



AltaML

Machine Learning 101

(Or, Why You Should Care About ML)
Cory Janssen, Co-Founder, AltaML



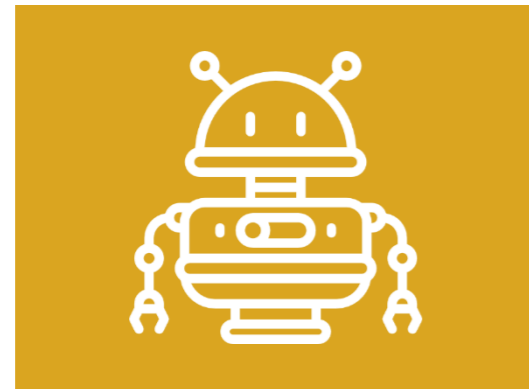
“I have a hard time thinking of an industry that I don’t think AI will transform in the next several years”

- **Andrew Ng**, Founder DeepLearning.AI



What is ML?

A Few Definitions



Artificial Intelligence

Replicating part, all, or more than human intelligence



Machine Learning

Enabling computers to learn without being explicitly programmed (usually with large datasets)



Deep Learning

Building multiple layers of abstraction on datasets to construct higher-level meaning

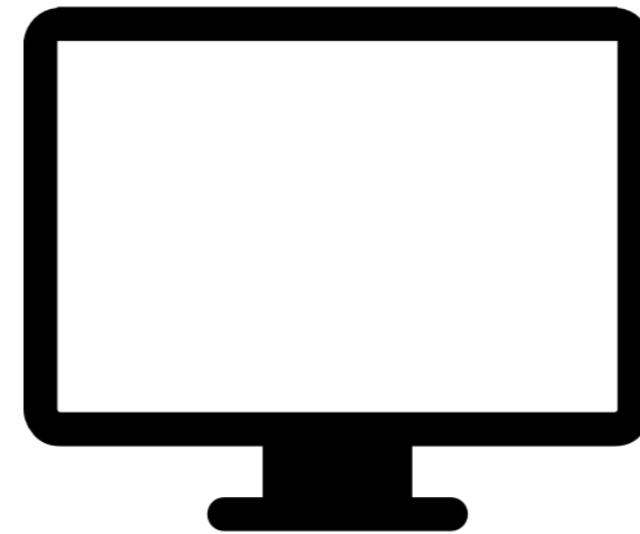


What is ML?

