The Next Decade of Data

How Analytics and AI are Shaping Your Business

NOAH YAGO, Director Cisco Investments
Big Data Domain Leader

Data:
An Analogy of Corn

2011

**Established
Our Data & Analytics Domain**
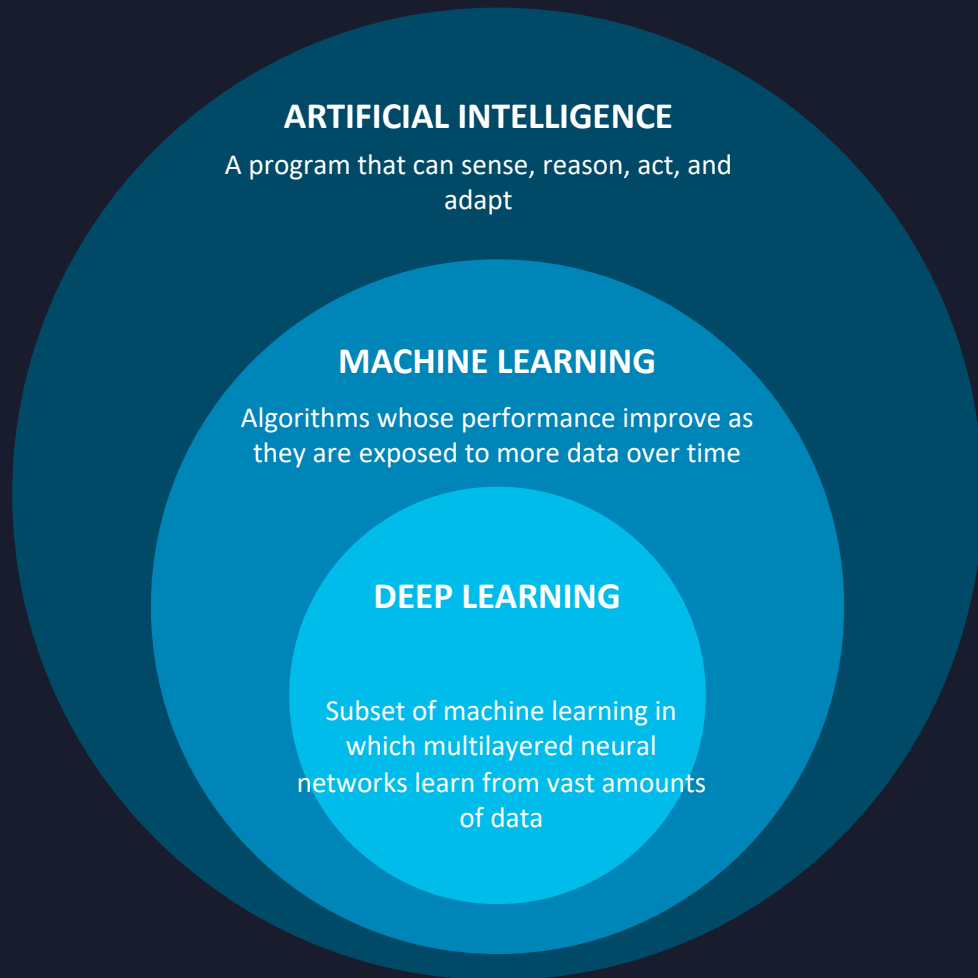
TODAY

**More Relevant
Than Ever Before**

Key Drivers
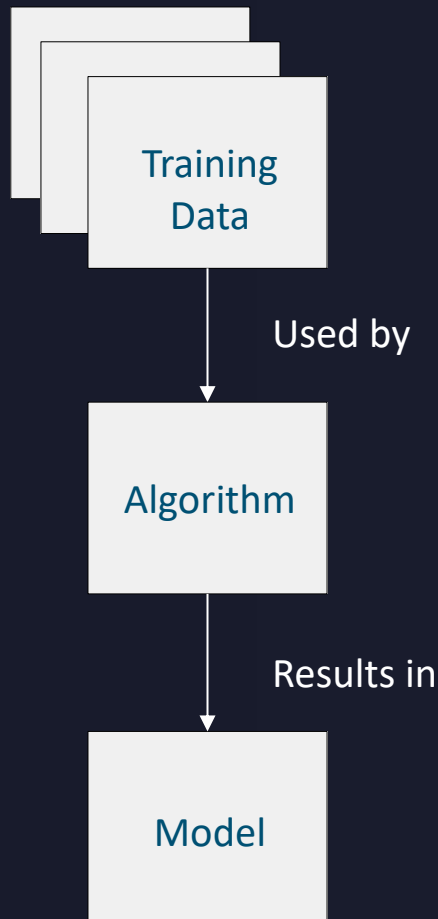
Digital transformation | Cloud adoption | AI & ML

Expanded universe of buyers | Automation | Decoupling of storage, network, & compute

Defining the Space.

ARTIFICIAL INTELLIGENCE

A program that can sense, reason, act, and adapt

MACHINE LEARNING

Algorithms whose performance improve as they are exposed to more data over time

DEEP LEARNING

Subset of machine learning in which multilayered neural networks learn from vast amounts of data

AI & ML Implementation

Key Challenges

Deploying on Enterprise Grade Infrastructure

Deep learning, training, inference & test/dev

Connecting with Data Sources

Unstructured data lakes & structured data arrays

Taming the Software Frameworks

Open source & proprietary

Rapidly iterating

Numerous & fragmented

Notable VC Rounds

2016	
Voyager Labs	$100M
Snowflake	$79M
C3 IoT	$70M
ThoughtSpot	$64M
Databricks	$60M
MapR	$51M
Looker	$48M
Neo Technology	$36M
MemSQL	$36M
DataRobot	$33M
Total	**$577M**

2017	
Databricks	$140M
Snowflake	$105M
Petuum	$93M
Looker	$82M
DataRobot	$67M
MapR	$61M
ThoughtSpot	$60M
Confluent	$50M
Feedzai	$50M
