INFO-TECH LIVE EVENTS

Artificial Intelligence: It's Time to Deliver

Presented by

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Written by

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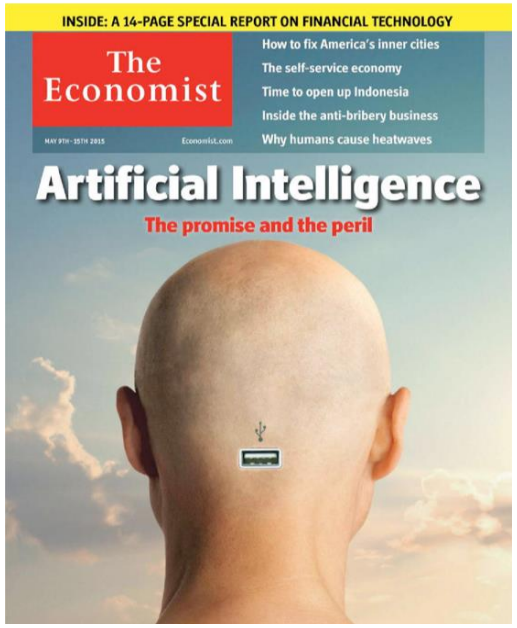
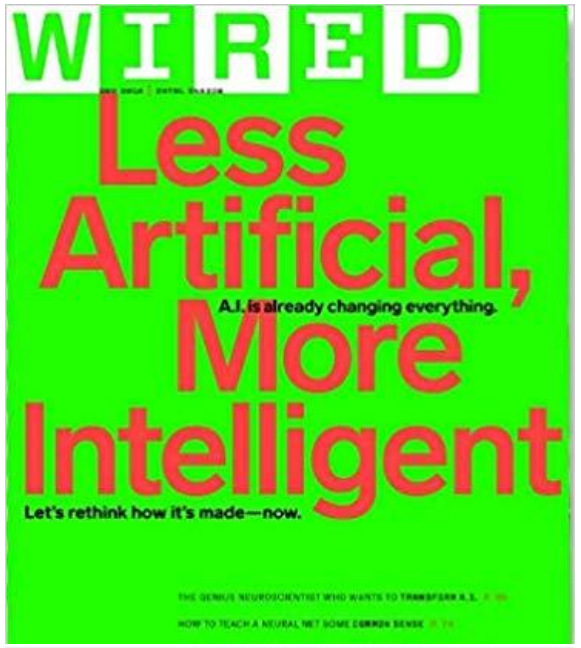

INSIDE: A 14-PAGE SPECIAL REPORT ON FINANCIAL TECHNOLOGY
The Economist
How to fix America's inner cities
The self-service economy
Time to open up Indonesia
Inside the anti-bribery business
Why humans cause heatwaves
Artificial Intelligence
The promise and the peril


WIRED
Less Artificial, More Intelligent
A.I. is already changing everything.
Let's rethink how it's made—now.


Forbes
AI:
The Killer App for Your Business
How connected artificial intelligence will reshape 21st century businesses.
TERADATA


Harvard Business Review
JUNE 2015
You Need an Innovation Strategy
Luxury's Talent Factories
Conquering Digital Distraction
Meet Your New Employee
How to manage the man-machine collaboration
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Newsweek
THE DOCTOR WILL SEE YOU NOW
HOW AI IS GOING TO CURE OUR SICK HEALTH CARE SYSTEM


NAUTILUS
13 SYMMETRY
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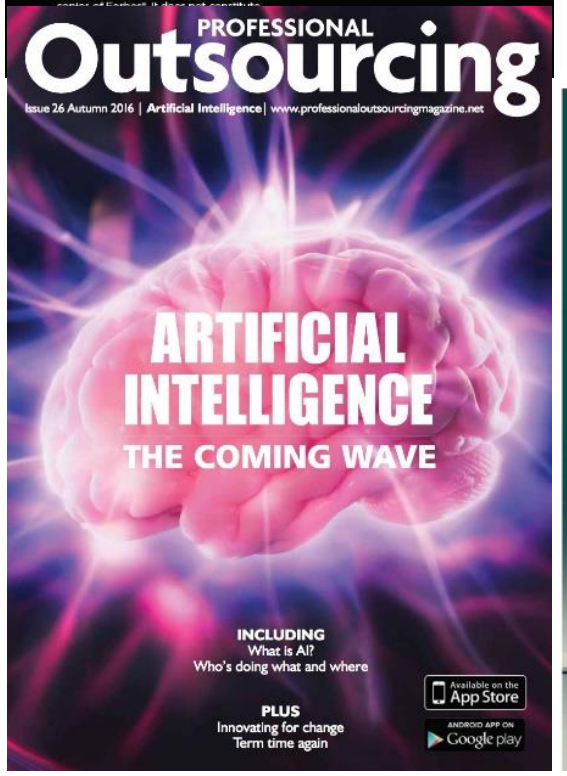
15 TURBULENCE
Face of Things to Come
OUR TECHNOLOGY PARADOX p.18
FALL 2014 Science Connected NAUTIL.US


PROFESSIONAL Outsourcing
Issue 26 Autumn 2016 | Artificial Intelligence | www.professionaloutsourcingmagazine.net
ARTIFICIAL INTELLIGENCE
THE COMING WAVE
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What is AI?
Who's doing what and where
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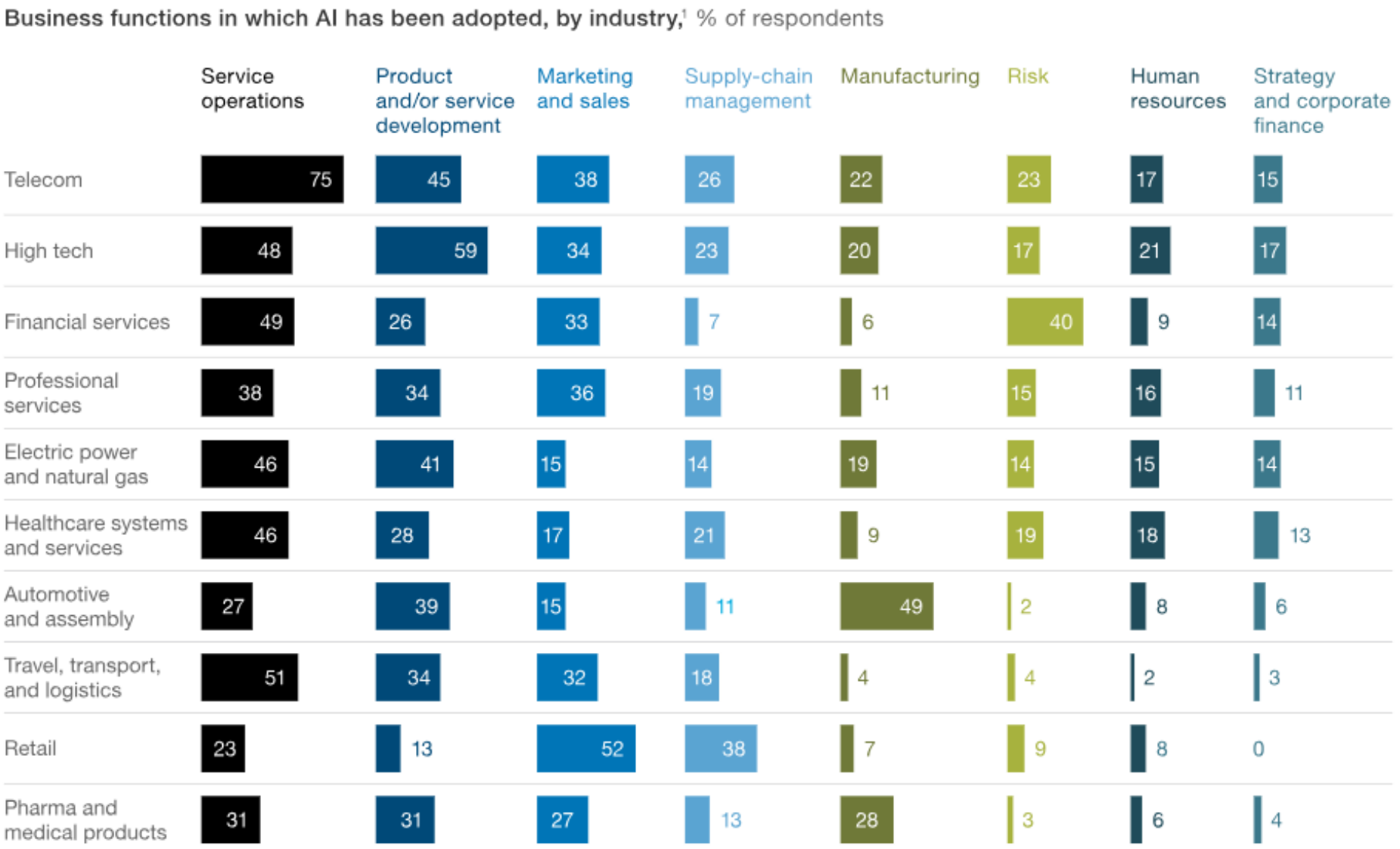
If bees could talk
AI-spy
Artificial intelligence in the workplace
A SPECIAL REPORT

$9.5 trillion-$15.4 trillion

Potential total annual value of AI and analytics across industries

Source: McKinsey & Company

AI adoption across industries & functions



"AI adoption advances, but foundational barriers remain," McKinsey & Company, 2018

Recipe

notes

1 What AI really is
- A tool for making predictions

2 How to get started
- Learn from your peers and common use cases, proof of concept first

3 Put customers first
- Human-centric design and leadership in the loop

4 Chart your AI path
- Your use cases, prioritization, minimum viable business case (MVBC), team, skills, prerequisites

5 Review AI vendor landscape
- Tools, approaches (buy/build/rent)

What AI Really Is

AlphaGo

Source: Cyberoro ORO – Cropped video still
from https://www.youtube.com/watch?v=wu8HB_buraA&t=42

“ We propose that a 2-month, 10-man study of artificial intelligence be carried out…”

Image: Computer History Museum

“ […] on the basis of the conjecture that **every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it**.

An attempt will be made to find how to **make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and *improve themselves***. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer.”

Source: A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence, John McCarthy 1955

What Is (Human) Intelligence?

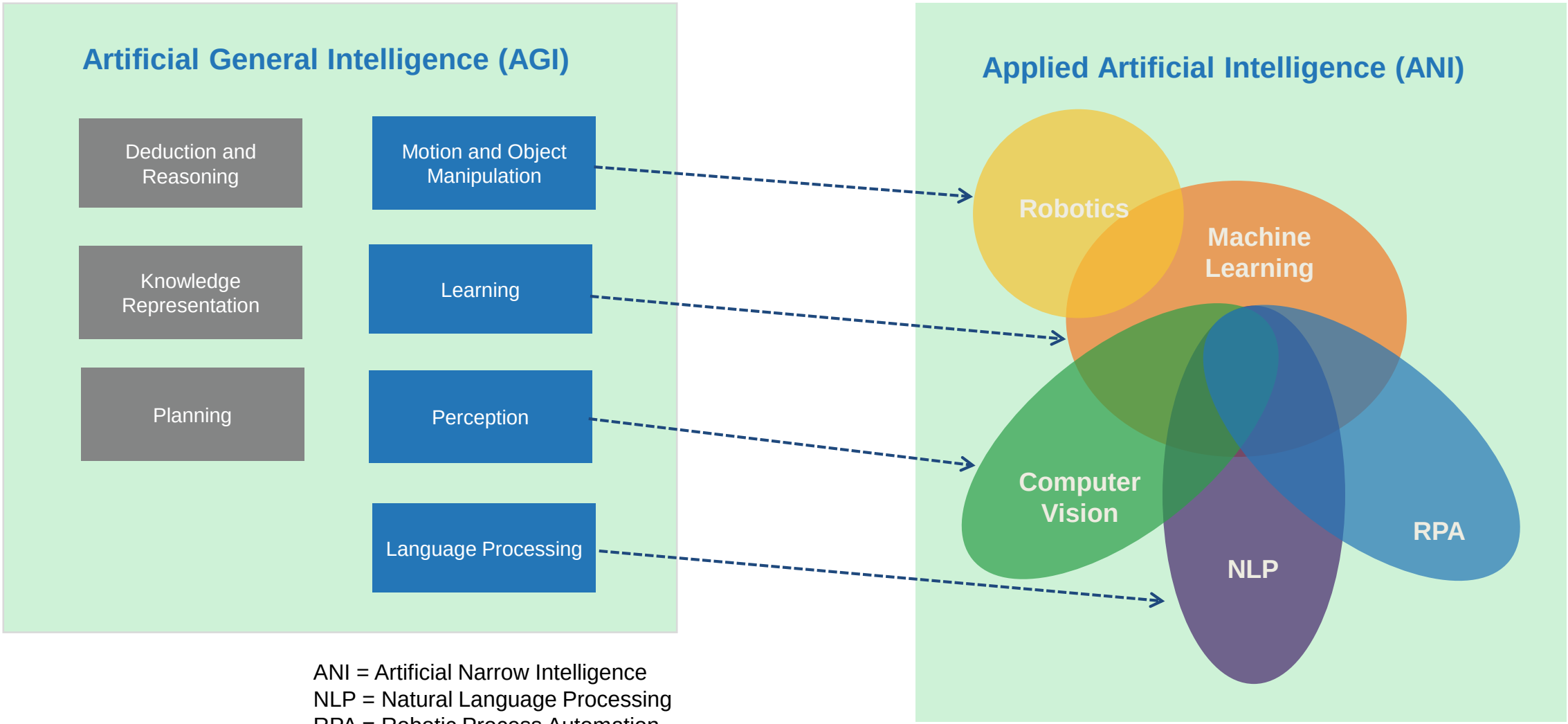
The ability to understand language...