Not Traditional

Traditional Programming

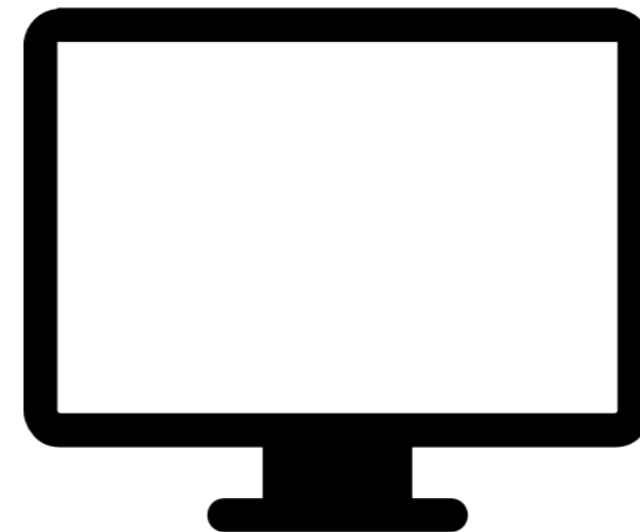
Data →
Rules →



Answers

Machine Learning

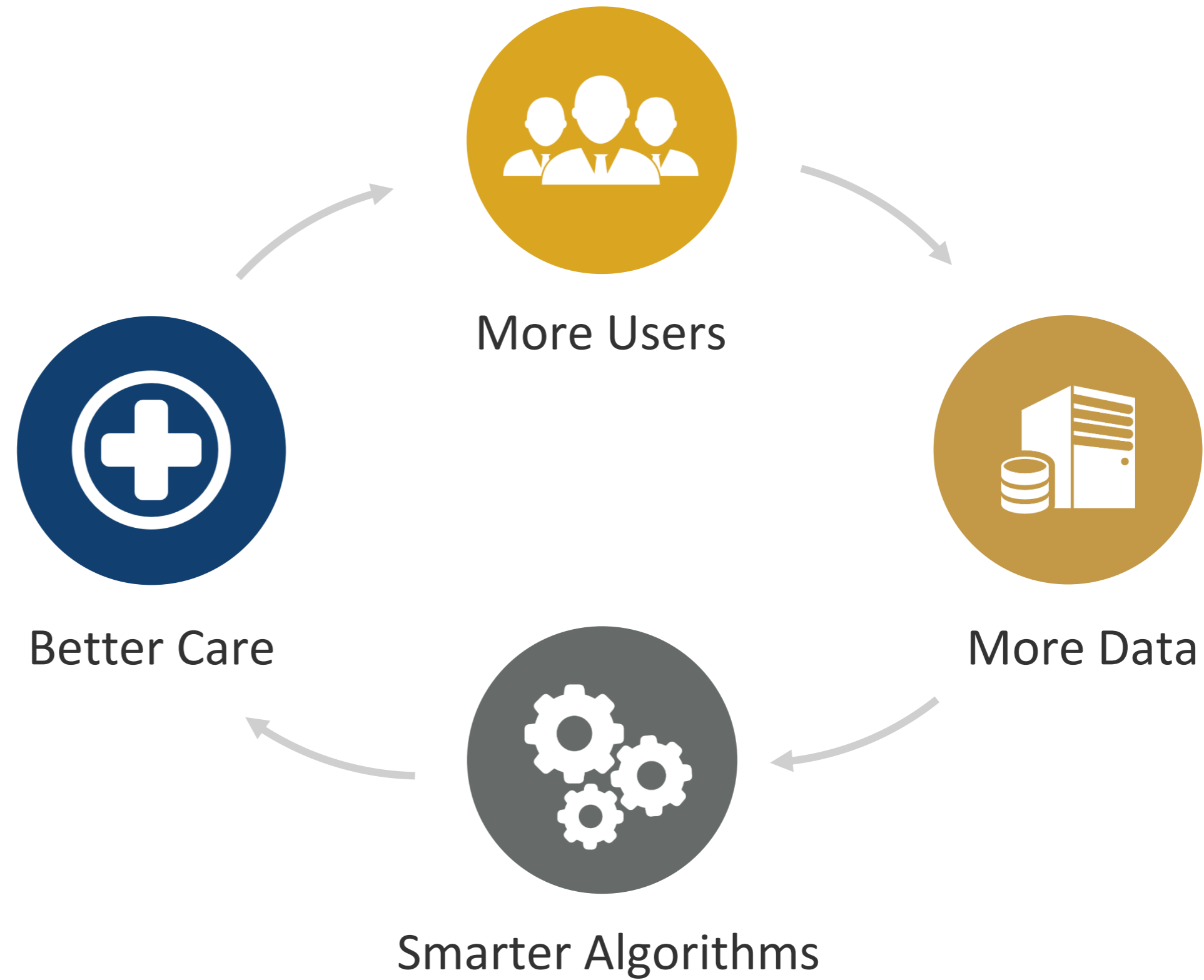
Data →
Answers →



Rules

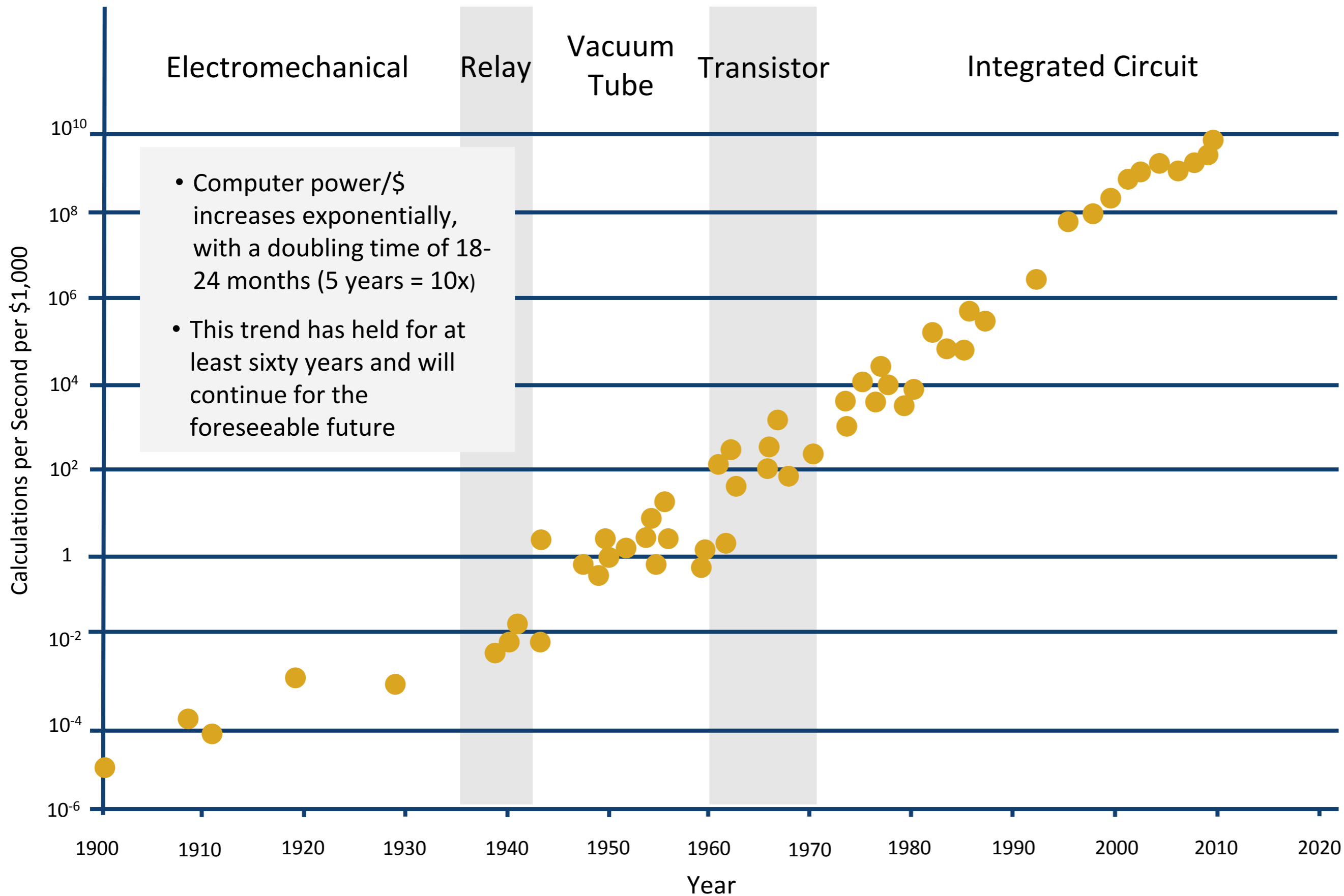


Data Network Effect





Moore's Law



Why Now?

