Artificial Intelligence:
The Future of Software

@MatthewRenze
#Techorama

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The Future of Software

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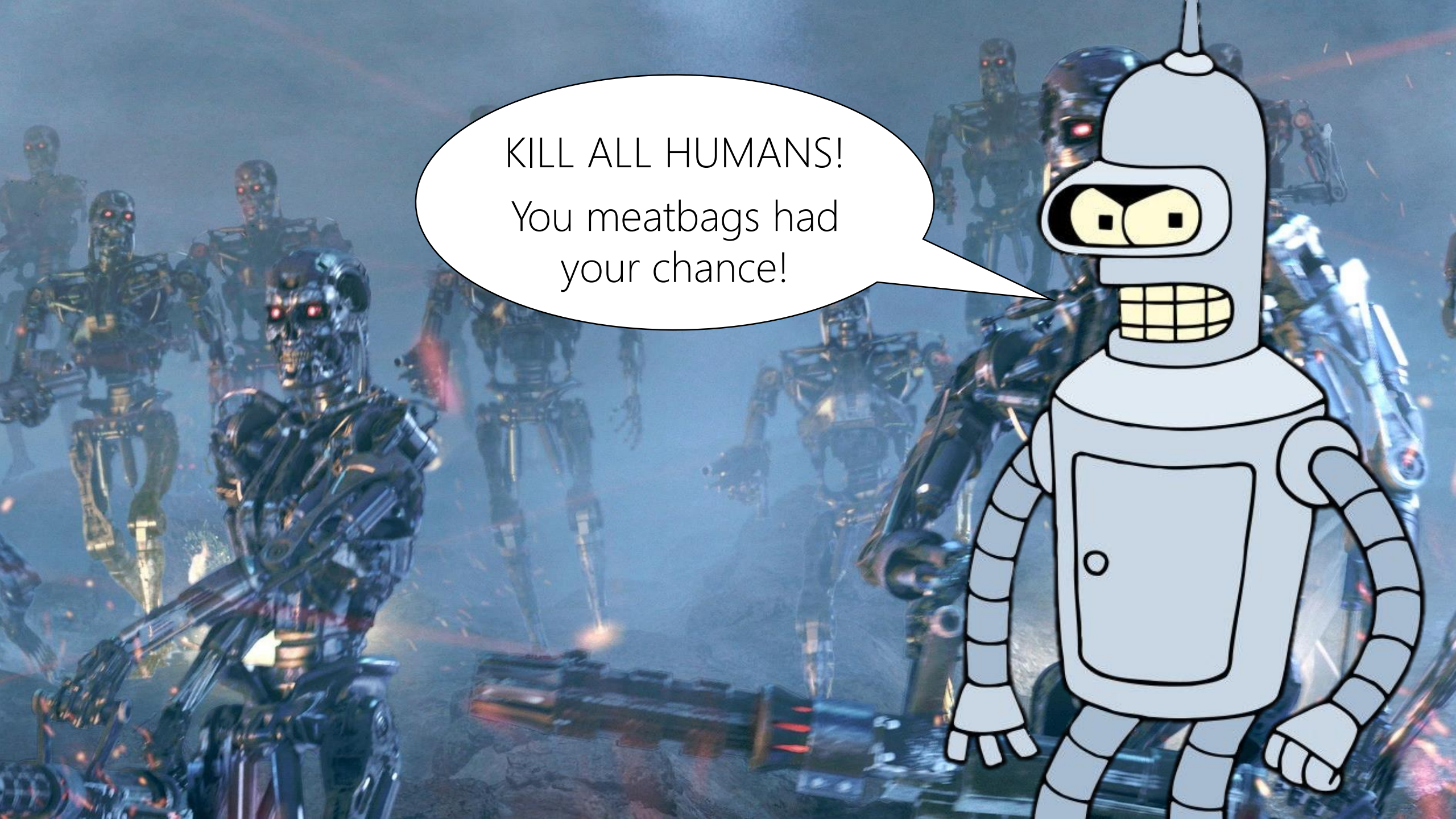
HAL 9000

