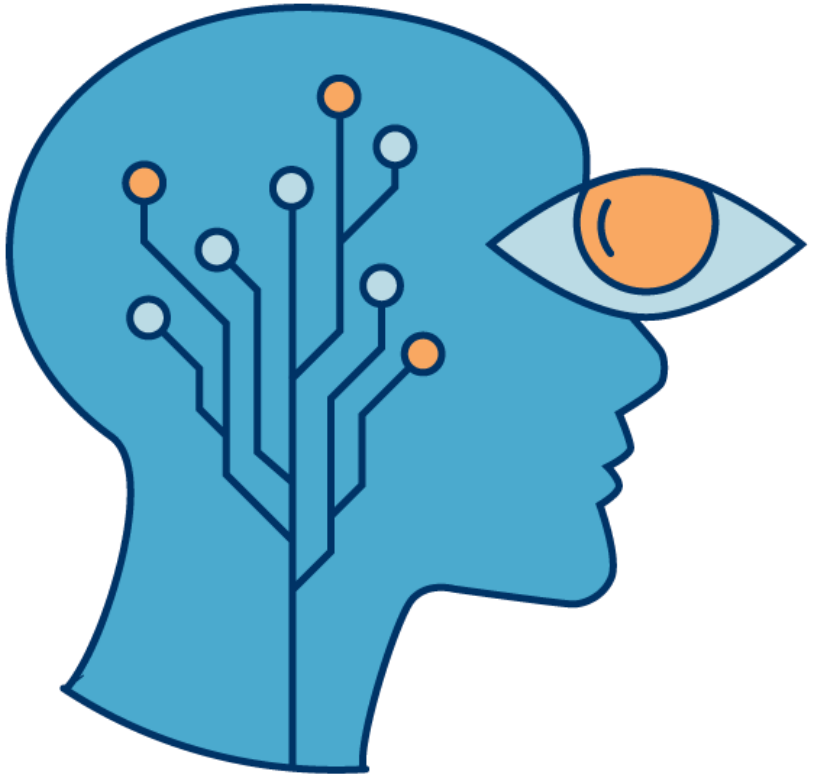
State of AI 2018

Artificial intelligence trends reshaping industries and economies



CB INSIGHTS

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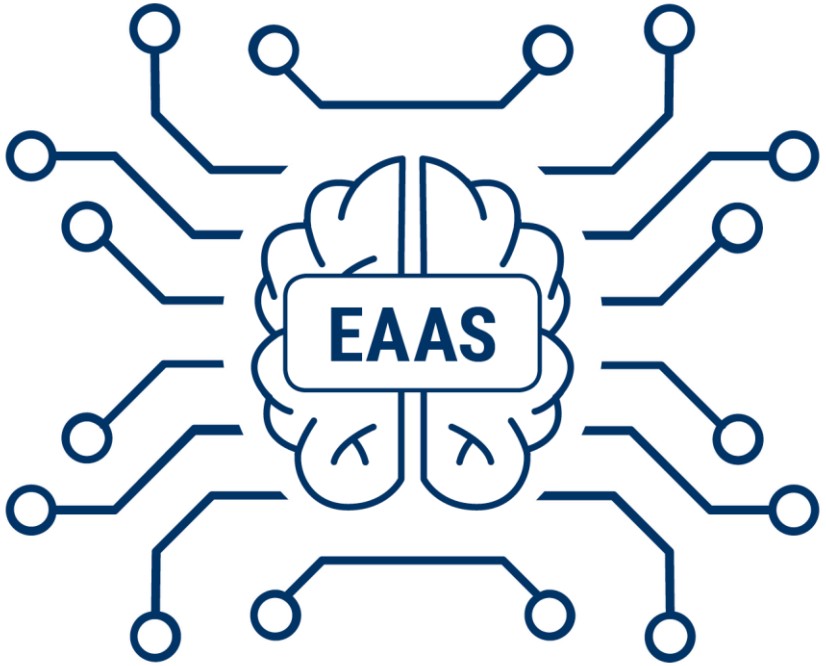
WHO WE ARE

The technology market intelligence platform.

CB Insights software lets you predict, discuss, and communicate emerging technology trends using data in ways that are beyond human cognition. We are a leader in the Expert Automation & Augmentation Software (EAAS) space.



TRUSTED BY THE WORLD'S LEADING COMPANIES

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"We use CB Insights to find emerging trends and interesting companies that might signal a shift in technology or require us to reallocate resources."

Beti Cung, Corporate Strategy, Microsoft

Microsoft

The Disruption of Financial Services

The Future of Fintech is an exclusive gathering of the world's largest financial institutions, best fintech startups, and most active venture investors.

New York, NY
June 19-21, 2018

ABOUT THE ANALYST

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Deepashri Varadharajan received her undergraduate degree in engineering at Vellore Institute of Technology in India. She later studied journalism, and received a Master's degree from the Columbia University Graduate School of Journalism.

Before CB Insights, Deepashri worked for organizations including Al Jazeera America, Deccan Herald, and interned at Siemens India.

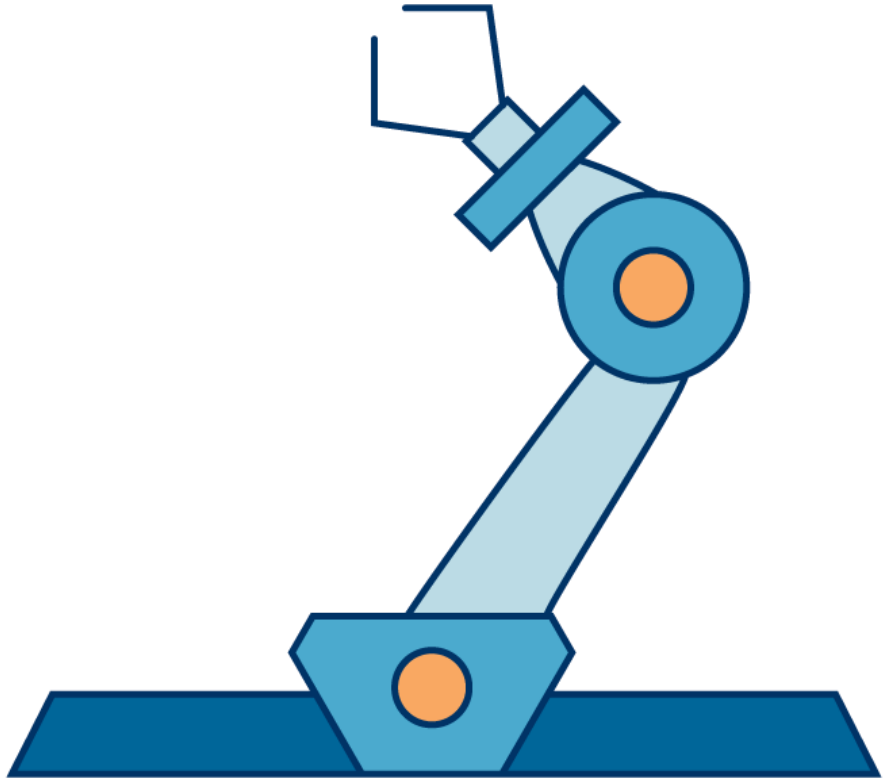
Most popular analyses by Deepa:

Artificial Intelligence Trends To Watch In 2018
The State of Automation

Contents

JOBS

New blue collar job – robot babysitters



Manufacturing jobs are on the rise

CBINSIGHTS Source: BLS

Chinese manufacturing giant moves to Arkansas

Governor Brings 400 New Jobs Back from China

Governor Asa Hutchinson today announced the signing of an MOU with Suzhou Tianyuan Garments Company, wrapping up another successful trade mission overseas. As part of the deal, Tianyuan will create 400 jobs and invest $20 million in Little Rock.

Chinese T-shirt manufacturer Tianyuan Garments Company signed a Memorandum of Understanding (MoU) with the Arkansas government to employ 400 workers at $14/hr at its new garment factory in Arkansas.

SoftWear AUTOMATION

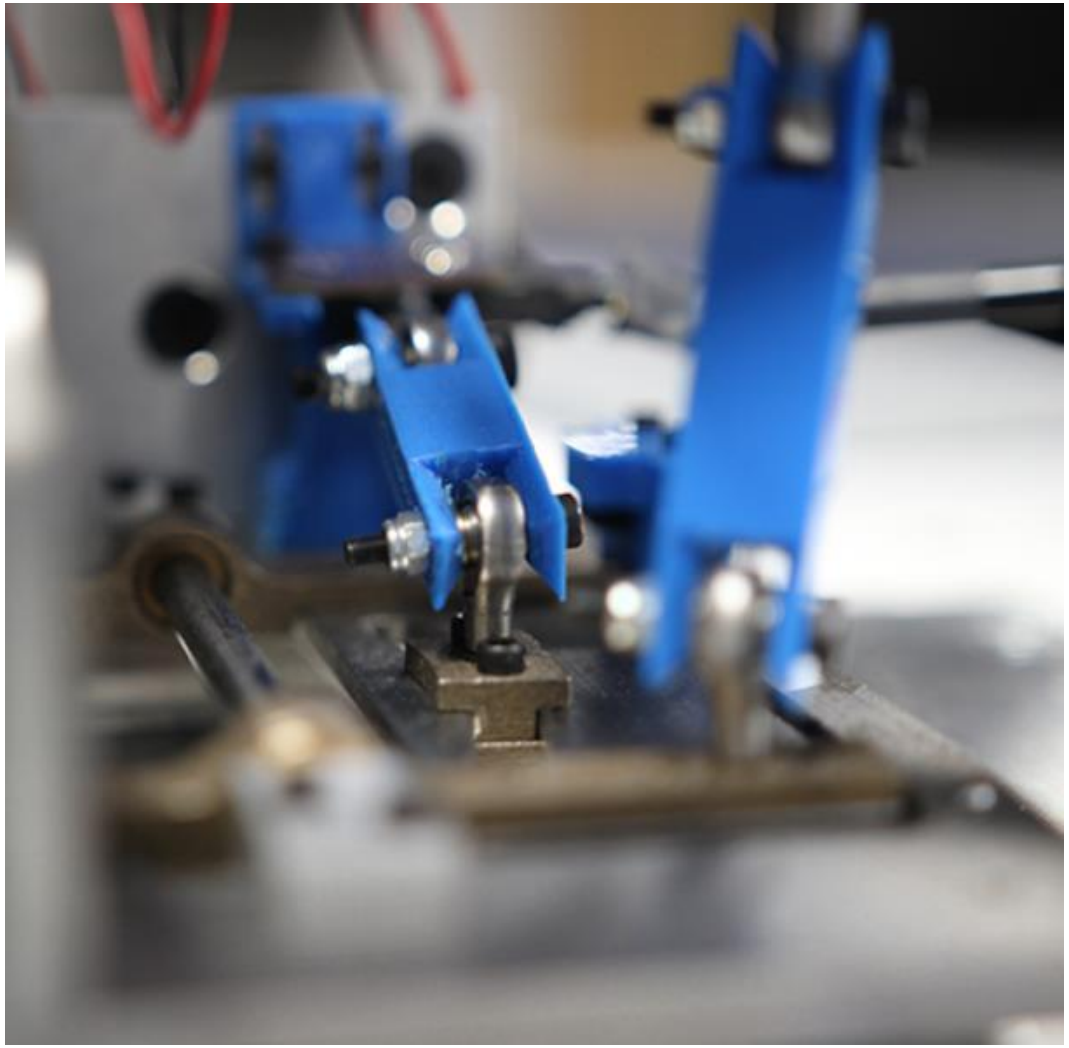
Funding

$7.5M

SoftWear develops "Sewbots" to automate sewing worklines in the manufacturing of garments and shoes.