Navigate in the
visual world...


Manipulate
objects...


And also...
Learning
Reasoning
Understanding
Grasping truths
Seeing relationships
Considering meaning
Separating facts from belief
Source: Artificial Intelligence for Dummies

What's taking the world by storm is AAI (ANI)



ANI = Artificial Narrow Intelligence
NLP = Natural Language Processing
RPA = Robotic Process Automation

Machine learning (ML)

is the scientific study of algorithms and statistical models that computer systems use to effectively perform a specific task without using explicit instructions, relying on patterns and inference instead.

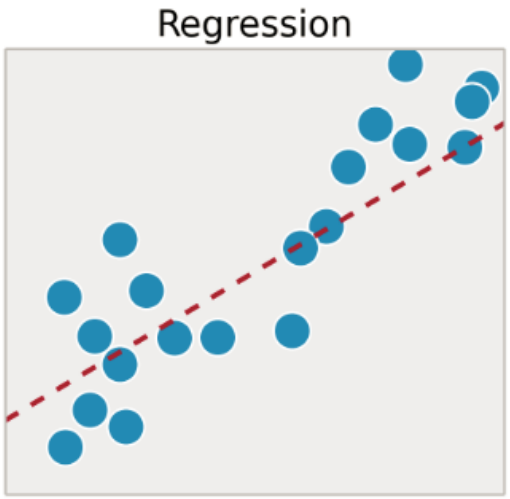
Source: Wikipedia

70% of machine learning models in use are “supervised” – they have been trained on data that has been labeled by humans

What's a supervised learning model?

Use square footage (P) to predict housing prices (C).

1) Find a proxy (P) for something hard to know (C).
2) Find a function that defines a correlation between P and C.
3) Use this function (=model) to make **guesses** about C.

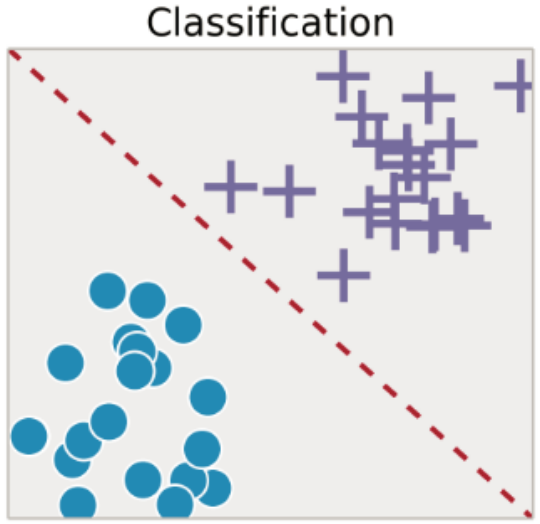


Source: Kathryn Hume

Another example: classification

Use “free money” or “out of debt” (P) to predict if emails are spam (C)

1) Find a proxy (P) for something hard to know (C).
2) Find a function that defines a correlation between P and C.
3) Use this function to make **guesses** about C.



Source: Kathryn Hume

What should we do here?

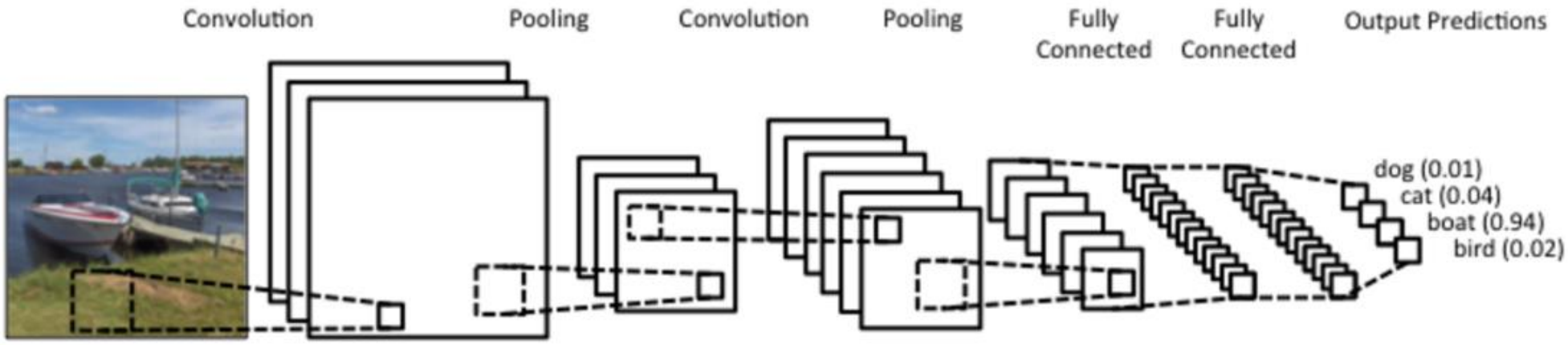
Source: Kathryn Hume

1) Find a proxy (P) for something hard to know (C).
2) Find a function that defines a correlation between P and C.
3) Use this function to make **guesses** about C.

What (P) should we pick to decide if it's a cat or dog?

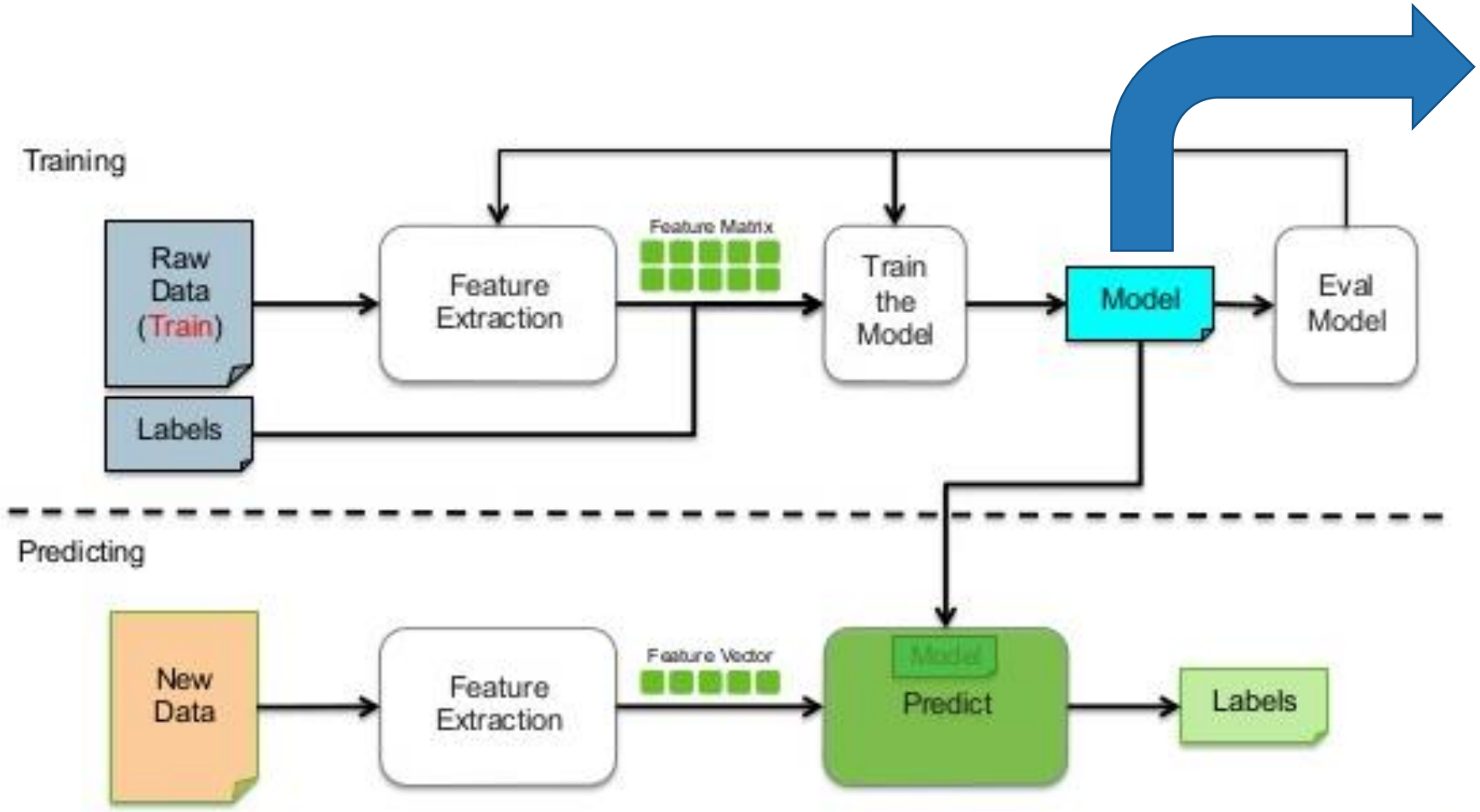
Enter deep learning aka neural nets

Use layers to transform complex input into mathematical expressions and remove the need for humans to select which features matter.