General AI

Source: IBM, Amazon, Google

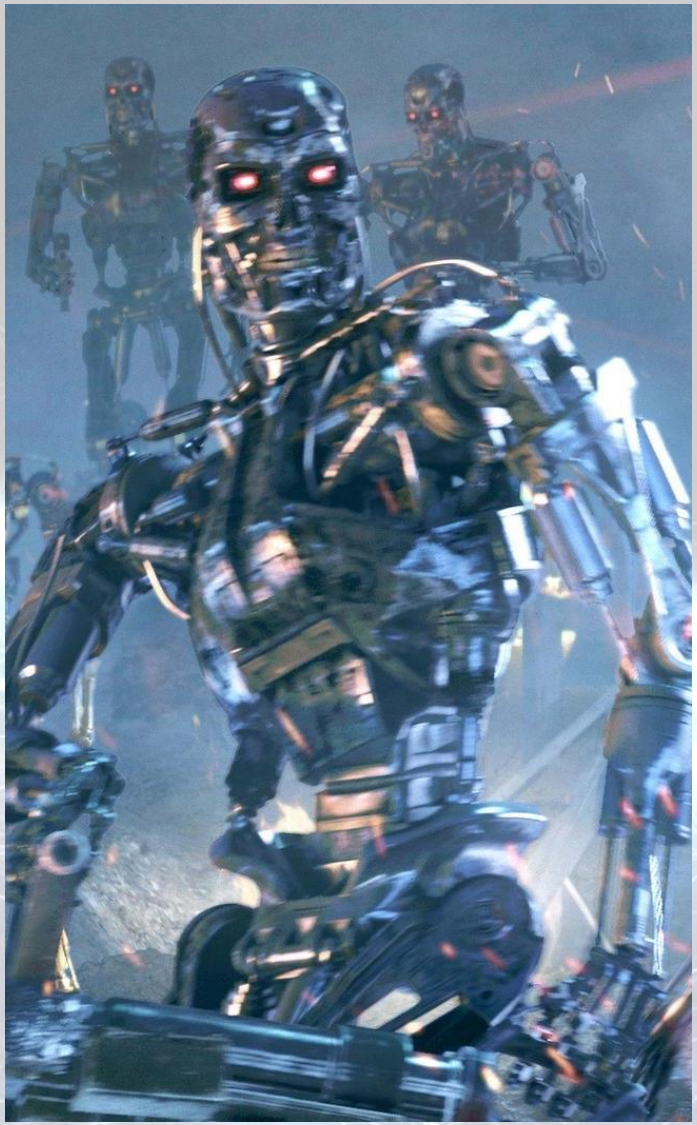
Narrow AI

Source: IBM, Amazon, Google


KILL ALL HUMANS!
You meatbags had your chance!

