

Scholarly Publishing in an AI World

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April 24, 2017



“Adapt or perish, now as ever, is Nature’s
inexorable imperative.”

H.G. Wells, novelist, historian, and journalist

“People don't say, 'I just had a kid and I hope it
turns out to be a factory worker.'”

*Rodney Brooks, former Director of the MIT Computer Science and AI
Laboratory*



Agenda

What is Happening with AI

Problems AI Can Help Solve in Scholarly Publishing

AI Starter Kit

What is AI Under the Hood

What is Happening with AI?

Progress is Blazingly Fast

100 STARTUPS USING ARTIFICIAL INTELLIGENCE TO TRANSFORM INDUSTRIES

CONVERSATIONAL AI/ BOTS



VISION



AUTO



ROBOTICS



CYBERSECURITY



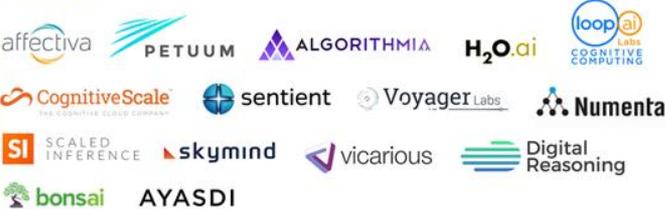
BUSINESS INTELLIGENCE & ANALYTICS



AD, SALES, CRM



CORE AI



HEALTHCARE



TEXT ANALYSIS/ GENERATION



IOT/IIOT



COMMERCE



FINTECH & INSURANCE



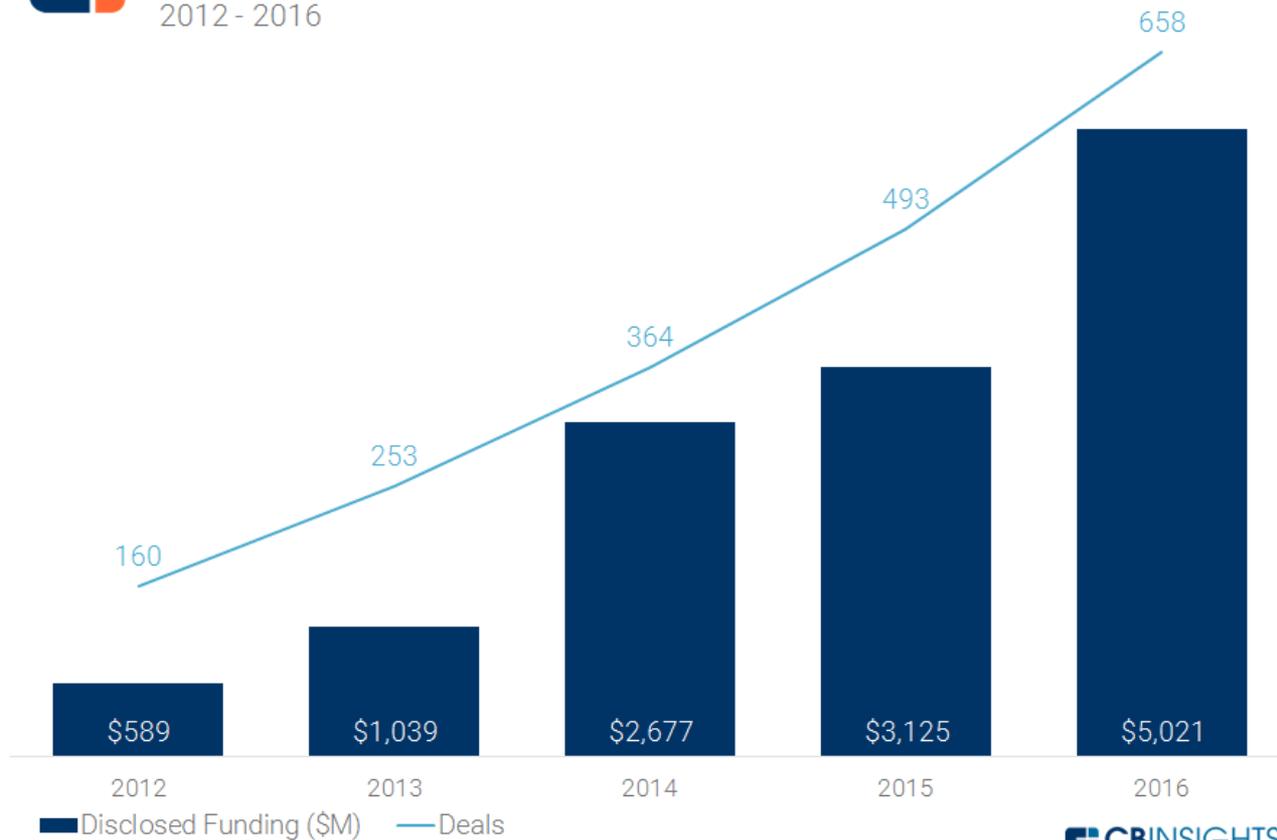
OTHER





AI ANNUAL GLOBAL FINANCING HISTORY

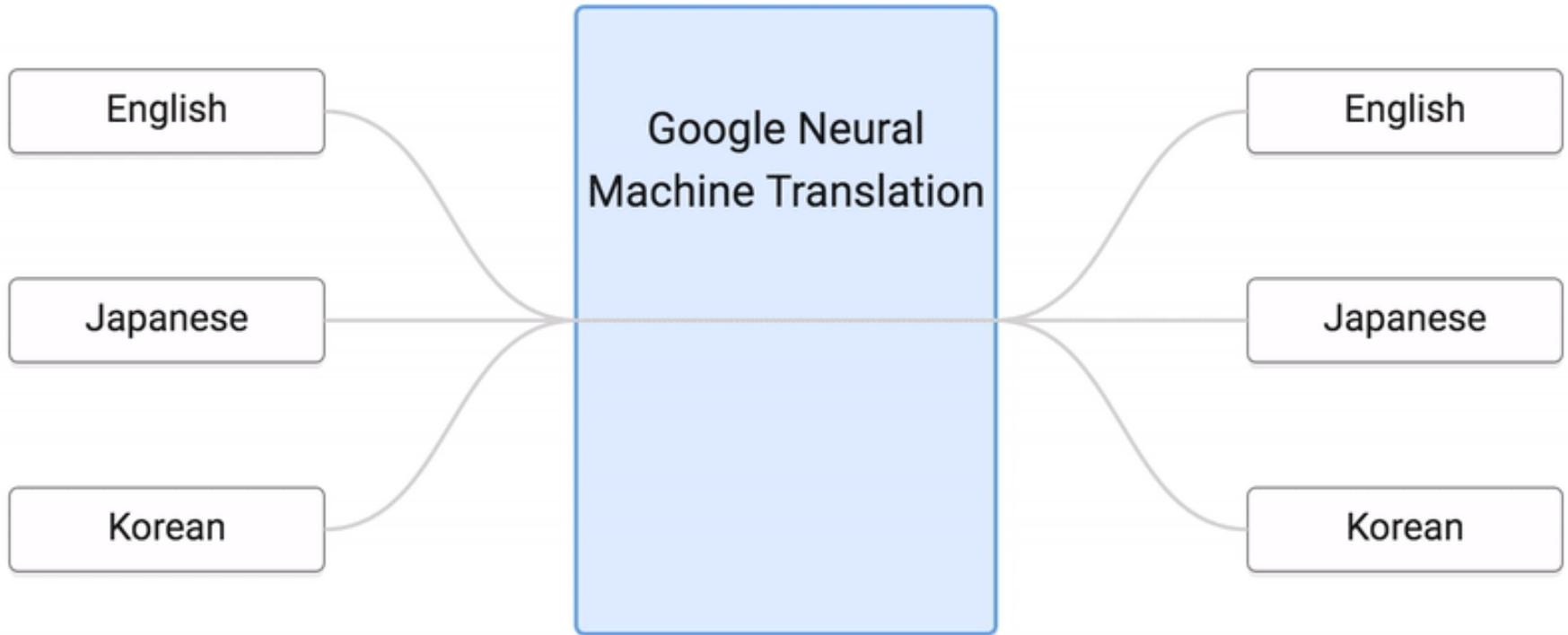
2012 - 2016



CBINSIGHTS



Training



[Google's Neural Machine Translation System: Bridging the Gap between Human and Machine Translation](#)