Source: Kathryn Hume

Supervised learning flow



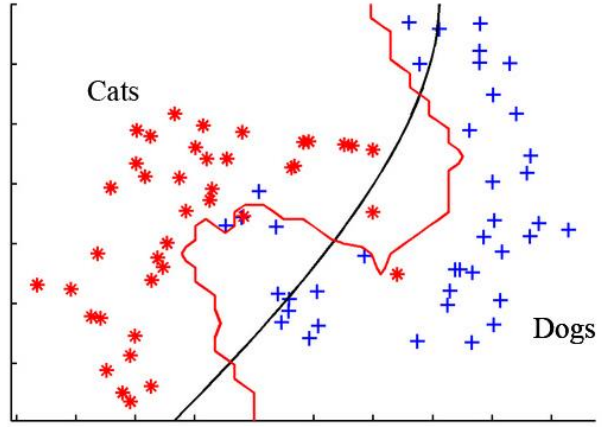
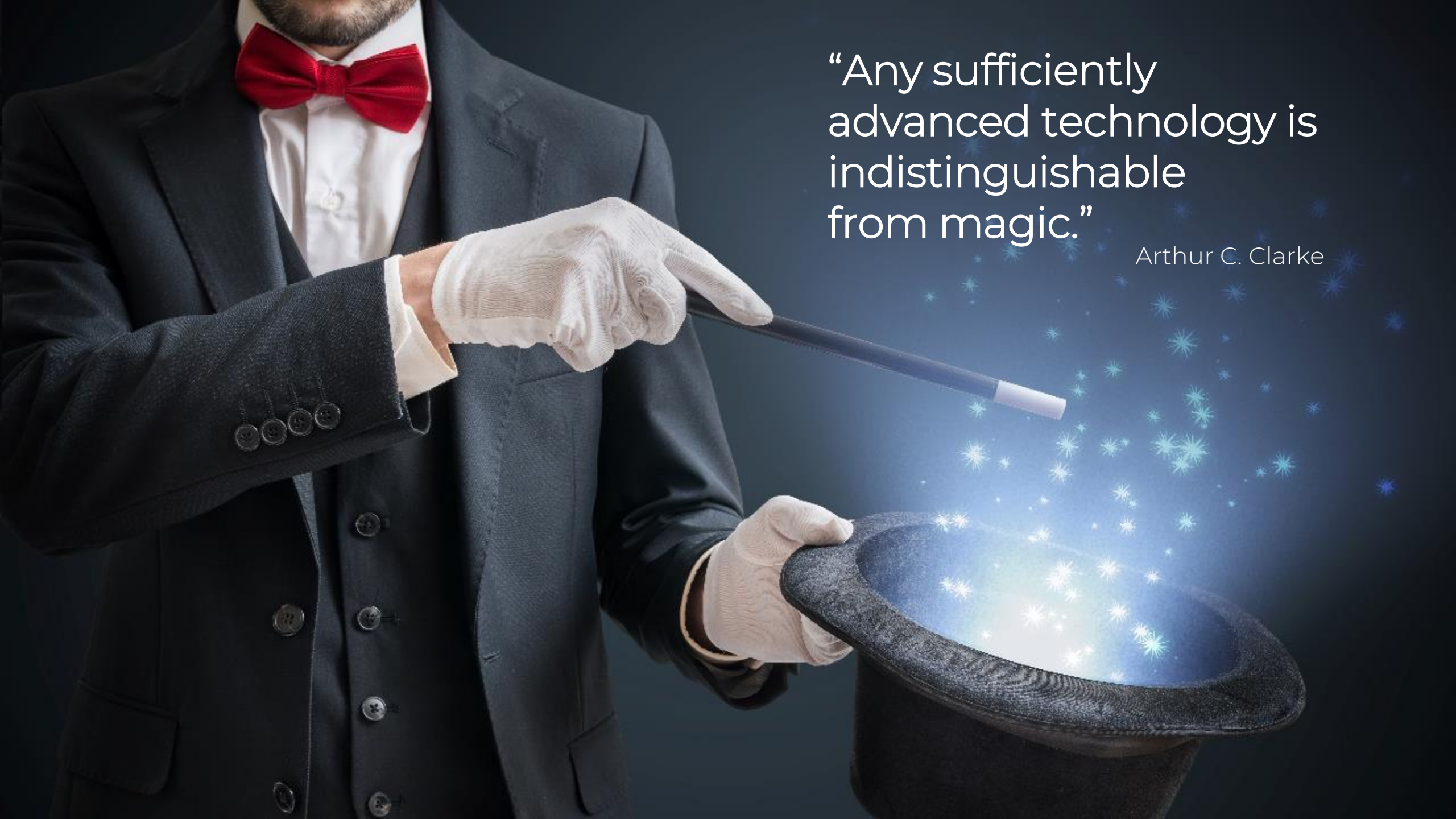
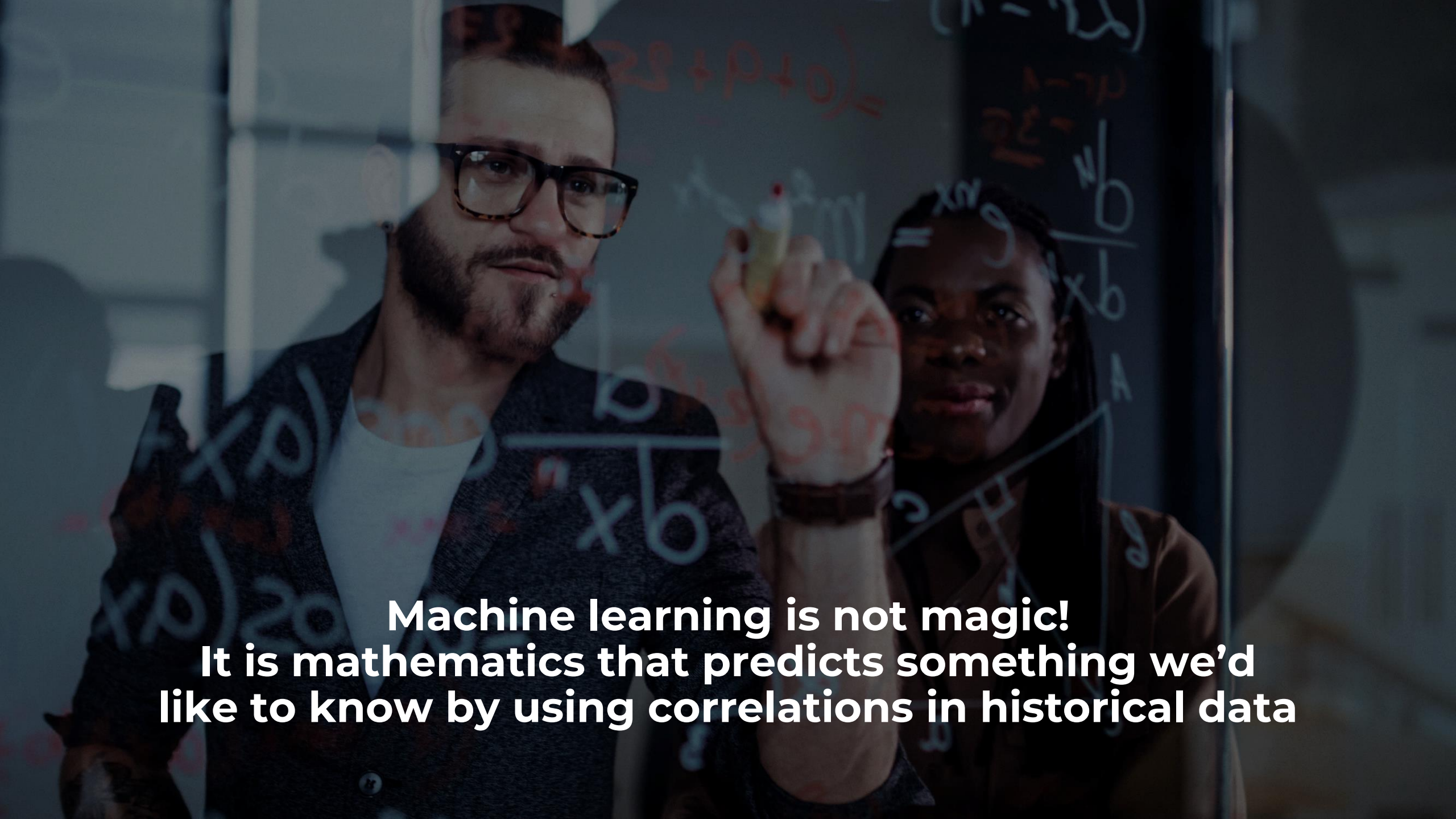


Image: Hortonworks


“Any sufficiently advanced technology is indistinguishable from magic.”
Arthur C. Clarke



Machine learning is not magic!
It is mathematics that predicts something we'd like to know by using correlations in historical data

“ We propose that a 2-month, 10-man study of artificial intelligence be carried out…”

Image: Computer History Museum

“ […] on the basis of the conjecture that **every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it**.

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Source: A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence, 1955

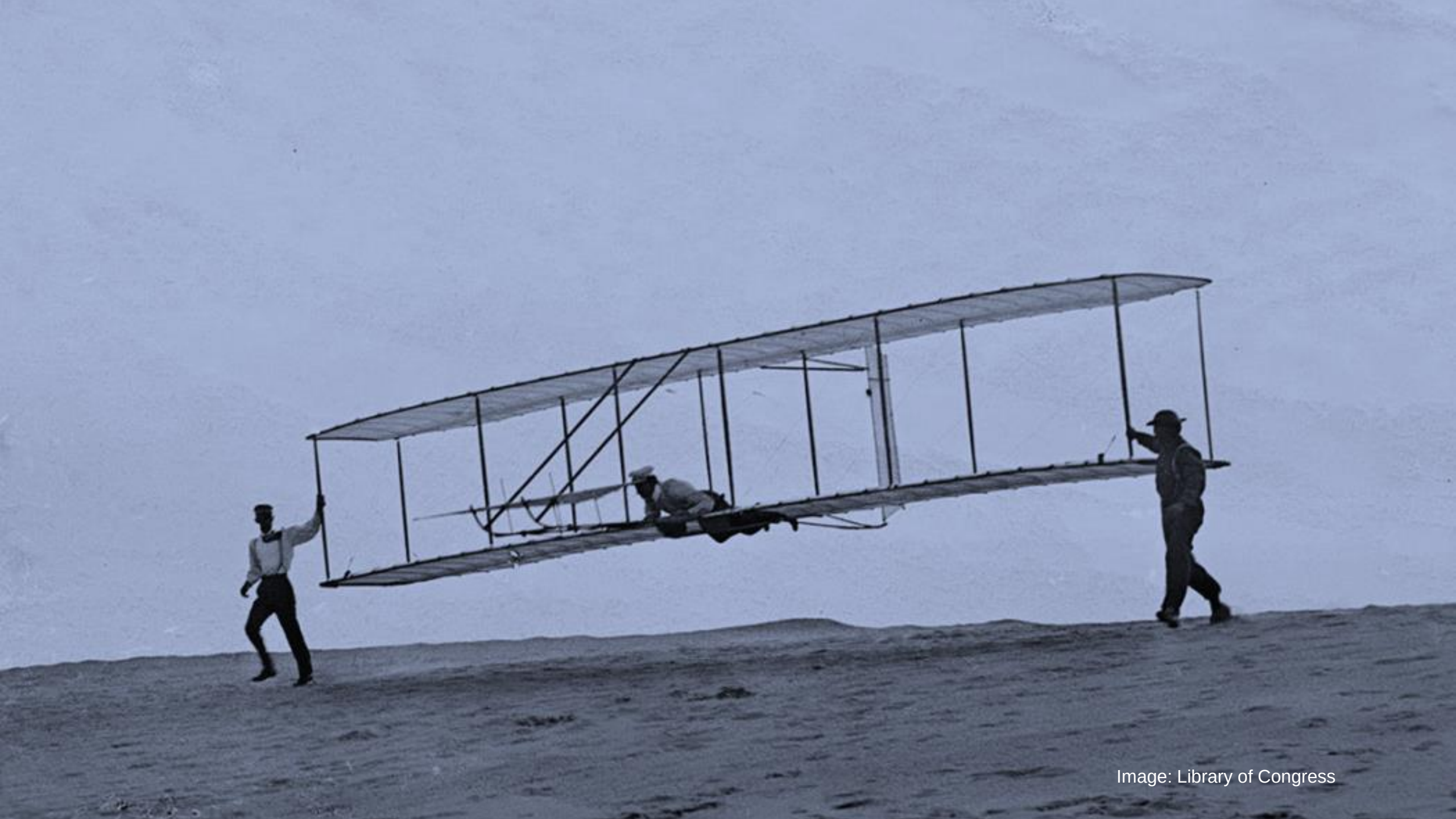
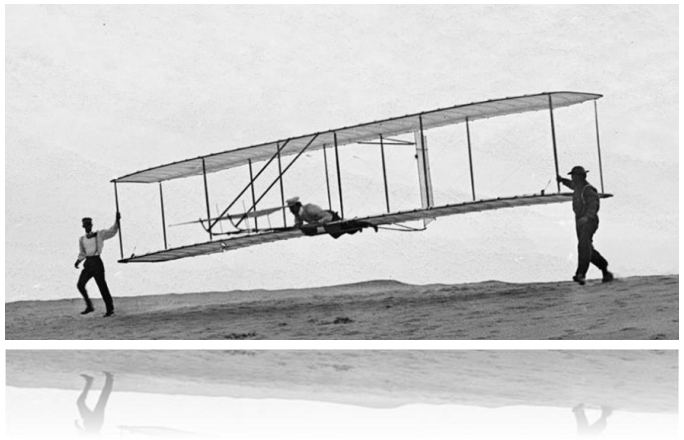