Select Investors

CTW Venture Partners



"...the system will make one T-shirt every 22 seconds. We will produce 800,000 T-shirts a day for Adidas... **even the cheapest labor market can't compete with us.**"

Tang Xinhong, chairman of Tianyuan Garments, speaking to ChinaDaily

The number and nature of jobs will **never be the same** as 2008 numbers.

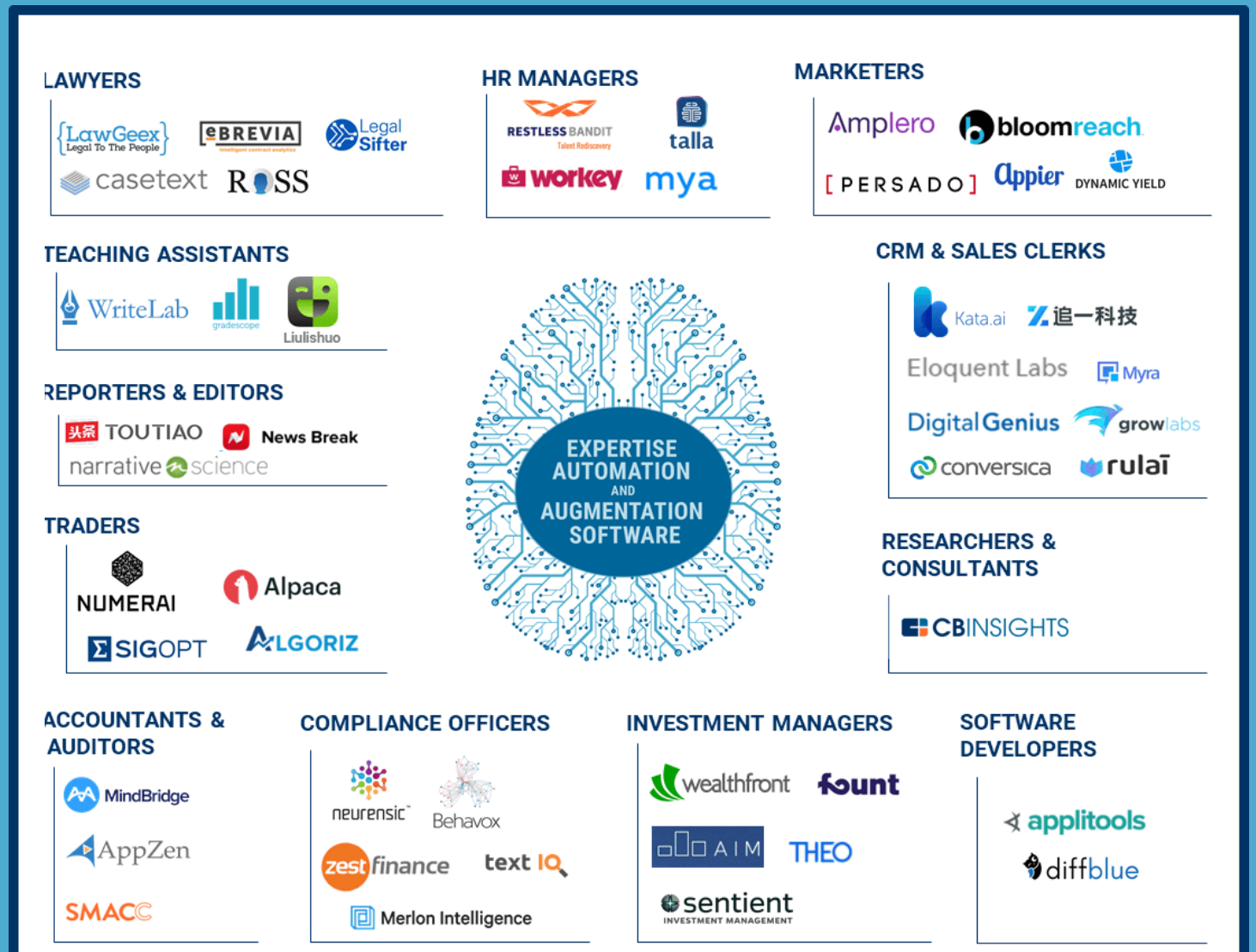
JOBS

White-collar automation accelerates

EAAS THREATENS ENTRY-LEVEL WHITE COLLAR JOBS

A growing wave of Expert Automation & Augmentation Software (EAAS) platforms will usher in a new era of **AI-enhanced productivity**.

The market map highlights some of the EAAS startups across number of professions ranging from lawyers to journalists to wealth managers, and more.

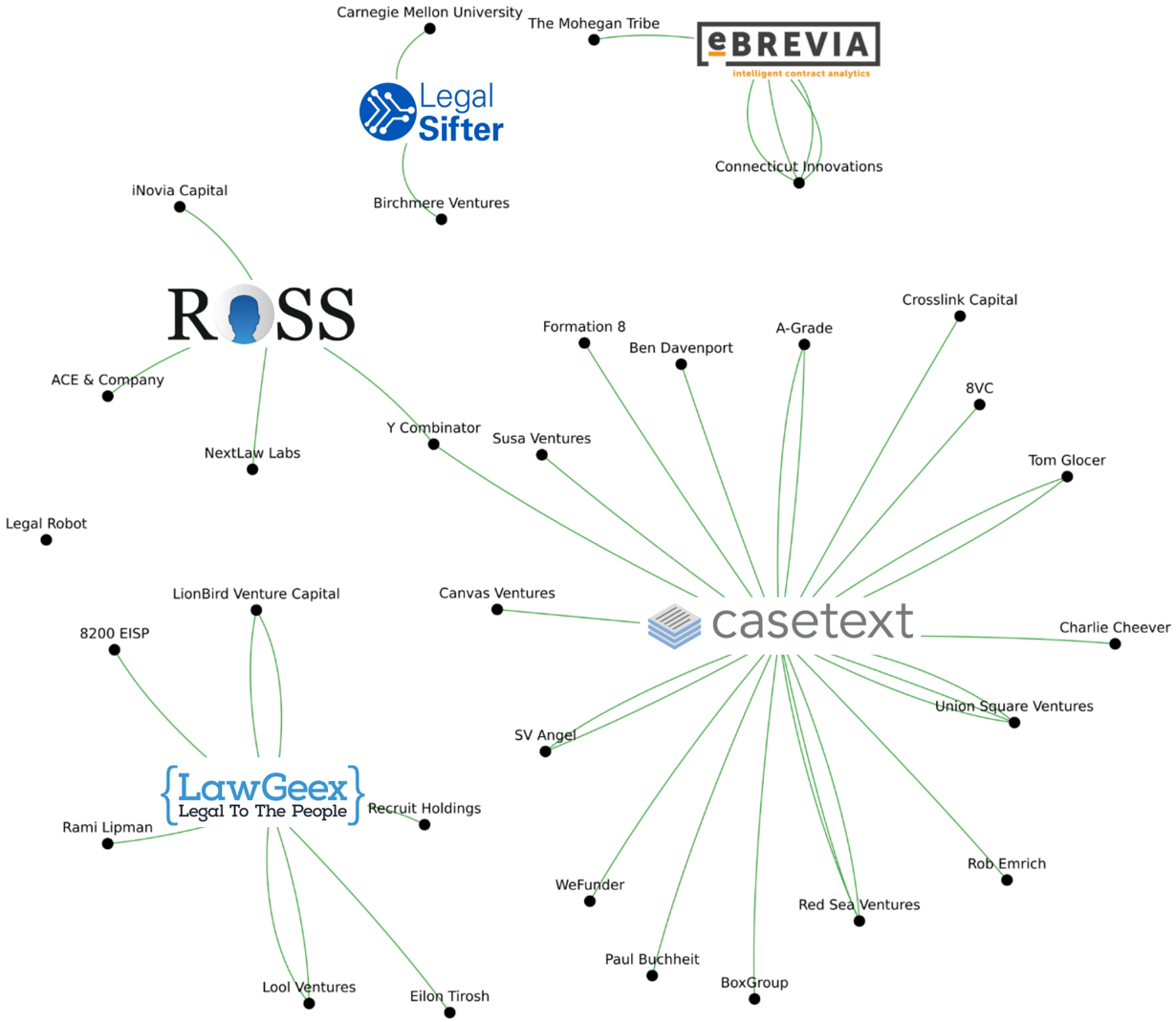


AI may impact fee structure of law firms

AI can summarize thousands of pages of legal documents within minutes while reducing the probability of error. This will impact the fee structure of law firms that charge by the hour on the revenue side but also be a potential cost savings as they will be able to hire fewer junior lawyers.

Early-stage AI deals in law

(green lines indicate investments)



"Most of (the) software we write today at Google, everything, these are hand-coded systems... Over time, these could be lone systems, **which automatically writes itself**."

Sundar Pichai, Google CEO

Machine learning removes safety net for entry-level software developers

Company	URL	Company Description	Round	Date
Pienso	pienso.com	Pienso is an easy-to-use machine learning platf…	Seed VC	11/06/2017
MoQuality	moquality.com	MoQuality is developing an AI platform for mobil…	Seed	07/17/2017
Applitools	applitools.com	Applitools is a provider of AI-based Automated …	Series B	07/12/2017
DiffBlue	diffblue.com	DiffBlue is a world leader in AI that understands…	Series A	06/27/2017
Crane AI	crane.ai	Crane is an artificial intelligence platform that pa…	Unattributed	06/26/2017
Pienso	pienso.com	Pienso is an easy-to-use machine learning platf…	Unattributed	06/14/2017
Acellere	acellere.com	Acellere is a software technology and services c…	Incubator/Acceler…	05/03/2017
Algoriz	algoriz.com	Algoriz allows users to build trading algorithms …	Seed	03/04/2017

Early-stage deals are emerging to startups focused on AI-based software testing, debugging, and basic frontend development.

JOBS

6-figure salaries in the AI talent wars

The **demand** for AI talent is far **outpacing** the **availability** of skilled researchers.