It's About The Hardware





Edmonton Edge



The AI community in Edmonton may have gotten off to a quiet start, but it is now viewed as a world leader in the field.

– Financial Post

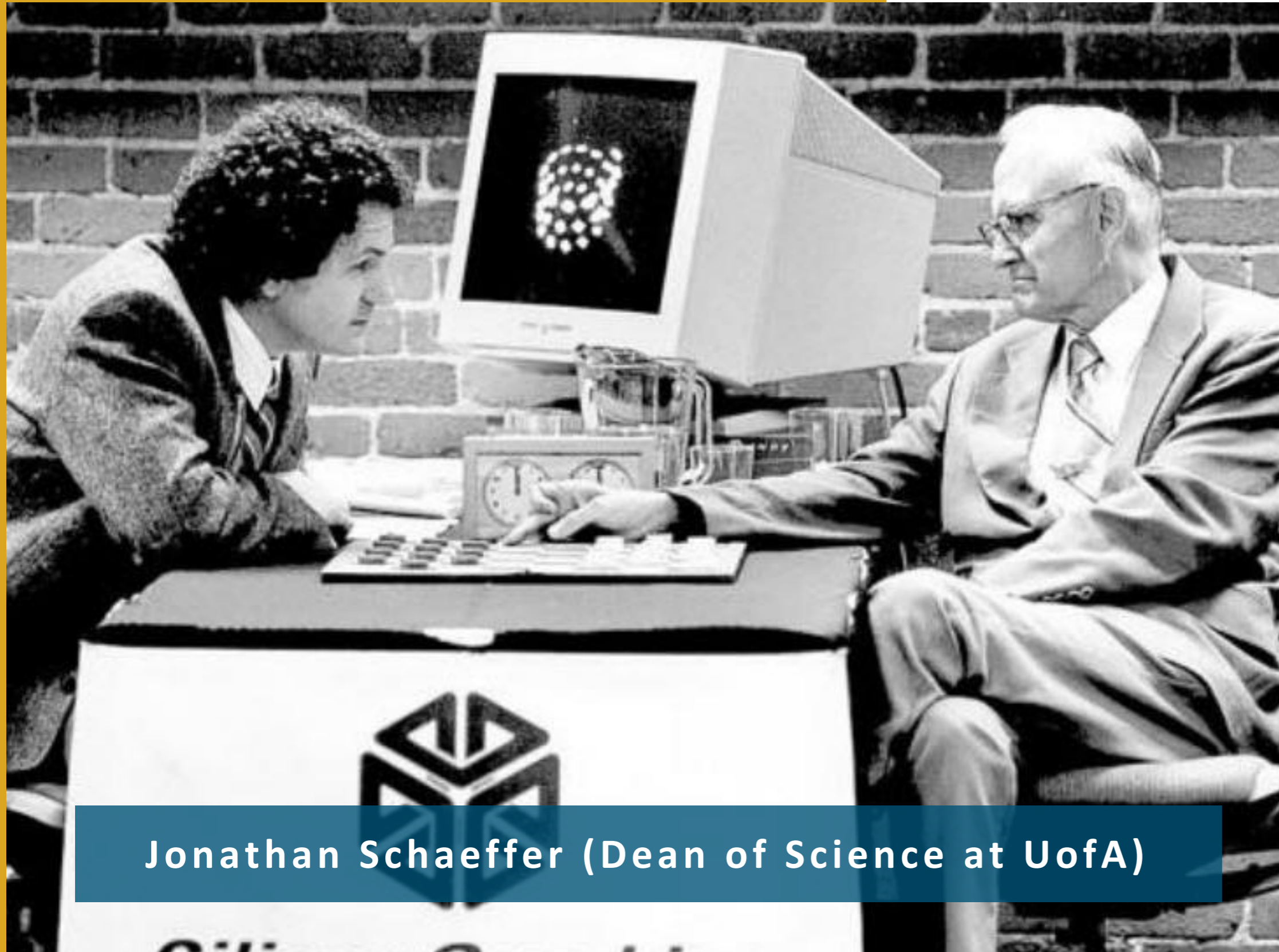
Rank institutions in by average count of publications from to