Image: Library of Congress

What we want from AI

What we've got

Actually, this

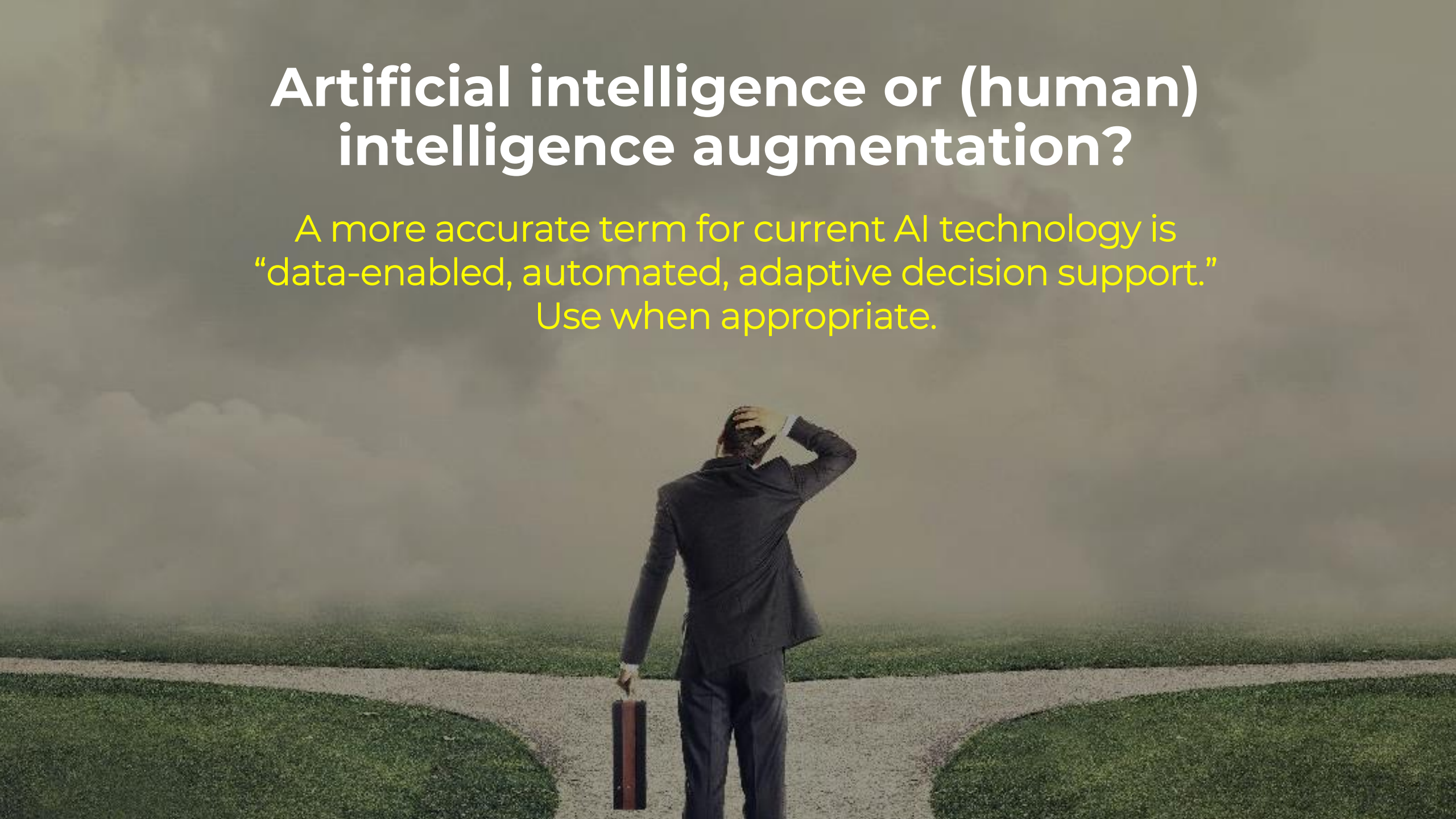


"Airplanes don't flap their wings; why should computers think?"

Source: The Atlantic

Artificial intelligence or (human) intelligence augmentation?

A more accurate term for current AI technology is “data-enabled, automated, adaptive decision support.” Use when appropriate.



How to Get Started

Avoid a cold start. Learn from the early adopters

Your peers and early adopters in other industries have already answered the R-W-W questions:

- “Is it real?”
- “Can we win?”
- “Is it worth doing?”

Learn from their experiences to avoid a cold start.

1

Learn about AI tech

Especially machine learning. Informed is forearmed.

2

Avoid a cold start

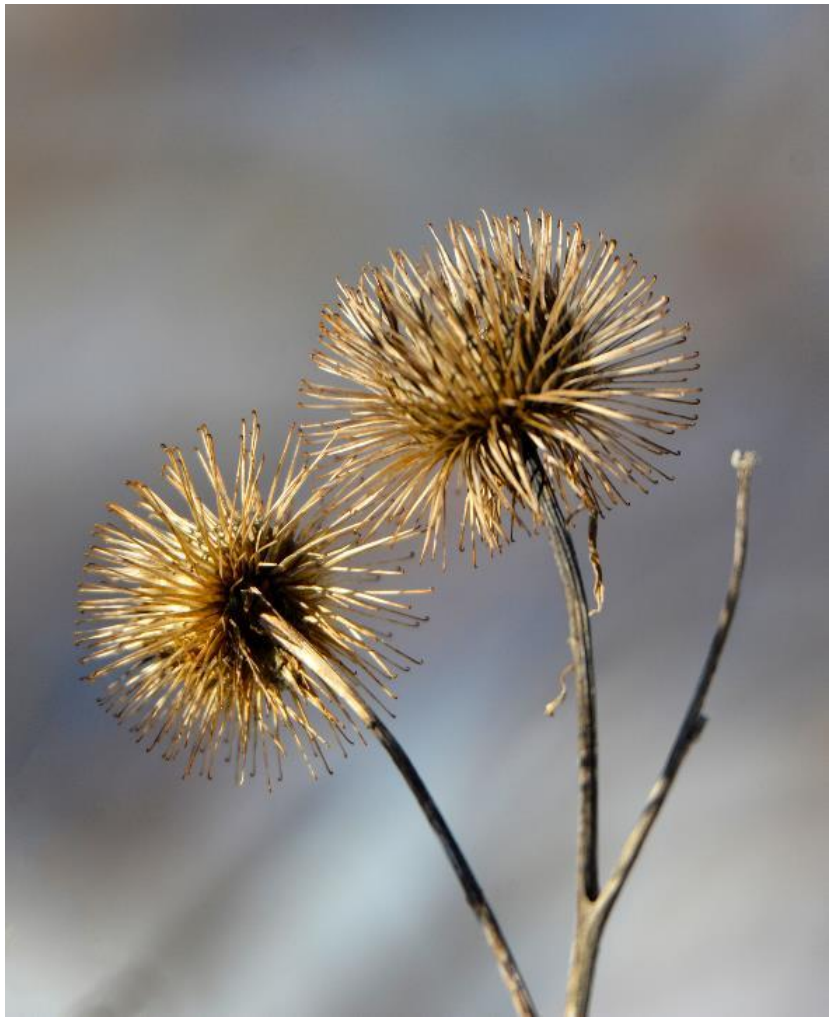
Learn what your peers and early adopters across industries are doing with AI.

3

Contextualize

Adopt peer use cases to your organization’s strategic goals and the needs of your customers.

What do these things have in common?



Think outside your industry's box

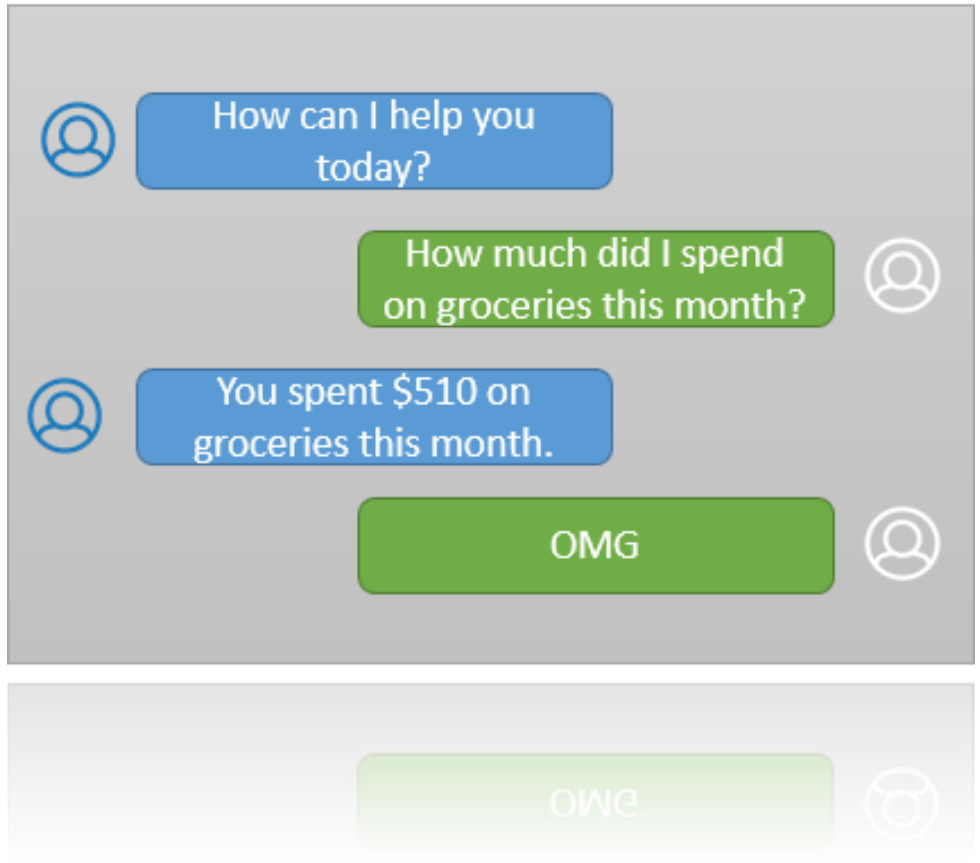
Before induction of anesthesia	Before induction of anesthesia
Has the patient confirmed identity? ☐ Yes	☐ **Confirm all team members have introduced themselves.**
Is the site marked? ☐ Yes	☐ **Confirm patient's name, procedure, and where incision will be made.**
Is the anesthesia machine and medication complete? ☐ Yes	**Has antibiotic prophylaxis been given within the last 60 minutes?** ☐ Yes ☐ Not applicable
Is the pulse oximeter on the patient and functioning? ☐ Yes	**Anticipated Critical Events** To Surgeon: ☐ What are the critical or non-routine steps? ☐ How ling will the case take? ☐ What is the anticipated blood loss? To Anaesthetist: ☐ Are there any patient-specific concerns?
Does the patient have a: Known allergy? ☐ No ☐ Yes Difficult airway or aspiration risk? ☐ No ☐ Yes, and assistance available Risk of >500ml blood loss? ☐ No ☐ Yes, and two IVs/central access and fluids planned	