SHARE

Self-taught artificial intelligence beats doctors at predicting heart attacks

By [Matthew Hutson](#) | Apr. 14, 2017, 3:30 PM



11K



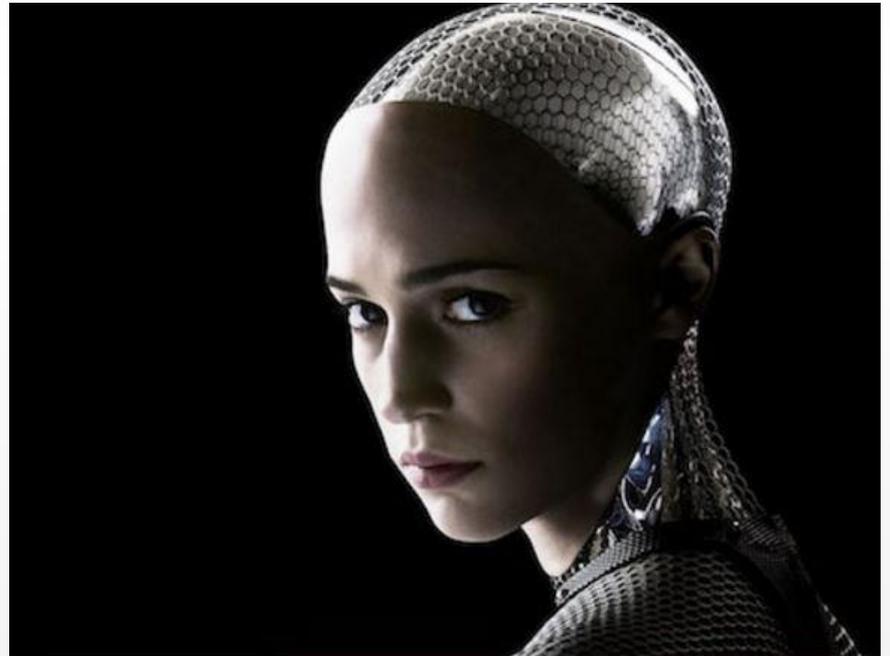
19K



2K

“The best one — neural networks — correctly predicted 7.6% more events than the ACC/AHA method, and it raised 1.6% fewer false alarms. In the test sample of about 83,000 records, [that amounts to 355 additional patients whose lives could have been saved.](#)

Machine Learning AI =
Hierarchical Pattern Recognition



TAKEAWAYS

Narrow AI

Today

Single-purpose machine

Solves one specific task, often with a predefined list of inputs, a predefined list of outputs, and training with large data sets of example inputs and outputs

The vast majority will be AI Helpers, while some small portion will develop into AI Workers

General AI

Decades
away

Purposeful mind

"machine intelligence with the full range of human intelligence." - Ray Kurzweil

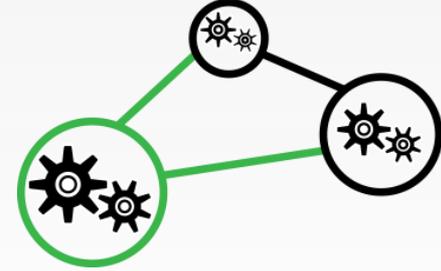
Can pass the Turing Test in which a machine and person converse sight unseen, and a human observer cannot discern which is the human

Can plan, learn, communicate, and integrate these skills toward its own intentions