All Areas [\[off | on\]](#)

AI [\[off | on\]](#)

- ▶ Artificial intelligence
- ▶ Computer vision
- ▶ Machine learning & data mining
- ▶ Natural language processing
- ▶ The web & information retrieval

Rank	Institution	Average Count	Faculty
1	▶ Carnegie Mellon University	131.3	62
2	▶ University of Alberta	56.5	23
3	▶ Cornell University	47.6	28
4	▶ Massachusetts Institute of Technology	43.3	35
5	▶ University of Texas at Austin	42.8	17



Jonathan Schaeffer (Dean of Science at UofA)

1992

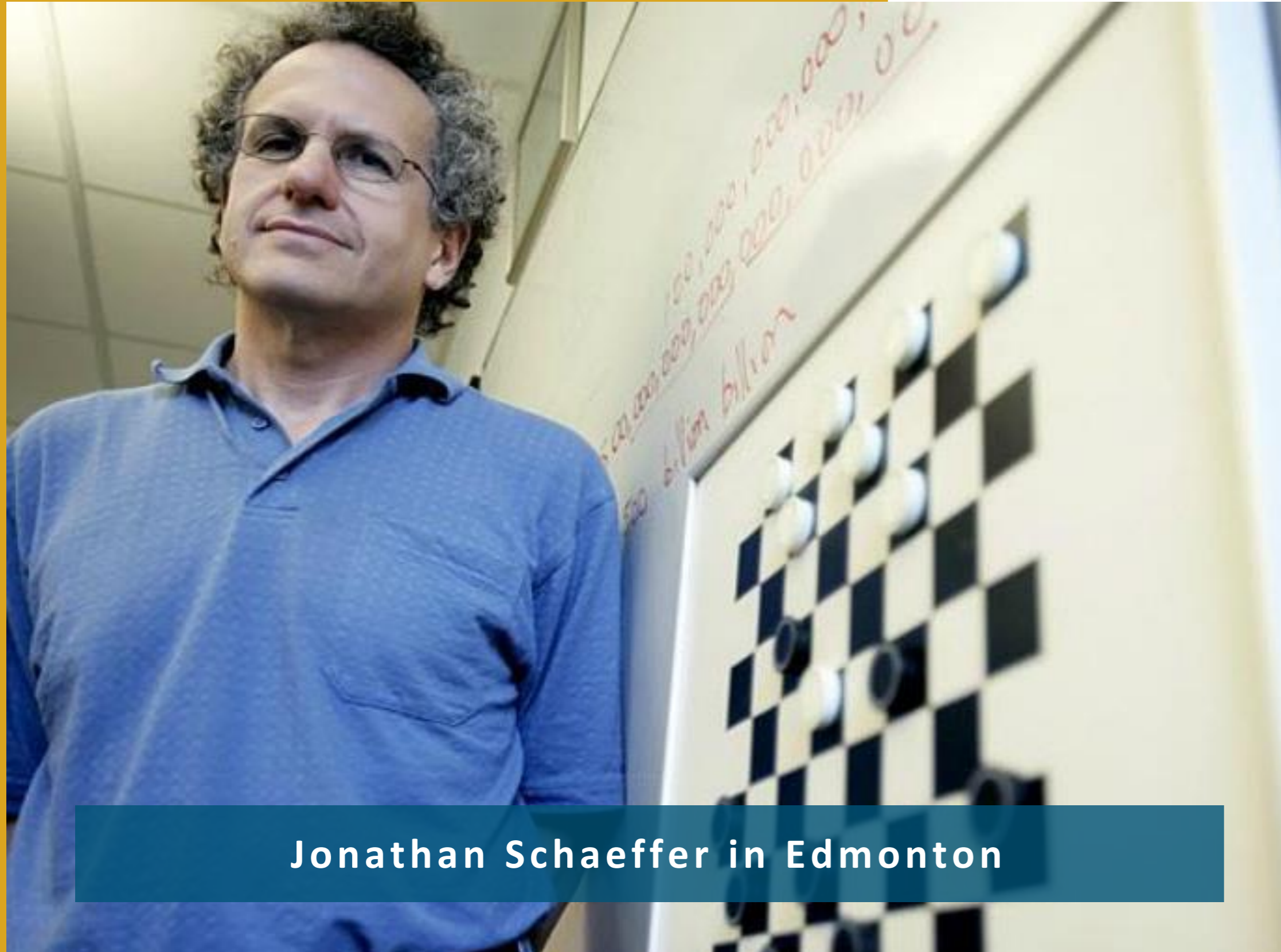
World's First
Officially Sanctioned
Man-Machine
Computer
Championship