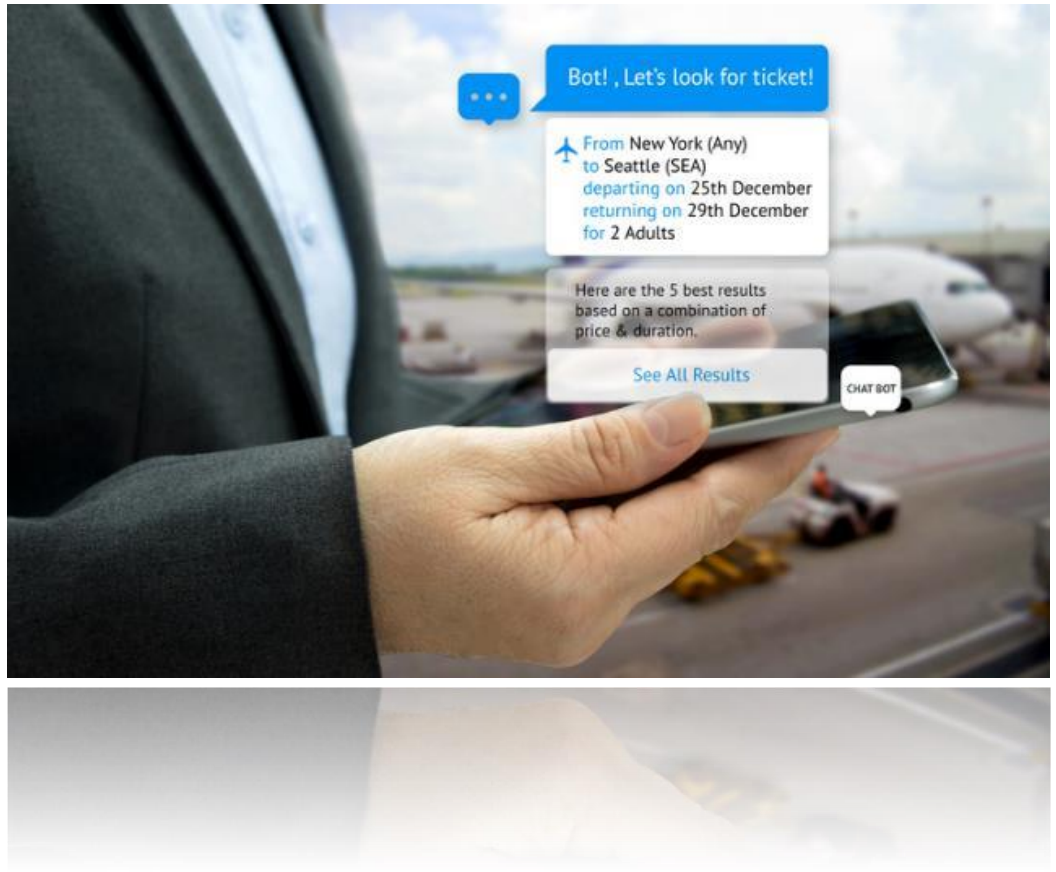
Source: WHO

How to Get Started

Common use cases

Chatbots: Beyond information gateways





48%

of consumers would rather use live chat than any other means of contact

– Ubisend, "The Chatbot Statistics Cheatsheet"

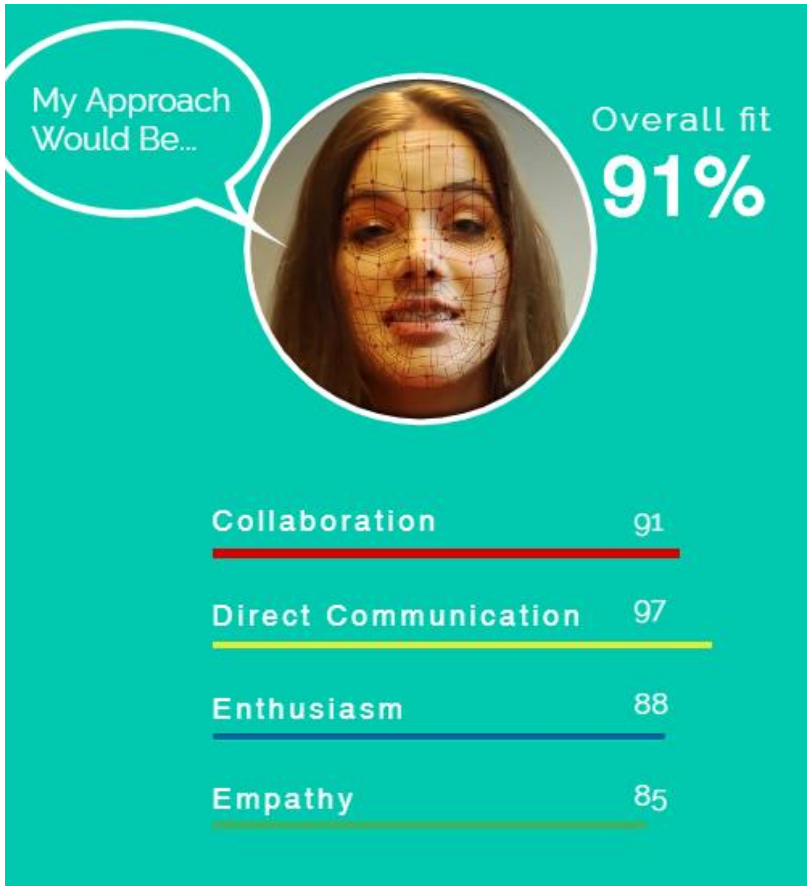
"If you are customer-facing, AI technology is no longer a differentiating factor, **it's a necessity**."

– Zahra Zahid, Slalom Consulting

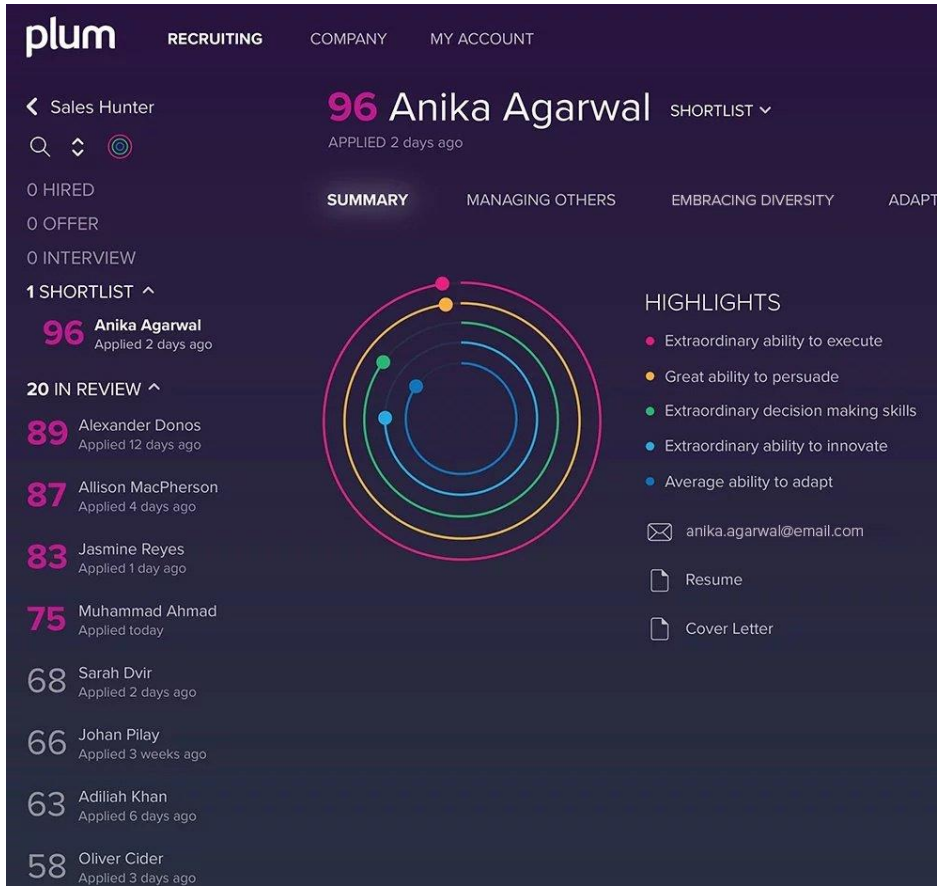
IBM artificial intelligence can predict with 95% accuracy which workers are about to quit their jobs.

– Eric Rosenbaum, CNBC

AI in HR: Hiring the right people fast, effectively, and without bias



Source: Knockri



Source: Plum

AI in Accounting & Finance: Back-office automation

- Automated data entry, categorization, and transaction processing
- Automated expenses
- Automatic reconciliation and closure of financial ledgers
- Audit and compliance
- Intelligent checking of invoices and automated payment of invoices to specified terms
- Corporate budgeting, planning, and forecasting

"**The back office support system is being dismantled** to make way for the new conception that is made possible by the advent of artificial intelligence disruptive technologies which together promise speed and significant cost reduction."

– Shankar Balasubramanian, Hexaware

Source: AI & Intelligent Automation Network

AI in Corporate Legal: Freeing people for higher value-add tasks

ARTIFICIAL INTELLIGENCE

An AI Completed 360,000 Hours of Finance Work in Just Seconds

Pack it up, folks. The machines will take it from here.

Dom Galeon | March 8th 2017

A New COIN

JP Morgan Chase & Co. is the biggest bank in the United States. It is one of the largest employers in the American banking sector, with more than 240,000 employees serving millions of customers. Some of those employees are lawyers and loan officers who spend a total of 360,000 hours each year tackling a slew of rather mundane tasks, such as interpreting commercial-loan agreements. Now, the company has managed to cut the time spent on this work down to a matter of seconds using machine learning.

- Document classification for knowledge transfer, retention, and regulatory compliance
- Document review
- Contract review and contract management
- Legal research/discovery
- Due diligence

Source: Dom Galeon, Futurism

How to Get Started

Contextualize AI

"Stay true to who you are as a business and then innovate on top of that with new technologies and new things."

– Justin Reilly, former head of customer experience innovation, Verizon

Source: AI & Intelligent Automation Network

Give your AI a purpose: Link it to strategy

Drivers to Establish Competitive Advantage

- Customer Intimacy/Service Excellence
- Product/Service Innovation
- Operational Excellence
- Risk & Compliance

Contextualize selected peer use cases for your organization

1. What #1 **business opportunity** do you wish to see realized with AI? (Hope) *or*
2. What #1 **risk** will AI help you to alleviate? (Fear) *or*
3. What #1 **annoying pet peeve** can you scratch with AI? (Frustration)
4. What are your **challenges** in performing this activity or process today?
5. What does **amazing** look like if we solve this perfectly?
6. What other business activities or processes will be **impacted** or improved if we solve this?
7. What **compliance/regulatory/policy** concerns do we need to consider in any solution?
8. What are the **benefits** of the new solution and who will benefit from it?
9. What **measures of success/change** should we use to prove value of the effort (KPIs/ROI)?
10. What are the **steps in the process/activity**?
11. What are the **applications/systems** used at each step and from step to step?
12. What **data elements** are either created, used, or transformed at each step (high level)?

Customer-Centric AI

“Speak to the reality of what is your mission and what do human beings need from you to be happy with you as a brand.”

– Justin Reilly, former head of customer experience innovation, Verizon

Source: AI & Intelligent Automation Network

Image: Changwon Fire Station


FLAP

Trust isn't something that can be given out piecemeal.

You either have it or you don't.