Crazy-Killer-Robot AI

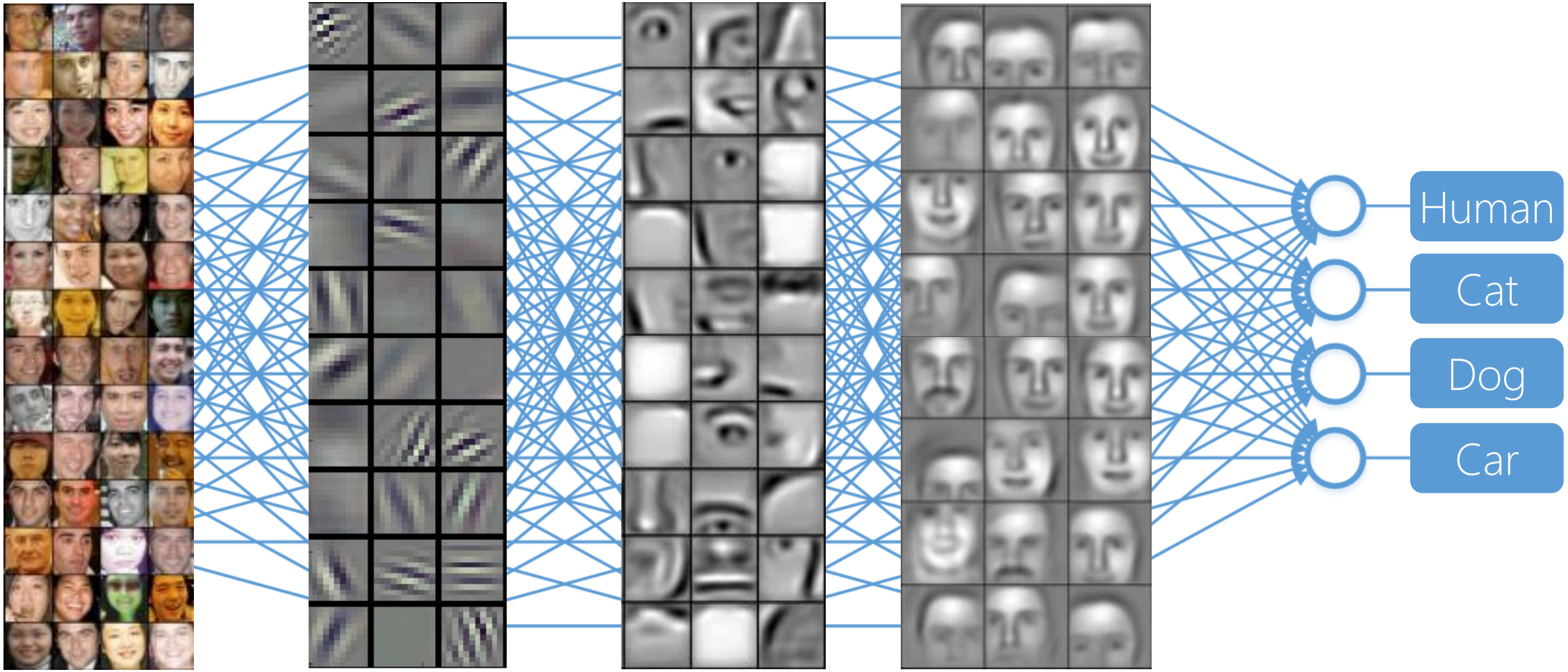
amazon



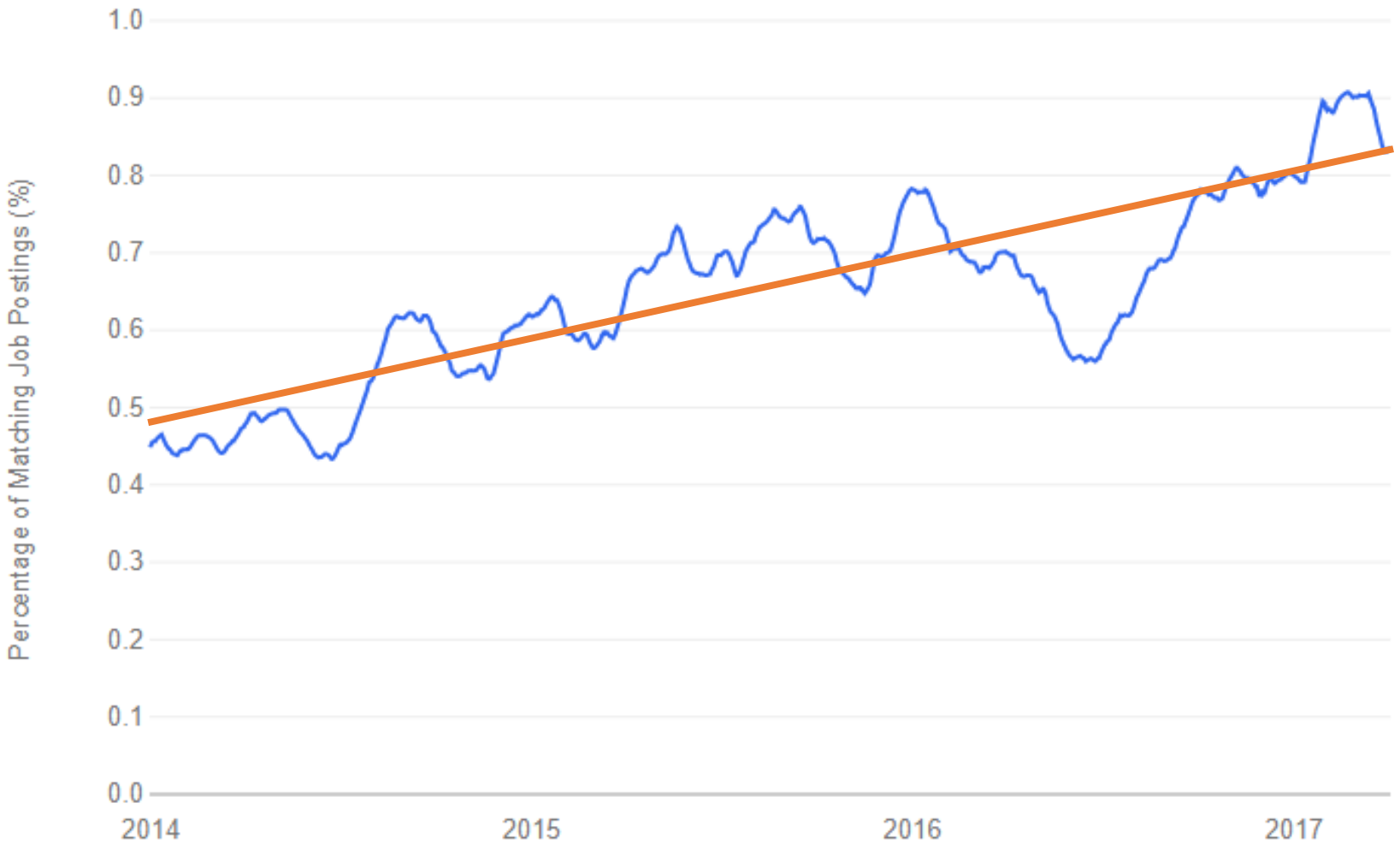
amazon

```
function updatePhotoDescription() {
    if (descriptions.length > (page * 9) + (currentImage.substring(7) - 1)) {
        document.getElementById('bigImageDesc').innerHTML = descriptions[(page * 9) + currentIm
    }
}

function updateAllImages() {
    var i = 1;
    while (i < 10) {
        var elementId = 'foto' + i;
        var elementIdBig = 'bigImage' + i;
        if (page * 9 + i - 1 < photos.length) {
            document.getElementById( elementId ).src = 'images/mini' + photos[page * 9 + i
            document.getElementById( elementIdBig ).src = 'images/medium' + photos[page
        } else {
            document.getElementById( elementId ).src = '';
```