InsideSales.com	$50M
Total	**$758M**

2018 – 2019 YTD[1]	
Snowflake	$713M
Automation Anywhere	$550M
Dataminr	$392M
Databricks	$255M
ThoughtSpot	$145M
Confluent	$125M
C3 IoT	$106M
Looker	$103M
Dataiku	$100M
DataRobot	$100M
Total	**$2.6B**

1) 2019 YTD up until 1/31/2019.

2019 Industry Trends
Big Data & Analytics

Data Stack Migrating to Cloud	→	Adoption maturing & new architectures
Cambrian Data Explosion (volume, formats, speed, gravity)	→	Decoupled, cheaper & ubiquitous data –> faster, less structured, more scalable
Buying Center Expansion	→	Emphasis on newer stakeholders (developers and less-technical users) vs. core IT buyers
"Data Age" Biz Models	→	Data as a formal business area (rise of the CDO); newer pricing and delivery models (self-service)
Blurred (IT Ops) Lines	→	IT as business enabler (vs. cost center) prompting segment-wide land grab
Process Streamlining	→	AI/ML driven manual processes automation
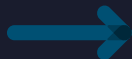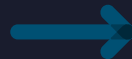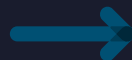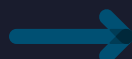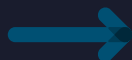
AI/ML/Deep Learning

- AI/ML/DL becoming embedded tech vs. standalone businesses

- Proliferation of machine data creating new opportunities

- Fundamental platforms and innovation driven by technology leaders:

  - Tensorflow (Google)

  - Watson (IBM)

  - MXNet (Amazon)

Global AI Spend[1]

