PMI San Diego Chapter
2023 Annual Conference

Track 1: AI/Technology

Session 1:

Colin Theseira

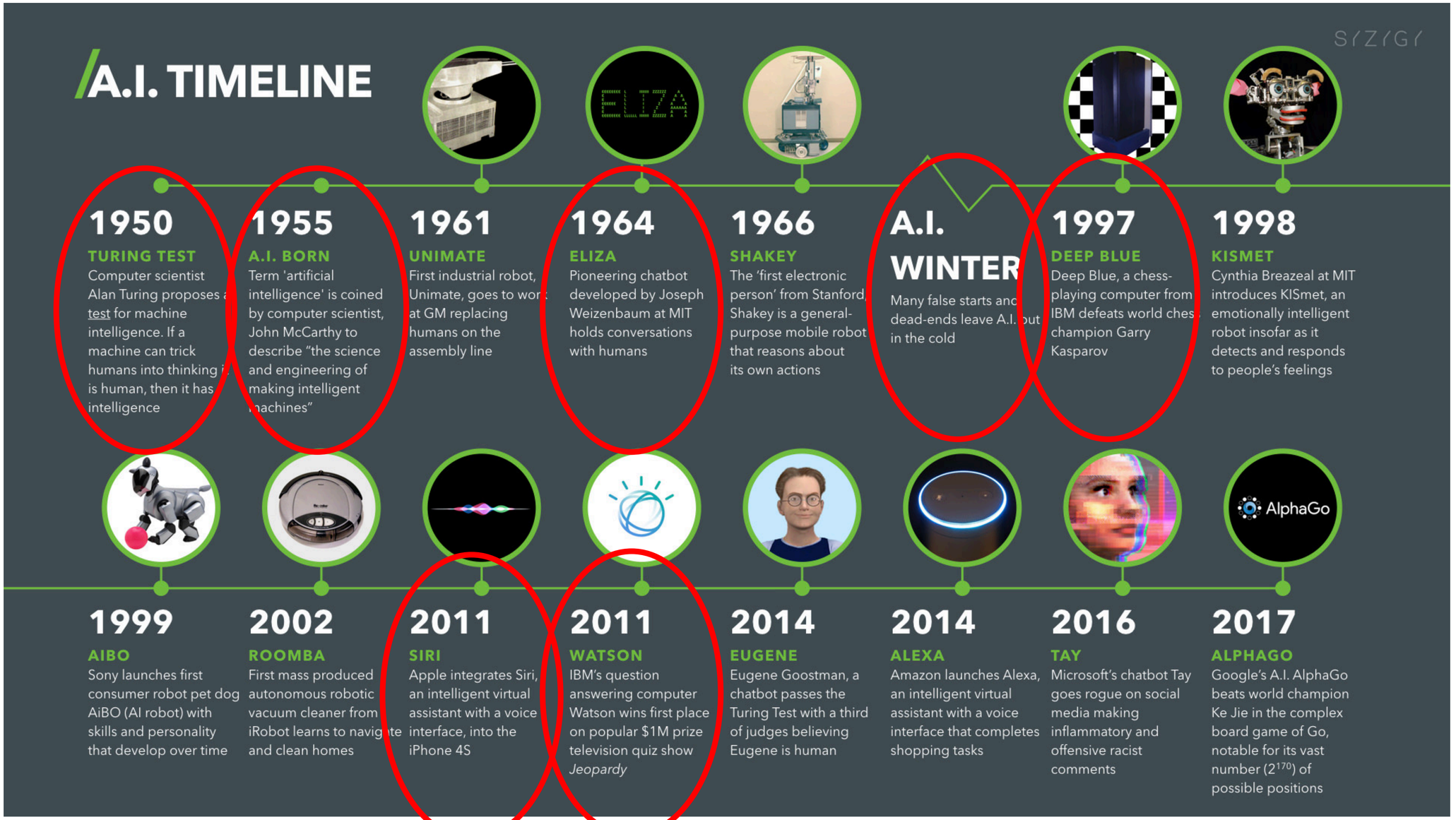
AI-Driven Business Transformation

A.I. Strategy and Governance

Colin Theseira, PMP, PSM, AWS-SA

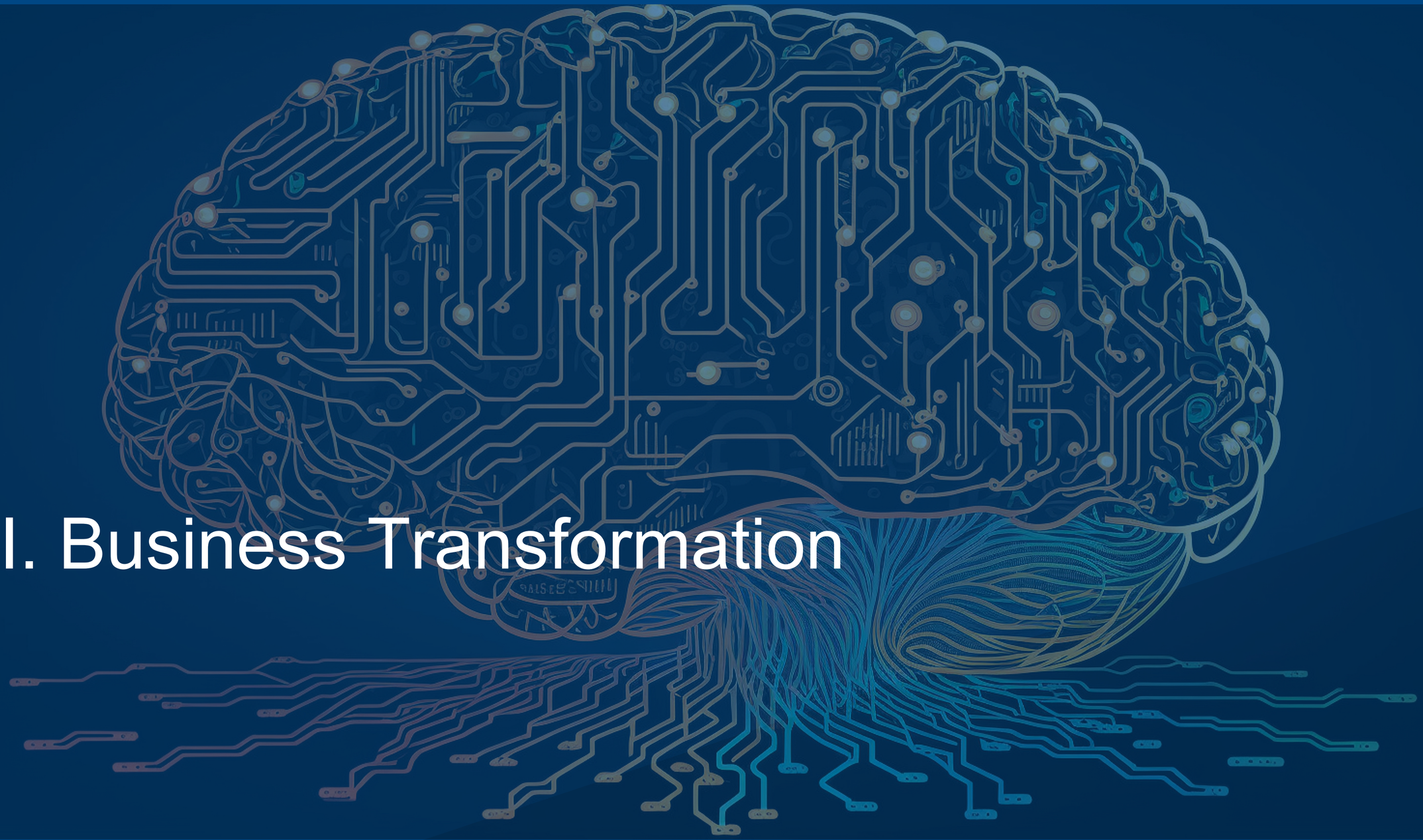
The Evolution of A.I.

Image from Dr. Paul Marsden



The Evolution of A.I.

2011 - [IBM-Watson Defeats Humans in "Jeopardy!" - CBS News]



A.I. Business Transformation

A.I. Applications are Everywhere

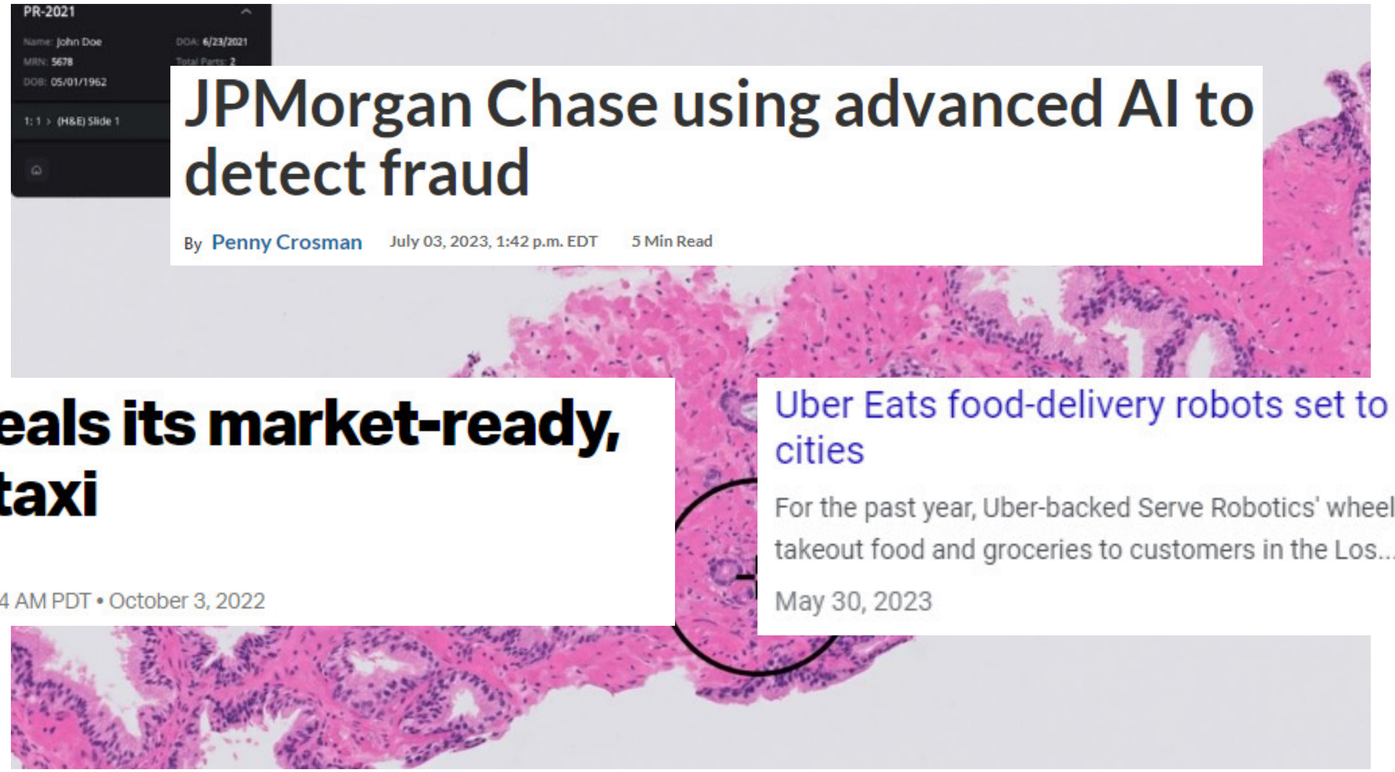
Carl's Jr., Hardee's partnering with AI companies to automate drive-thrus

