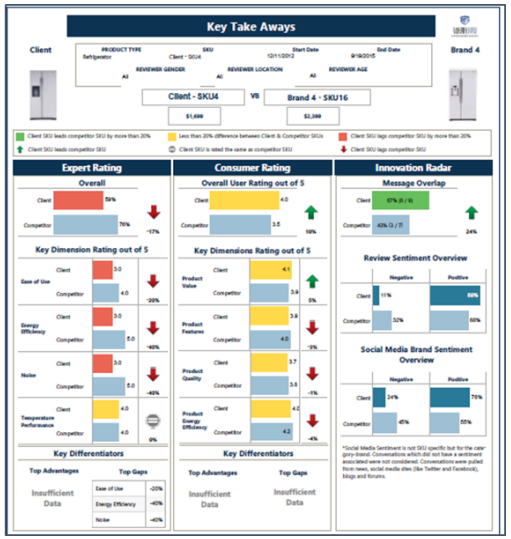
External data from ecommerce sites, brand websites etc.

Deep Learning for Natural Language Processing

INFERENCE

- Sentiment Analysis
- Drivers of Purchase
- Triggers of Purchase
- Expert Opinion
- ★★★☆ Consumer Rating
- Popular Features

Text Analytics



Understand key factors that influence customer perception & behavior

Example 2: Business + Data + Math + Technology

BUSINESS

Consumer durables company wants to obtain product feedback as soon as its products are released in the market and not wait for 6-8 months which was the current state scenario?

DATA

Unstructured data from reviews in marketplaces, brand websites, Industry forums, blogs

MATH

Natural Language Processing Techniques to detect spam, emotion, entities, sentiments, contextual meaning etc.

TECH

Self-service visualization built using Tableau that provides the summary view and different levels of drill-down into specific consumer characteristics

Horizontal View – AI & ML use cases in Marketing

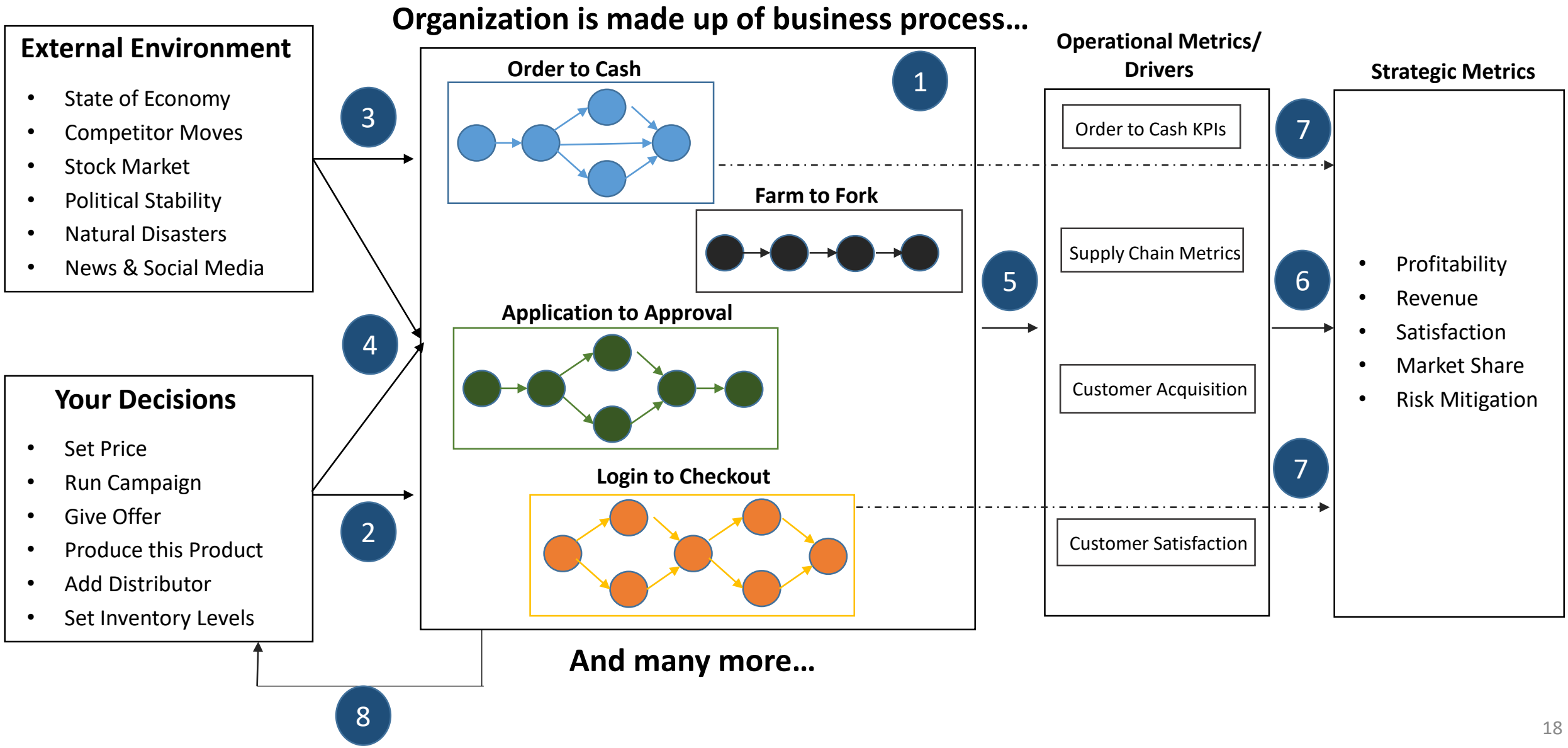
Predicting Lifetime Value (LTV)	Wallet share estimation	Churn	Customer segmentation
Product mix	Cross selling	Recommendation algorithms	Up-selling
Channel optimization	Discount targeting	Reactivation likelihood	Adwords optimization and ad buying