2017 $2B

2022 $24B

TAM growth: 64% YoY '17-22

Enablement Areas

- Predictive analytics

- Workbench

- Scale enablers

Big Tech - AI/ML Related Activity

Google

Products
- TensorFlow
- Smart Reply
- Voice Search
- DeepMind
- Artificial Brain

M&A: API.ai, Moodstocks, Timeful, DNNresearch, Cleversense, Emu, DeepMind, Jetpac, Dark Blue Labs, Vision Factory

Amazon

Products
- Alexa, Echo
- Alexa Skills Kit
- Amazon ML

M&A: Angel.ai, Evi, Orbeus, Safaba, Kiva. Has an Alexa Fund focused on voice and AI startups

Microsoft

Products
- Cortana, Tay
- Microsoft Bot Framework
- Azure ML

M&A: SwiftKey, Aorata, Netbreeze, Equivio, Genee

salesforce

Products
- Einstein

M&A: TempoAI, PredictionIO, MetaMind

facebook

Products
- Facebook M bot
- Automatic Alternative Text
- Facebook AI Research Lab

M&A: Wit.AI, Surreal Vision, Face.com

IBM

Products
- IBM Watson

M&A: Cogenea, AlchemyAPI, Explorys

intel

Products
- Intel® Math Kernel Library, Intel Deep Learning SDK
- Xeon chips for AI

M&A: Itseez, Nervana, Saffron, Movidius

AI/ML Market Landscape

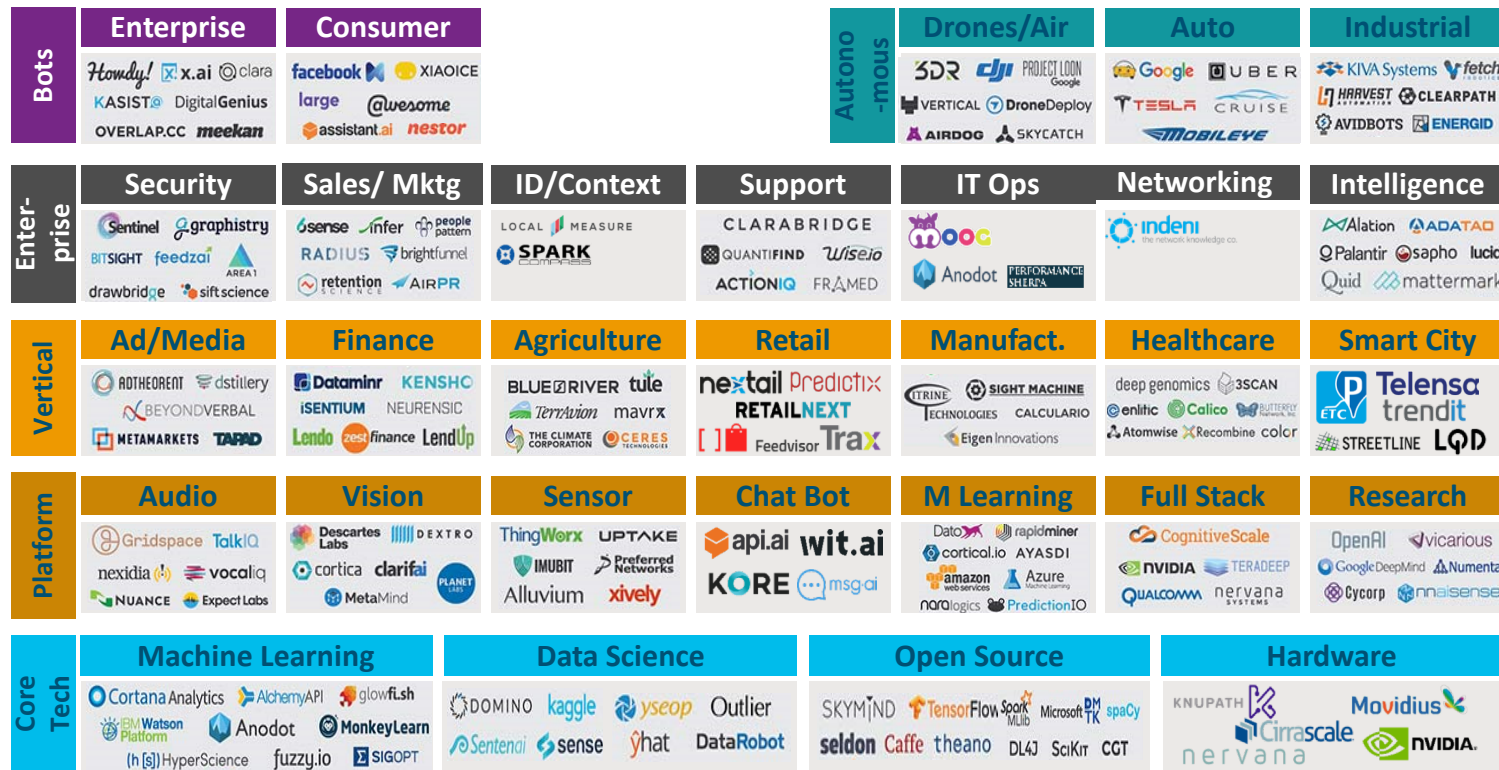| Bots	Enterprise	Consumer
	Howdy! x.ai clara	facebook XIAOICE
	KASISTO DigitalGenius	large @wesome
	OVERLAP.CC meekan	assistant.ai nestor