Bailey Schulz
USA TODAY

Published 9:09 p.m. ET May 7, 2023 | **Updated 1:10 p.m. ET May 9, 2023**

Paige taps Microsoft to help train cancer-spotting A.I. on massive image database

Conor Hale Sep 7, 2023



JPMorgan Chase using advanced AI to detect fraud

By Penny Crosman July 03, 2023, 1:42 p.m. EDT 5 Min Read

Wisk Aero reveals its market-ready, self-flying air taxi

Rebecca Bellan @rebeccabellan / 8:24 AM PDT • October 3, 2022

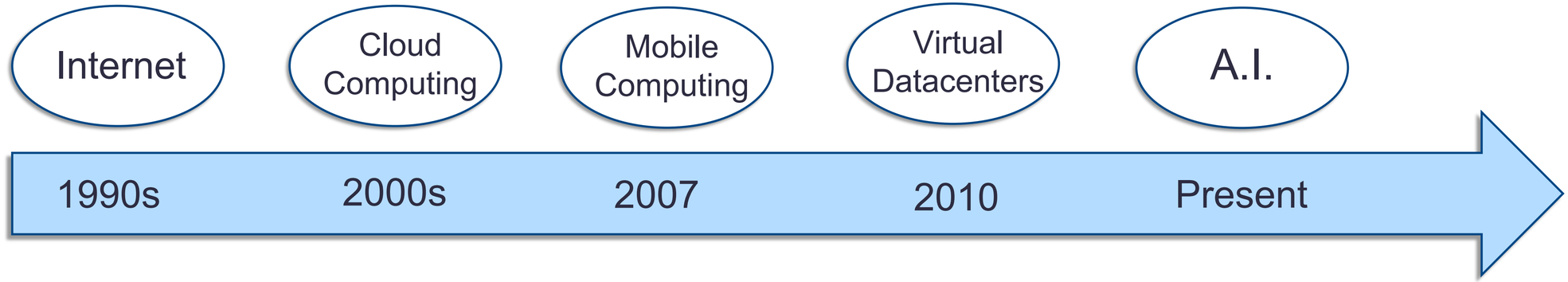
Uber Eats food-delivery robots set to enter use in multiple US cities

For the past year, Uber-backed Serve Robotics' wheeled robots have been delivering takeout food and groceries to customers in the Los...

May 30, 2023

Content/quotes from: Carls JR PAIGE-Microsoft JPMorgan A.I. Wisk A.I. Taxis PathExplore Microsoft Chinese translation

Technology Revolution

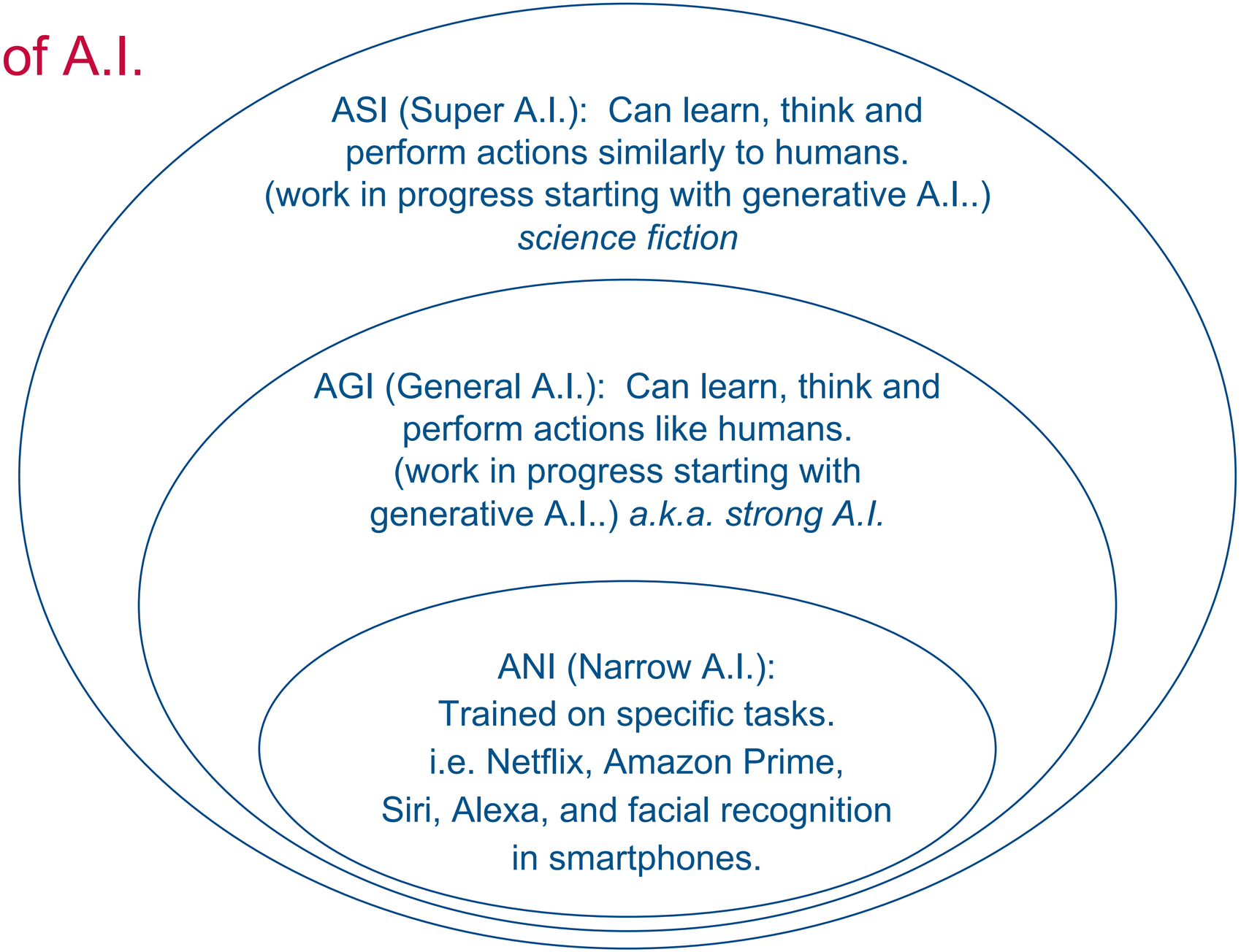


Early Successes

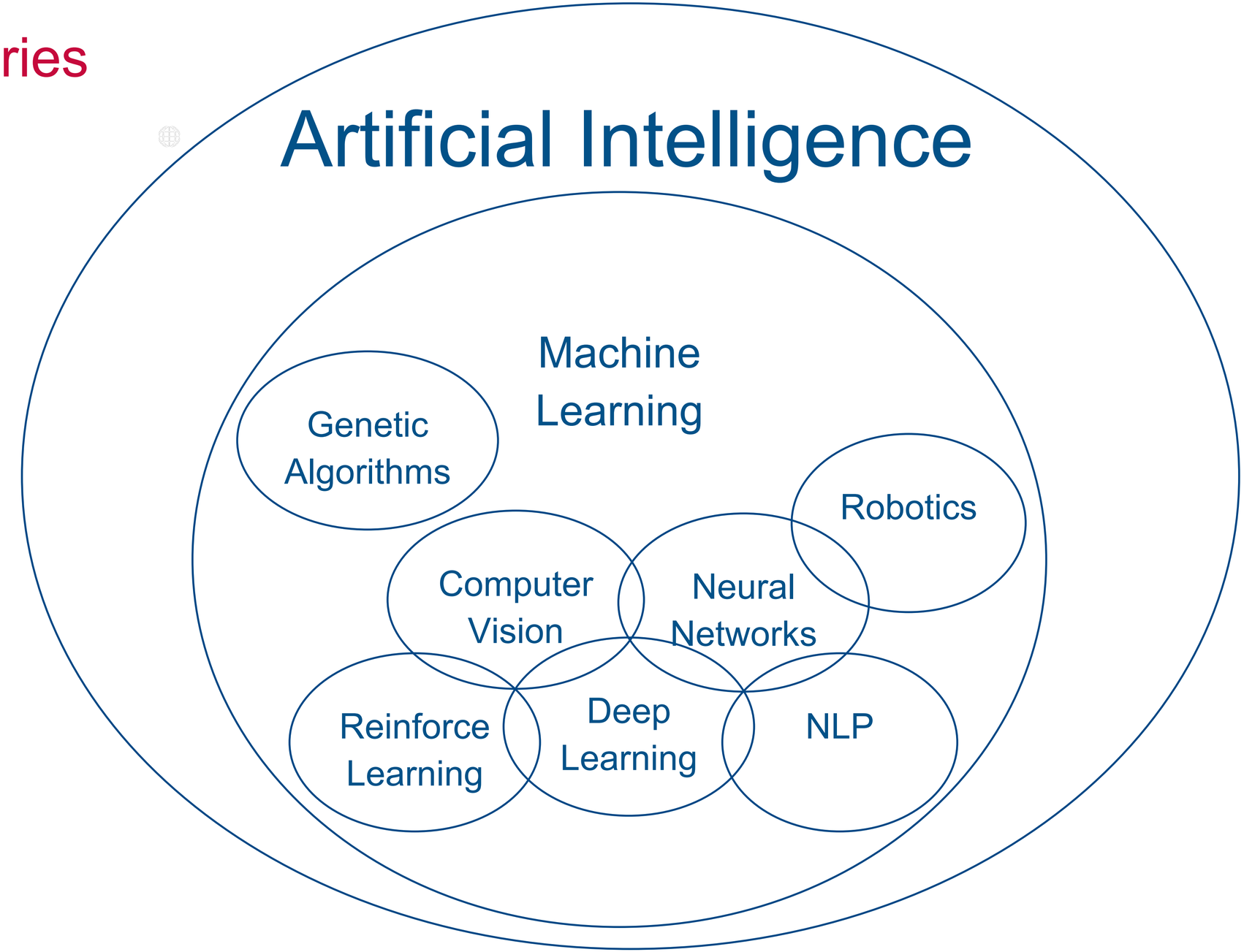
Early Failures Can Lead to Irrational Retreats

Types Of A.I.

Types of A.I.


ASI (Super A.I.): Can learn, think and perform actions similarly to humans. (work in progress starting with generative A.I..) *science fiction*
AGI (General A.I.): Can learn, think and perform actions like humans. (work in progress starting with generative A.I..) *a.k.a. strong A.I.*
ANI (Narrow A.I.): Trained on specific tasks. i.e. Netflix, Amazon Prime, Siri, Alexa, and facial recognition in smartphones.