Big tech scoops top AI talent

Google's Deepmind Technologies reported that "staff costs and other related costs" accounted for £104.8M. A quick LinkedIn search puts the staff number at 415. Assuming this as team size in 2016, and discounting other expenses, this puts the average employee salary for the team at £252,000 (around $350,000 per annum).

DEEPMIND TECHNOLOGIES LIMITED

Notes to the financial statements
For the year ended 31 December 2016

3. Turnover

The turnover represents research and development fees from other group undertakings (US) amounting to £40,283,597.

4. Operating loss

Operating loss is arrived at after charging the following:

	Year ended 31 Dec 2016 GBP	Year ended 31 Dec 2015 GBP
Staff costs and other related costs	104,774,132	44,284,695
Management service fee	41,141,450	-
Depreciation	85,641	-
Amortization of intangible assets	777,904	-
Advertising and promotional expense	1,848,927	270,646
Legal fees	658,144	146,881
Audit	11,005	9,691
Professional services	3,873,872	630,077
Other administrative expenses	10,640,922	8,820,453
	163,811,997	**54,162,443**

Source: Companies House, United Kingdom

China is on a hiring spree too

$567K-$624K

$315K-$410K

According to a recent Tencent report, there are around 300,000 qualified AI researchers. But **demand is in the millions**.

TALENT WARS HEAT UP

Top AI talent bleeds to startups

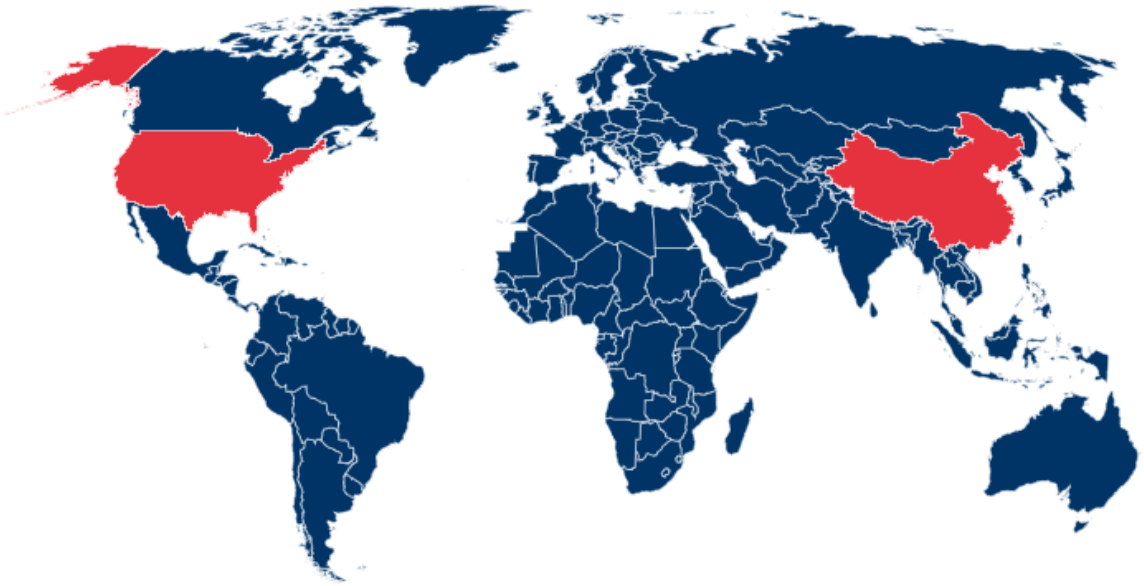
Ex-Baidu

Ex-Google

Ex-Baidu

GEO-POLITICS

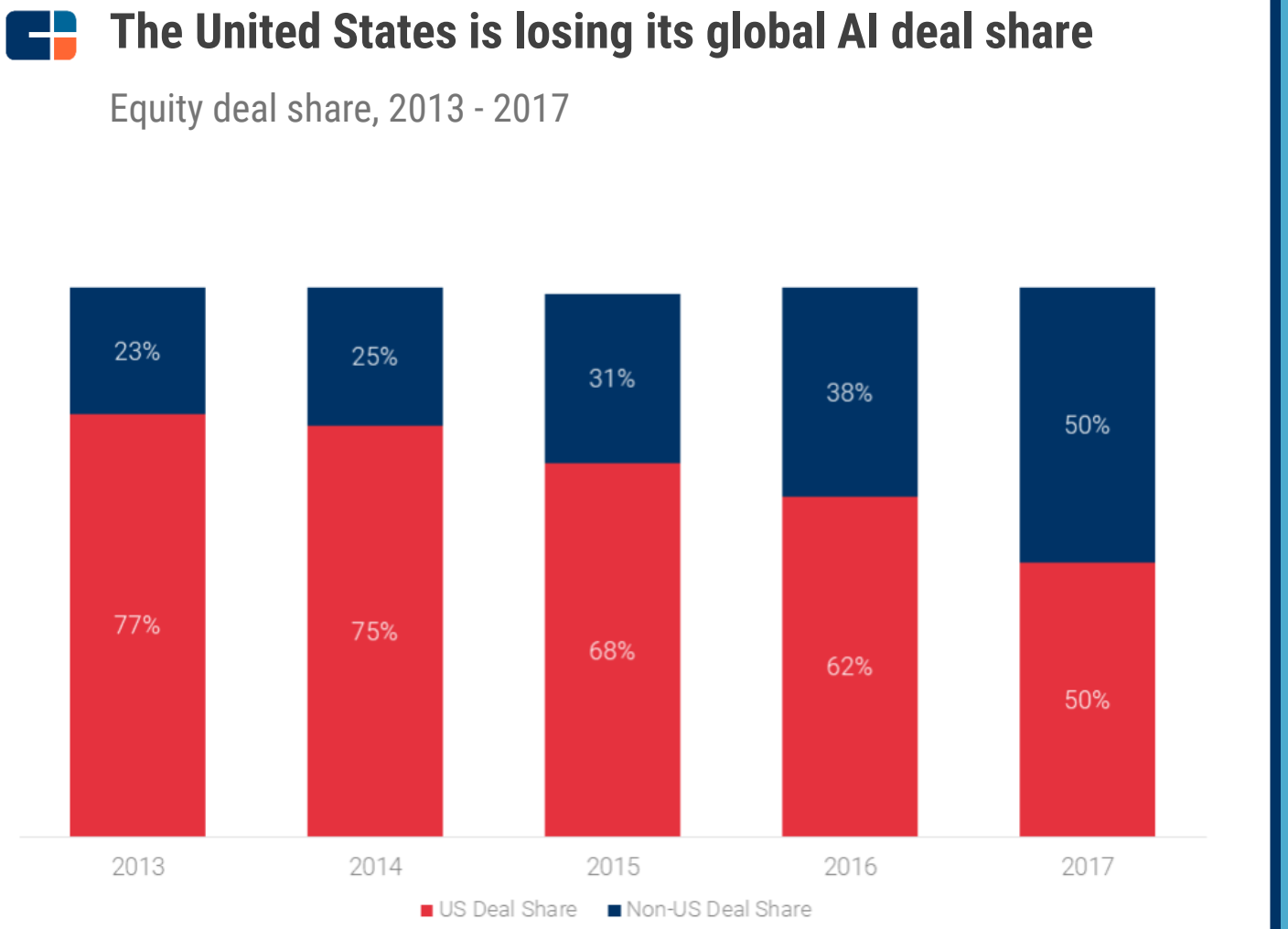
US vs China competition heats up



US global AI deal share falls to all-time low

The United States still dominates globally in terms of the number of AI startups and total equity deals.

But it is gradually losing its global deal share.



China wants to be a global AI leader

In the first step, by 2020, the overall technology and application of artificial intelligence will be synchronized with the world advanced level. The artificial intelligence industry will become a new important economic growth point. The application of artificial intelligence technology will become a new way to improve livelihood and effectively support the entry into the ranks of

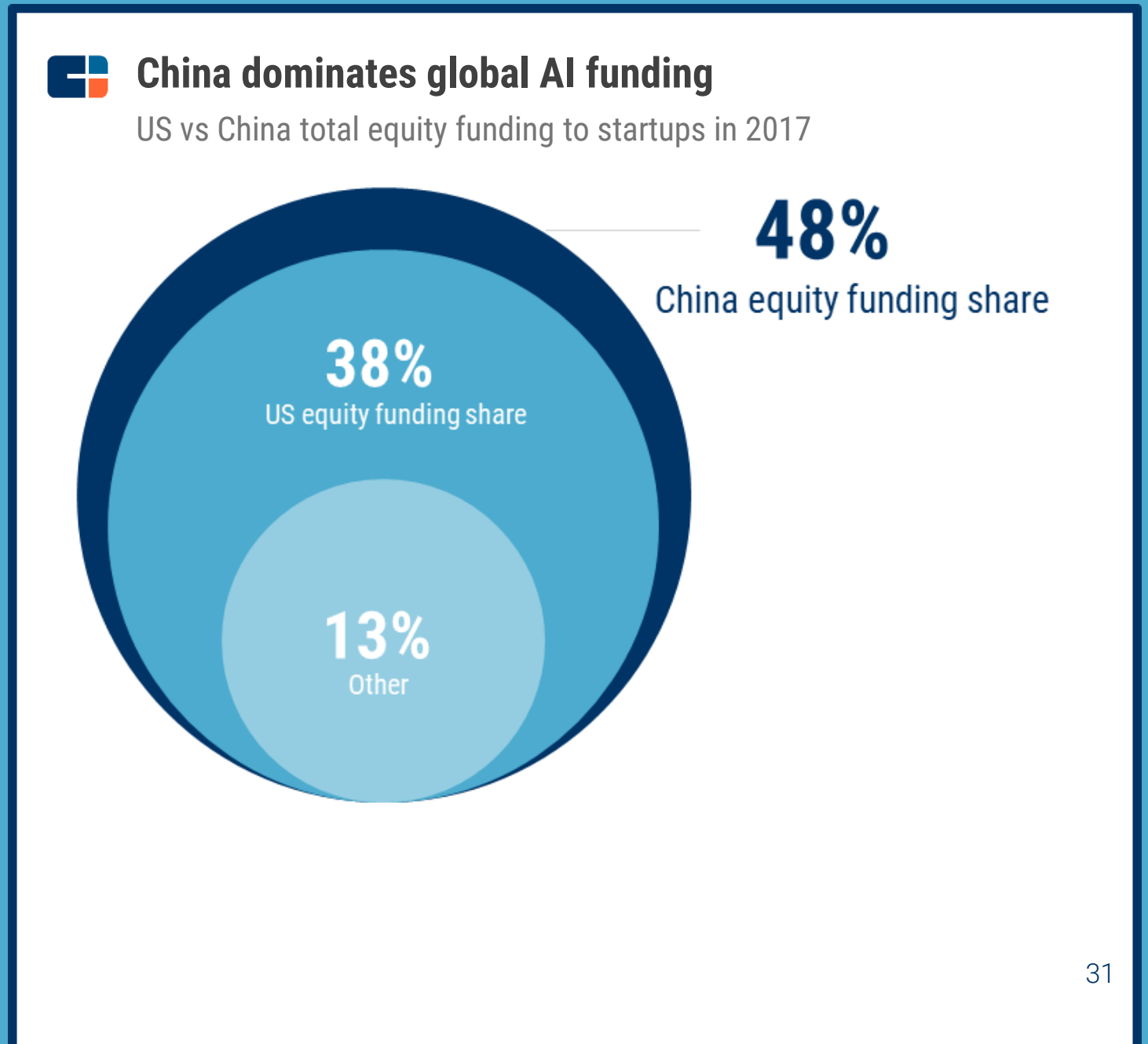
Issued by the Chinese government in July 2017