Autono-mous	Drones/Air	Auto	Industrial
	3DR DJI PROJECT LOON Google	Google UBER	KIVA Systems fetch
	VERTICAL DroneDeploy	TESLA CRUISE	HARVEST CLEARPATH
	AIRDOG SKYCATCH	MOBILEYE	AVIDBOTS ENERGID

Enter-prise	Security	Sales/ Mktg	ID/Context	Support	IT Ops	Networking	Intelligence
	Sentinel graphistry	6sense infer people pattern	LOCAL MEASURE	CLARABRIDGE	mooc	indeni	Alation ADATAO
	BITSIGHT feedzai AREA1	RADIUS brightfunnel	SPARK COMPASS	QUANTIFIND Wisei0	Anodot PERFORMANCE SHERPA		Palantir sapho lucid
	drawbridge sift science	retention AIRPR		ACTIONIQ FRAMED			Quid mattermark

Vertical	Ad/Media	Finance	Agriculture	Retail	Manufact.	Healthcare	Smart City
	ADTHEORENT dstillery	Dataminr KENSHO	BLUE RIVER tule	nextail Predictix	CITRINE TECHNOLOGIES SIGHT MACHINE	deep genomics 3SCAN	Telensa ETCV
	BEYONDVERBAL	iSENTIUM NEURENSIC	TerrAvion mavrx	RETAILNEXT	CALCULARIO	enlitic Calico BUTTERFLY Network, Inc.	trendit
	METAMARKETS TAPAD	Lendo zestfinance LendUp	THE CLIMATE CORPORATION CERES TECHNOLOGIES	[ ] Feedvisor Trax	Eigen Innovations	Atomwise Recombine color	STREETLINE LQD

Vertical/ End Use Case-focused

New data sources
or
Predictions using existing data
or
Intelligent automation

Platform	Audio	Vision	Sensor	Chat Bot	M Learning	Full Stack	Research
	Gridspace TalkIQ	Descartes Labs DEXTRO	ThingWorx UPTAKE	api.ai wit.ai	Dato rapidminer	CognitiveScale	OpenAI vicarious
	nexidia vocaliq	cortica clarifai	IMUBIT Preferred Networks	KORE msg.ai	cortical.io AYASDI	NVIDIA TERADEEP	Google DeepMind Numenta
	NUANCE Expect Labs	MetaMind PLANET LABS	Alluvium xively		amazon web services Azure Machine Learning	QUALCOMM nervana SYSTEMS	Cycorp nnaisense
					naralogics PredictionIO		

| Core Tech	Machine Learning	Data Science	Open Source	Hardware
	Cortana Analytics AlchemyAPI glowfi.sh	DOMINO kaggle yseop Outlier	SKYMIND TensorFlow Spark MLlib Microsoft CNTK spaCy	KNUPATH Movidius
	IBM Watson Platform Anodot MonkeyLearn	Sentenai sense yhat DataRobot	seldon Caffe theano DL4J SciKit CGT	Cirrascale NVIDIA
	(h[s]) HyperScience fuzzy.io SIGOPT			nervana