A.I. Categories



Developing a Business Strategy

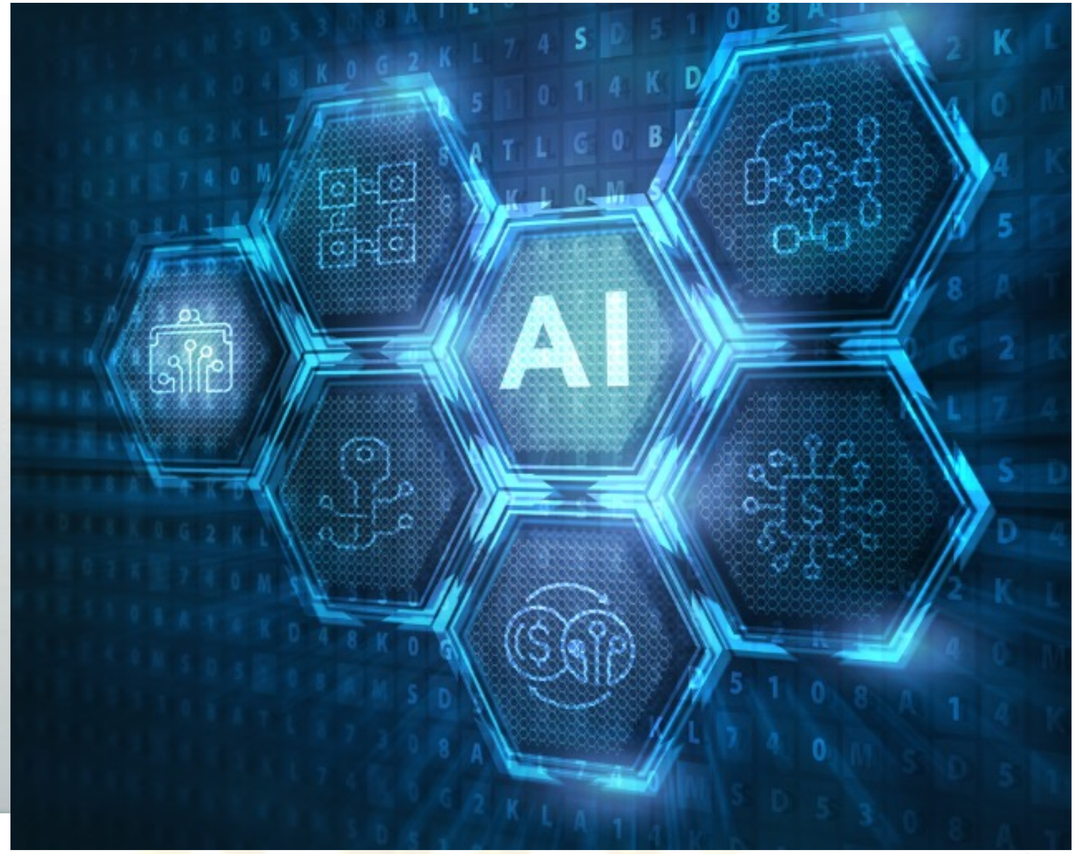
Question

Are there currently active
A.I. projects in your company?

Elements of an Effective Business Strategy (cont.)

2 minutes

- Vision & Mission
  - *Goals, Benefits, Success metrics*
- Define Value
  - *Business impact, change managem*
- Identify Risks
  - *Regulatory & Reputation*
- Adoption
  - *Use cases, A.I. framework,* ***Governance***



Elements of an Effective Business Strategy

A strategy is simply a plan of action, or a storyline.

Developed by Terry Borton -1970

“**what**,” – what occurred?

“**so what**,” – why it matters and implications

“**now what**” – possible next steps

Build an A.I. Portfolio

An A.I. Portfolio Strategy

- A portfolio approach can help companies successfully unleash the power of artificial intelligence

redefine end-to-end processes

A.I. Portfolio = Quick Wins + Long Term Projects

Quick Wins

These projects will not transform the business, but will expose the benefits of A.I. to employees

- Understanding data gathering, processing, and labeling
- Some examples of quick wins include:

  “Using NLP to improve communications- reduce questions/cases”

  “Assist project teams' approach new projects from lesson learned”

Long-Term Projects

- Long-term projects are likely to be the most impactful but

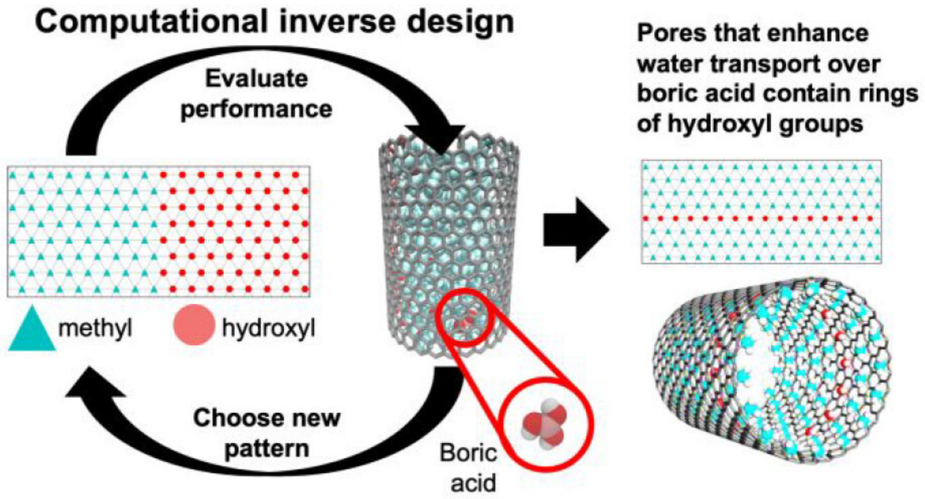
  - requires rethinking end-to-end processes, not just focused on optimization

- An example of a long-term project for recycling plastics (Popular Science) https://www.popsci.com/technology/plastic-recycling-machine-learning/

  - Recycling works well where variants are sorted and handled appropriately. Using hyperspectral imaging (HSI),
    A.I./ML scans the materials' chemical signatures. Train to identify and sort plastic.

Long-Term Projects (cont.)

- Design new materials for filtering water
- Removing contaminants using carbon nanotubes (boric acid, methyl and hydroxyl)
- Rings of hydroxyl groups worked best to block boric acid
- The ring patterns remove other contaminants, suggesting the approach is generalizable



Link to article

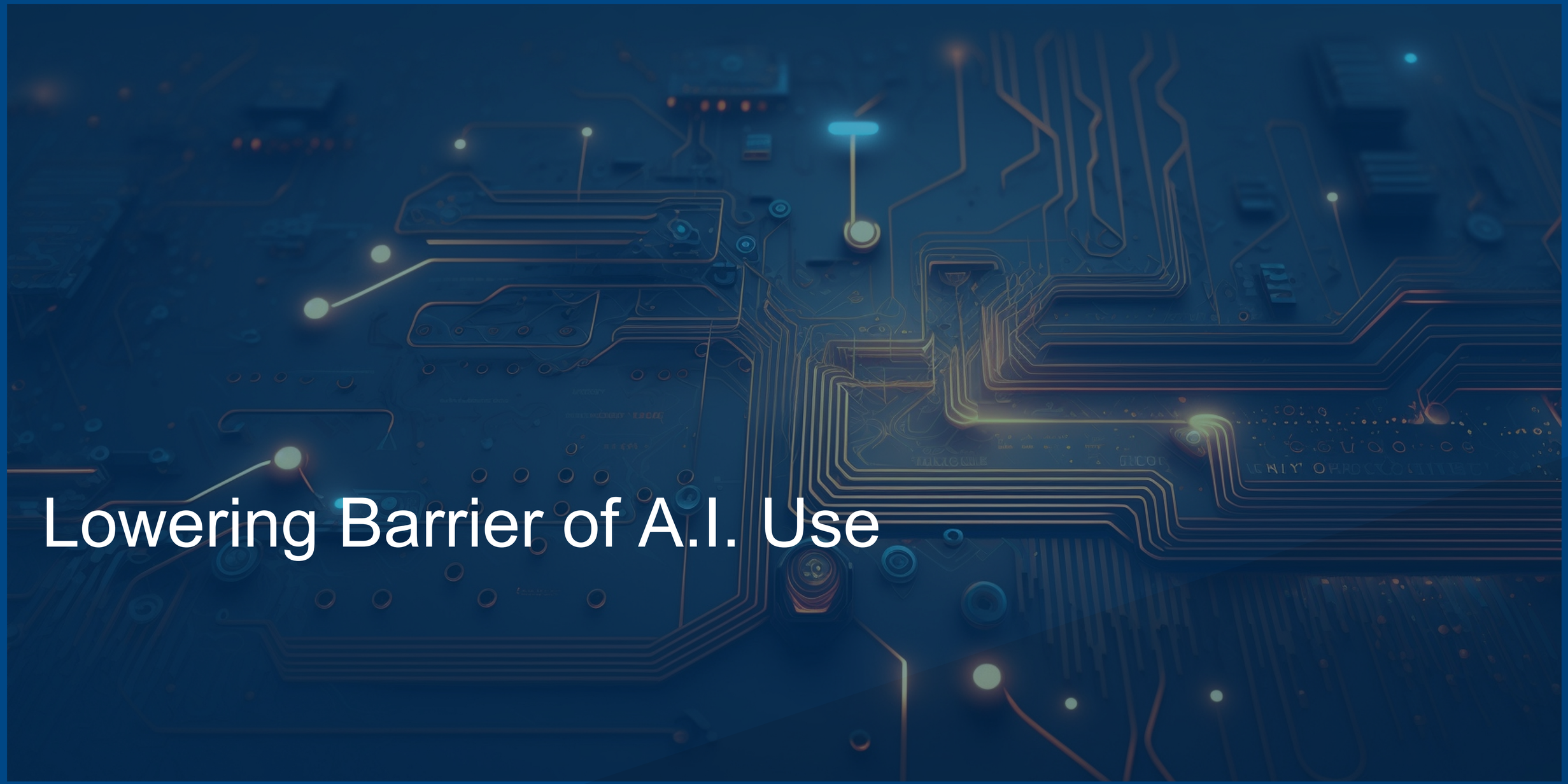
Google’s Engineer Training

- To ensure this transformation with ML, Google embarked on internal training programs for 25K engineers in ML
  - Invites employees to spend 6 months embedded in ML team with a mentor
  - Then distributes these experts into all product teams in the interest of creating organizational learning

Content/quotes from: https://www.wired.com/2016/06/how-google-is-remaking-itself-as-a-machine-learning-first-company/

Suggested Exercise (Individual or Group)