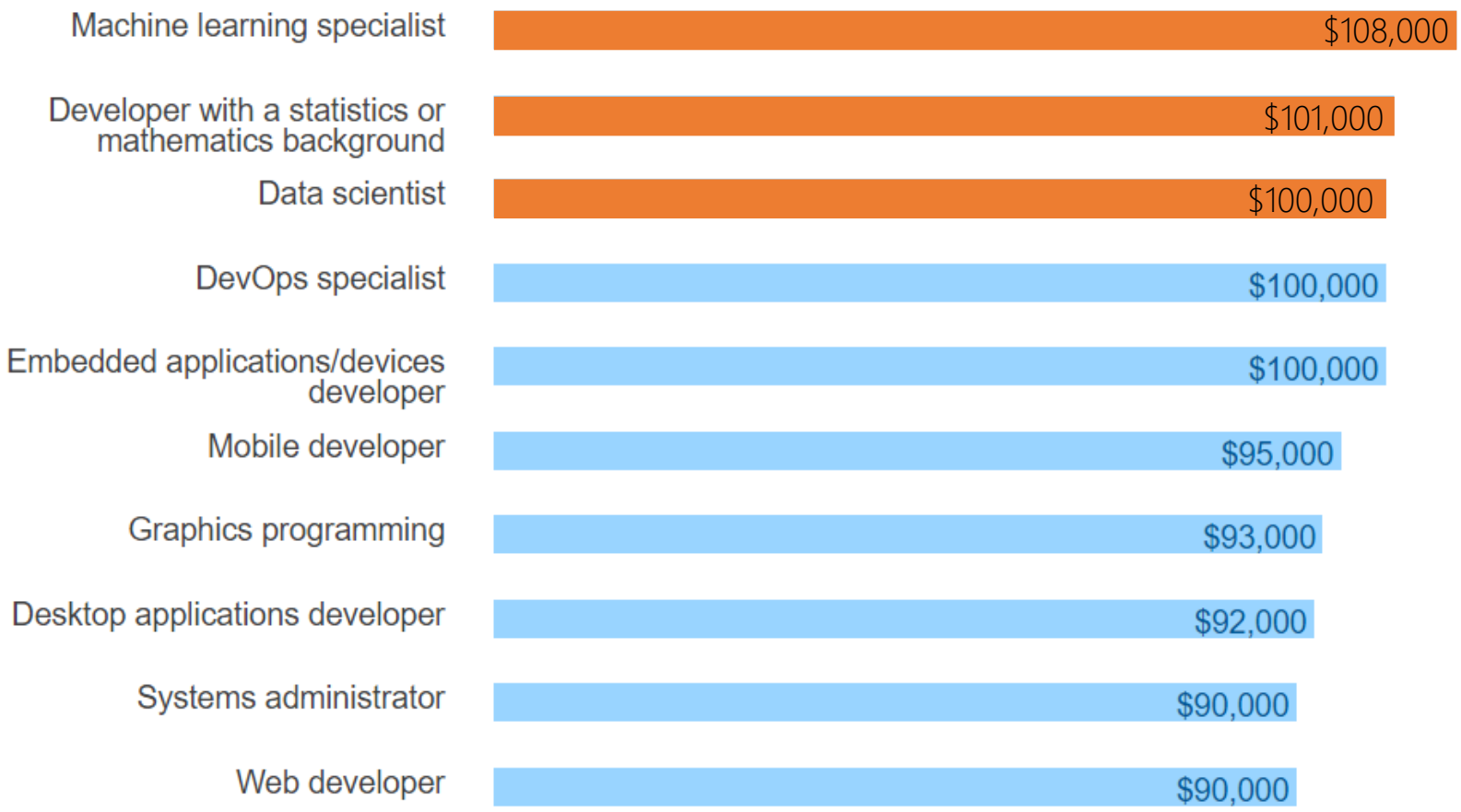

Human
Cat
Dog
Car

Job Postings for Machine Learning



Source: Indeed.com

Average Salary by Job Type (USA)