In some areas of AI, **China** is clearly **beating the US.**

China surpasses US in equity funding

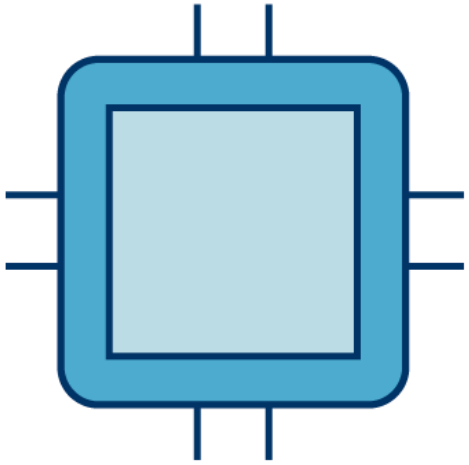
Despite a mere 9% global deal share, China accounted for nearly 48% of the total funding.

To put this proportion in perspective, in 2016, China accounted for only 11.3% of global funding.



Technologies fueling China’s growth

Facial recognition



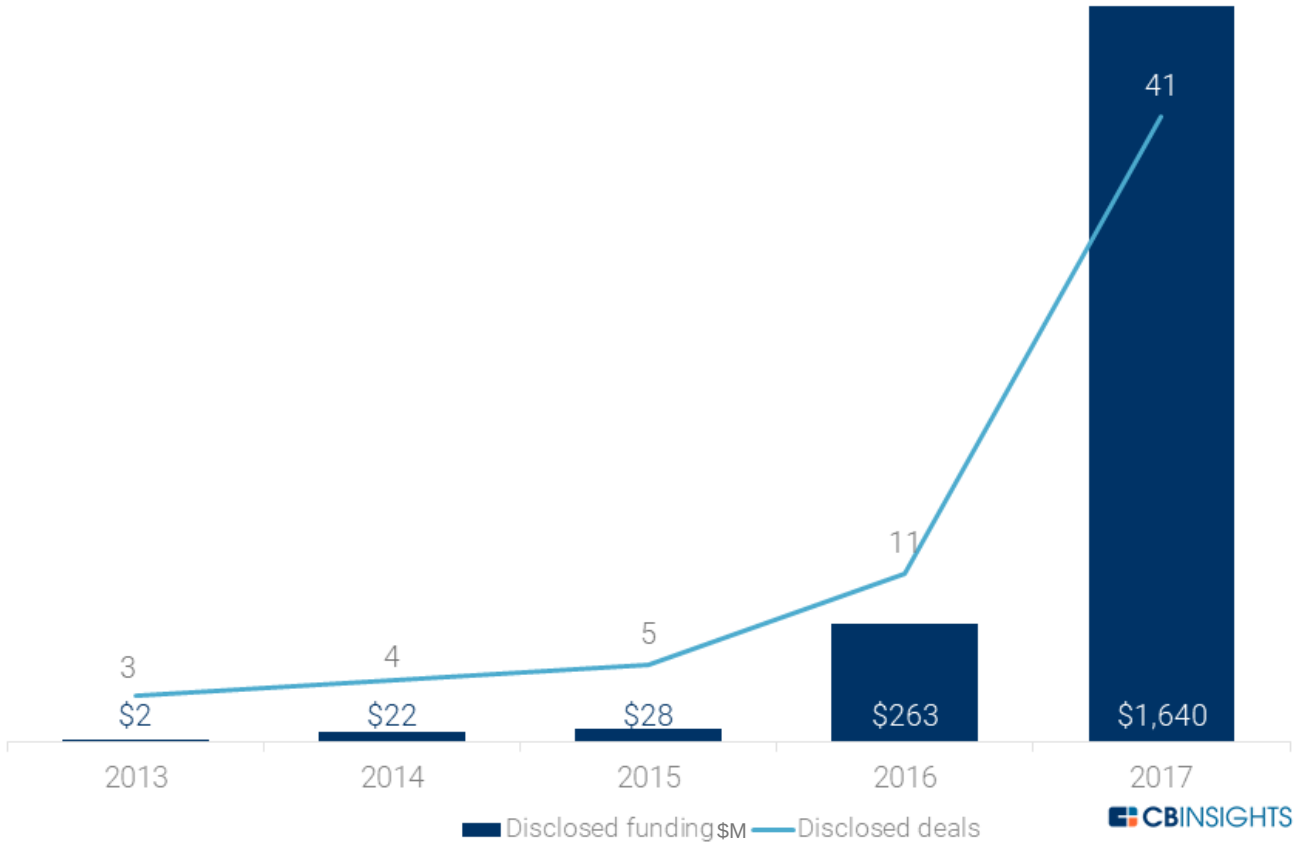
AI chips

China advances ambitious surveillance plans

Three key players here are China-based unicorns Megvii (dba Face++) and SenseTime, and startup CloudWalk (the latter a recipient of a $301M grant from the Guangzhou Municipal Government.

China invests heavily in facial recognition tech

All deals, including grants, 2013 - 2017



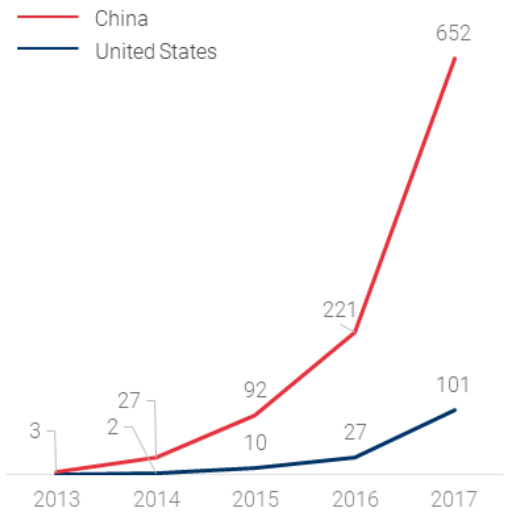
Patents reflect China's AI R&D efforts

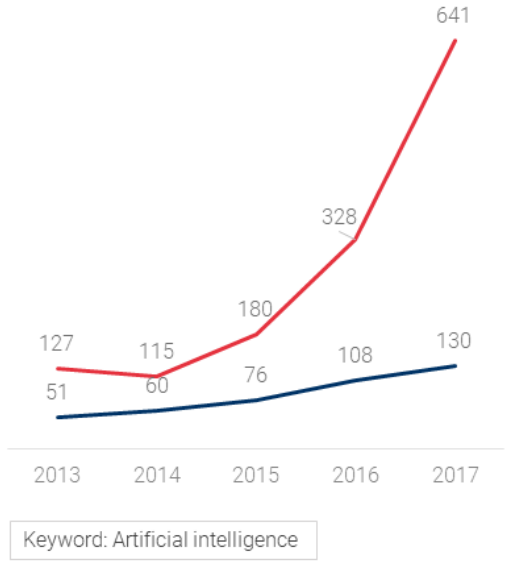
Based on basic keyword searches of title and abstract, AI-related patent publications in China are surging far ahead of patents being published in these spaces by the US Patent and Trademark Office.

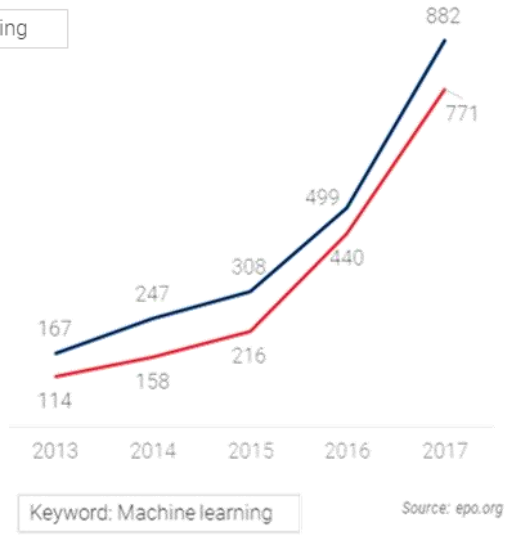
(Note: The patent filing process involves a significant time-lag before the publishing of patent applications.)