AI Helpers



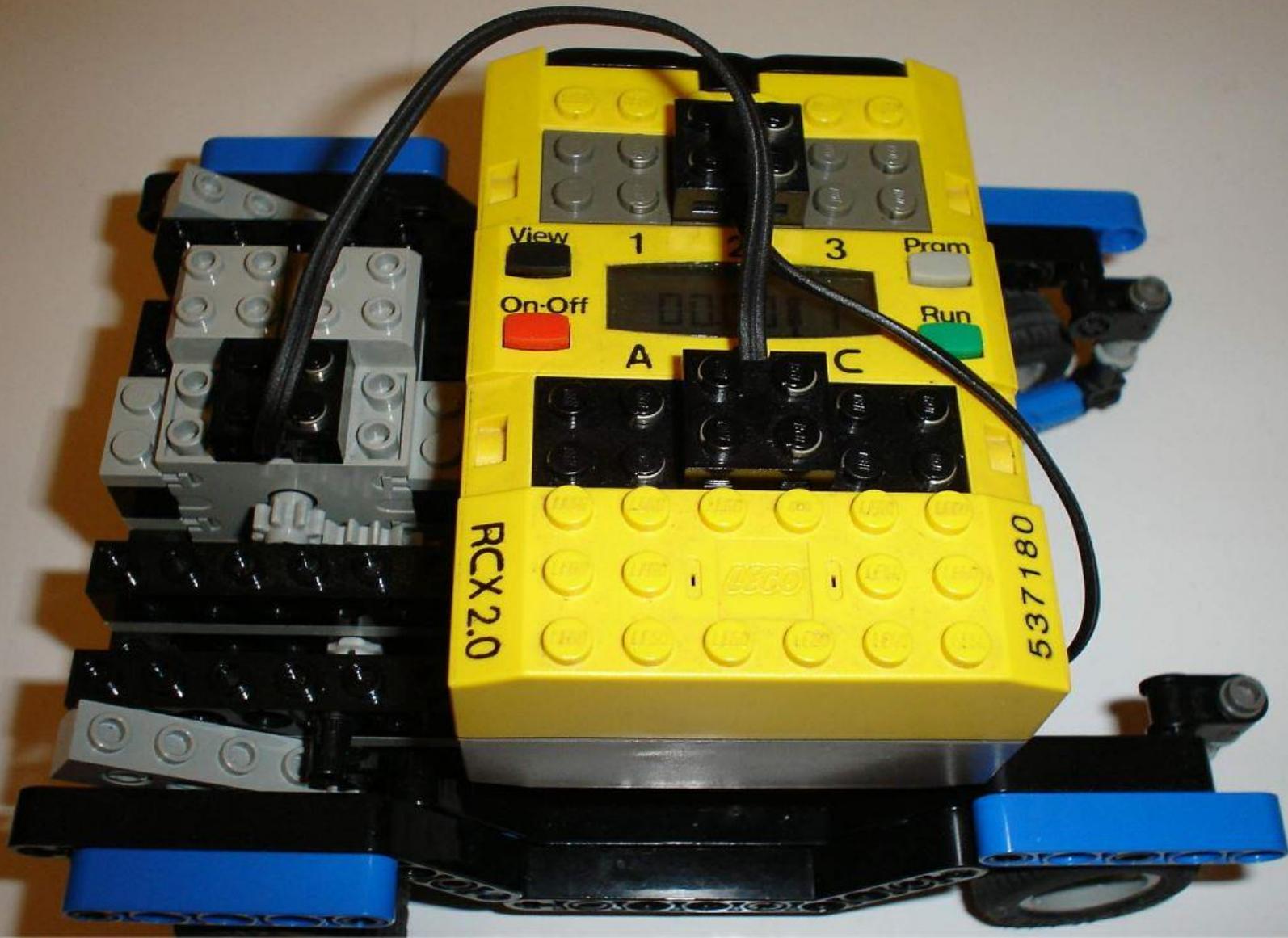
AI Workers



Self-Driving Cars

P100D





TAKEAWAYS

Essential Ingredients to Build Your AIs

1. Lots of well-structured data to use for training

1. Massive computing power that is only becoming available now

1. Machine Learning talent that is globally in short supply

Engineering Will Adapt



Kiefer Sutherland and Mary Lynn Rajs kub in "24".
Photo credit: 20th Century Fox



Photo credit: ULTRA Company

TAKEAWAYS

Traditional Engineering

Humans write the logic that takes your data inputs and produces your desired outputs.

Supporting staff are needed to keep the project on schedule, do reporting up, and change priorities when needed.

Op Ex
intensive

Deep Learning

Humans do the initial work of creating training data sets and setting up computing capacity

You let the machine create its own algorithm between the inputs and outputs, and you let it learn from each new example it gets right or wrong

Cap Ex
intensive

Problems AI Can Solve in Scholarly Publishing

Problems AI Can Help Solve in Scholarly Publishing

- Finding the right articles to read
- Identifying reviewers
- Detecting plagiarism
- Detecting figure manipulation
- Measuring researcher impact
- Your ideas!



- Making discoveries in the lab
- Customer Service
- Formatting to Guidelines
- AR/VR Conferences



Raises the Bar to Remain Competitive in 5 Years

AI will raise the bar for everyone who wants to compete for authors, reviewers, librarians, and funders.