Source: Stack Overflow 2017

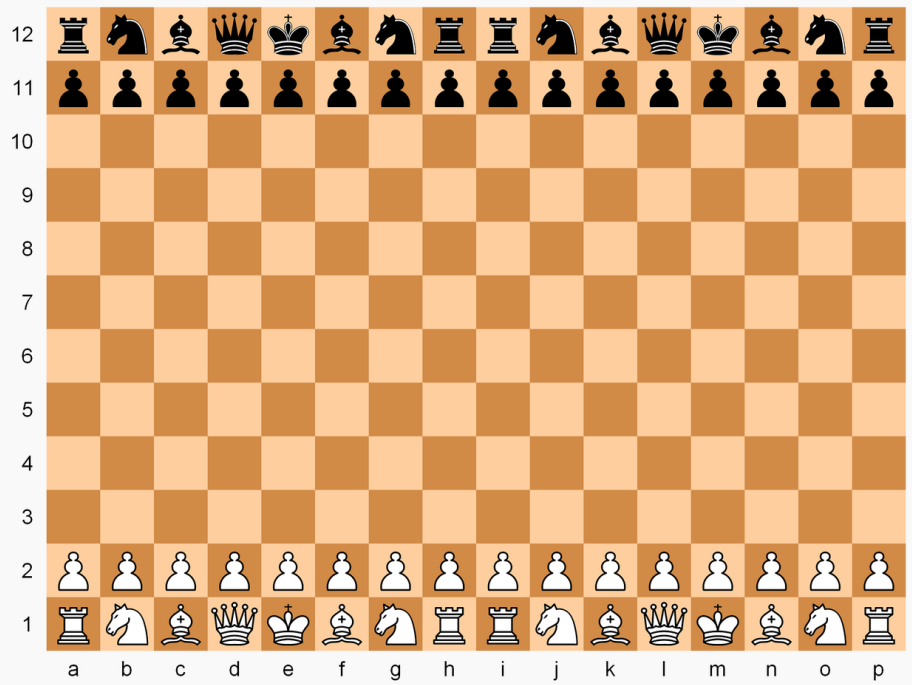
What is AI?

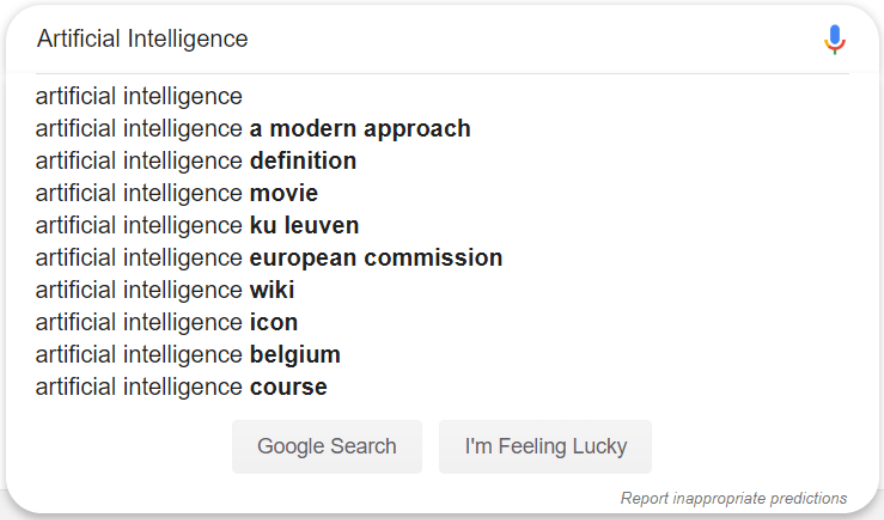
Why is it important?

How will it affect you?

What is artificial intelligence?

Caution
WARNING
ELECTRICITY


12
11
10
9
8
7
6
5
4
3
2
1
a b c d e f g h i j k l m n o p


Google
Artificial Intelligence
artificial intelligence
artificial intelligence **a modern approach**
artificial intelligence **definition**
artificial intelligence **movie**
artificial intelligence **ku leuven**
artificial intelligence **european commission**
artificial intelligence **wiki**
artificial intelligence **icon**
artificial intelligence **belgium**
artificial intelligence **course**
Google Search
I'm Feeling Lucky
Report inappropriate predictions

Your location
Arrivals
1 hr 44
1 hr 46
14 min
Snake Temple
SOUTH HOMES
16 min
14 min
14 min (7.5 km)