AI-related patent publications explode in China

Based on keyword searches, 2013 - 2017





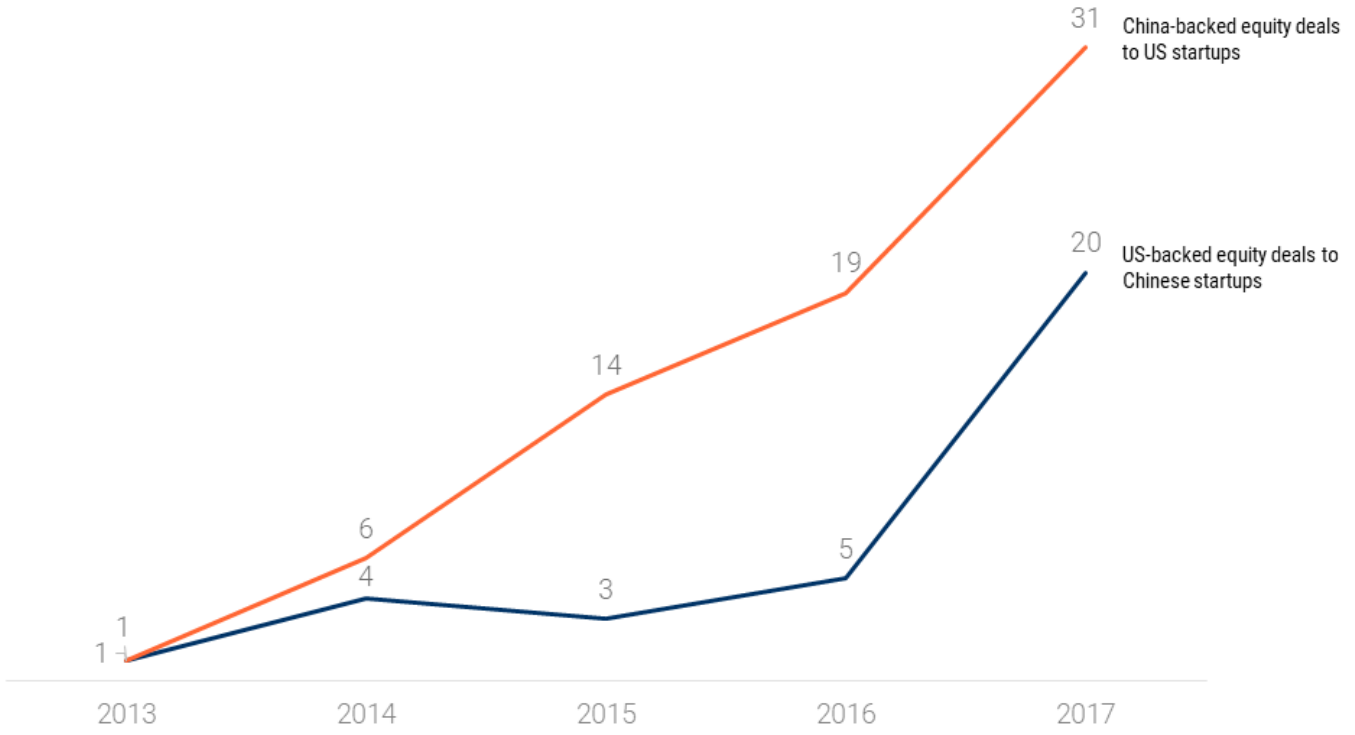


Tech swapping between countries increases

Despite scrutiny of Chinese companies seeking partnerships or investments in the US, there are more Chinese investments in AI startups in the US than vice-versa.

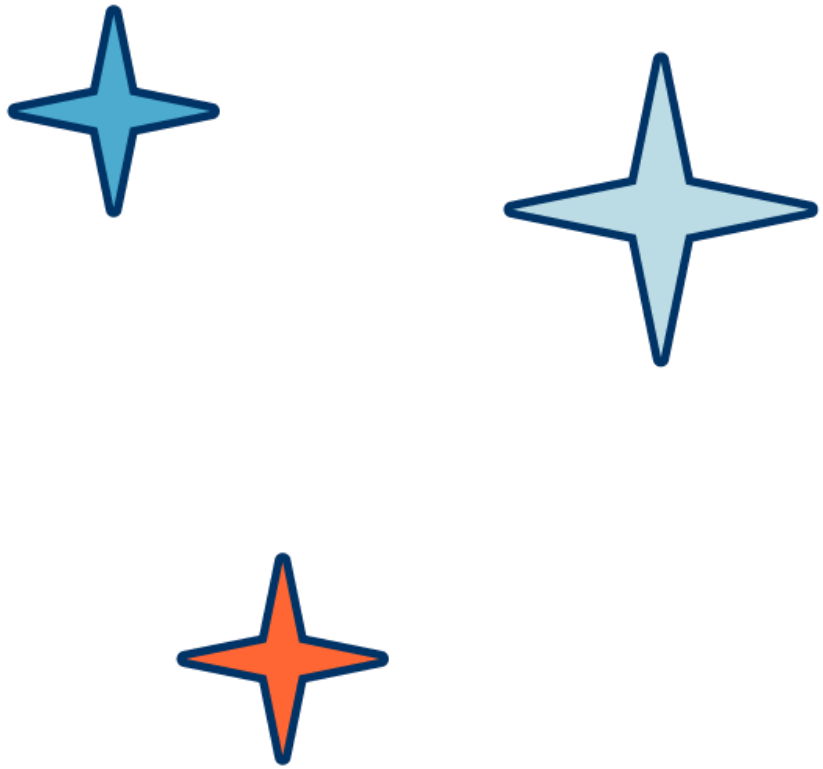
Cross-border AI investments on the rise

Equity deals, 2013 - 2017



BUSINESS

AI for X is… everywhere

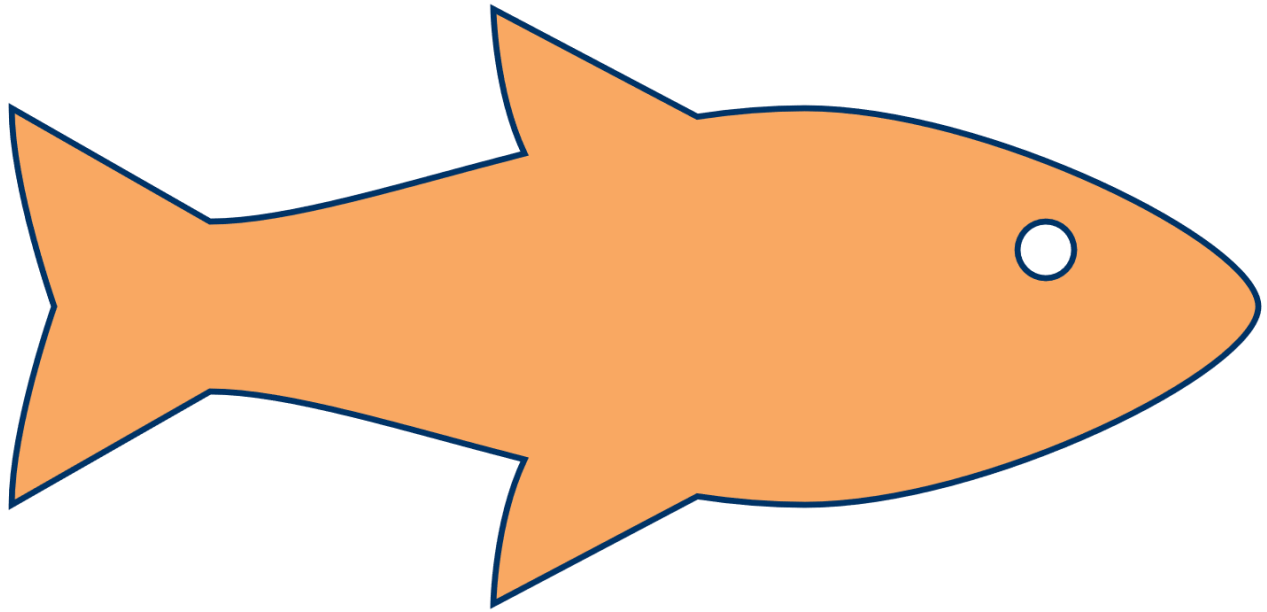


There is now AI for weed.

DeepGreen uses computer vision to identify the gender and health profile of cannabis plants. Weedguide raised $1.7M to use AI for personalized weed recommendations.

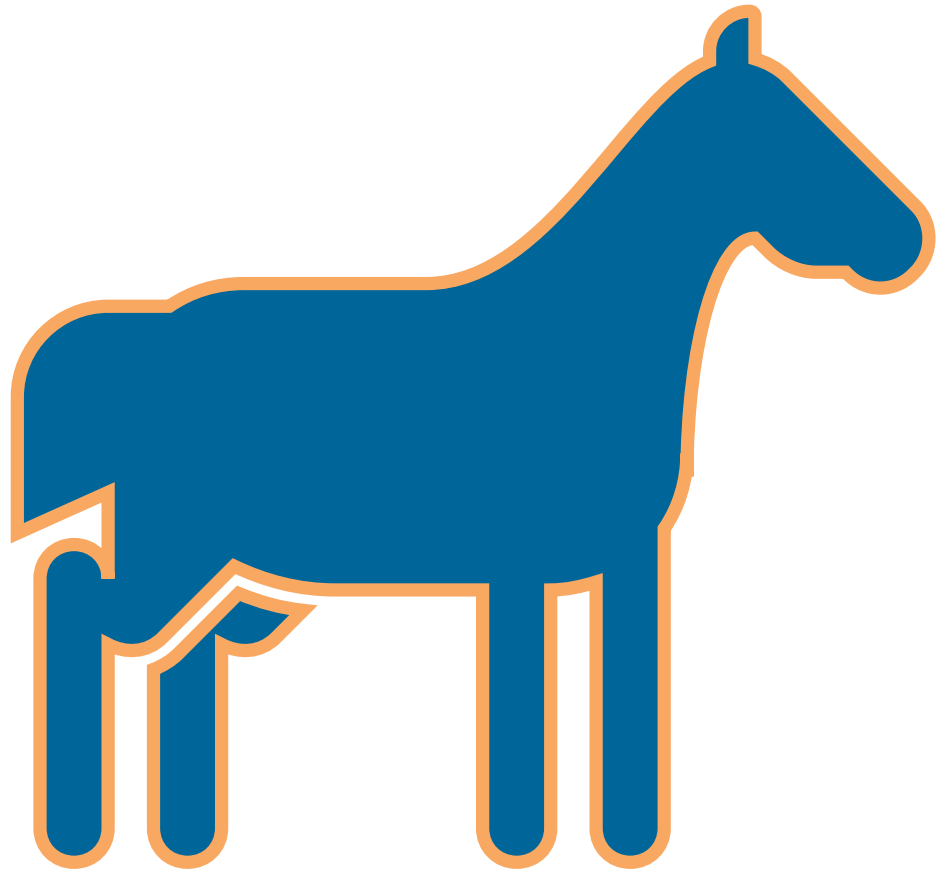
And fish.

DeepFish in Russia is using neural networks to identify, well, fish. It merges radar technology with AI to differentiate between fish and noise in radar images.



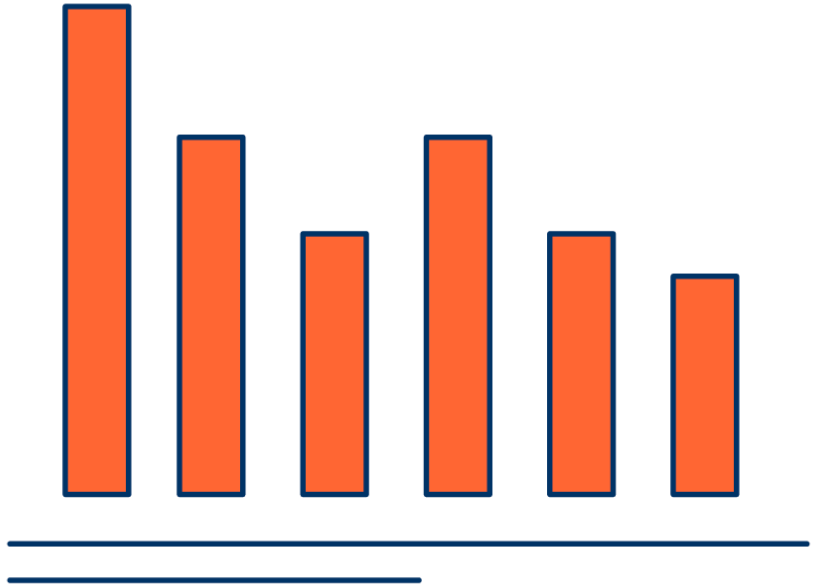
And horses.