How will investments in AI make the current workflow better / faster / cheaper?

What will become possible with these technologies that was never before possible that you will need to invest in to remain competitive?



Will You Invest or Partner

Will you be the one to create these AIs, or will you partner with the ones who do?

Risk of Investing: Unsuccessful projects

Risk of Not Investing: Dependency on others who do

It won't be an option to ignore AI in five years because there will be no way to be competitive without it.

AI Starter Kit

Select the Right Problem - AIs vs. Humans

Narrow AIs

Tasks that are:

- Repeating
- Consistent
- Data-generating

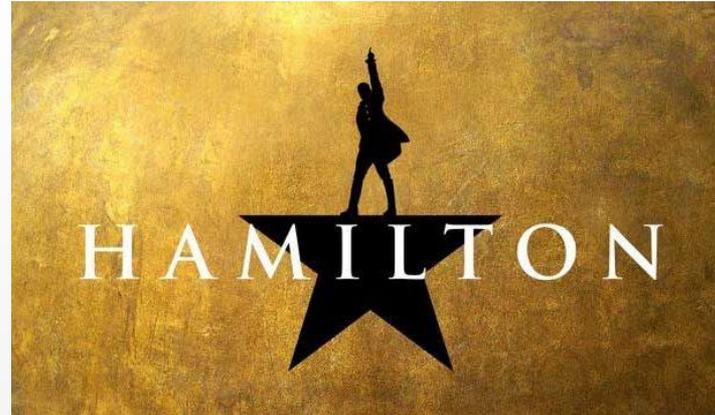
*Hierarchical pattern
recognition*

Google
scholar

Humans

Tasks that are:

- Original
- Inconsistent inputs and outcomes
- Don't readily produce data



Where to begin

1. Select the right problem
2. Identify engineering talent
3. Supervise learning of your AI
4. Use the AI as a helper to your staff

TensorFlow™

[Install](#)[Develop](#)[API r1.0](#)[Deploy](#)[Extend](#)[Res](#)

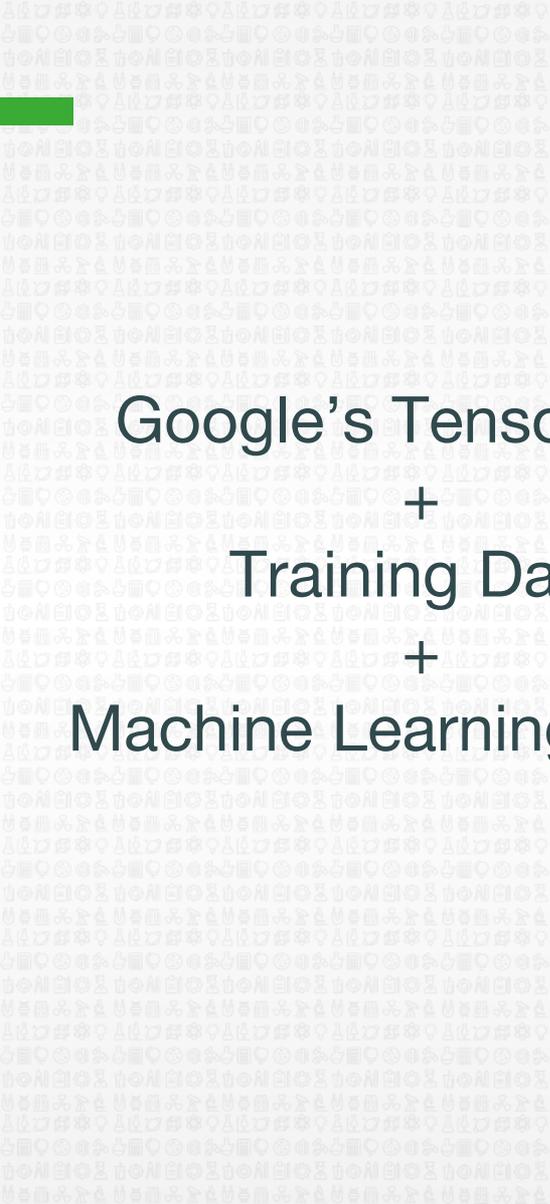
An open-source software library for Machine Intelligence

[GET STARTED](#)

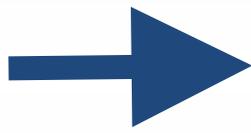
TensorFlow™ is an open source software library for numerical computation using data flow graphs. Nodes in the graph represent mathematical operations, while the graph edges represent the multidimensional data arrays (tensors) communicated between them. The flexible architecture allows you to deploy computation to one or more CPUs or GPUs in a desktop, server, or mobile device with a single API.