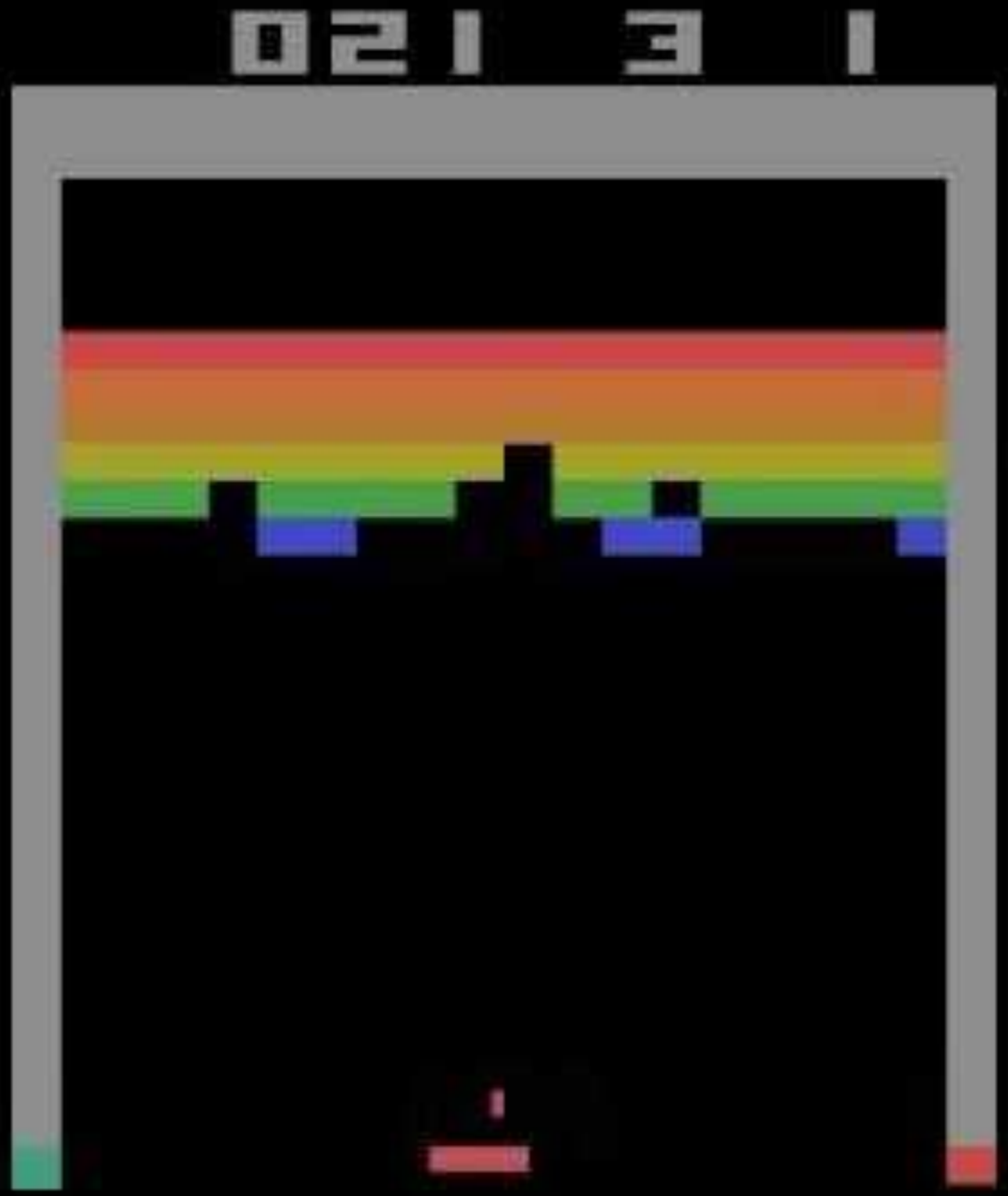
Source: LIFE Magazine

Source: Evan Amos

AI Winter
1970s – 2000s

Source: Takashi Hososhima

KUKA
KUKA


021 3 1

100 Training Episodes