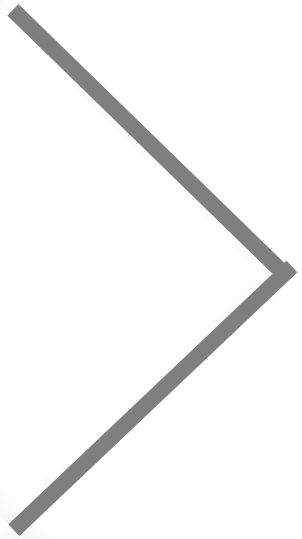
Prioritize the human benefits

Human Benefits

Experience

Trust

Resilience



Business Benefits

Scale

Efficiency

Intelligence


“Products that love people”


Maximize
Mutual Lifetime Value


“Like relational databases, AI is going to get into every important piece of software”
– Andreesen Horowitz, “The Promise of AI”

Chart Your AI Path

Start with a POC and decision design

Use-case prioritization and MVBC

Start with a POC to test the technology and your organization's readiness

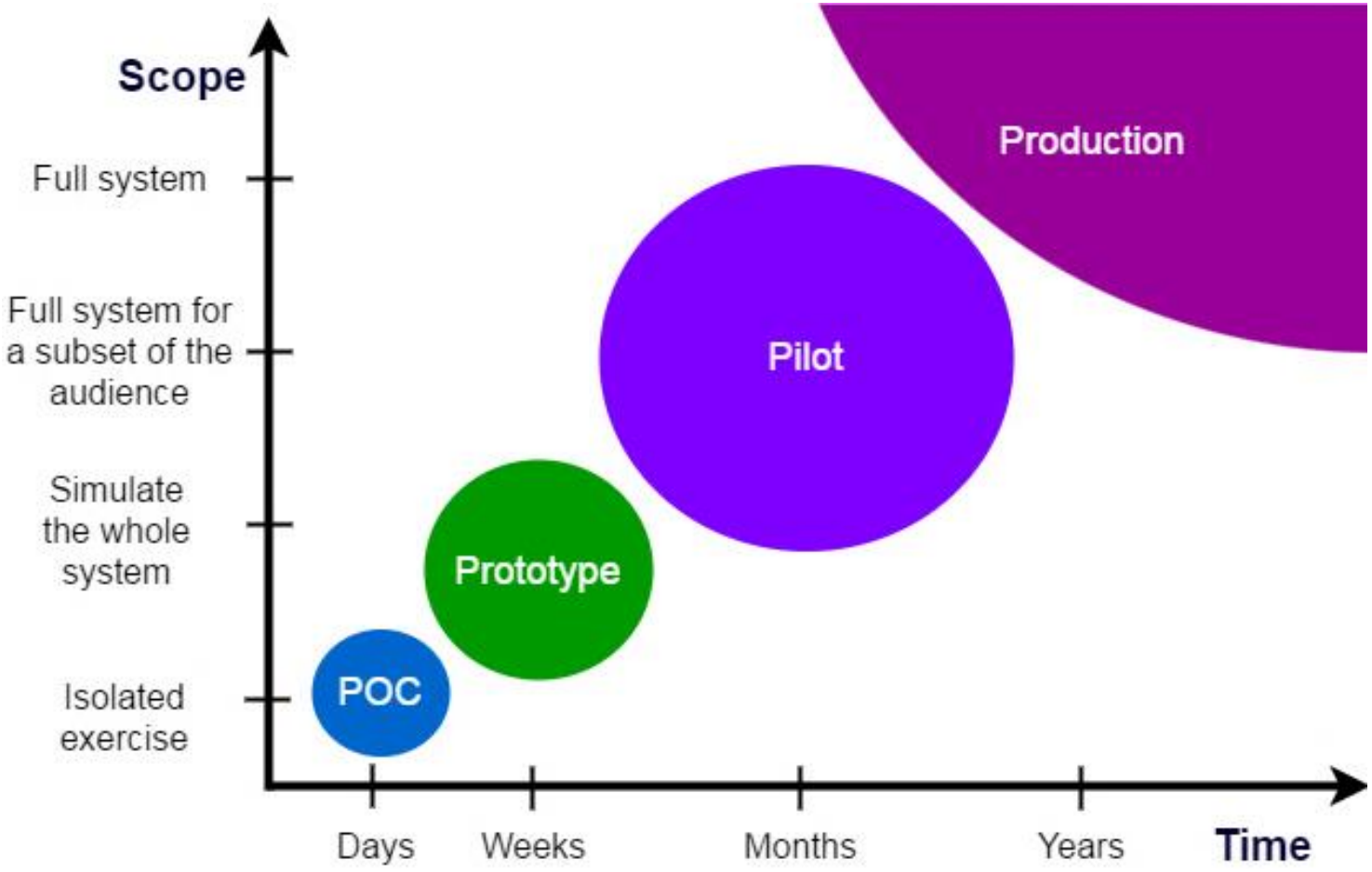


Image: Valdas Blog

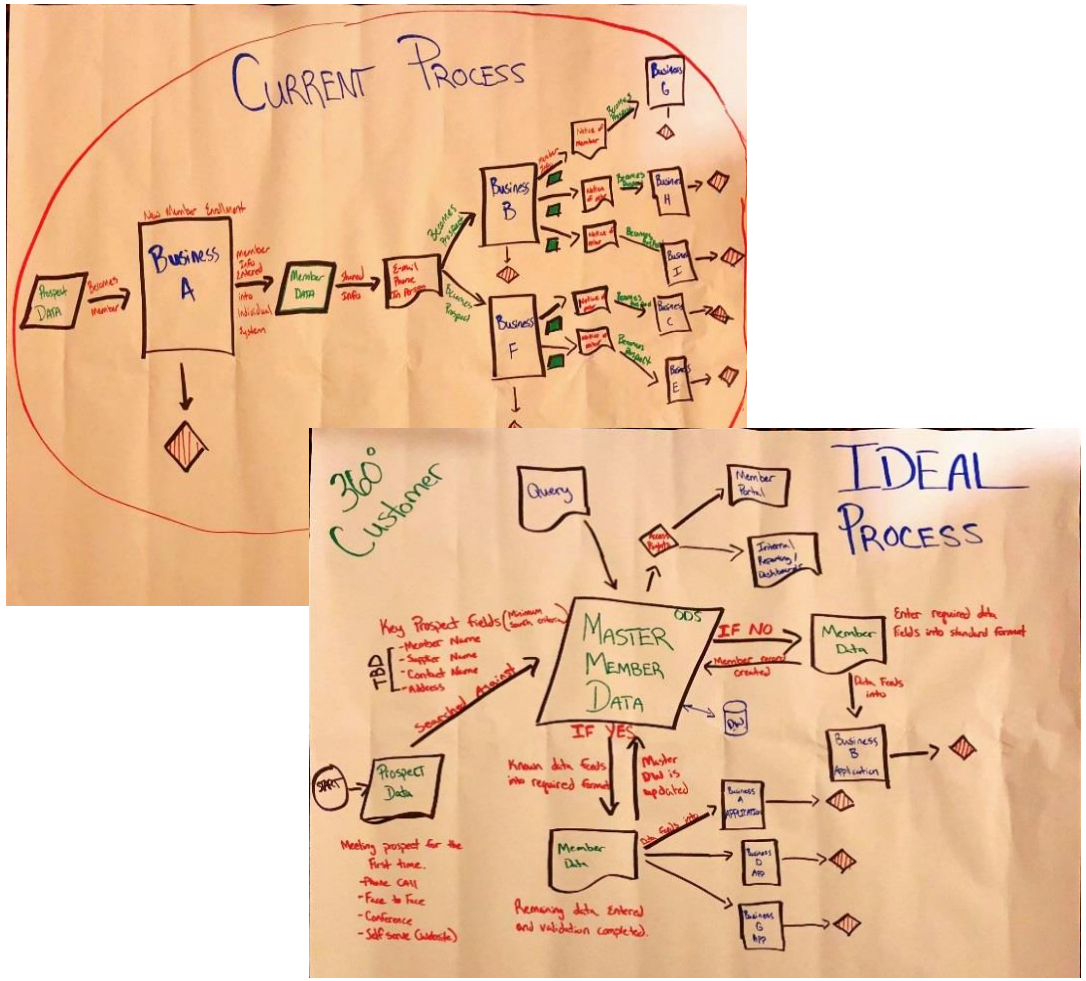
Thoughtful POC considerations

- Decision design
- Work backwards
- Keep the human in the loop
- Machine vs. human: 80-20
- Don’t leave decisions to data scientists and coders

When documenting ideas, don't strive for perfection

Problem Statement		
What #1 business opportunity do you wish to see realized with AI? *or* What #1 risk will AI help you to alleviate? *or* What #1 annoying pet peeve can you scratch with AI?		
Current challenges	**What does amazing look like?**	
Related processes/Impact	**Compliance**	**Benefits and KPIs**

Current process & systems	Applications & systems	Data elements involved



Create an MVBC to improve speed to value

Collaboration Platform Pilot

value proposition

ITISA Collaboration, file-sharing and communications platform

THAT DOES Helps users collaborate by allowing them to share and simultaneously edit documents

FOR The innovation team members, and eventually the rest of the organization

UNLIKE The current platform the organization is running

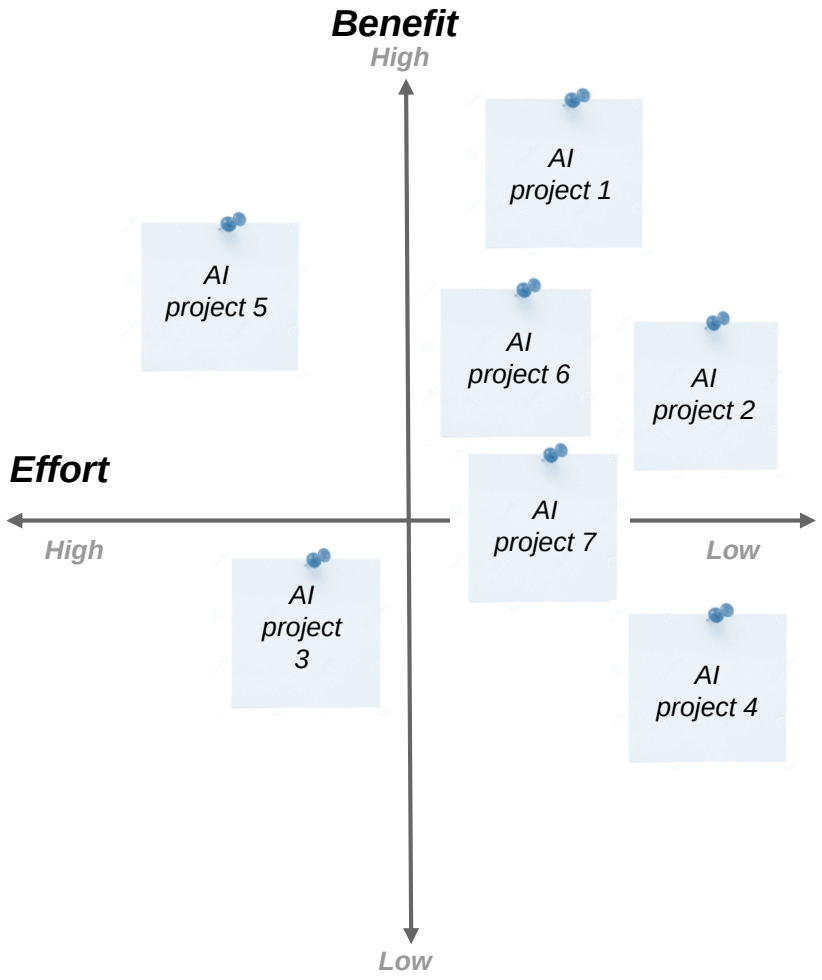
vision

To spread a culture of collaboration across the organization facilitated by technology that enables all employees to work smarter, more efficiently, and create better outcomes.

cost ($)	benefits	measure	owner
5,000 CAPITAL & EQUIPMENT 15,000 VENDOR SOFTWARE 40,000 STAFF TIME PROJECT LEAD 15,000 CAPITAL & EQUIPMENT 75,000 TOTAL COST	**FEASIBILITY** Understanding whether the vendor solution can be configured effectively in connection with the other tools in the organization's software suite.	This benefit is measureable through a set of test tasks that can be conducted to determine whether the solution will work or not.	Director of IT
	UPTAKE Determining whether or not there is desire to adopt a new solution for collaboration, communication and file-sharing amongst the employee base	This benefit is measureable through the number of employees register accounts with the vendor.	Head of Innovation
	PRODUCTIVITY As a result of an increase in collaboration, an increase in productivity is expected.	This benefit is quantifiable by measuring project throughput for a fixed period after implementation.	Head of Innovation

project steps	benefit dates	key risks	mitigation tactics
TEST This phase of the project will be dedicated	01/26	1 The solution works for the innovation team, but fails when	1 The innovation team will secure a guarantee from the vendor and scale the solution before