Vertical / Industry View – AI & ML use cases in Retail

- Price optimization
- Location of new stores
- Product layout in stores
- Merchandizing
- Inventory Management (how many units)
- Shrinkage analytics
- Warranty Analytics
- Market Basket Analysis
- Cannibalization Analysis
- Next Best Offer Analysis
- In store traffic patterns

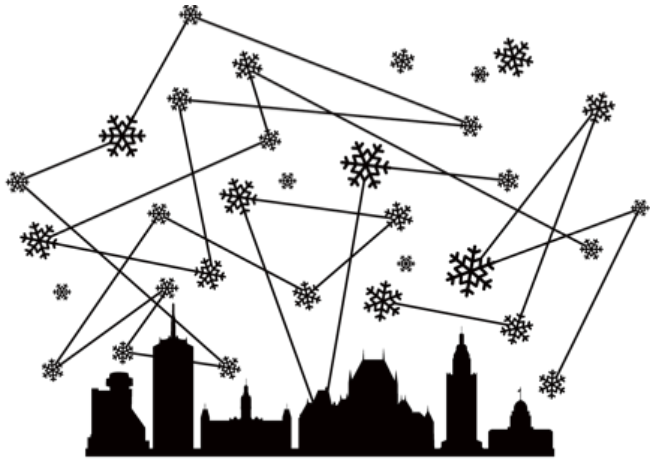
Why do enterprises need AI & ML? How can one be sure that the requirements will not fade away over time?

Why are AI & ML techniques relevant for organizations?



Looking at it from a business decision maker perspective

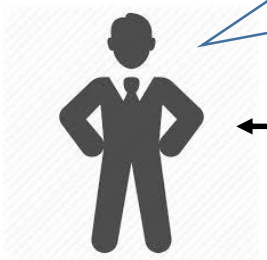
Real World (Business)