Hi, how can I help?

Make me a haircut appointment on Tuesday anytime between 10 and 12.

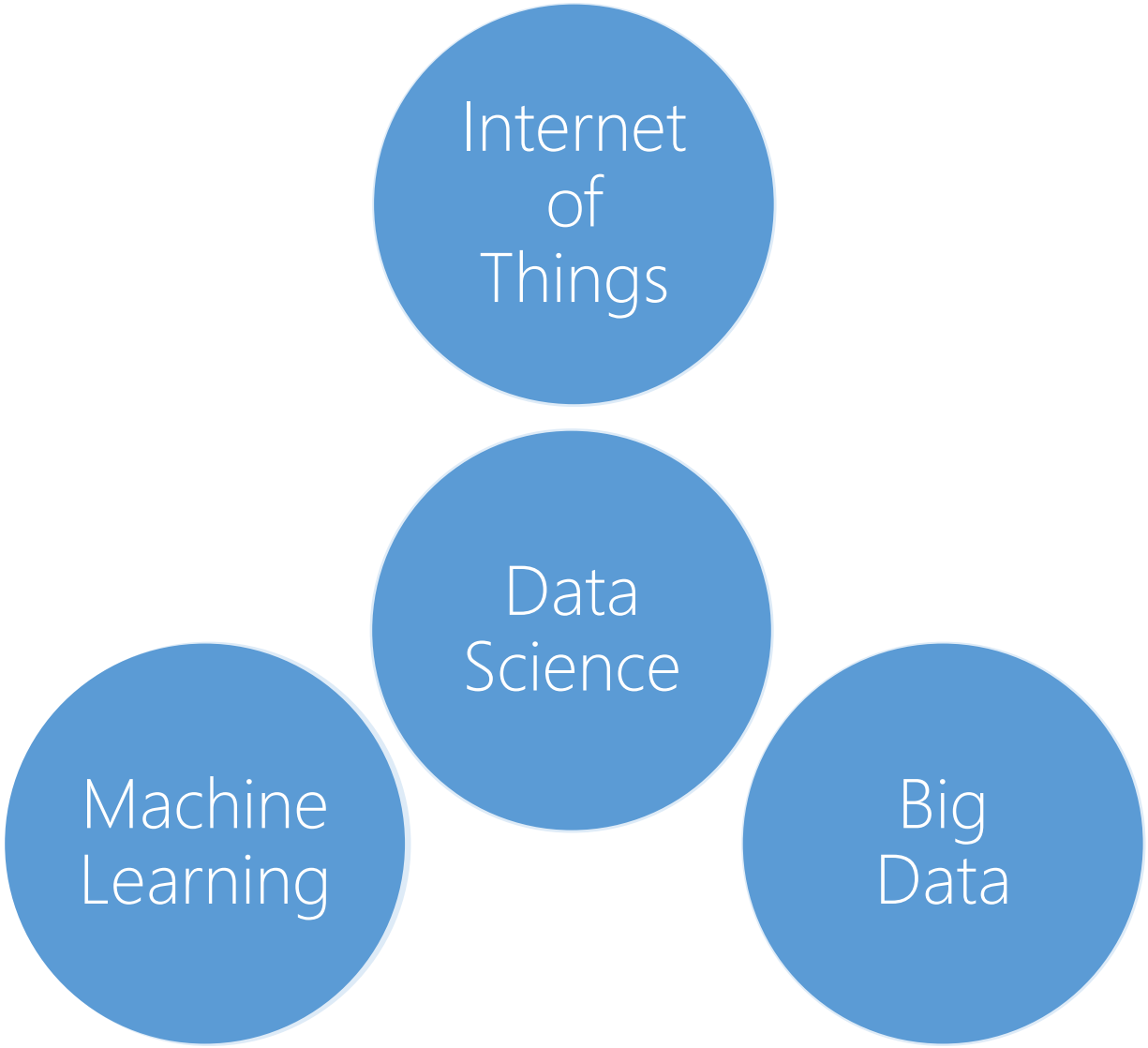
No problem. I'll make you an appointment and update you soon.