1997

Deep Blue Defeats
Kasparov

Murray Campbell, UofA grad played key role



Jonathan Schaeffer in Edmonton

2007

Checker is Solved



Deepstack Team, led by Dr. Michael Bowling

2015

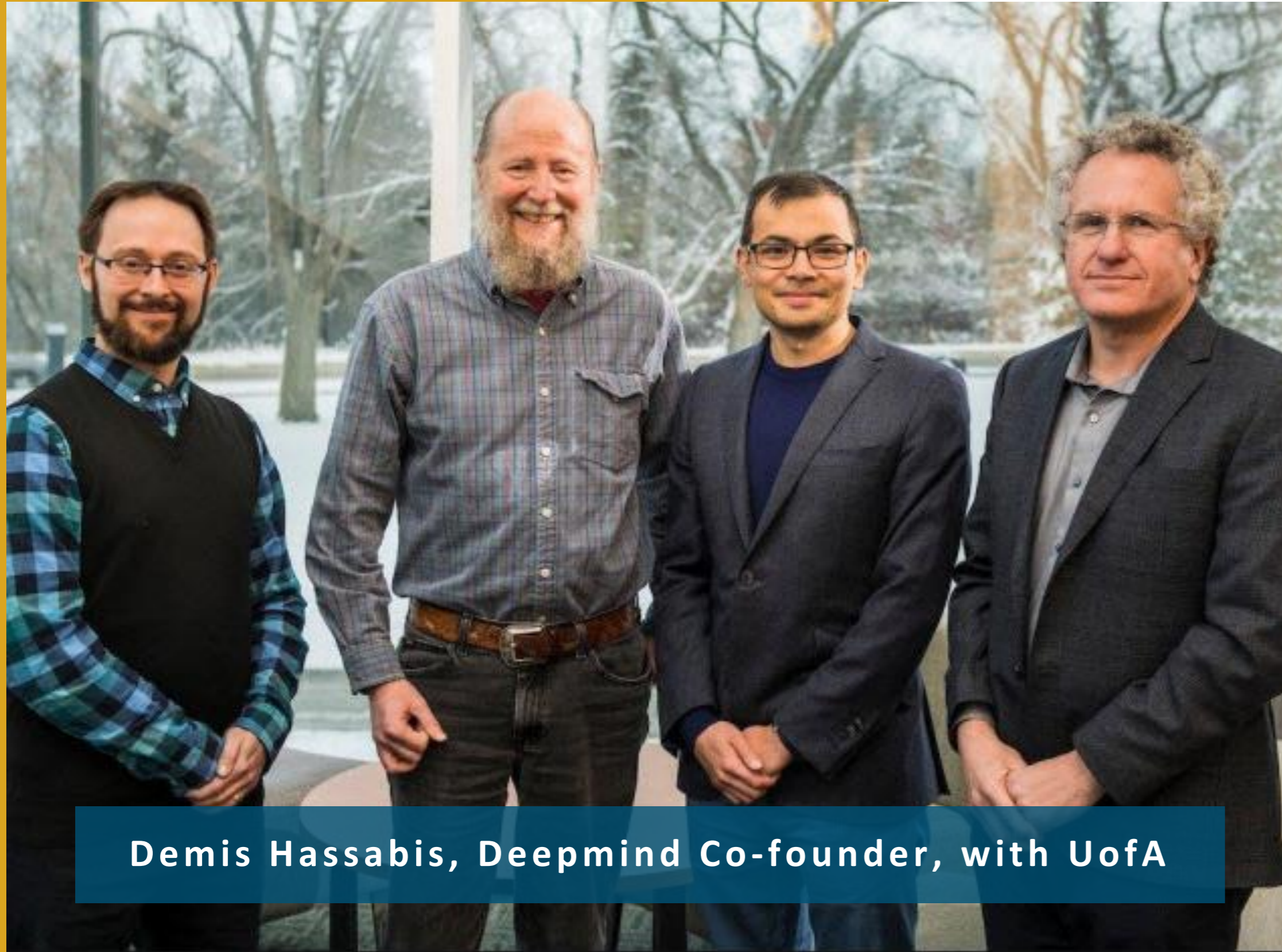
Heads-up limit Texas
Hold'em Solved



2016

AlphaGo Defeats
Lee Sedol

David Silver and Aja Huang (pictured) attended UofA



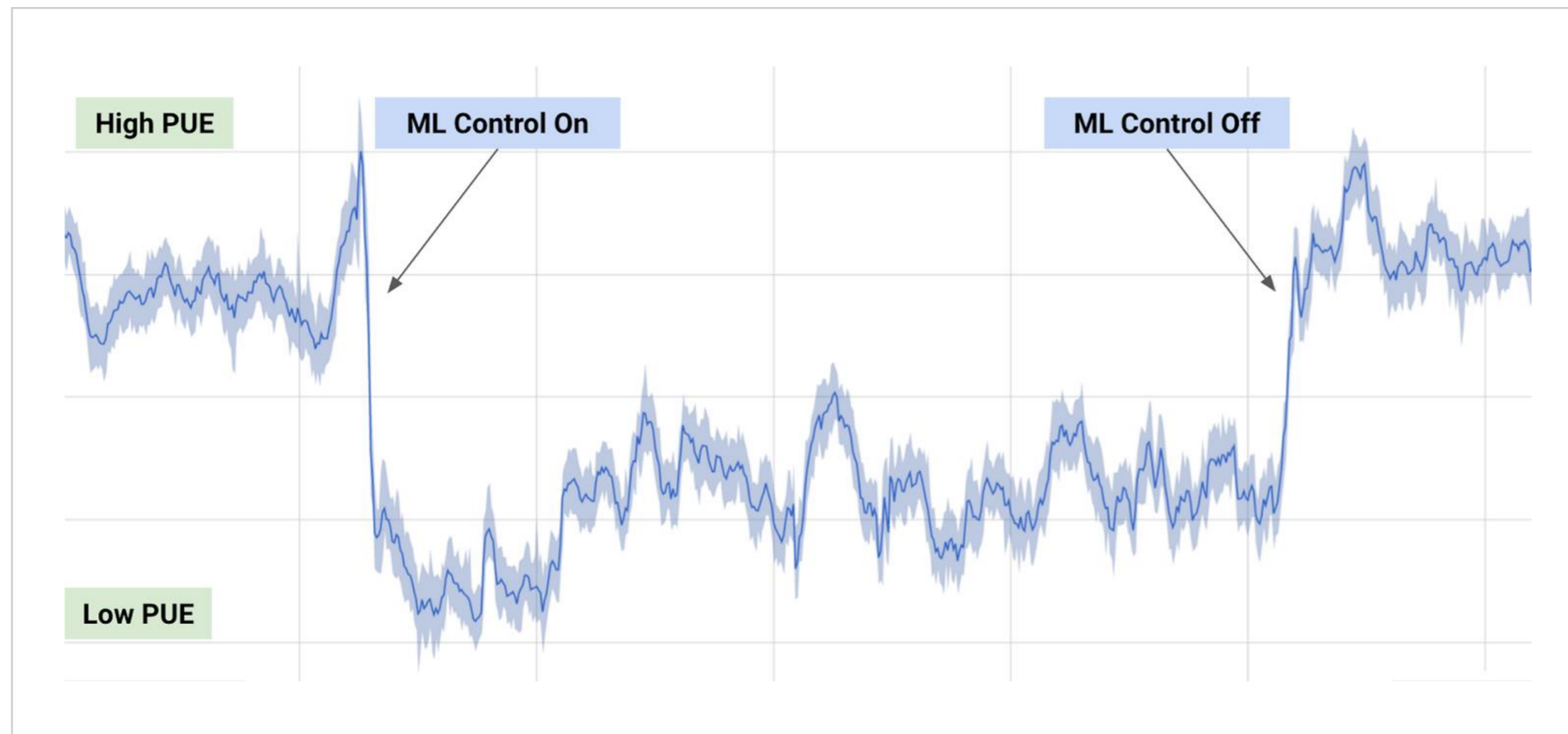
Demis Hassabis, Deepmind Co-founder, with UofA