Better **DECISIONS**

EXPERTISE

- ✓ Education
- ✓ Training
- ✓ Experience



Business Decision Maker

Better **MENTAL MODELS**

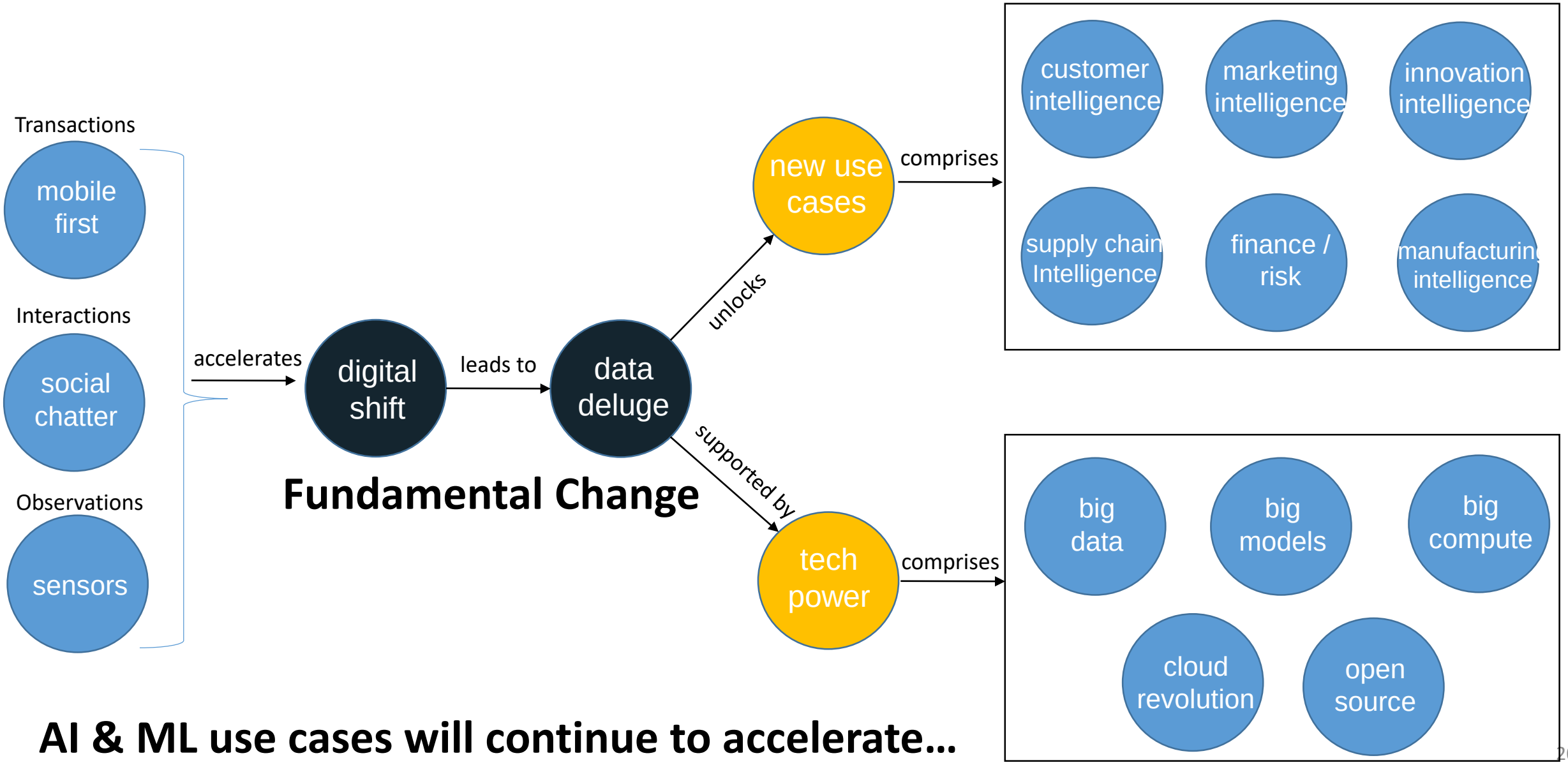
Better **Approximation of the Real World**

Data Science Pipeline

DATA → ML / DL Algorithms → Inferences / Predictions

Purpose / Goal of AI & ML

In Summary: Digital Shift is a Fundamental, Irreversible Change



Fundamental Change

AI & ML use cases will continue to accelerate…

Thank You!

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