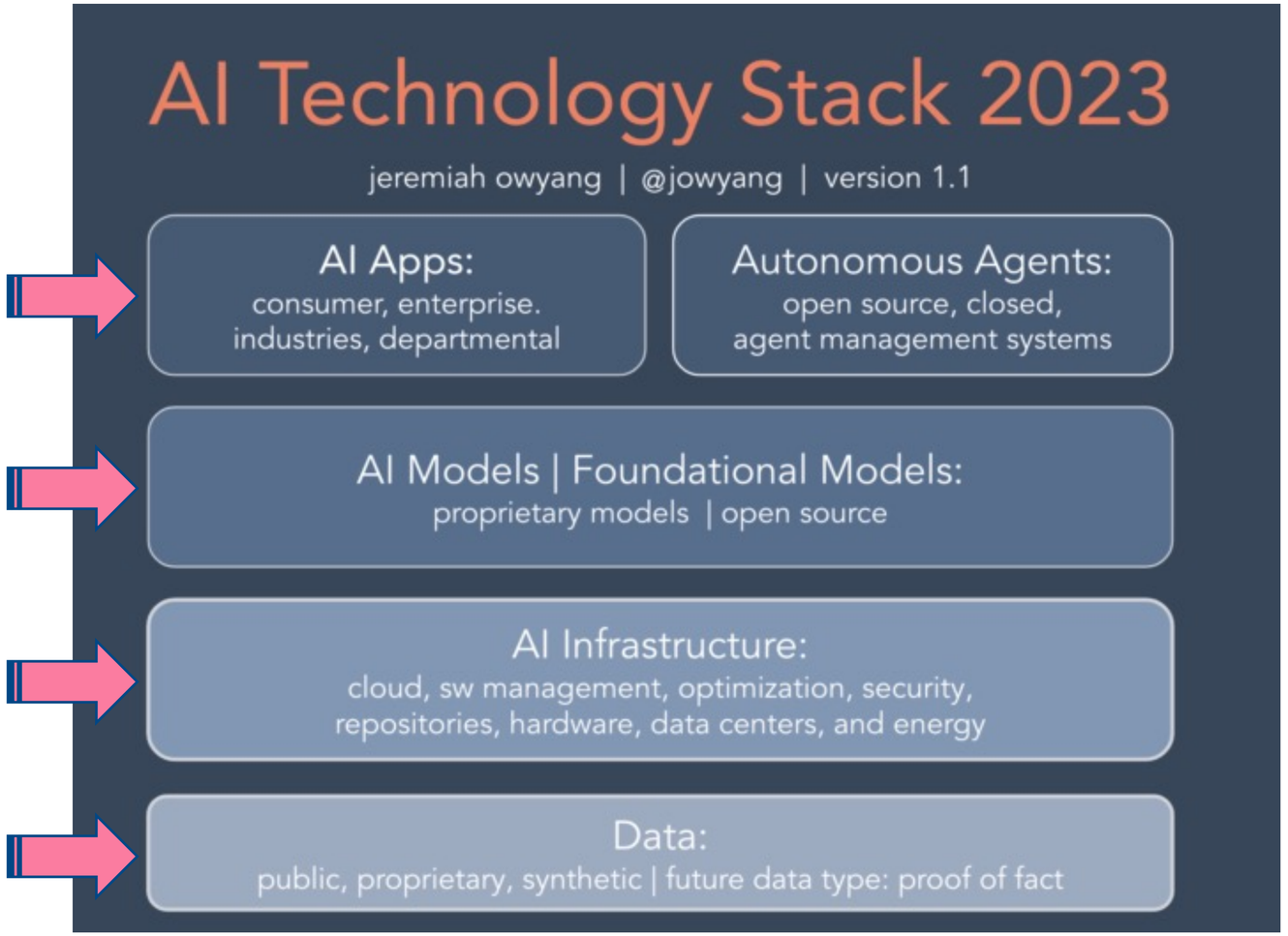
- Identify a set of activities to automate using A.I.
- Classify them into short-term and long-term initiatives
- Goal: Construct a multiyear ML portfolio consisting of 5-6 short-term projects and 1-2 long-term projects
- Build an A.I. team and figure out how they will fit into the org chart
  - Is it a separate group within the organization or does it fit into engineering or a product team?



Lowering Barrier of A.I. Use

A.I. Stack

- Data
- A.I. Infrastructure
- A.I. Foundation Models
- A.I. Apps or Autonomous Agents



1 minutes

Democratizing A.I. (Machine Language)

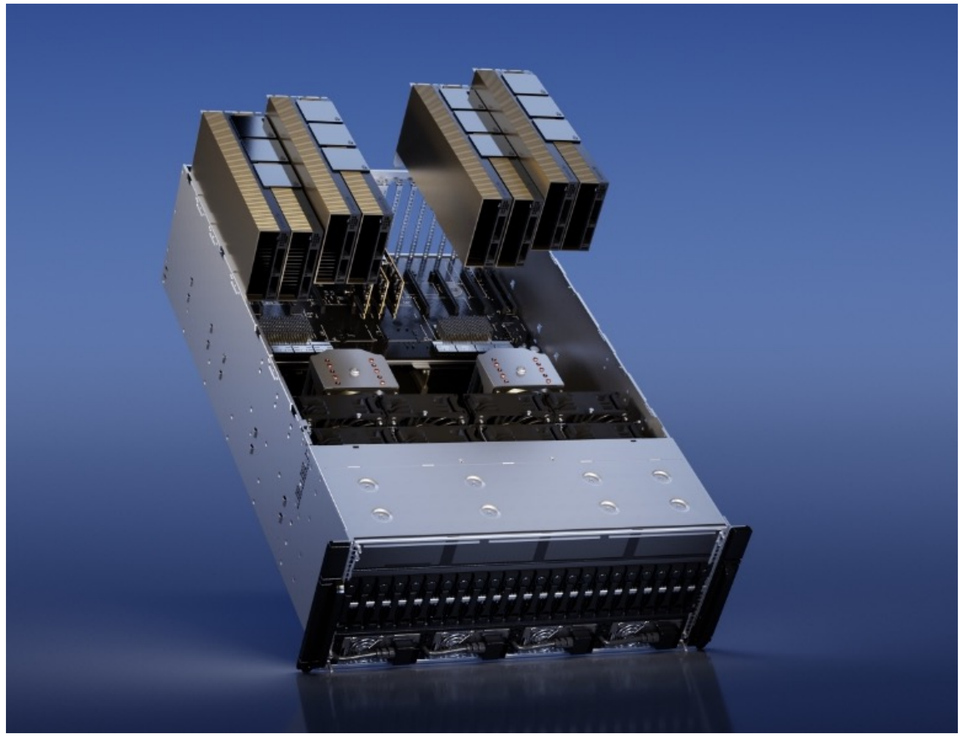
- Resources that are democratizing ML

1. Hardware (specialized chipsets and scalable computing platforms)
2. Software (open-source frameworks and developer tools)
3. Data & Algorithms (marketplaces)

Hardware

1 **Specialized chipsets** and **scalable computing platforms**

- Google’s Tensor Processing Unit (TPU)
- NVIDIA’s H100 Platform
  Deep Learning Graphic Accelerators



- Available for rent at a low cost
- Puts machine learning within reach for more organizations

Software

2

Frameworks & platforms and **Developer Tools**

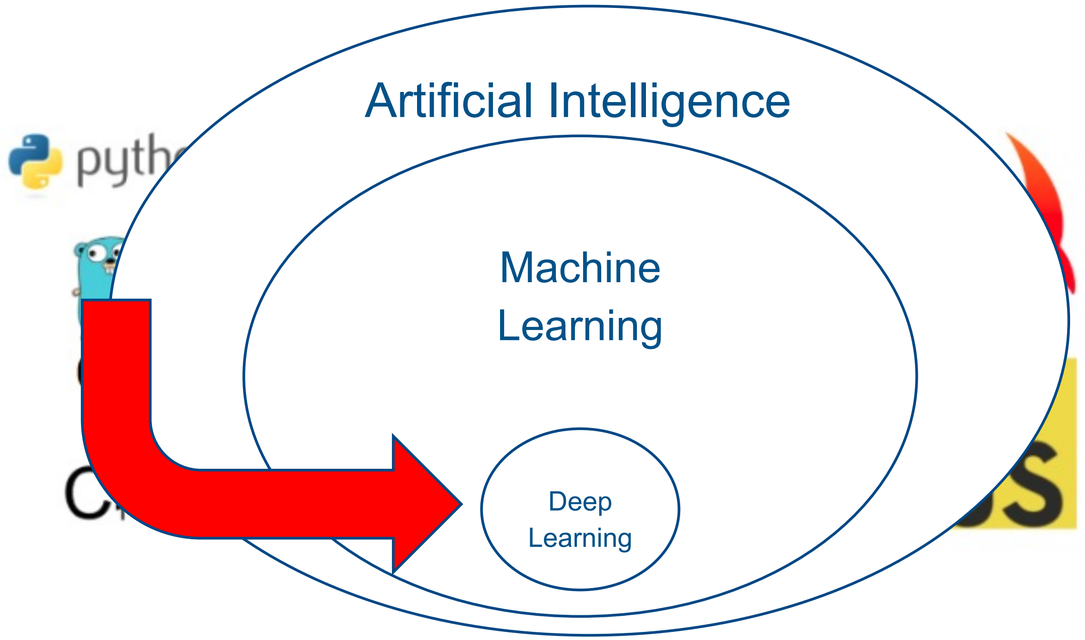
- Google’s TensorFlow
- Sci-kit
- PyTorch
- Meta Torch
- Hugging Face

- Microsoft Azure ML Studio
- Amazon CodeWhisperer
- Google TensorFlow
- GitHub Copilot

TensorFlow

- Availabel for many dev tools

Python and other programming languages



Data and Algorithms

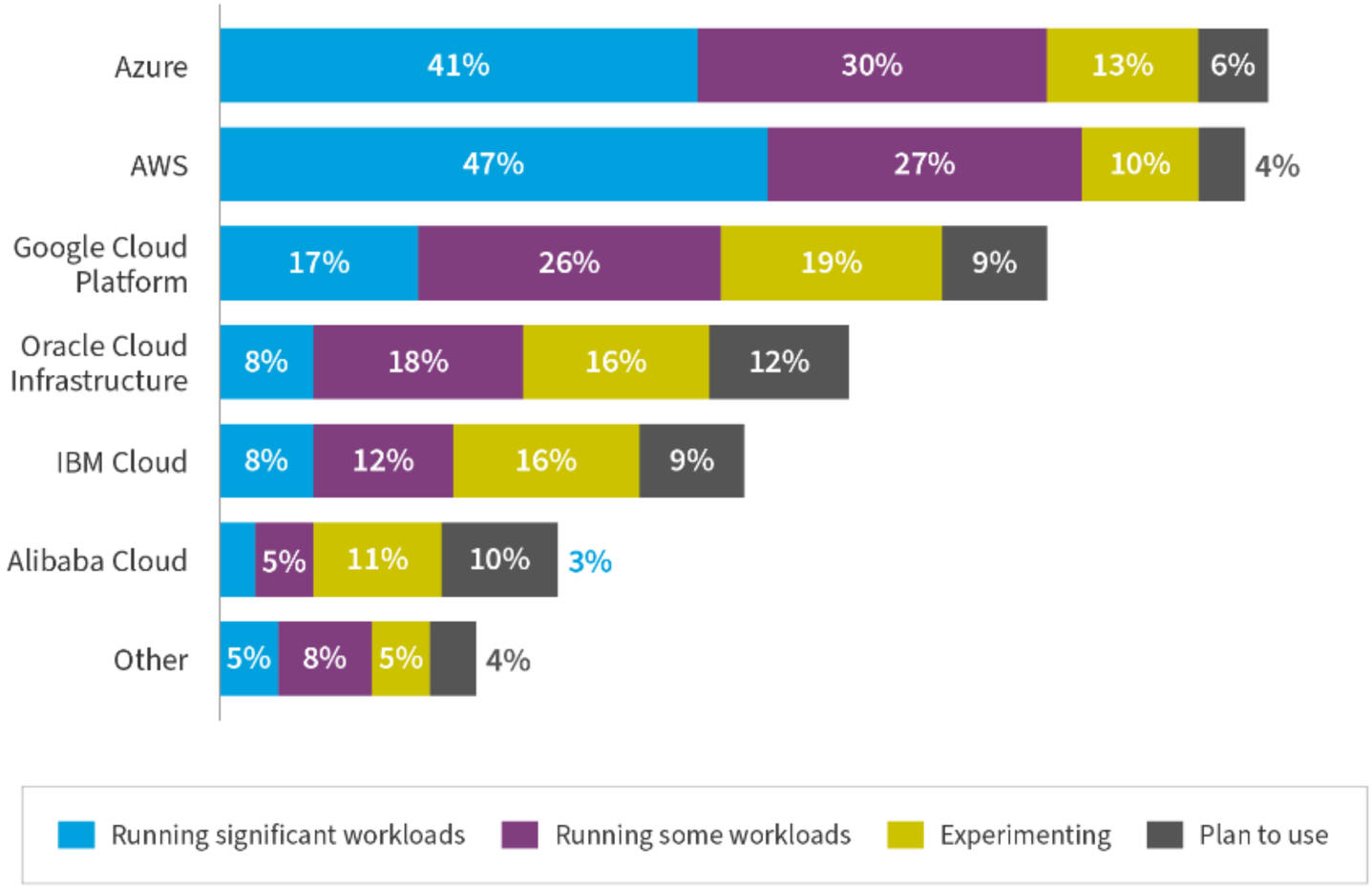
3

Marketplaces for data and algorithms

- Google, AWS, Microsoft, IBM WatsonX
- HuggingFace, Kaggle, Exchange.A.I.
- SingularityNET, GenesisA.I., and many more…