Sweden's Hoofstep raised VC money to bring deep learning-based behavioral analysis to horses.



BUSINESS

The machine learning hype will die



AI IS EVERYWHERE

The ML frenzy in numbers

1,100+

New startups raised 1st equity since 2016

$15.2B

Equity funding in 2017 alone, a 141% jump from the previous year

300+

Companies entered incubators in 2017, 3x more than 2016

BUT THE HYPE WILL SOON DIE

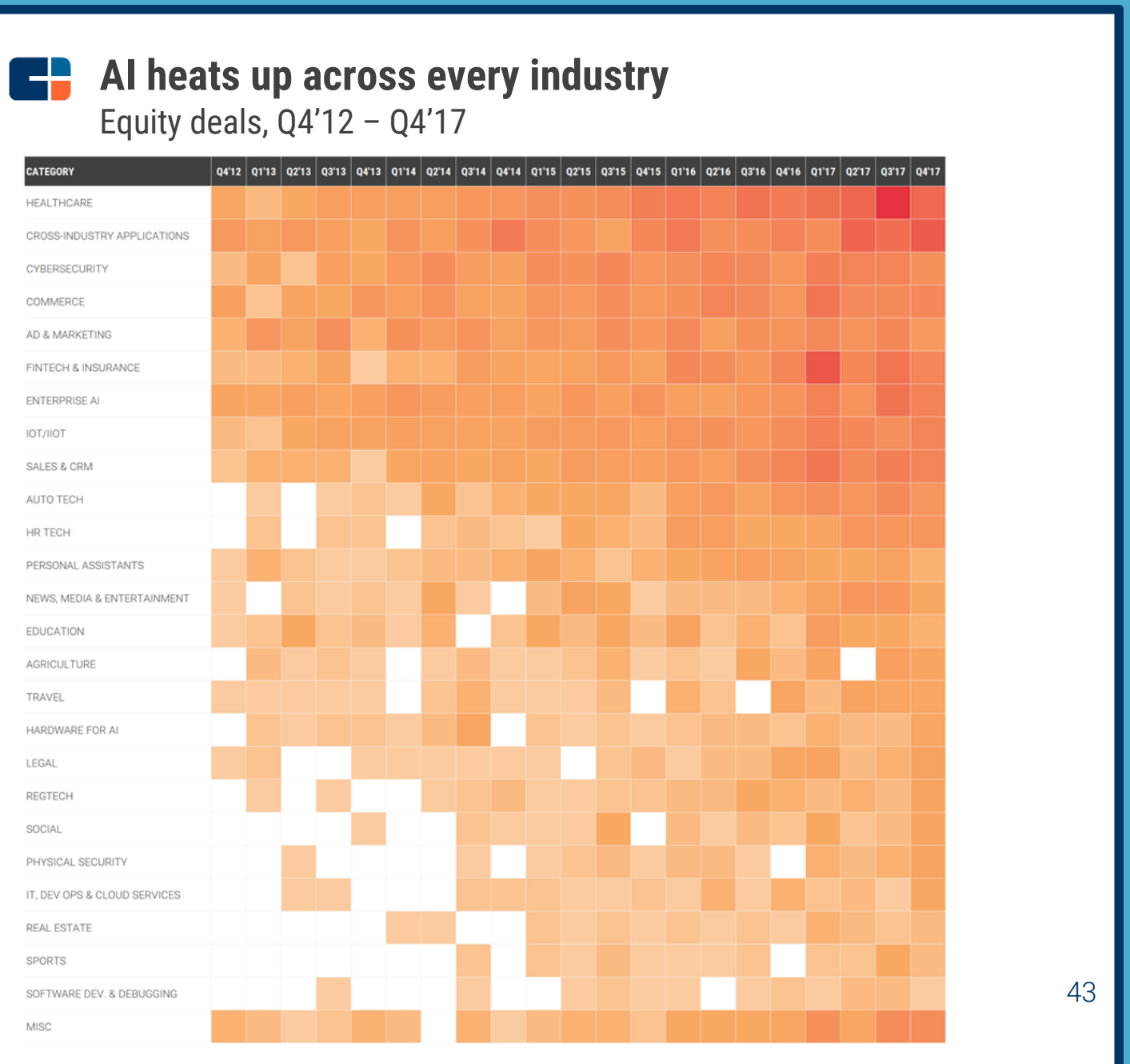
“I believe that in 2 years, no investor is going to be explicitly looking to fund AI-powered startups.”

Frank Chen, partner at a16z

Machine learning gets normalized

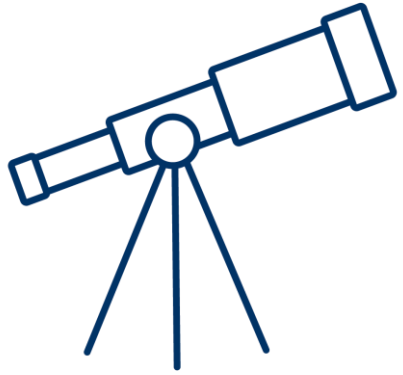
We are already seeing this happen in many industries.

Machine learning is inseparable from IIoT. Almost all cybersecurity companies use machine leaning to some extent today. In addition to this, big tech companies are offering a suite of machine learning solutions to enterprises.

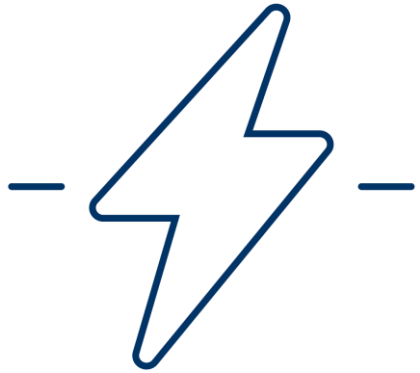


Investors will get picky about startup funding

Competitive landscape



Business model feasibility



Robustness of technology

BUSINESS

Amazon, Google, Microsoft dominate enterprise AI

Investors poured **$1.8B** into **enterprise AI** startups **in 5 years**.

Now Amazon, Microsoft, and Google may make smaller companies **obsolete**.

Big tech doubles down on enterprise services

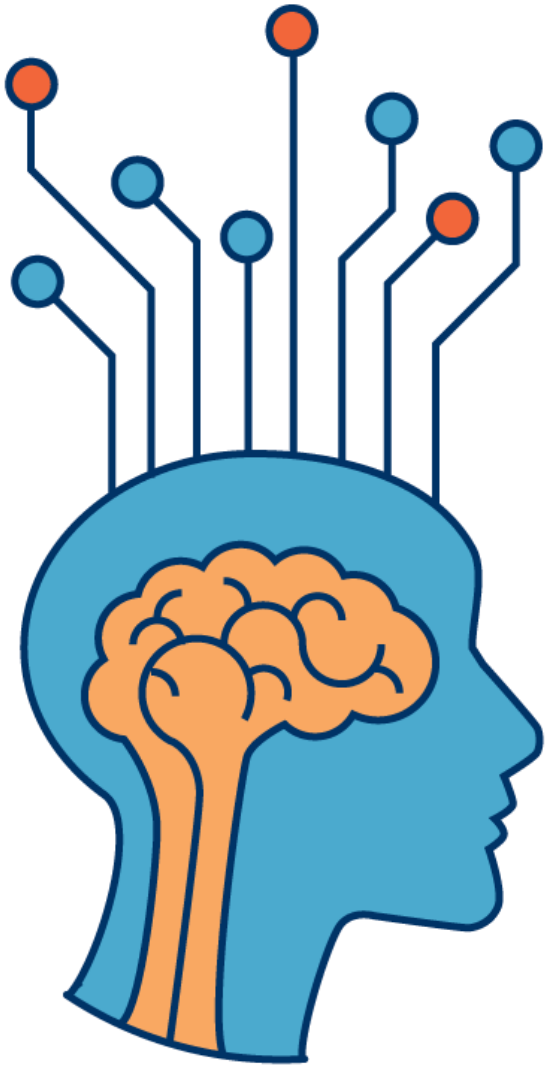
Microsoft is competing neck and neck with AWS with Azure cloud services.

Google released Cloud AutoML. Customers can bring their own data to train the algorithms to suit their specific needs.

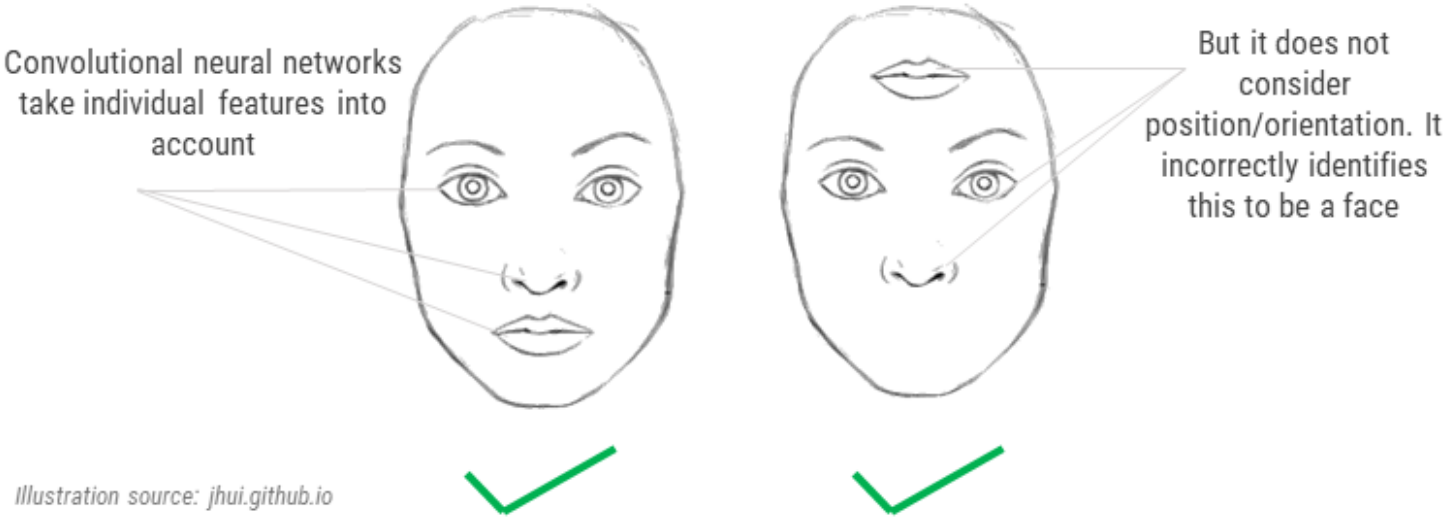
AWS expanded its enterprise AI offerings. Its 4th quarter revenue alone was $5B.