Prioritize your use cases: 2x2 and vote



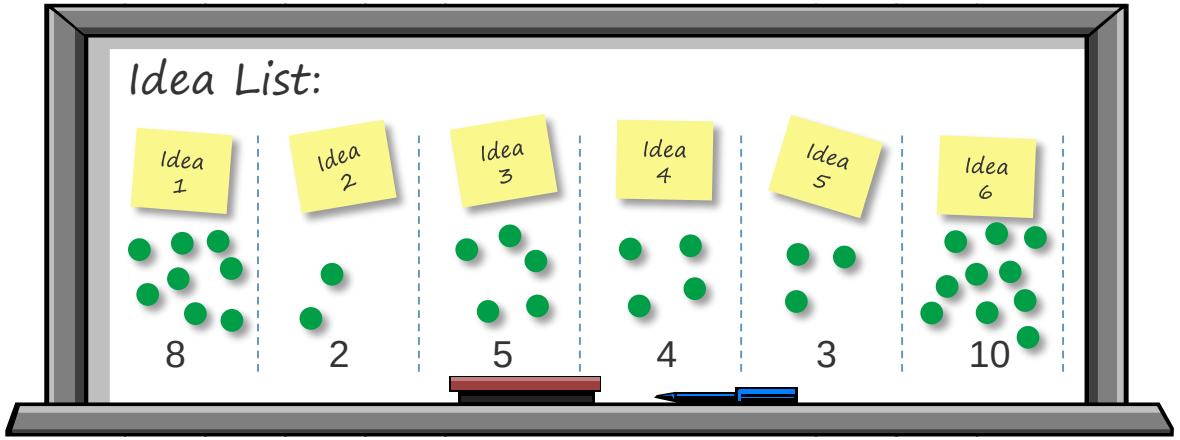


Chart Your AI Path

People

Assemble an integrated, cross-functional, business-led team to explore possibilities

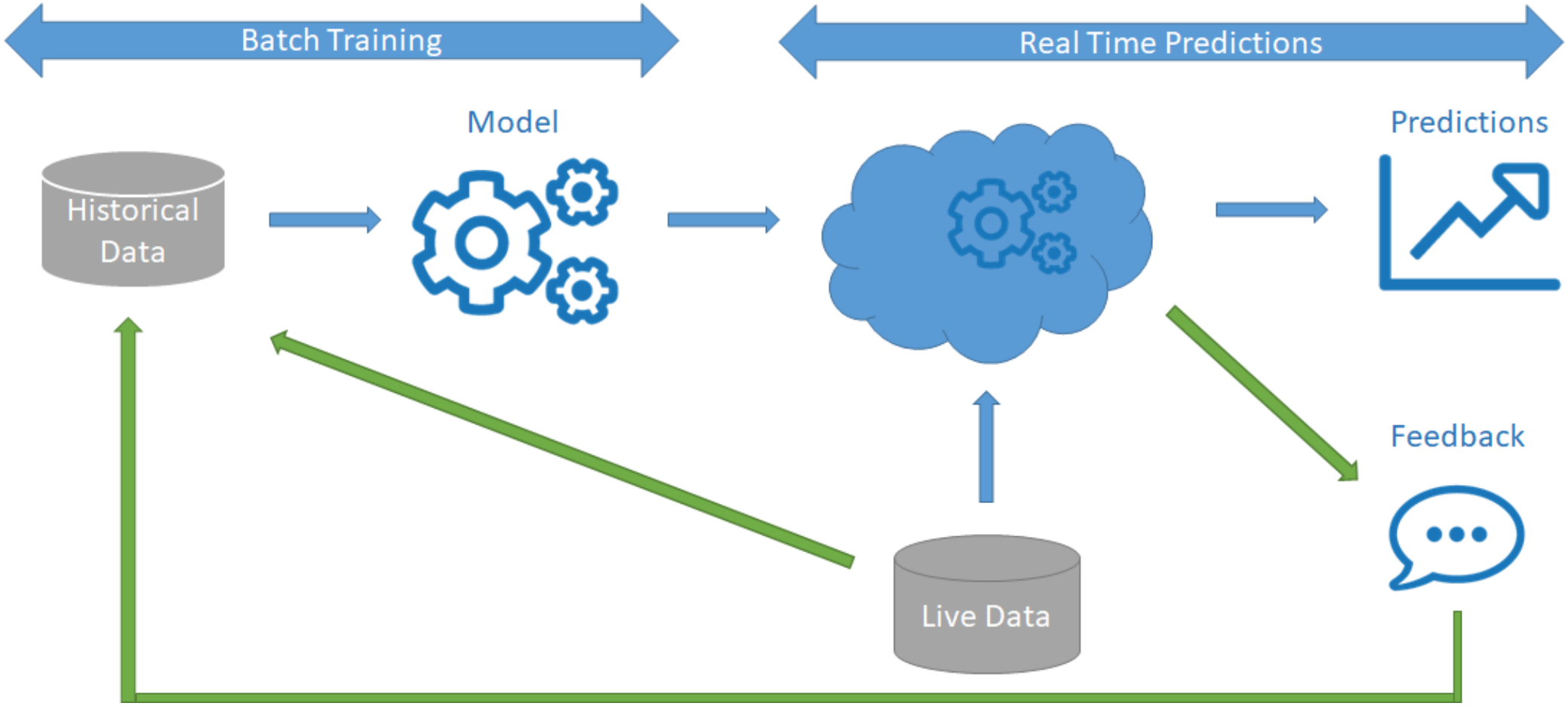
- **Business Sponsor(s)**
  - E.g. Data Owners
- **Executive Sponsor**
- **Project Lead**
- Data Stewards
- External Partners

- Tech Team:
  - Enterprise Architect
  - Director/VP of Applications
  - Data Scientist/Data Analyst
  - BI/Analytics Developer
  - DWH Architect
  - Data Integration Lead
  - **Senior BA**

Engage business to deliver value – the “last mile”


And to avoid
“Shadow AI”

Engage Apps to deploy POC in production



Product owners are your secret weapon

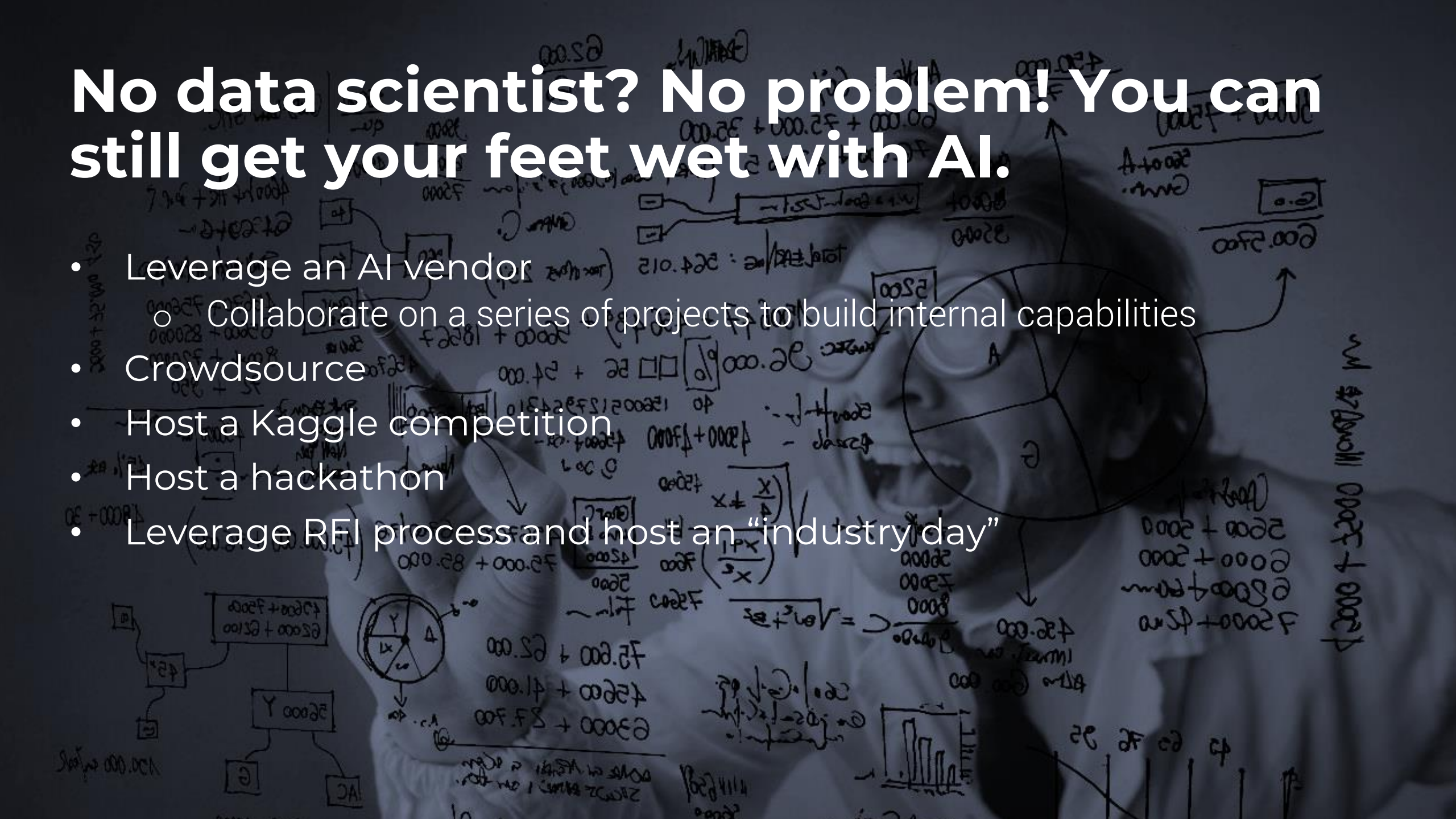
"The first follower is transforms a lone nut into a leader."

"New followers emulate the followers -- not the leader."

– Derek Sivers
"First Follower: Leadership Lessons from a Dancing Guy"

No data scientist? No problem! You can still get your feet wet with AI.

- Leverage an AI vendor
  - Collaborate on a series of projects to build internal capabilities
- Crowdsource
- Host a Kaggle competition
- Host a hackathon
- Leverage RFI process and host an “industry day”



AI Technologies Landscape

MACHINE INTELLIGENCE 3.0

ENTERPRISE INTELLIGENCE

VISUAL
Orbital Insight, planet, clarifai, DEEPVISION, cortica, Figocion, SPACE_KNOW, Captricity, netra, deepomatic

AUDIO
Gridspace, TalkIQ, nexidia, twilio, CAPIO, Expect Labs, Clover, Mobvoi, Qurious.AI, popUP archive

SENSOR
PREDIX, GE IoT, MAANA, Sentenai, PLANET OS, UPTAKE, INUBIT, Preferred Networks, thingworx, KONUX, Alluvium

INTERNAL DATA
PRIMER, IBM WATSON, Cycorp, Palantir, ARIMO, Alation, sapho, Outlier, Digital Reasoning

MARKET
mattermark, Quid, DataFox, PREMISE, Bottlenose, CB INSIGHTS, enigma, Tracxn, predata

ENTERPRISE FUNCTIONS

CUSTOMER SUPPORT
DigitalGenius, Kasisto, ELOQUENT, Wise.io, ACTIONIQ, zendesk, Preact, CLARABRIDGE

SALES
collective[i], 6sense, fusemachines, AVISO, salesforce, INSIDE SALES.COM, clari, Zensight

MARKETING
MINTIGO, Lattice, RADIUS, Liftigniter, AirPR, MOTIVA, brightfunnel, msg.ai, retention, PERSADO, COGNICOR

SECURITY
CYLANCE, DARKTRACE, ZIMPERIUM, darkinstinct, Sentinel, DEMISTO, graphistry, drawbridge, SignalSense, AppZen

RECRUITING
textio, entelo, Wade & Wendy, hi, unitive, SpringRole, GIGSTER, Hire Vue

AUTONOMOUS SYSTEMS

GROUND NAVIGATION
drive.ai, AdasWorks, ZOOX, MOBILEYE, UBER, Google, TESLA, nuTonomy, Auro Robotics

AERIAL
SKYDIO, SHIELD AI, Airware, dji, LILY, DroneDeploy, pilot.ai, SKYCATCH

INDUSTRIAL
JAYBRIDGE, OSARO, CLEARPATH, fetch, KINDRED, HARVEST, rethink robotics

AGENTS

PERSONAL
amazon alexa, Cortana, Allo, facebook, Siri, Replika

PROFESSIONAL
butter.ai, pogo, SKIPFLAG, clara, x.ai, slack, talla, Zoom, sudo

INDUSTRIES

AGRICULTURE
BLUE RIVER, mavrx, tule, TRACE GENOMICS, Pivot Bio, Terravion, AGRI-DATA, Descartes Labs, ubiquity, abundant