2017

Google's
Deepmind Opens
in Edmonton



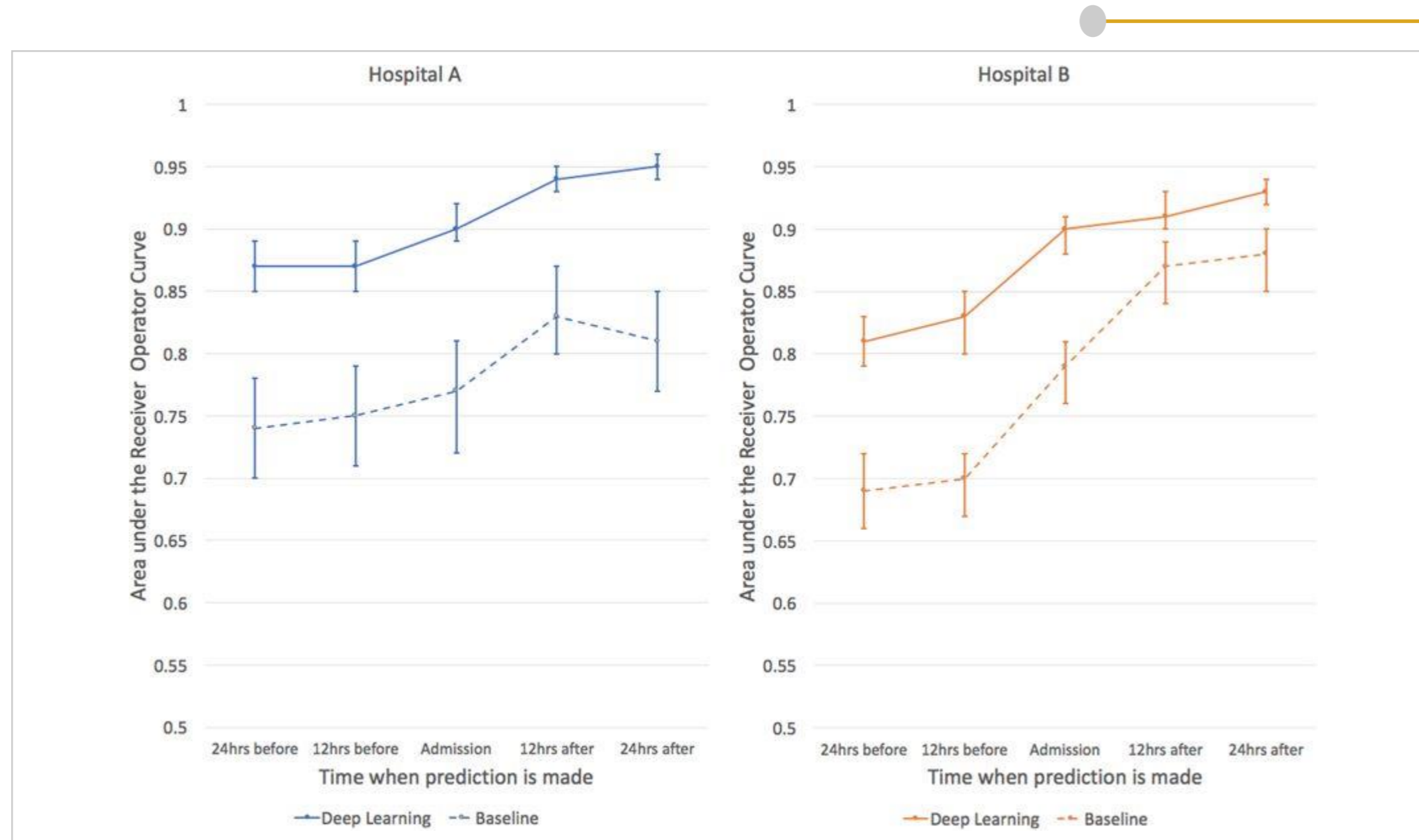
Examples - Deepmind



Cut energy used for cooling by **40%** at Google's data centers



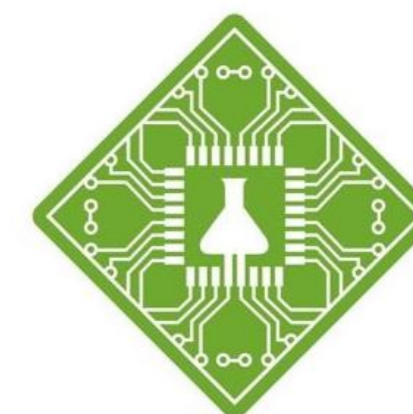
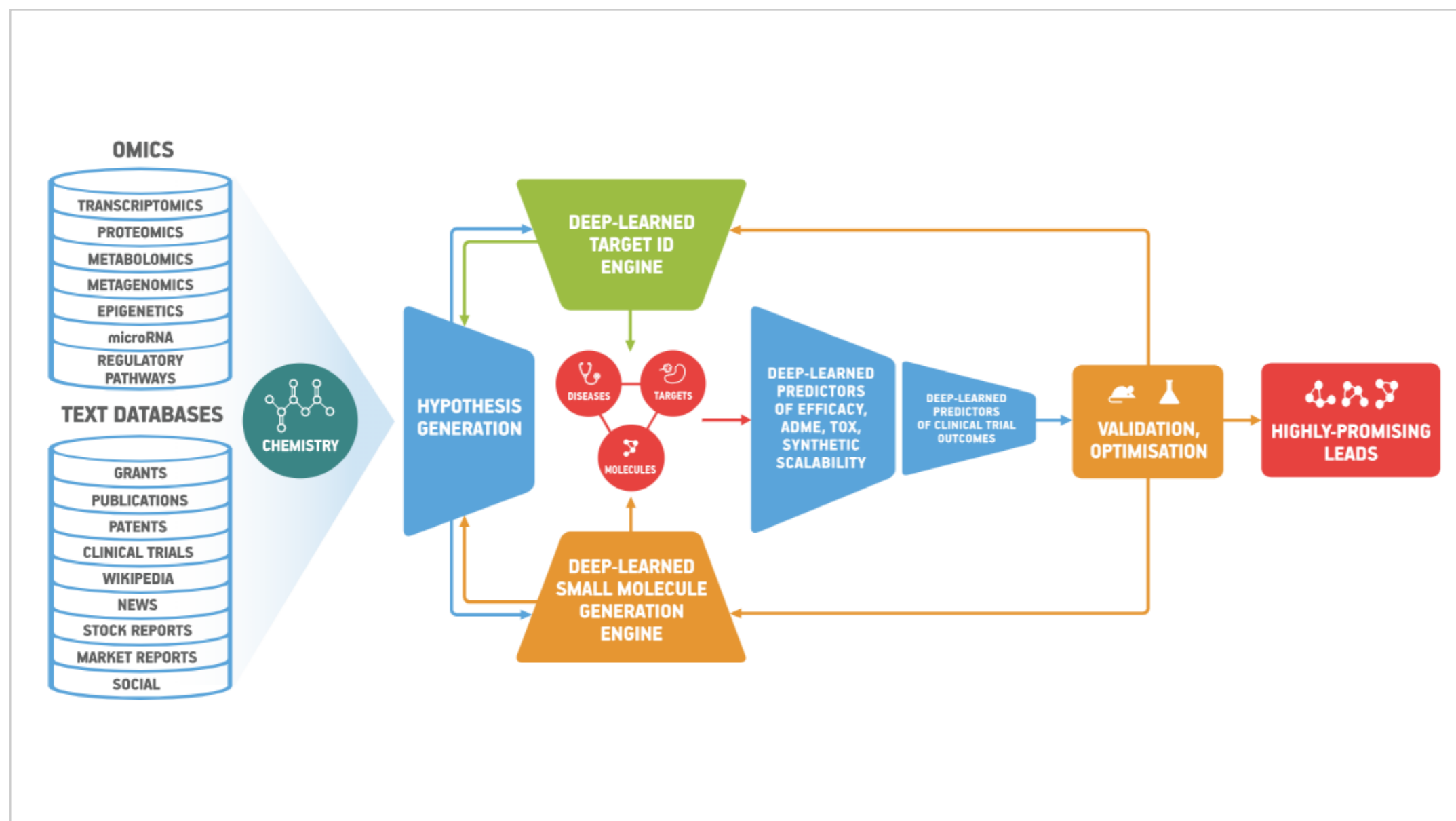
Examples – Outcome Prediction