TECHNOLOGY

The emergence of ‘capsule networks’



Challenges of convolutional neural networks (CNN)



The example below shows a very basic illustration. A CNN would identify individual features and mistake the second image to be a face.

CAPSULE NETWORKS

Google's Geoffrey Hinton published a research paper in 2017 that introduces the concept of "**capsule networks**".

The promise of capsule networks

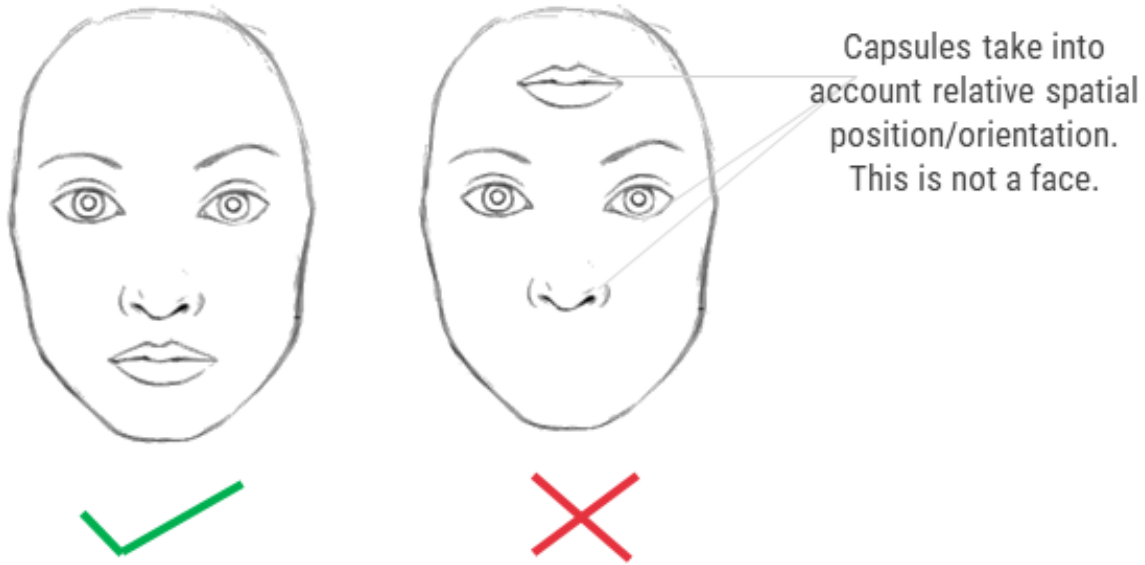


Illustration source: jhui.github.io

For example, these networks would more easily identify that when features on a face are rearranged, it is no longer a face.

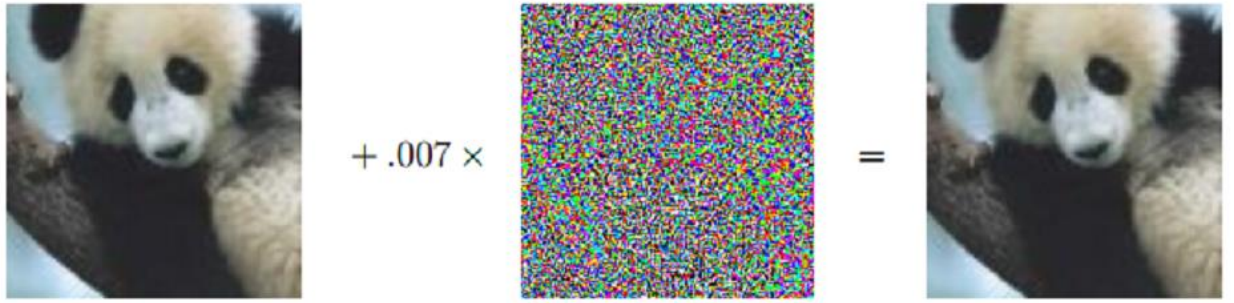
CapsNets will require less training data

Figure B.1: Sample smallNORB images at different viewpoints. All images in first row are at azimuth 0 and elevation 0. The second row shows a set of images at a higher elevation and different azimuth.

With CNNs, for instance, you have to train the algorithm with images of the same object from different angles or viewpoints for it to identify all variations. As a result, it would require a large volume of training data to cover all possible variations.

Image source: https://openreview.net/pdf?id=HJWLfGWRb

CapsNets may be less prone to hacking attempts



One of the more popular examples is from a 2015 paper. As seen above, a small change that is not readily noticeable to the human eye results in a neural network identifying a panda as a gibbon, a type of ape, with high confidence.

INDUSTRY

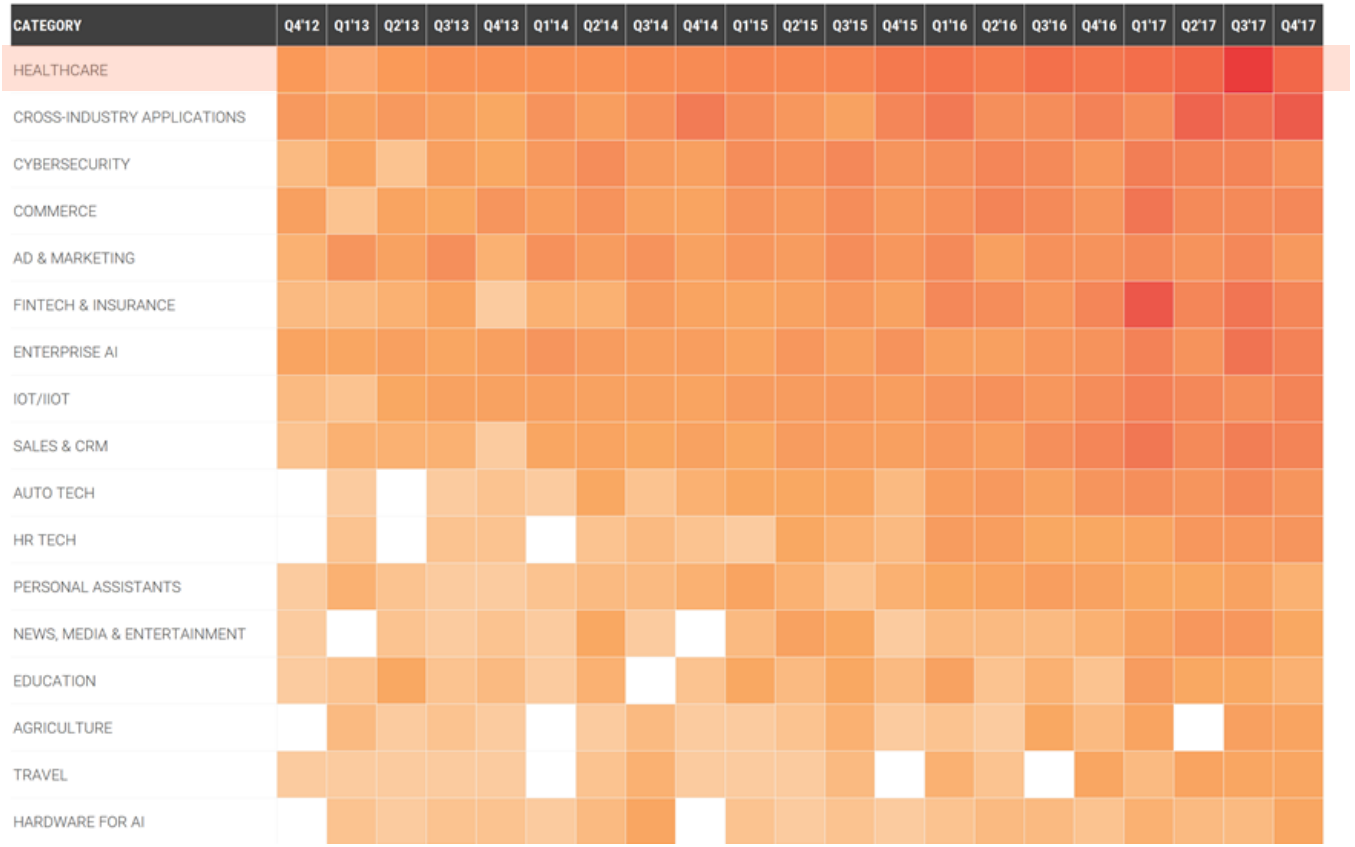
AI diagnostics gets the nod from regulators

Healthcare AI deals top the chart

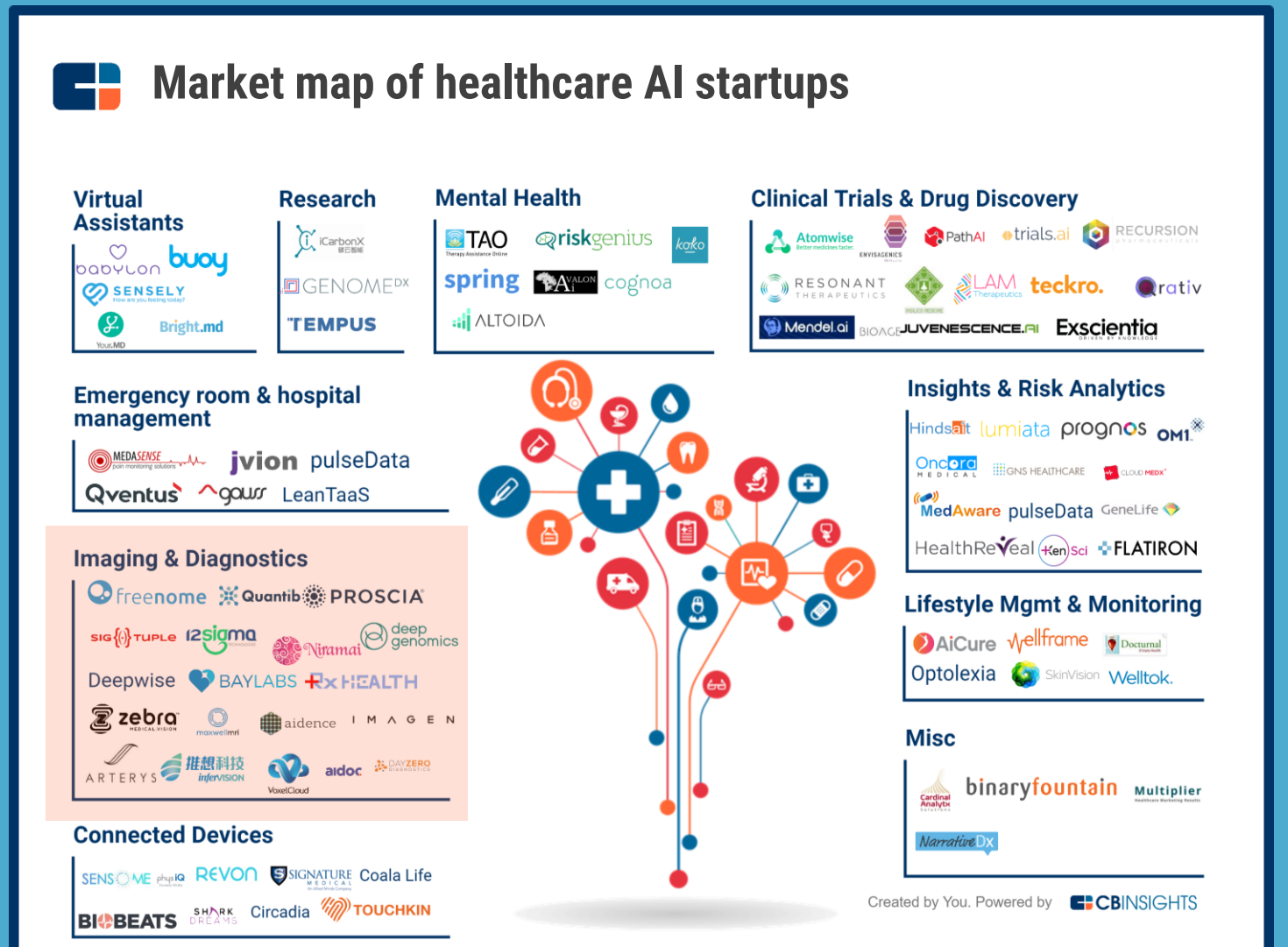
Healthcare is the hottest area of AI startup investment as our heatmap shows.