EDUCATION
KNEWTON, volley, gradescope, CTI, coursera, UDACITY, altschool

INVESTMENT
Bloomberg, sentient, SENTIUM, KENSHO, alphasense, Dataminr, CEREBELLUM CAPITAL, Quandl

LEGAL
blueJ, BEAGLE, Everlaw, RAVEL, Seal, ROSS, LEGAL ROBOT

LOGISTICS
NAUTO, Acerta, PRETECKT, clearmetal, Routific, MARBLE, PITSTOP

INDUSTRIES CONT'D

MATERIALS
zymergen, Citrine, Eigen Innovations, SIGHT MACHINE, GINKGO BIOWORKS, nanotronics, CALCULARIO

RETAIL FINANCE
TALA, zestfinance, Lendo, earnest, affirm, MIRADOR, wealthfront, Betterment

HEALTHCARE

PATIENT
PULSE, CareSkore, ZEPHYR HEALTH, IBM Watson Health, OncoChart, SENTRIAN, Atomwise, Numerate

IMAGE
BUTTERFLY, 3SCAN, ARTERYS, enlitic, BAYLABS, imagia, Google DeepMind

BIOLOGICAL
iCarbonX, color, GRAIL, deep genomics, RECURSION, LUMINIST, Numerate, Atomwise, verily, WHOLE BIOME

shivonzilis.com/MACHINEINTELLIGENCE · Bloomberg BETA

TECHNOLOGY STACK

AGENT ENABLERS
OCTANE.AI, howdy, Maluuba, KITT.AI, OpenAI Gym, Kasisto, AUTOMAT, semantic

DATA SCIENCE
DOMINO, SPARKBEYOND, rapidminer, kaggle, DataRobot, yhat, AYASDI, data iku, seldon, yseop, bigml

MACHINE LEARNING
CognitiveScale, GoogleML, context relevant, Cycorp, HyperScience, narrative logics, minds.ai, H2O.ai, SCALED INFERENCE, sparkcognition, Loop, GEOMETRIC INTELLIGENCE, deepsense.io, reactive, skymind, bonsai

NATURAL LANGUAGE
agolo, AYLIEN, LEXALYTICS, Narrative Science, spaCy, LUMINOSO, cortical.io, MonkeyLearn

DEVELOPMENT
SIGOPT, HyperOpt, fuzzyio, pkite, rainforest, lobe, Anodot, Signifai, LAYER 6, bonsai

DATA CAPTURE
CrowdFlower, diffbot, CrowdAI, import.io, Paxata, DATASIFT, amazon mechanical turk, enigma, WorkFusion, DATALOGUE, TRIFACTA, parsehub

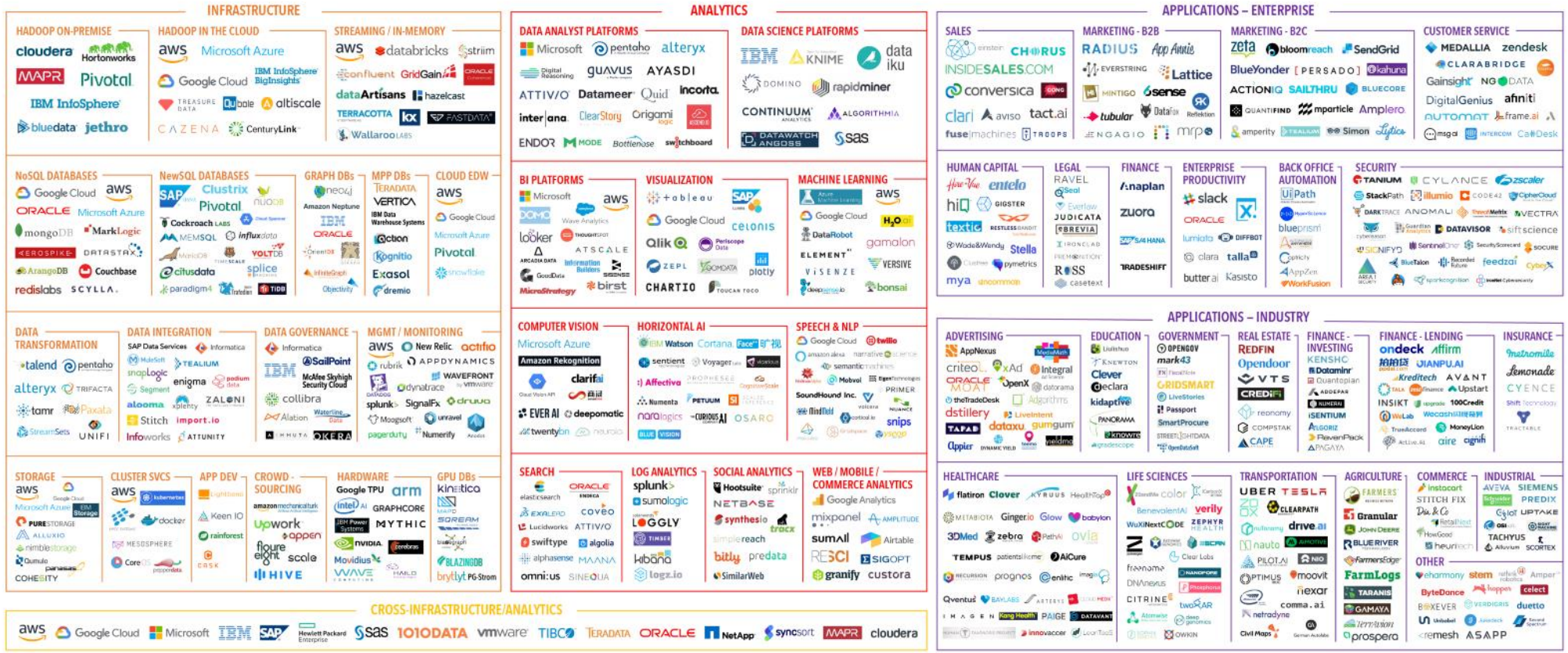
OPEN SOURCE LIBRARIES
Keras, Chainer, CNTK, TensorFlow, Caffe, H2O, DEEPLEARNING4J, theano, torch, DSSTNE, Scikit-learn, AzureML, neon, MXNet, DMTK, Spark, PaddlePaddle, WEKA

HARDWARE
KNUPATH, TENSTORRENT, Cirrascale, NVIDIA, intel nervana, Movidius, tensilica, GoogleTPU, 10^26 Labs, Qualcomm, Cerebras, Isosemi

RESEARCH
OpenAI, nnaisense, ELEMENT AI, vicarious, KNOGGIN, Numenta, Kimera Systems, Cogitai

Image: ShivonZilis.com

BIG DATA & AI LANDSCAPE 2018



Final 2018 version, updated 07/15/2018

mattturck.com/bigdata2018

FIRSTMARK
EARLY STAGE VENTURE CAPITAL

AWS Machine Learning Services Stack

AI SERVICES

Vision: REKOGNITION IMAGE, REKOGNITION VIDEO, TEXTRACT

Speech: POLLY, TRANSCRIBE

Language: TRANSLATE, COMPREHEND

Chatbots: LEX

Forecasting: FORECAST

Recommendations: PERSONALIZE

ML SERVICES

AMAZON SAGEMAKER

BUILD
- Pre-built algorithms & notebooks
- Data labeling (GROUND TRUTH)
- Algorithms & models (AWS MARKETPLACE FOR MACHINE LEARNING)

TRAIN
- One-click model training & tuning
- Optimization (NEO)
- Reinforcement learning

DEPLOY
- One-click deployment & hosting

ML FRAMEWORKS & INFRASTRUCTURE

Frameworks: TensorFlow, mxnet, PYTORCH

Interfaces: GLUON, Keras

Infrastructure: EC2 P3 & P3N, EC2 C5, FPGAs, GREENGRASS, ELASTIC INFERENCE

AWS re:Invent

aws

Do we have the necessary skills?

If not yet, can we acquire or grow them over time?

When working with vendors, ask:

- Has this technology solved a similar problems?
- Is anyone using it?
- Will this technology fit in my technology environment?
- Can a single technology platform solve my problem end to end?
- Can I build a flexible, scalable solution that is responsive and adaptive to change?


ARE YOU
READY?

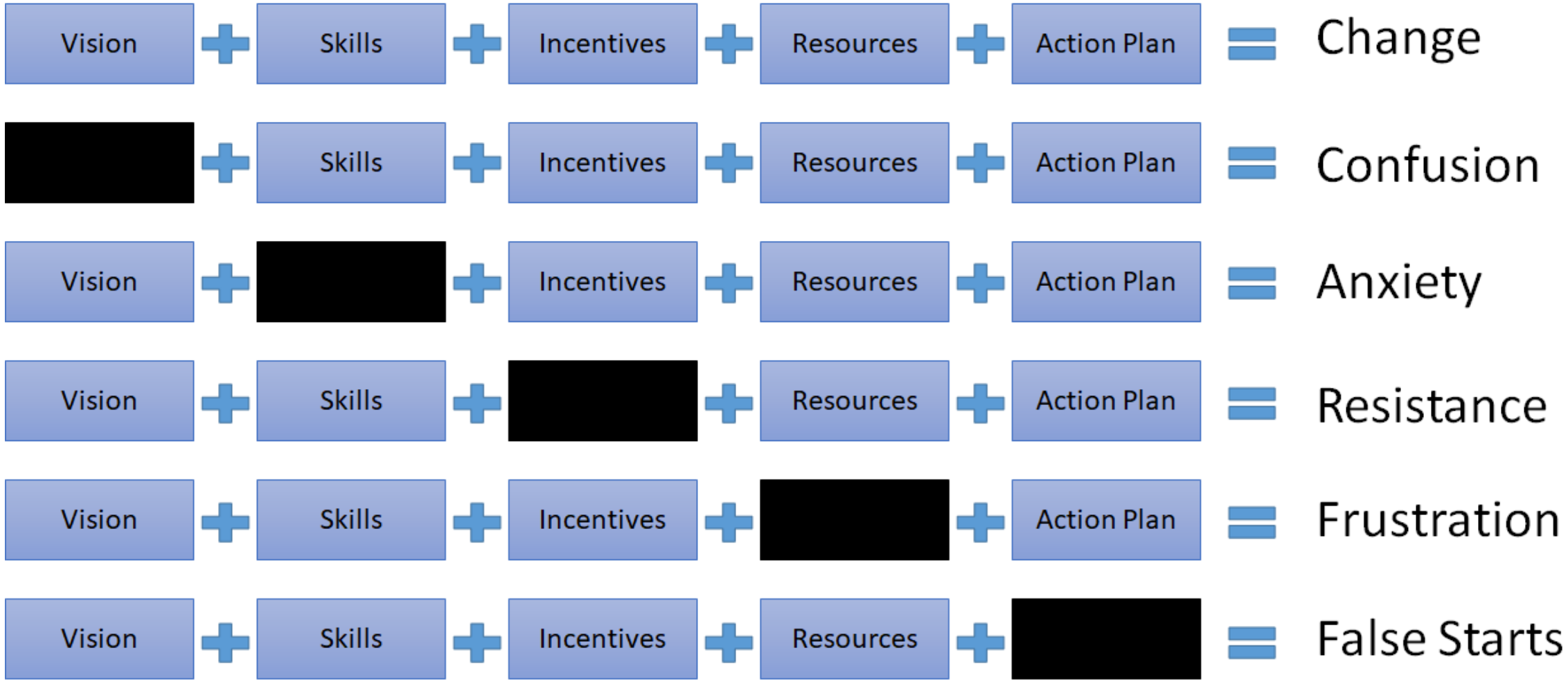

Do you have enough data to
train your AI? Is it good data?


Do you have the appropriate
infrastructure in place?


Can you deliver AI seamlessly to
the point of decision making?


Where are you with governance
– data, models, decisions?

Putting it together



Adapted from Stephanie Blackburn Freeth

Key takeaways

- AI = ANI = ML It's… Magic! No, it's mathematics.
- Data-enabled, automated, adaptive decision support
- Avoid cold start
- Contextualize
- "Love people," MVBC
- POC
- MVBC
- Team
- Get your organization ready

Thank you!

and for more information please contact:

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aneill@infotech.com