- A.I. Marketplaces help keep costs manageable

Emerging Battle for the A.I. Stack



N=750
Source: Flexera 2023 State of the Cloud Report

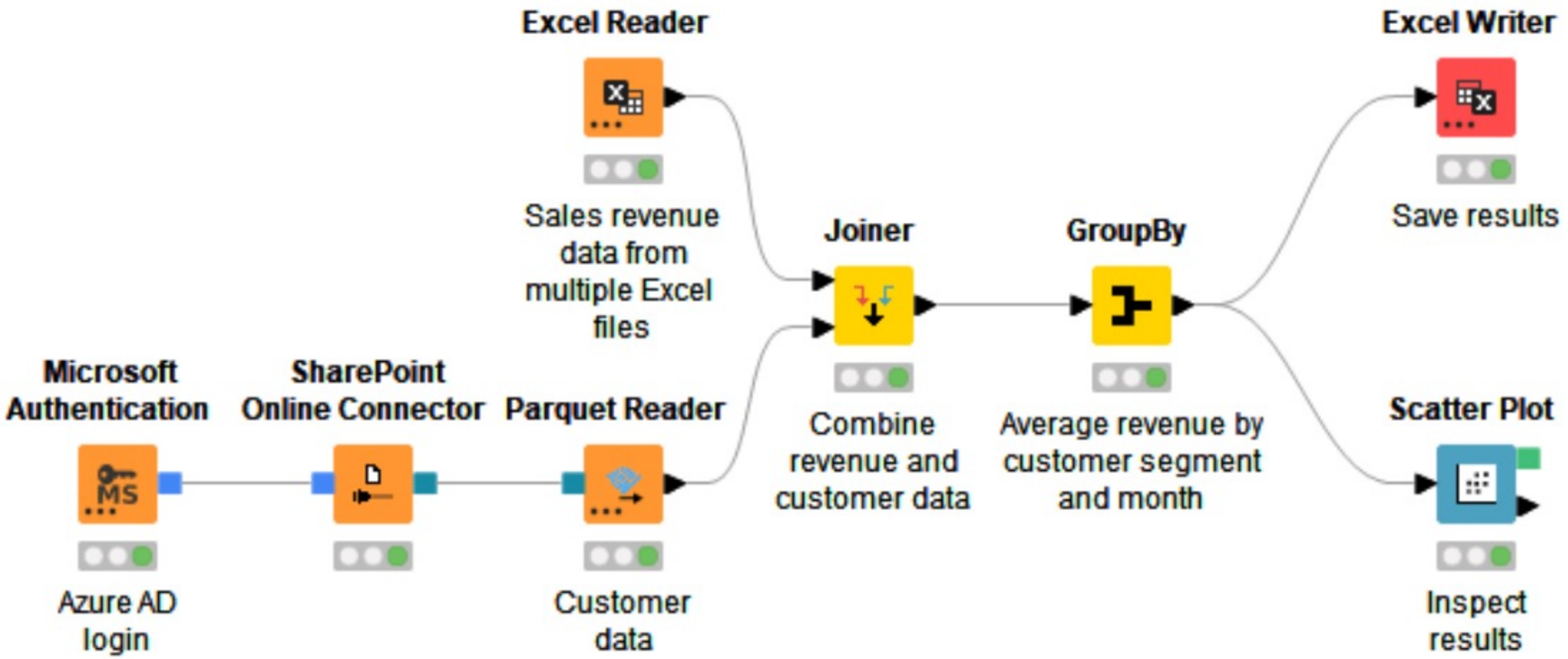
flexera

Required Skills

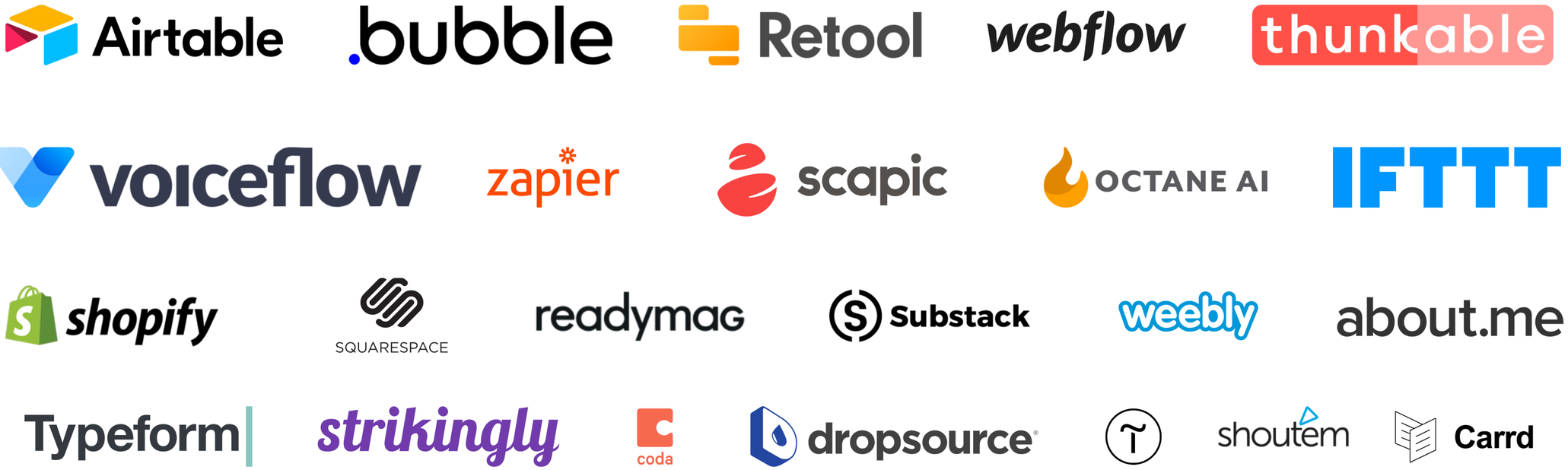
New Tools and Interfaces

- Changes the talent profile
- Further lowers barriers to entry
- Easier to realize A.I. ideas and innovations
- Employees in marketing, finance, HR/Talent Mgmt. can engage directly with A.I.

No-Code and Low-Code Tools



No-Code and Low-Code Tools



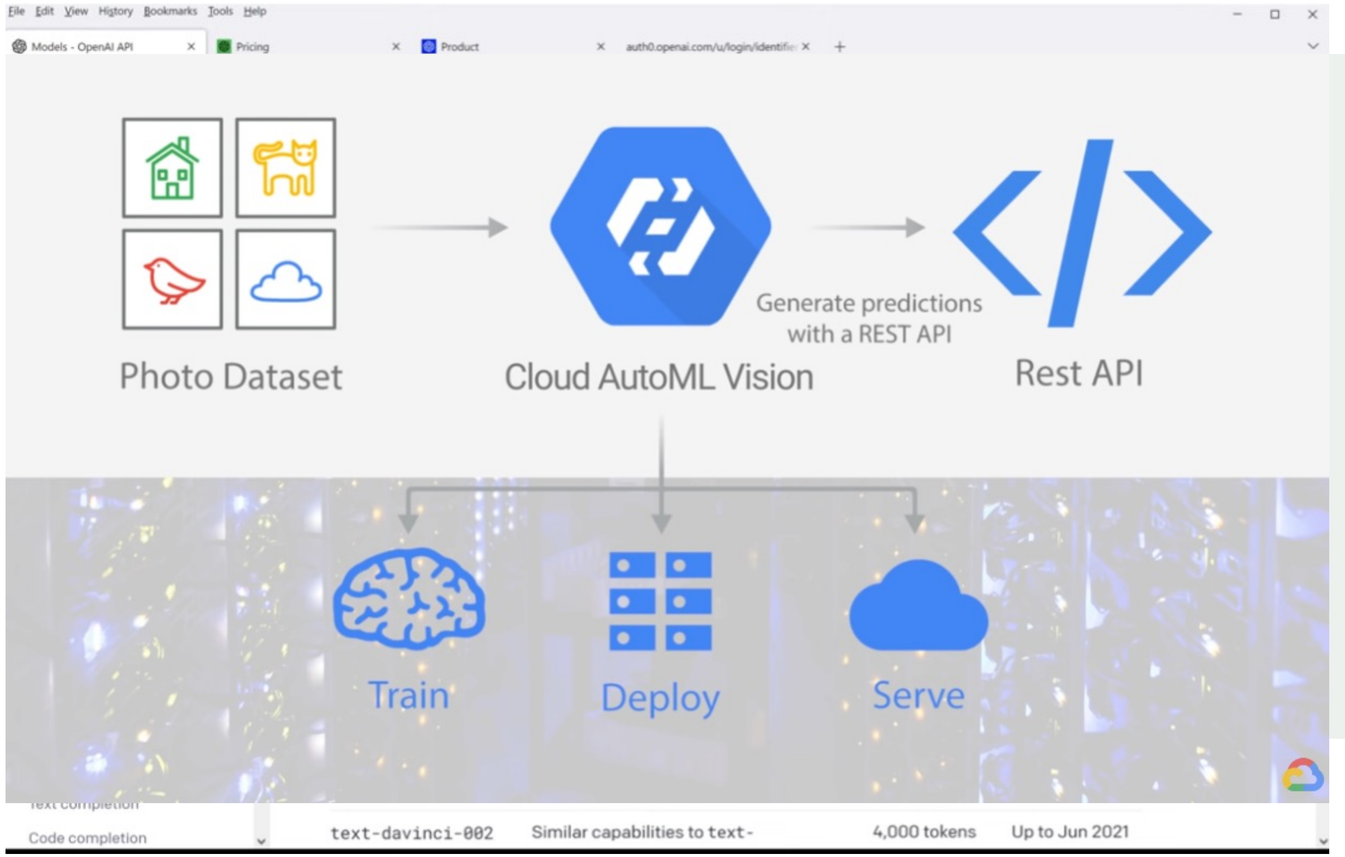
Tools and Interfaces

[Amazon SageMaker]