Produced a model with **93%-94%** accuracy in predicting in-hospital mortality versus **86%** for traditional methods



Examples – Harnessing Omics Data

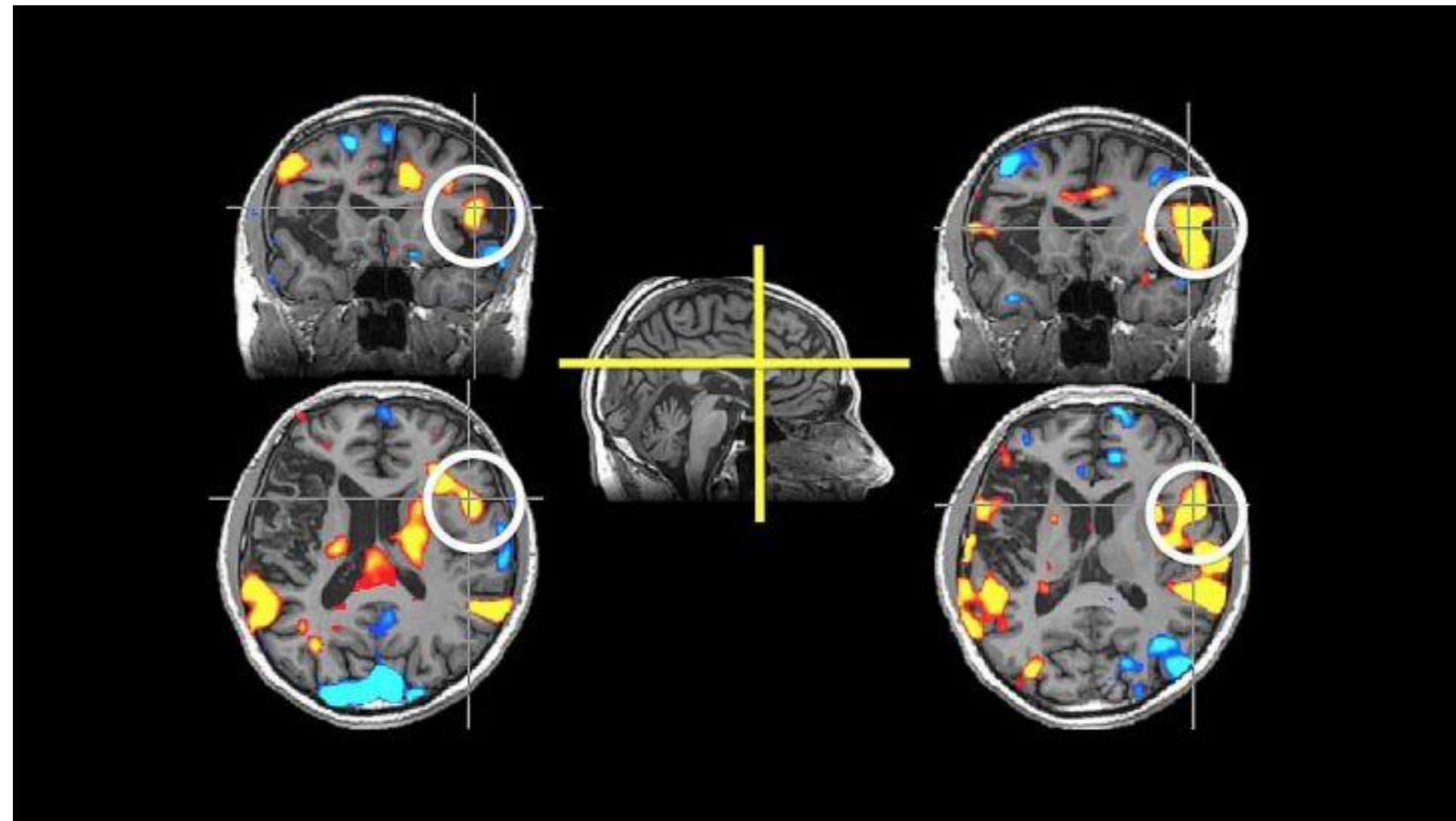


INSILICO MEDICINE

Screened **72 million** compounds to select potential anti-cancer drugs



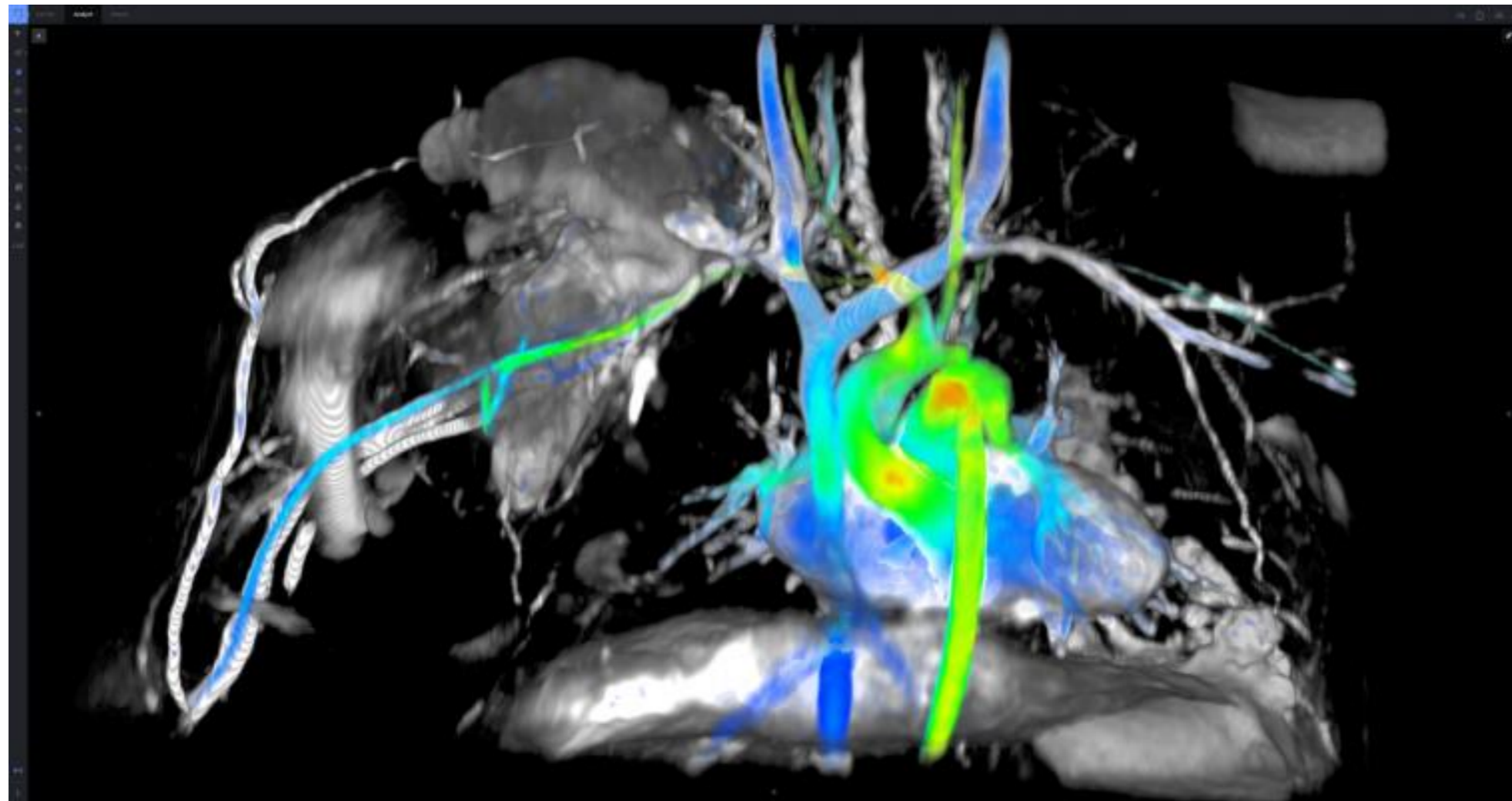
Examples – Intelligent CDSS



Identifies and triages suspected stroke patients from CT images, in **95%** of cases alerting a specialist an average of **52 minutes** earlier



Examples – AI Enabled Imaging

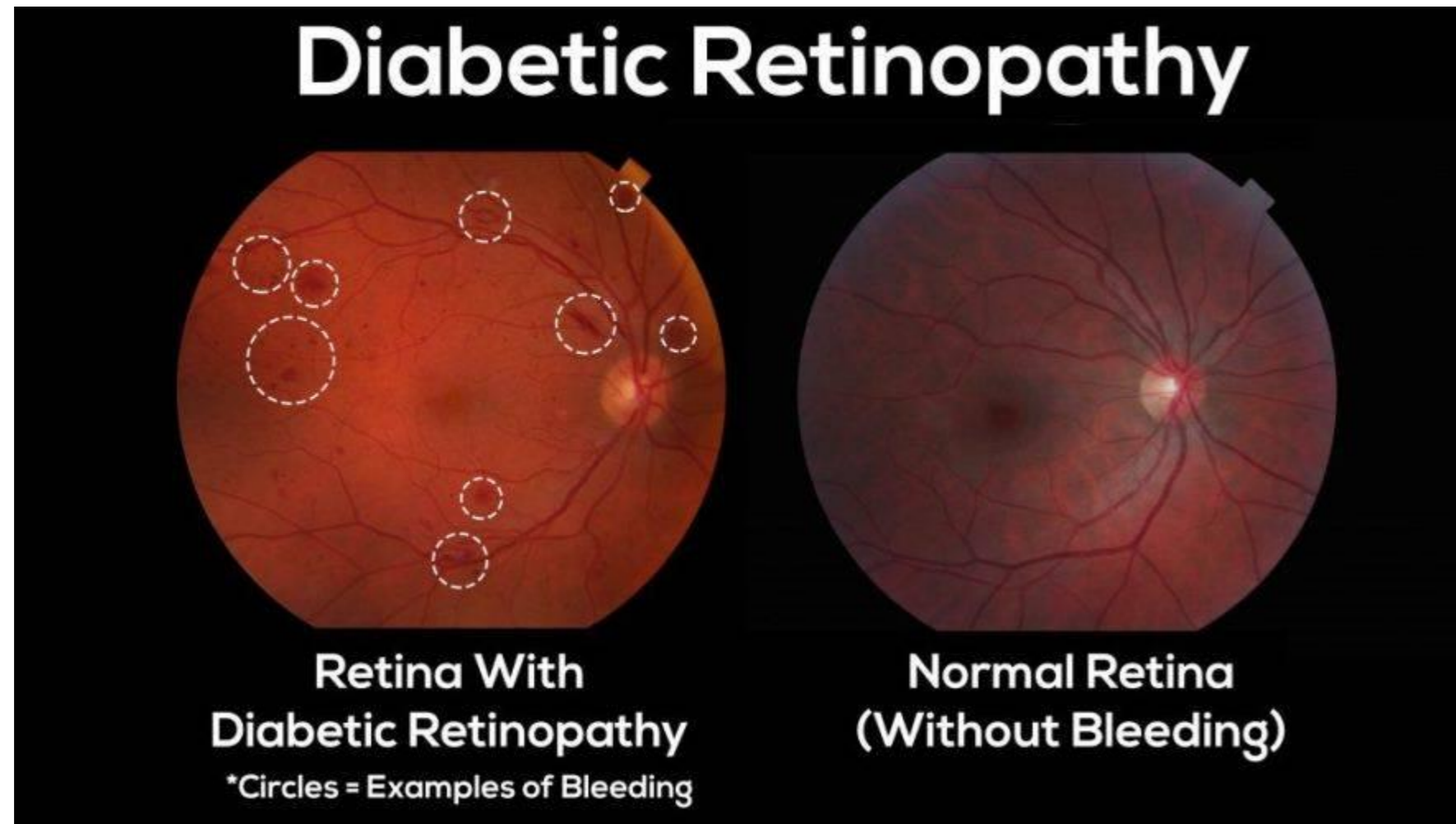


ARTERYS

Eliminates manual tasks by a radiologist to render an MRI scan in **9x less time**