Google's TensorFlow
+
Training Data
+
Machine Learning Talent



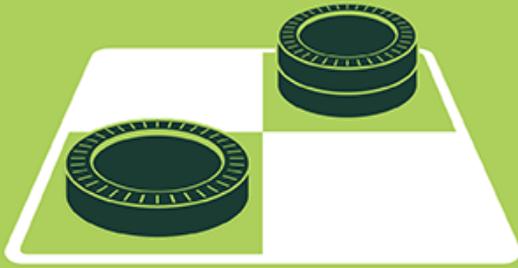
Better / Faster / Cheaper
OR
Never Before Possible



What is AI Under the Hood

ARTIFICIAL INTELLIGENCE

Early artificial intelligence stirs excitement.



MACHINE LEARNING

Machine learning begins to flourish.



DEEP LEARNING

Deep learning breakthroughs drive AI boom.



1950's

1960's

1970's

1980's

1990's

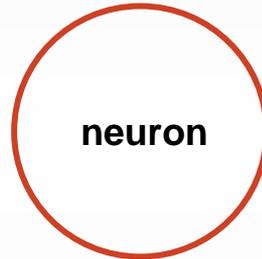
2000's

2010's

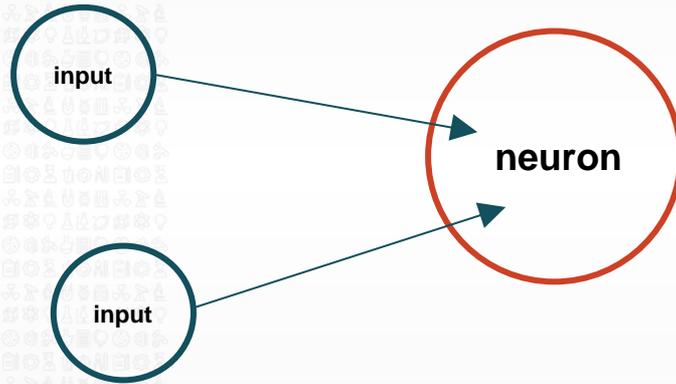
Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.