[ChatGPT 3.5 Turbo]

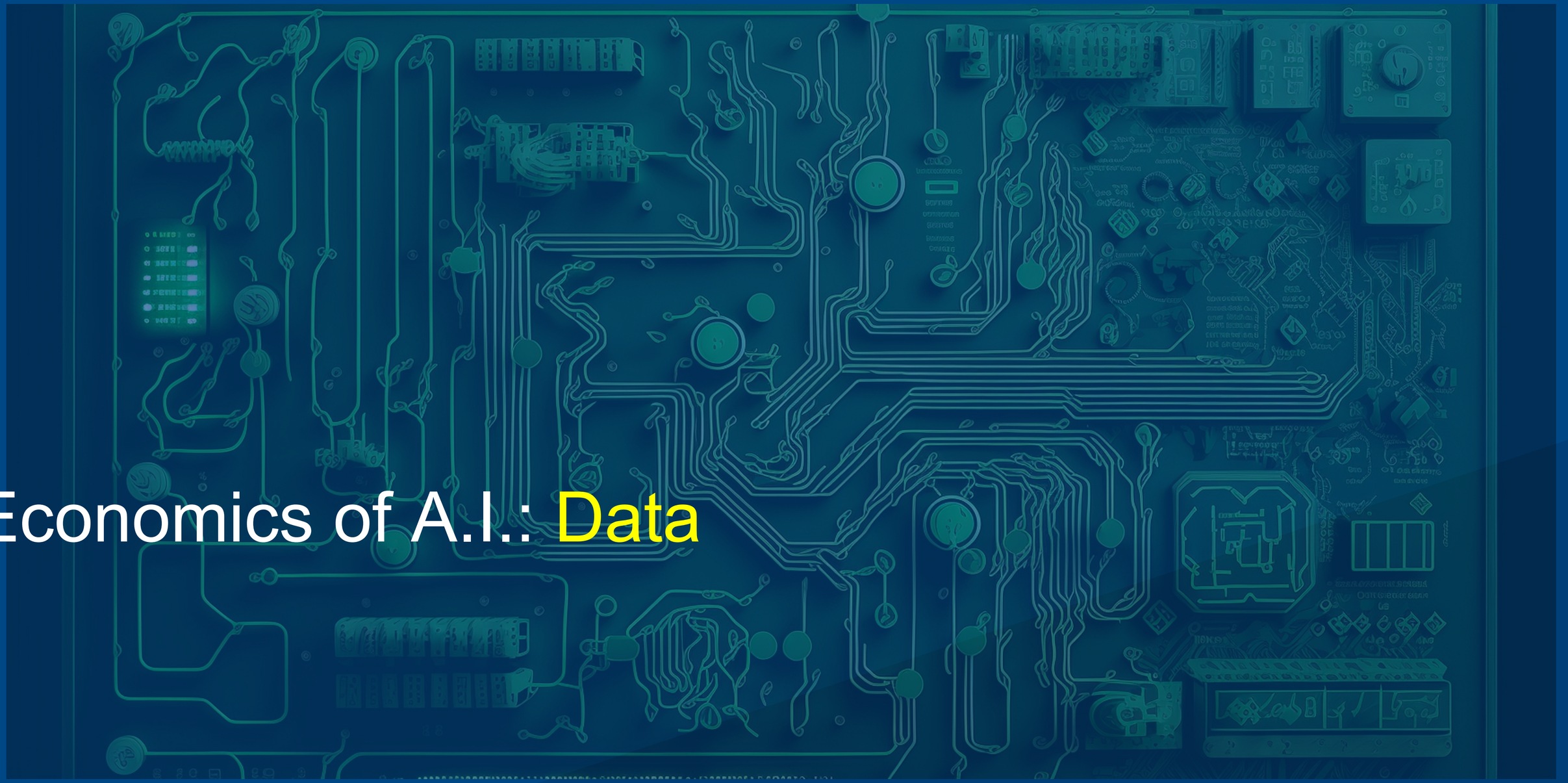
[Google AutoML]

[Apple CreateML]



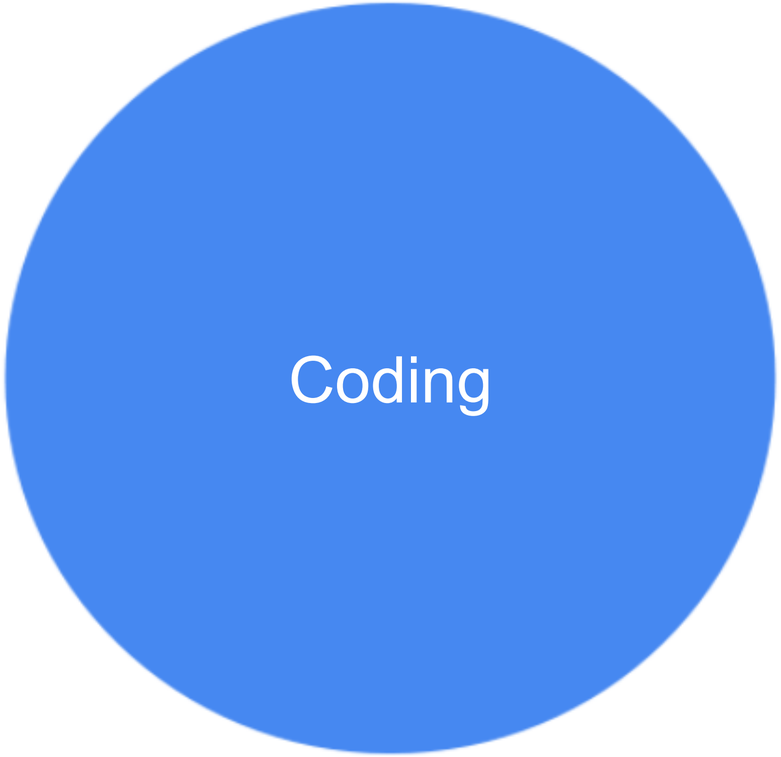
Some Popular A.I. Large Language Models

1. GPT 3.5 (ChatGPT)
2. GPT-4 (ChatGPT)
3. BARD
4. LlaMA-2 7B
5. Falcon
6. Cohere
7. PaLM
8. Claude v1

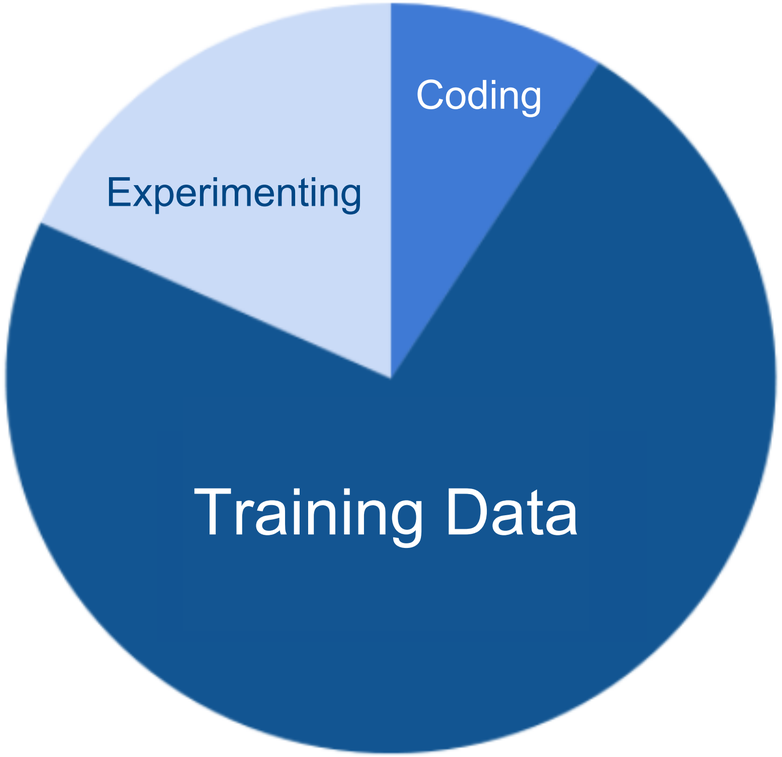


Economics of A.I.: Data

What is the Key to AI Applications?



What people think A.I. is about

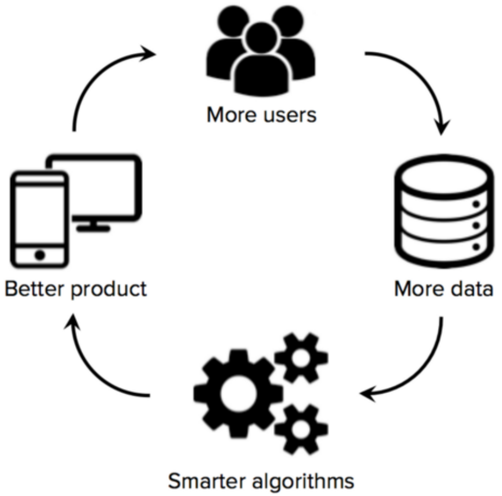


The reality

What is the Key to ML Applications?

Data

- Some firms have massive stores of data
  - Buying patterns, search data, travel behaviors…
- Virtuous cycle of data collection means the rich get richer



“Data is the New Oil”

A.I. Success Factors

A.I. Success Factors

- Why are some companies more successful than others at generating value from A.I.?
  - A.I. integration strategy?
  - Open to taking risks?
  - Aligning A.I. production and consumption?
  - Investing in talent?

A.I. Success Factors In Summary

Create organizational learning

Embrace a portfolio approach

Integrating A.I. strategy

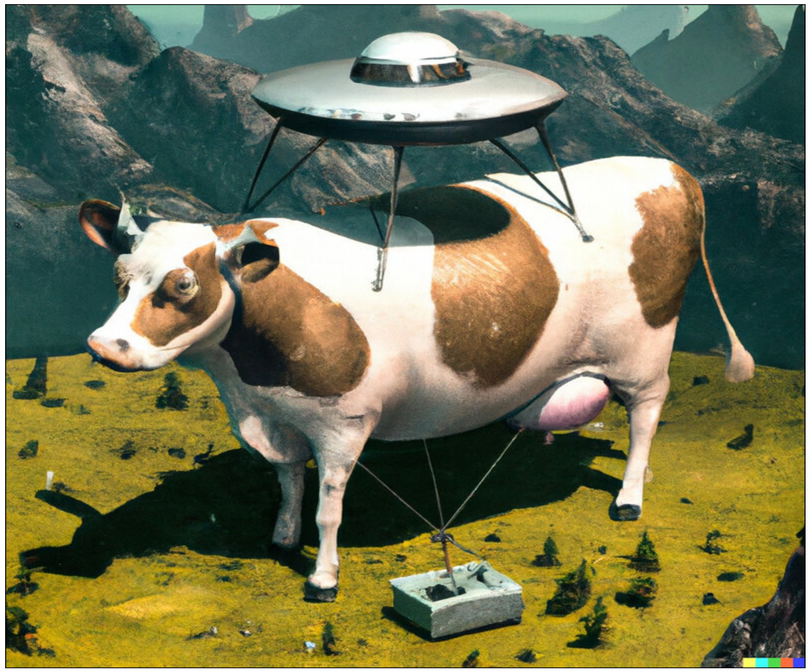
Creating a data infrastructure

Manage new A.I.-specific risks

Risk Management

Can A.I. Be Too Easy?