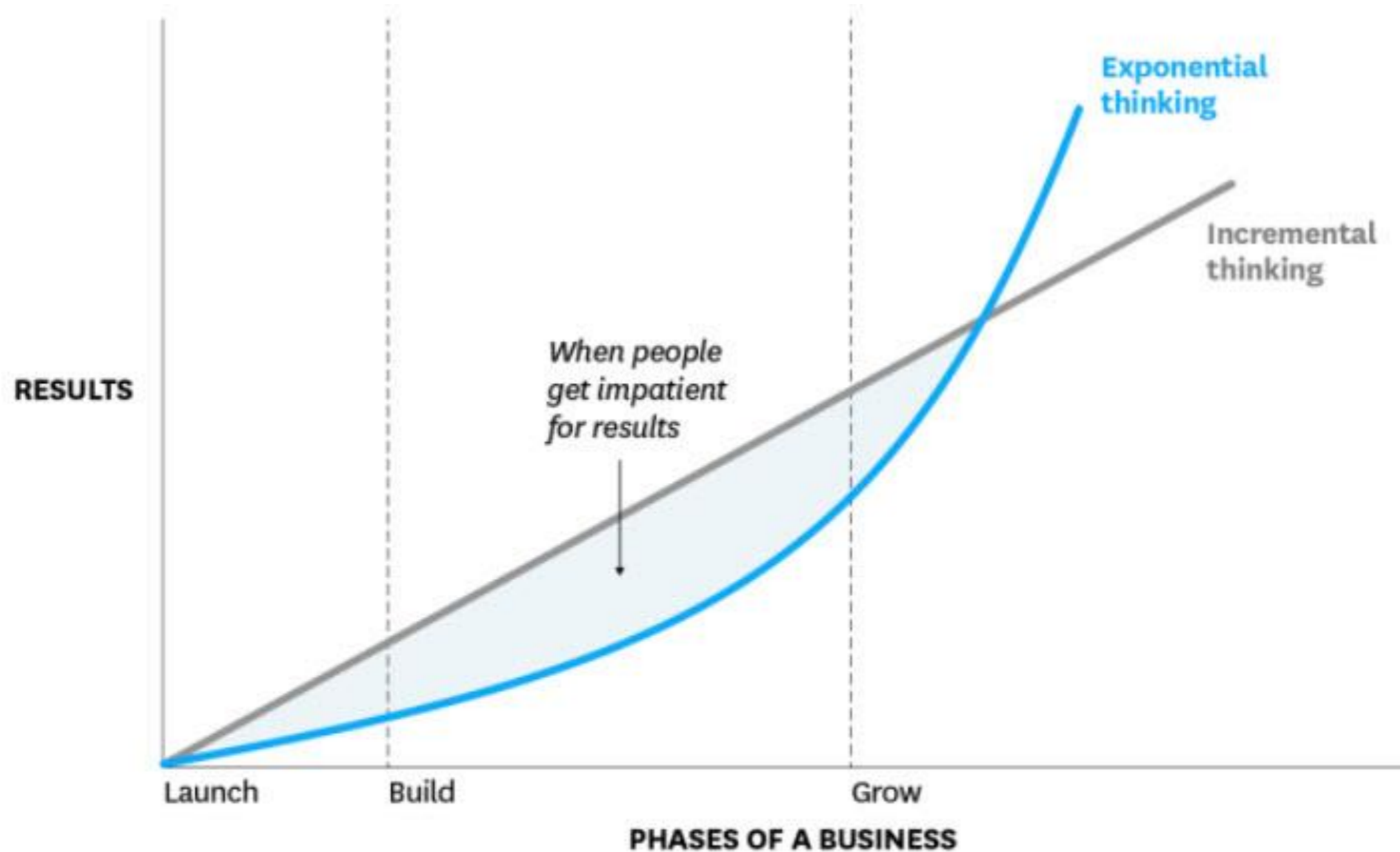
Examples – Diabetic Retinopathy



87.2% sensitivity for detecting diabetic retinopathy within **20 seconds** of image capture



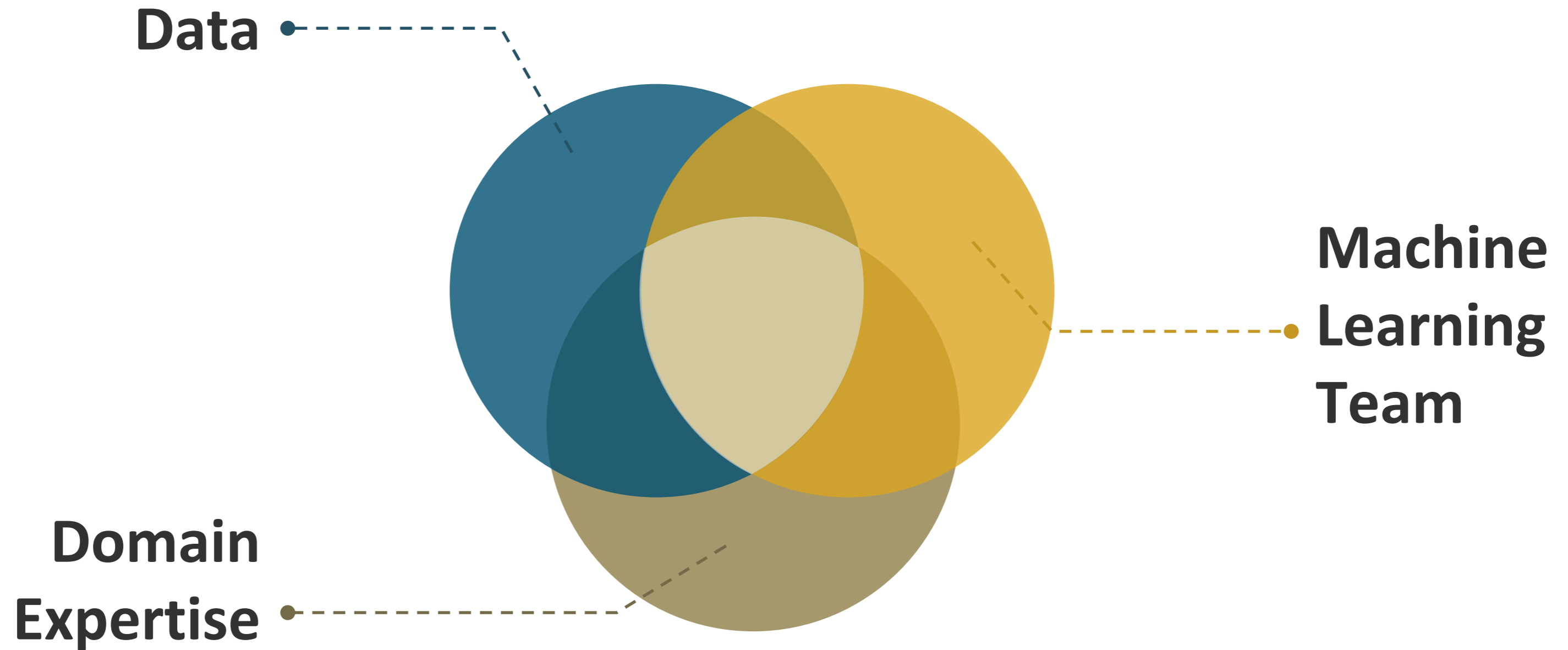
The Difficulty...



Unless we make a small bet, the project *will* fail because of culture and buy-in.



ML Project Elements





How We Work

Roadmap and Deep Dive

Analyze potential use-cases and the viability of an ML solution.

- 1) Problem
- 2) Metrics
- 3) ROI
- 4) Data
- 5) Model

Goal: Provide detailed, prioritized ML roadmap

3 Months

Model Development and MVP

Focus on delivering an initial ML solution to selected business problems.

- 1) Data Pipeline Development
- 2) Exploratory Data Analysis
- 3) Model Development
- 4) Minimum Viable Product

Goal: Develop initial model/MVP to illustrate effectiveness of ML solution

3-6 Months

Integration

Focus on integrating ML solution into the organization.

- 1) Model Sustainability
- 2) APIs
- 3) Front-end Solution
- 4) Integrated Solution

Goal: Integrate a functioning ML solution

3 Months



"It's the first inning. It might even be the first guys up at bat. We're on the edge of the golden age [of AI]."

- Jeff Bezos



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