AI heats up across every industry

Equity deals, Q4'12 – Q4'17



Much of this growth is fueled by medical imaging & diagnostics companies.



ARTERYS

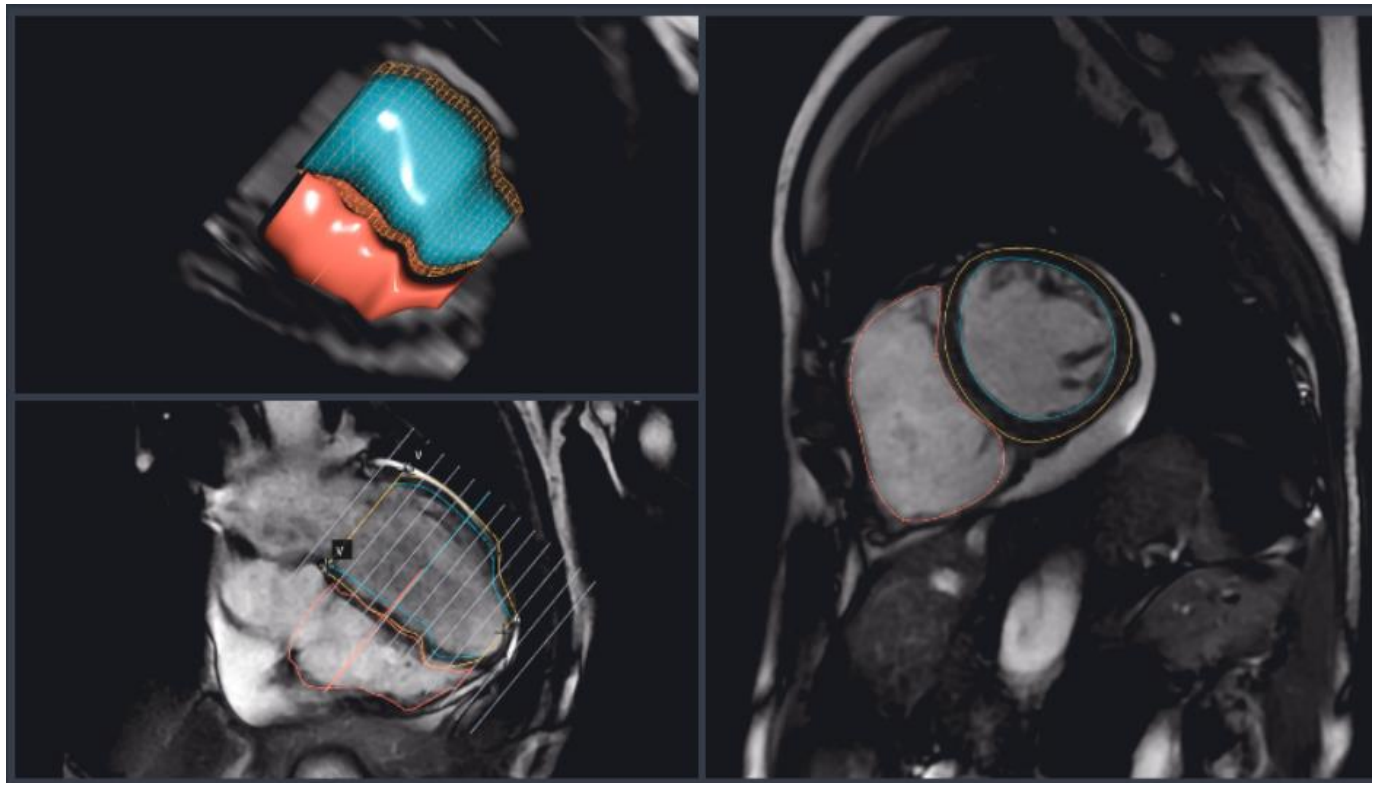
Funding
$42M

Valuation
$82M

The Arterys cloud computing platform was approved for analyzing cardiac images.

Select Investors

DNA Capital, Emergent Medical Partners, Fosun Capital, GE Ventures, NewYork–Presbyterian Hospital, Northwell Ventures, ORI Capital, Temasek Holdings and Varian Medical Systems



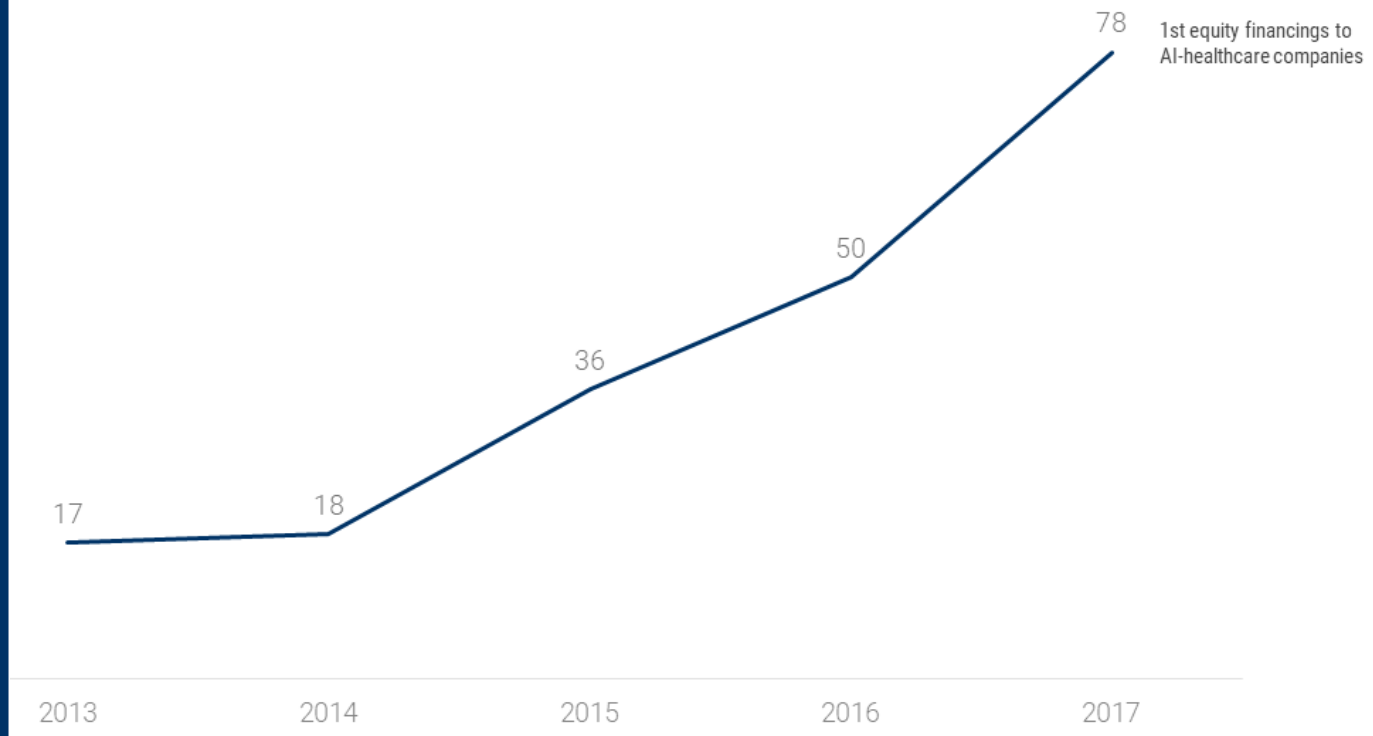
Strong public partnerships in AI diagnostics

Smaller health AI startups undeterred by big players

Big names Google DeepMind, IBM, GE, and Alibaba make this a tough market for smaller startups to compete in. But this hasn't stopped new companies from venturing into the space.

Increasingly crowded healthcare AI space

1st equity deals, 2013 - 2017




Top AI Trends
To Watch In 2018
CBINSIGHTS
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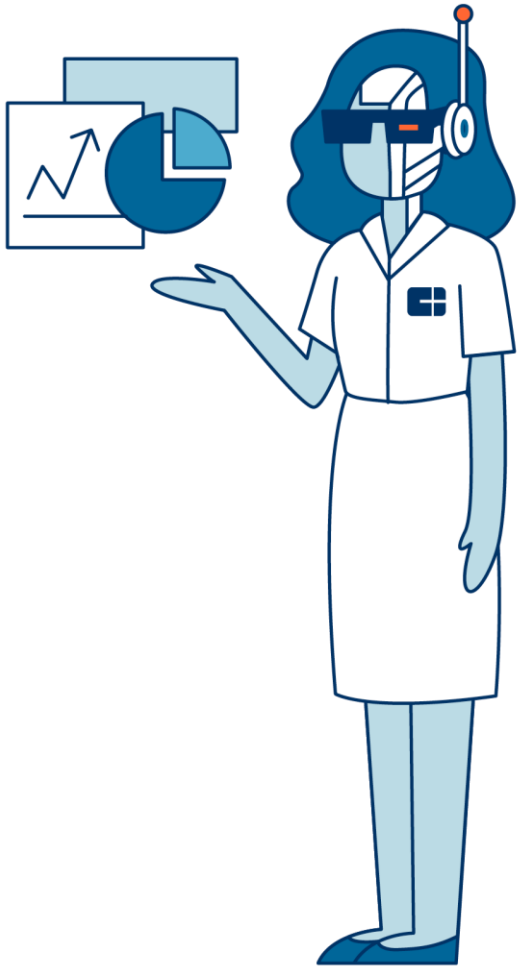

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