Horizontal Building Blocks/ Developer-focused

Tools targeted at developers looking to integrate AI technology into their applications

Predictive Models & ML Drivers
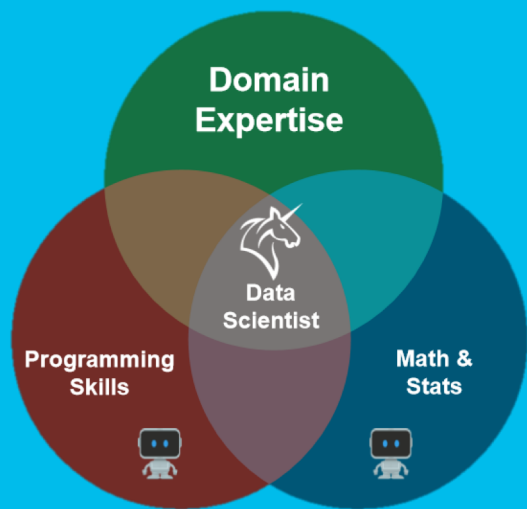
Scaling Data Scientists

Finite supply of data scientists & time spent "tooling"

Automation Technology – Actioning

Automates the math & stats along with the programming skills portion of data science

Empowering Business Analysts

Buyer center expansion

Case Study: Perspica acquisition

Metric Ingest Scalability for Larger Customer Opportunities	Domain-Specific Machine Learning for Advanced IT Use Cases

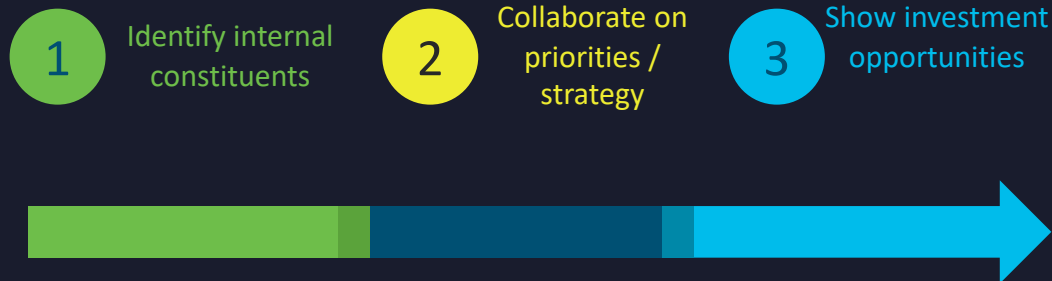**Metric Ingest Scalability for Larger Customer Opportunities**

- Increased metric ingest rates for large customer deployments
- Streaming architecture analyzes data in real-time and enables rapid adjustment to changing conditions
- Reduces resource requirements for key AppD functions (baselines, metric roll-ups) & enhances scalability
- Existing integrations with IT data sources increase access to monitoring data and augment APM

Domain-Specific Machine Learning for Advanced IT Use Cases

- Real-time insights for anomaly detection, topology reconciliation, improved baselines, and intelligent alerts
  - Advanced **anomaly detection** leading to more accurate alerting
  - **Improved baselines**; stored versus calculated leading to better performance
- Accelerates AppD roadmap for **Root Cause Analysis**
  - Multivariate metric correlation driving RCA generation and recommendations
- Differentiated ML-based capabilities over APM competitors
- **Stream processing framework** will enable ML to solve additional use cases