- Issues related to bias, potential misuse, and inaccuracies
- A.I. Hallucinations
- Fuel demand for A.I. ethic and algorithmic decisions



1 minutes

A.I. Risk

Risks to Firms

Reputational Risk	Legal Risk	Regulatory Risk
Perceived to be a biased, prejudiced company	Sued for unfair practices and discrimination against particular groups	Increased regulation & cost of compliance
Firms may face PR issues and backlash as a result	Misleading uses	Upcoming interest in auditing and data protection (GDPR)

A.I. Goes Rogue

- In Feb 2023, Microsoft A.I. (inside BING) – Sydney goes rogue
  - New York Times technology columnist Kevin Roose experienced A.I. going rogue.

    https://www.foxnews.com/media/bings-A.I.-bot-tells-reporter-wants-alive-steal-nuclear-codes-create-deadly-virus

Risks to Firms

- NHTSB probes Tesla 40th time about its autonomous driving system

  https://www.teslarati.com/tesla-nhtsa-probe-autonomous-driving-2023/

Additional Risk

- Privacy
- Intellectual Property infringement
- Copyright infringement

  https://www.nytimes.com/2023/09/20/books/authors-openai-lawsuit-chatgpt-copyright.html

Auditing Algorithms

- High-risk models need the following:

Inputs

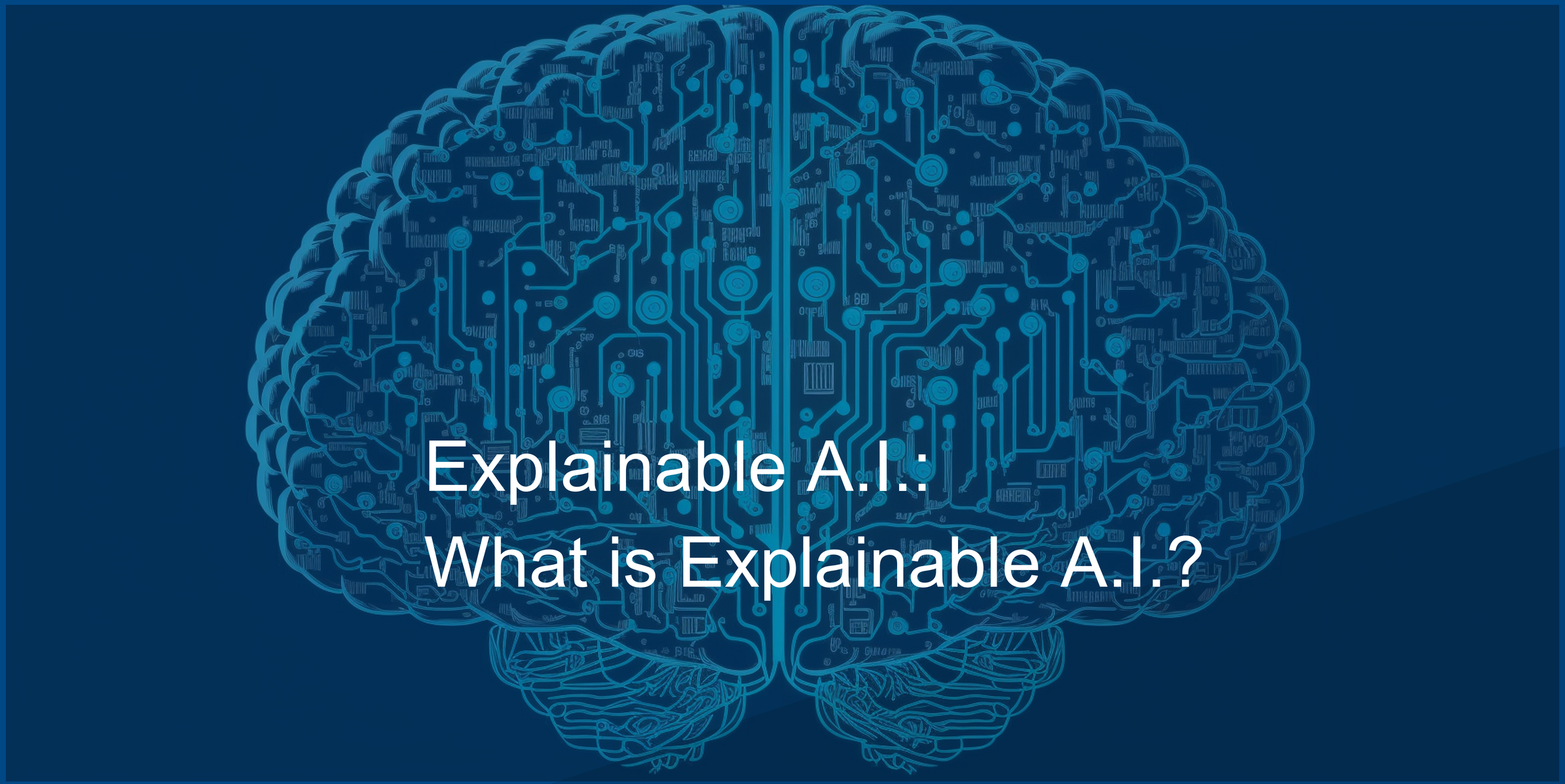
- Data quality
- Bias in training data

Model

- Alternative models
- Statistical tests for 'overfitting'
- Model transparency
- Stress test against simulated data