Artificial Neural Network / Deep Learning

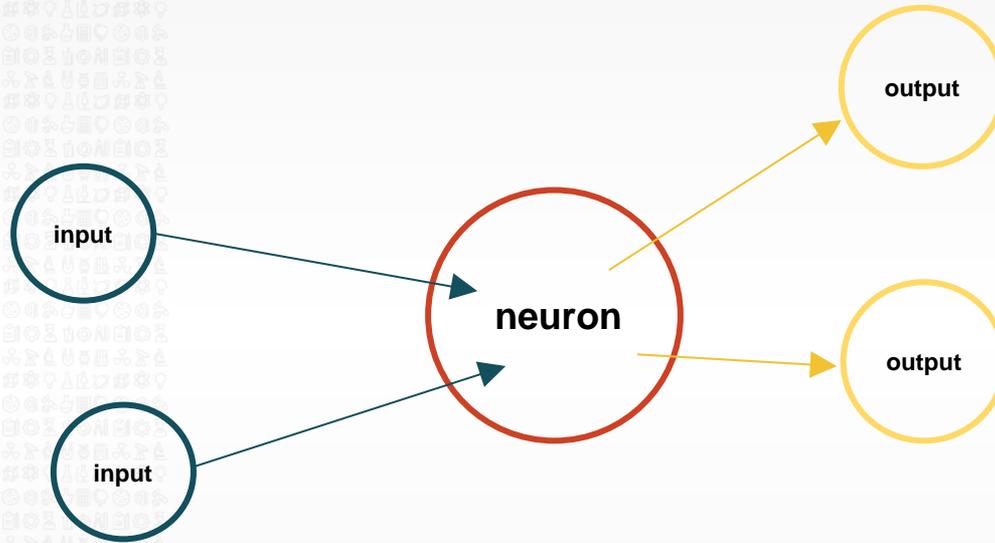
Artificial Neural Network



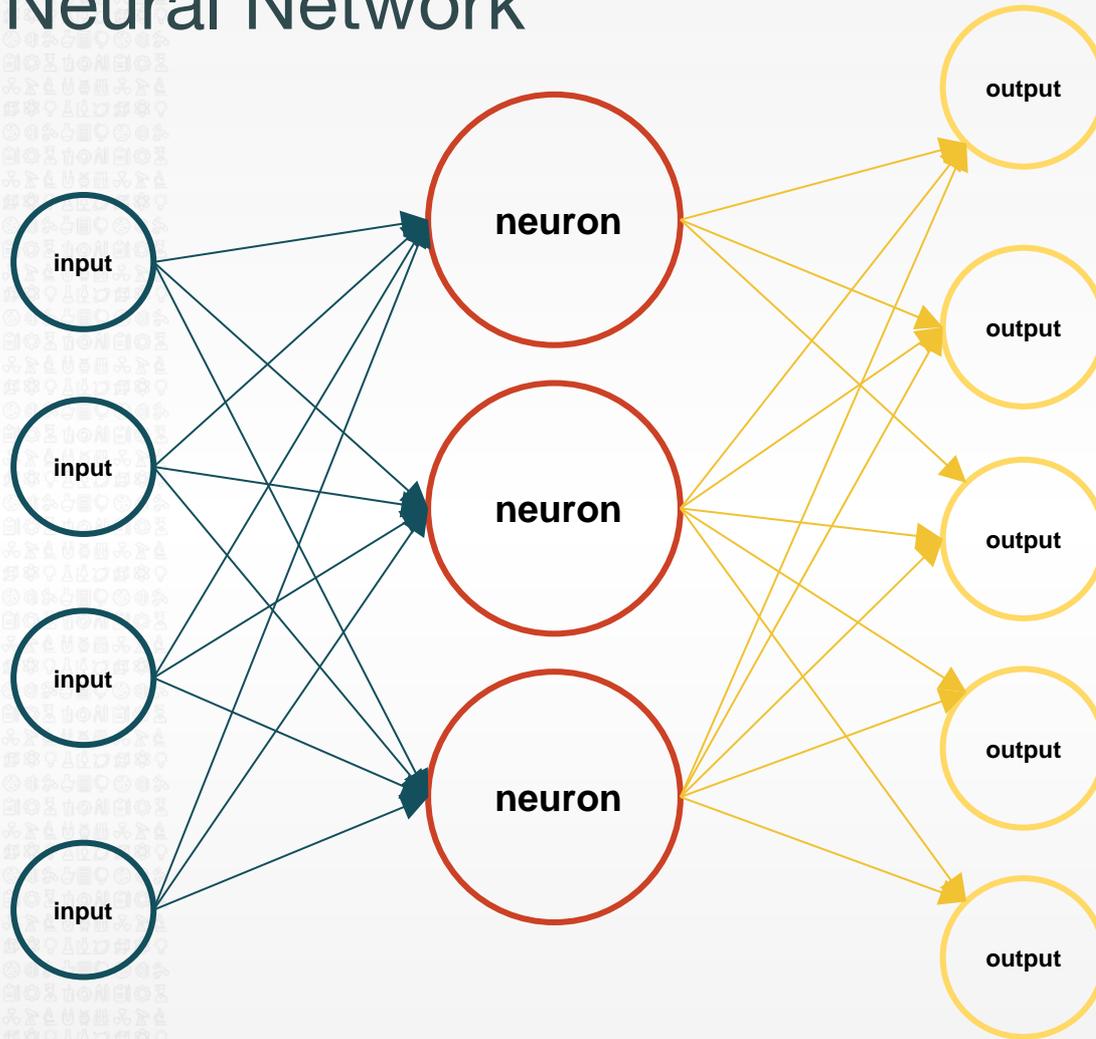
Artificial Neural Network



Artificial Neural Network

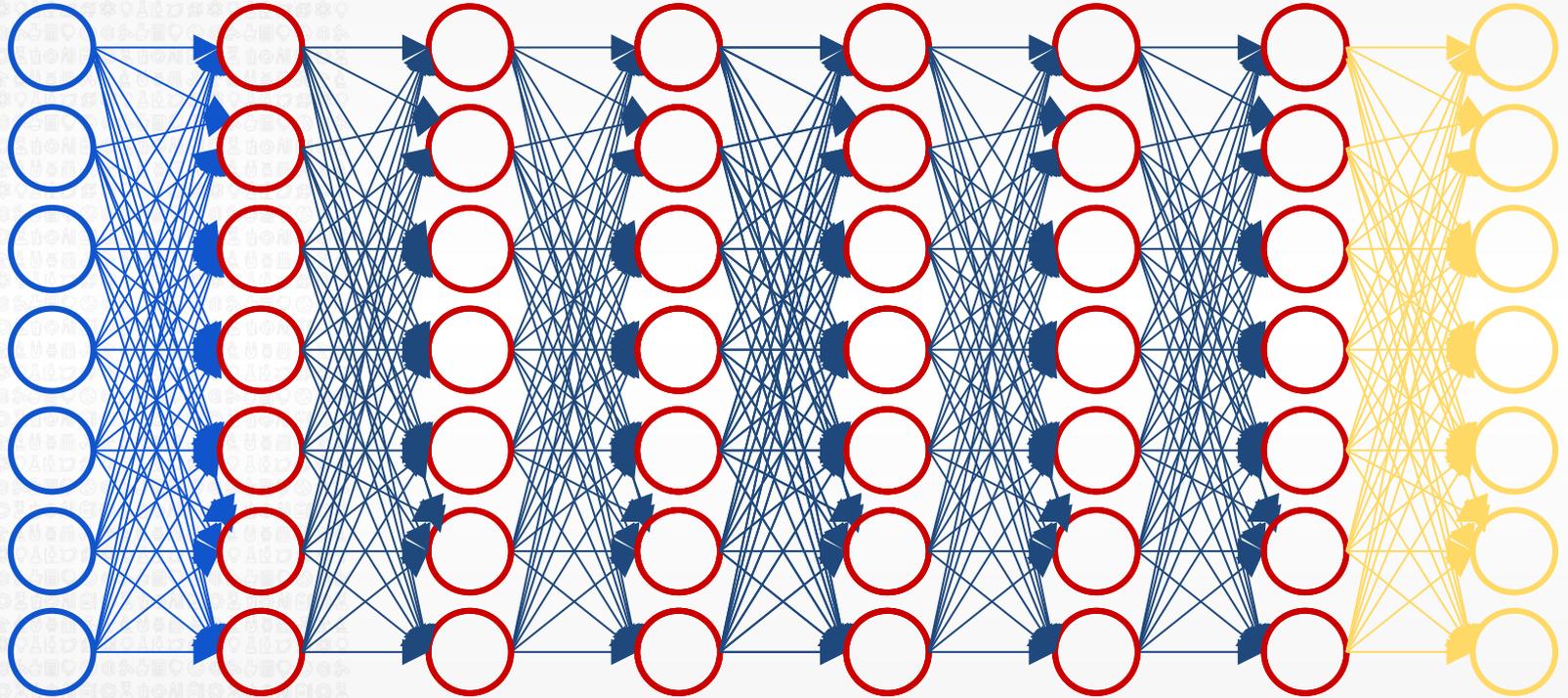


Artificial Neural Network



Artificial Neural Network

Inputs



Outputs

Hierarchical Pattern Recognition

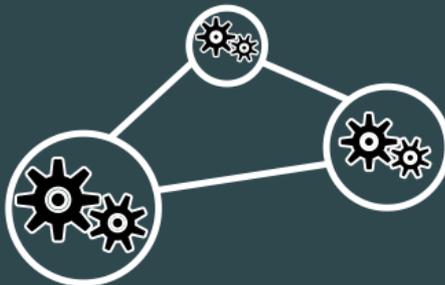
Risks: Job displacement

9%
**Jobs
Created**

**Robot monitoring
Data science
Automation specialist
Content curator**

7%
**Net Jobs
Lost**

**Office &
Administrative
Support**



16%
**Jobs
Replaced**

According to Forrester's projections



THE END

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References and Credits

Peter Diamandis and the A360 Conference
Neil Jacobstein of Singularity University and Stanford
Andrew Ng of Baidu and Stanford
Ray Kurtzweil