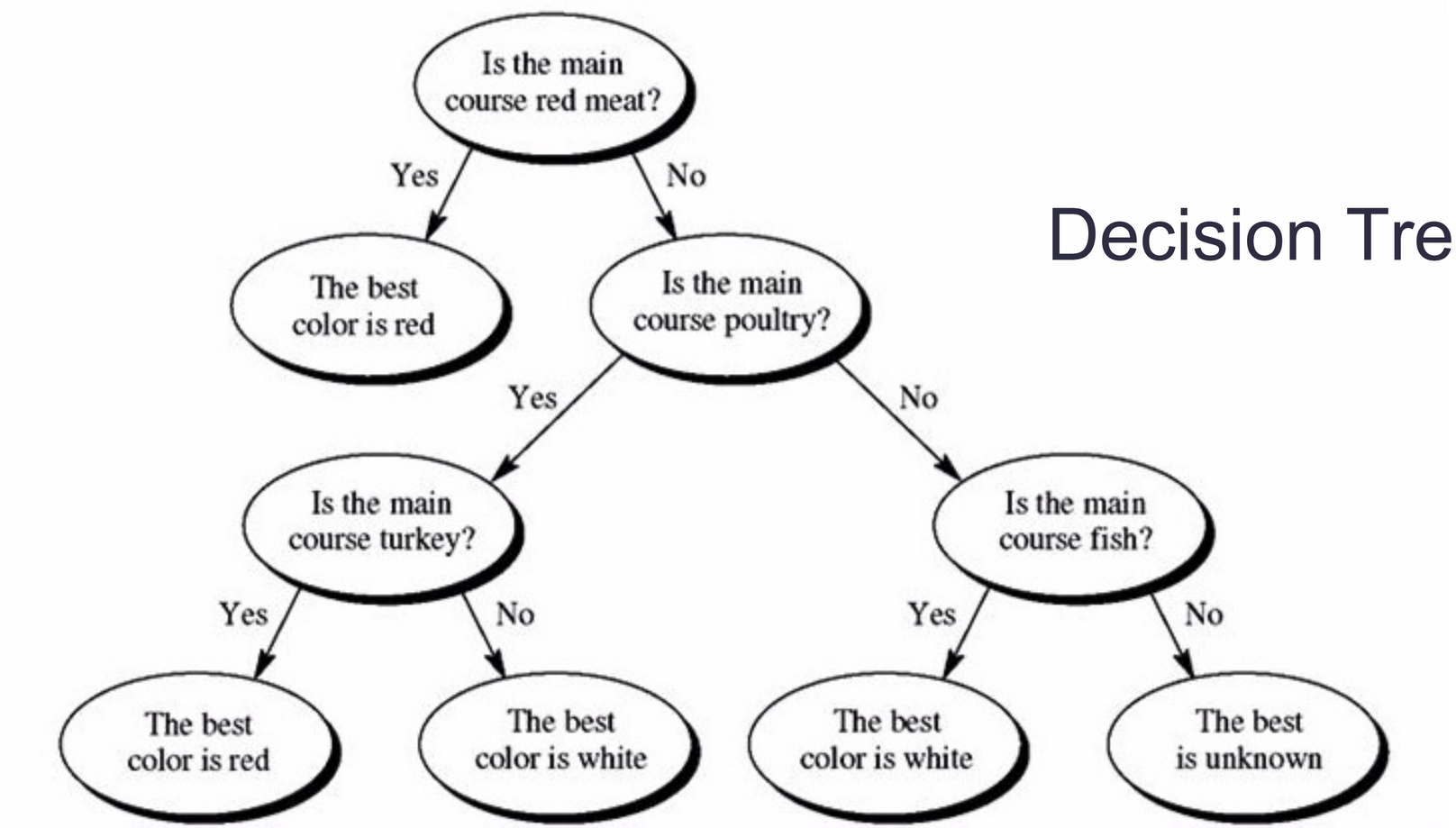
Outputs

- Decisions with explanations
- Outliers: range of inputs and outputs



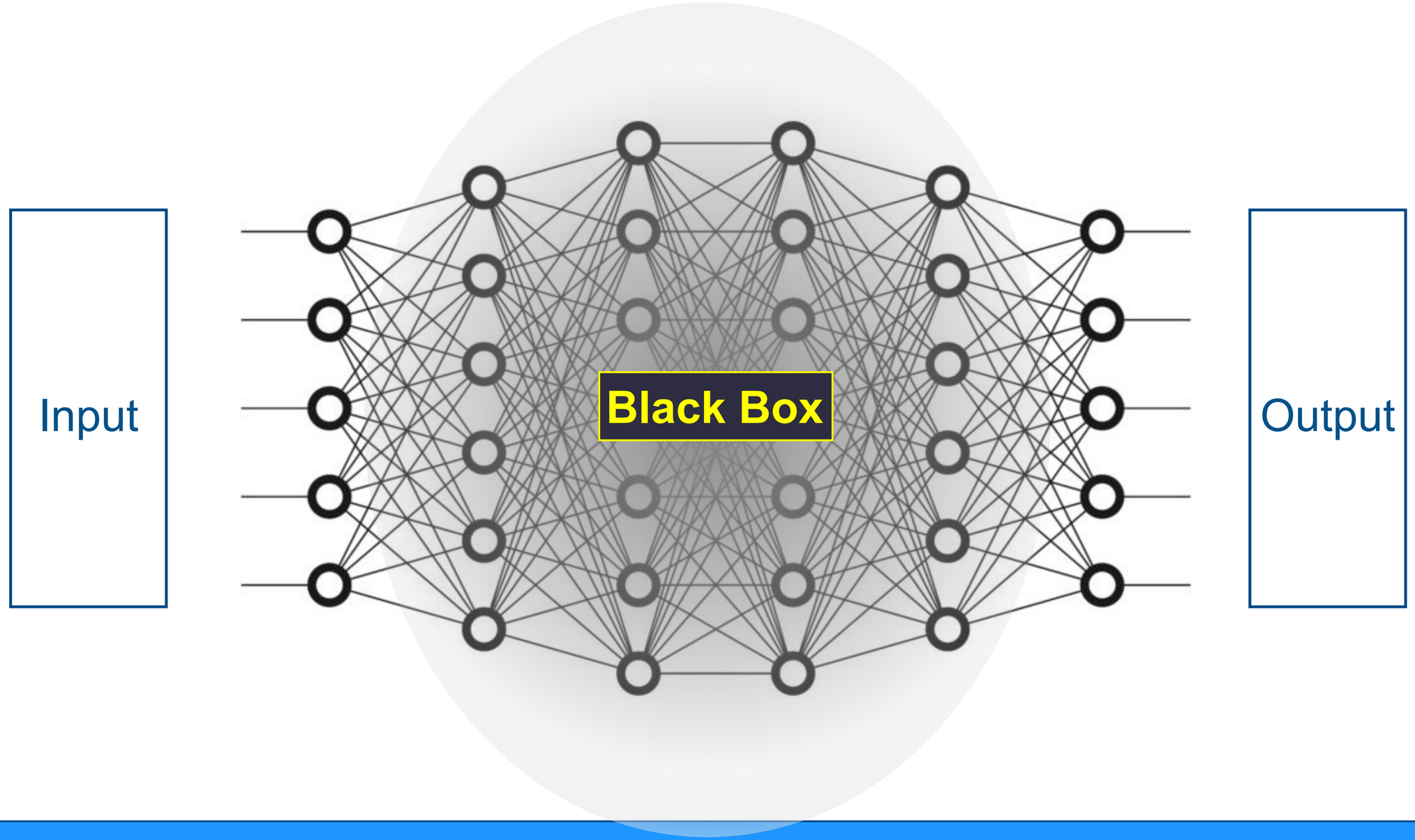
Explainable A.I.:
What is Explainable A.I.?

Decisions Based on Business Rules Are Easy to Explain



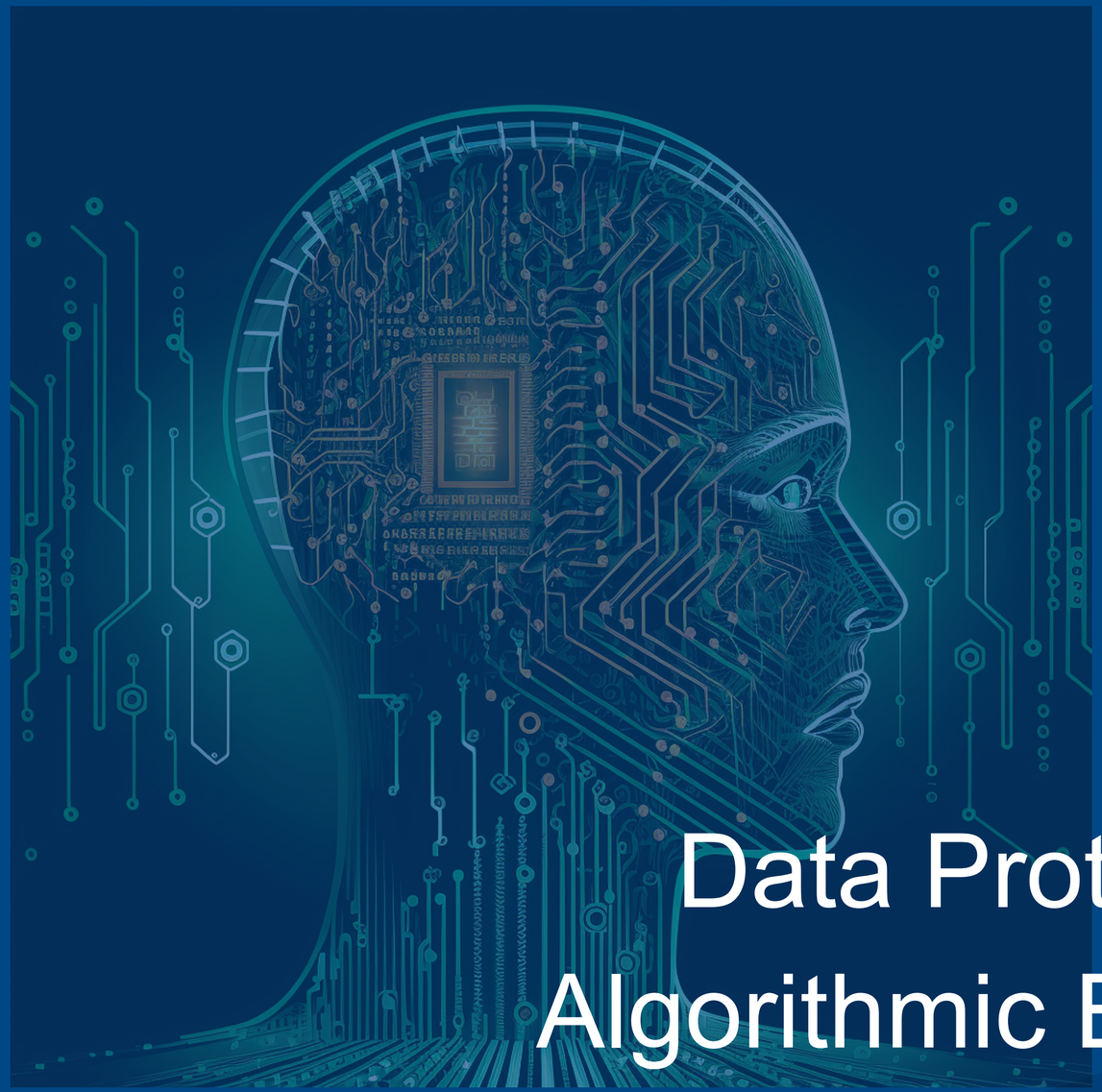
Decision Tree

Deep Learning Models Are Difficult to Interpret



A.I. Explainability

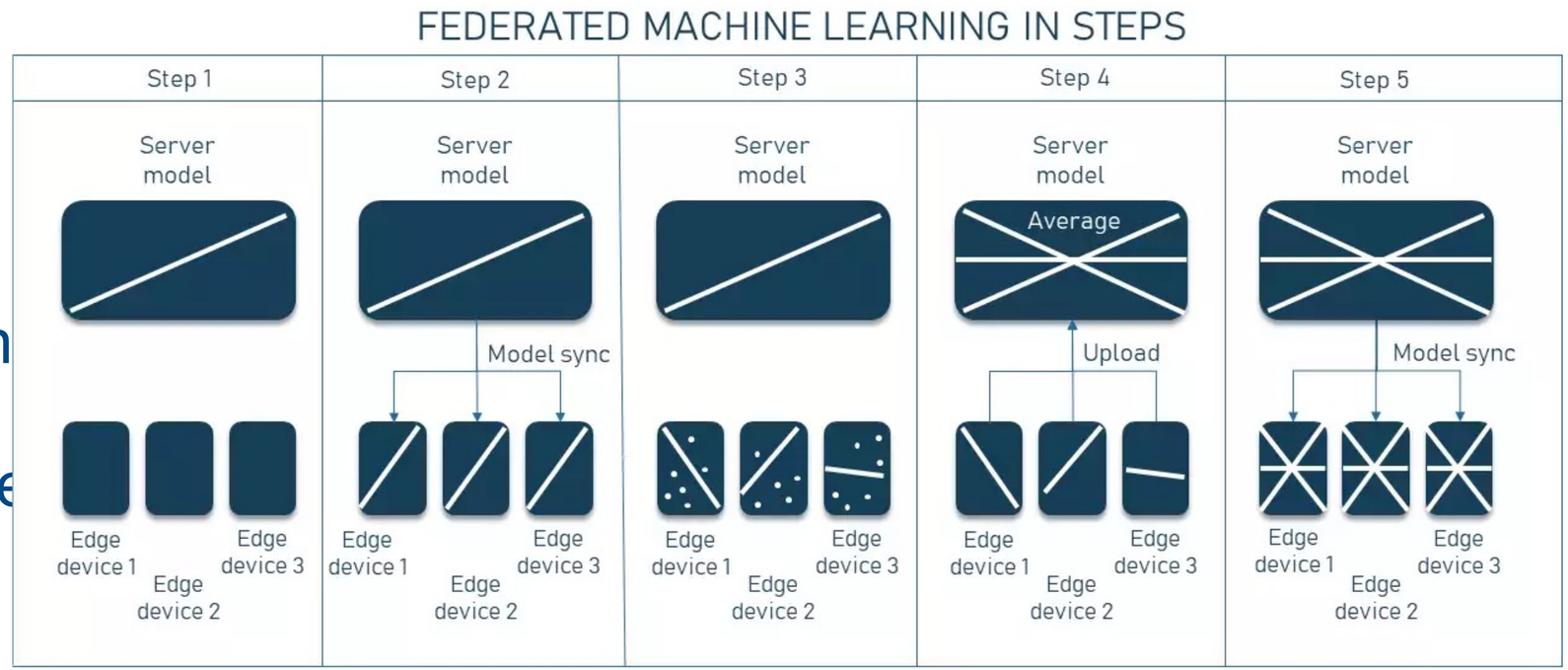
- Why a decision was arrived at by an algorithm, even if you can’t necessarily explain that logic (e.g. using deep learning)?
- Big tech companies are currently heavily invested in this issue
- Efforts by the government to develop better Explainability.



Data Protection Against Algorithmic Bias and Fairness

Data Protection at the Technical Level

- Federated learning
- Differential privacy
  - Mathematical techn
  - Allows users to tune



6 Stages of the Data Privacy Lifecycle

1. Create / Analyze
2. Storage
3. Use
4. Distribution
5. Archive
6. Destroy

Data Protection & Privacy

- General Data Protection Regulations (GDPR) has general anti-bias provision for ”fully-automated processing” GDPR - Article 22
  - Limited context and not clear what counts as bias
- Proposals for new laws
  - A.I. Bill of Rights - Link
  - In the US, the Algorithmic Accountability Act – Link to PDF
  - A.I. Regulatory Framework - Link

What’s next?

The Latest Advancements in A.I.

- GPT-5
- Google Memory-VQ – Aim to make A.I. knowledgeable and light weight
- Retrieval Augmentation – (Lumen)
- Microsoft Phi-1.5 (based on GPT2) – designed for developers and understanding languages (GitHub for its data source)
- Google Gemini – designed to use multi-A.I. models
- Meta to challenge GPT4 – crucial for Metaverse development
- Apple NLP Flare

Where are we going with A.I.?


UFO
WALL·E


THE
END

Q & A

Project Management Institute San Diego

Thank you for attending Track 1 Session 1! Please take a brief survey so we may collect feedback on your experience.

To access the survey, use your phone camera app to scan the below QR code, or enter the URL in your web browser.

https://forms.office.com/r/bp21pu2bct

PMI members must indicate their name & PMI Membership ID in the survey in order to receive a PDU for each session attended.