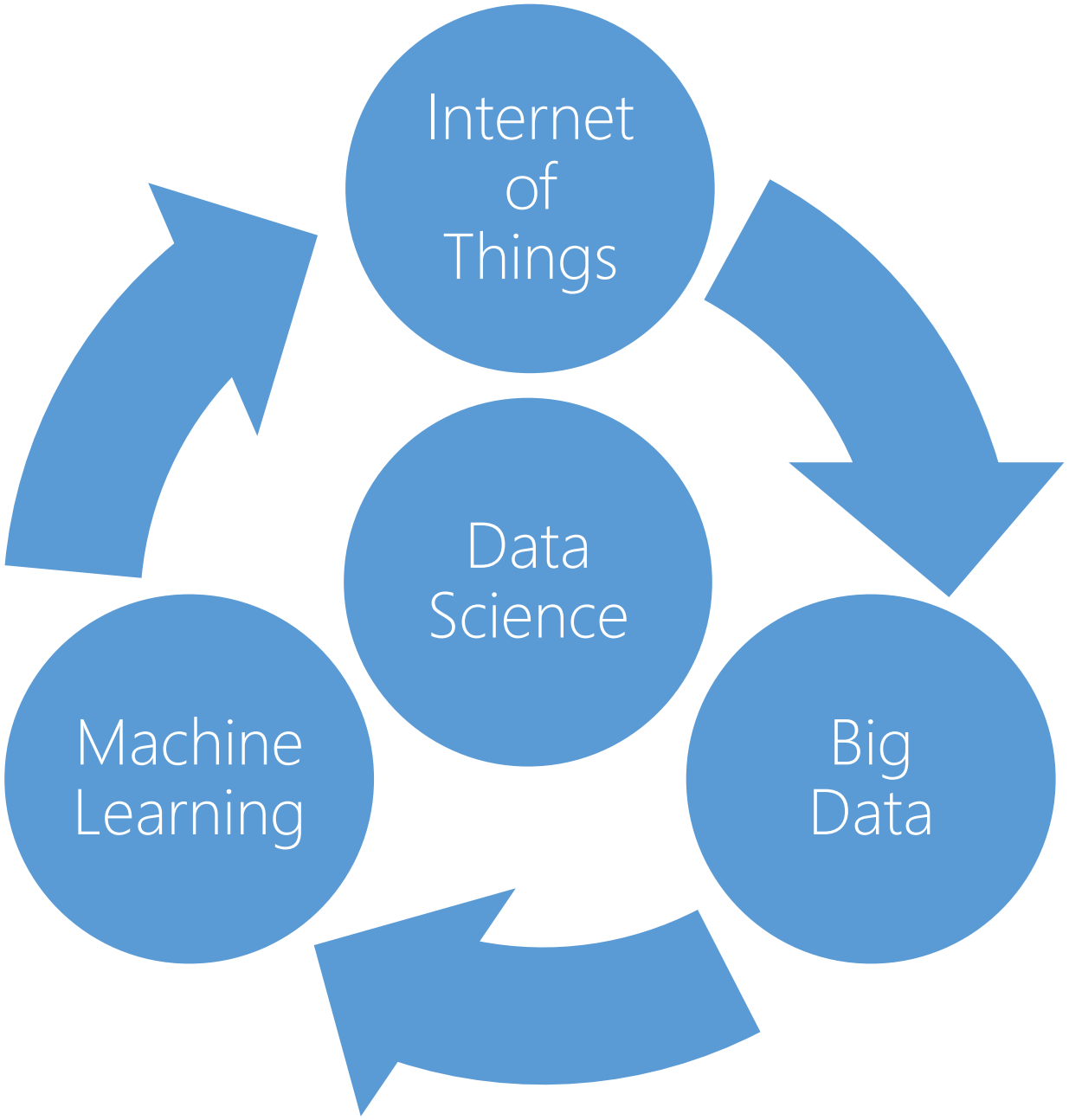
GOOGLE

Mashable

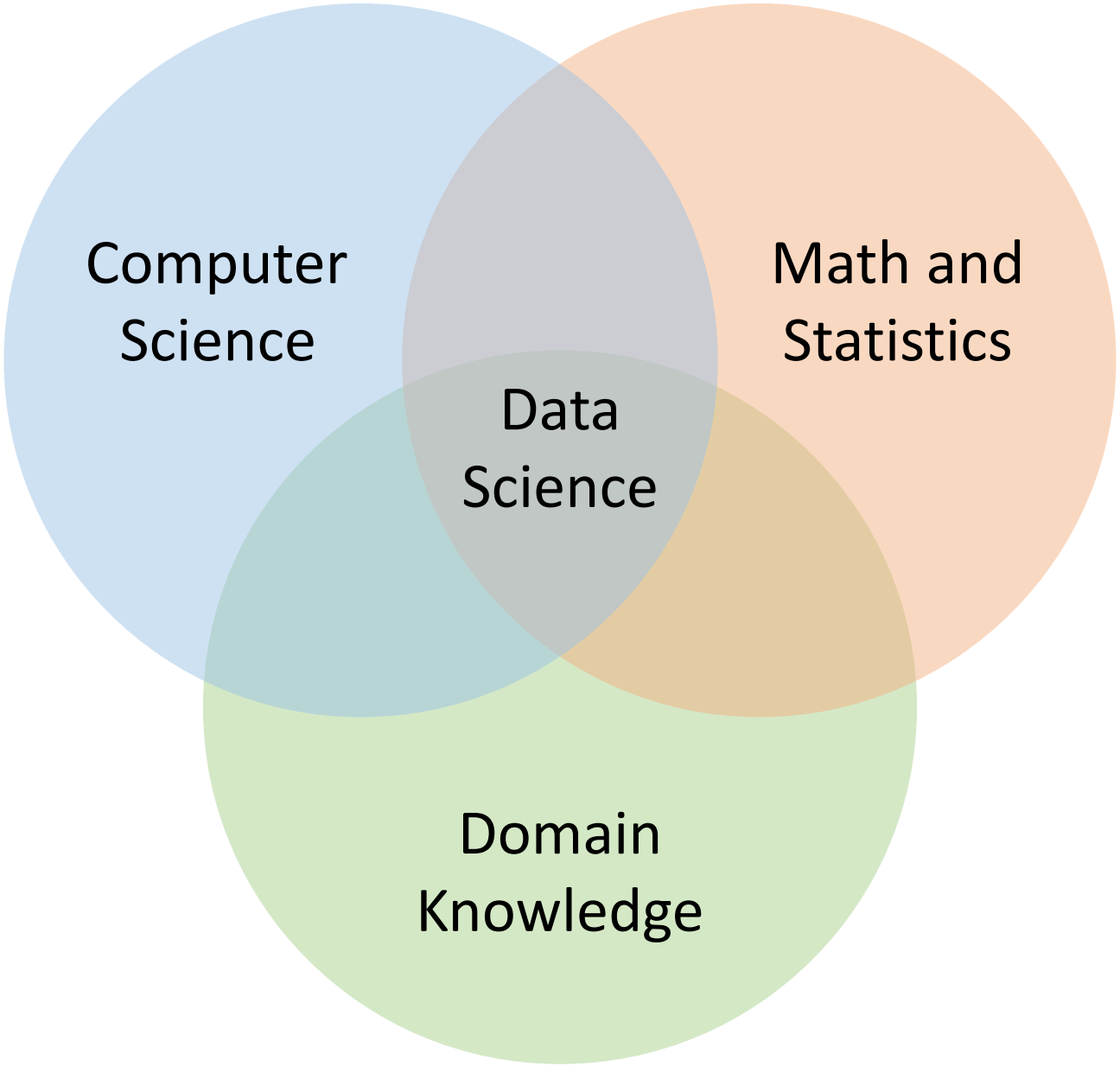
Why is AI important?

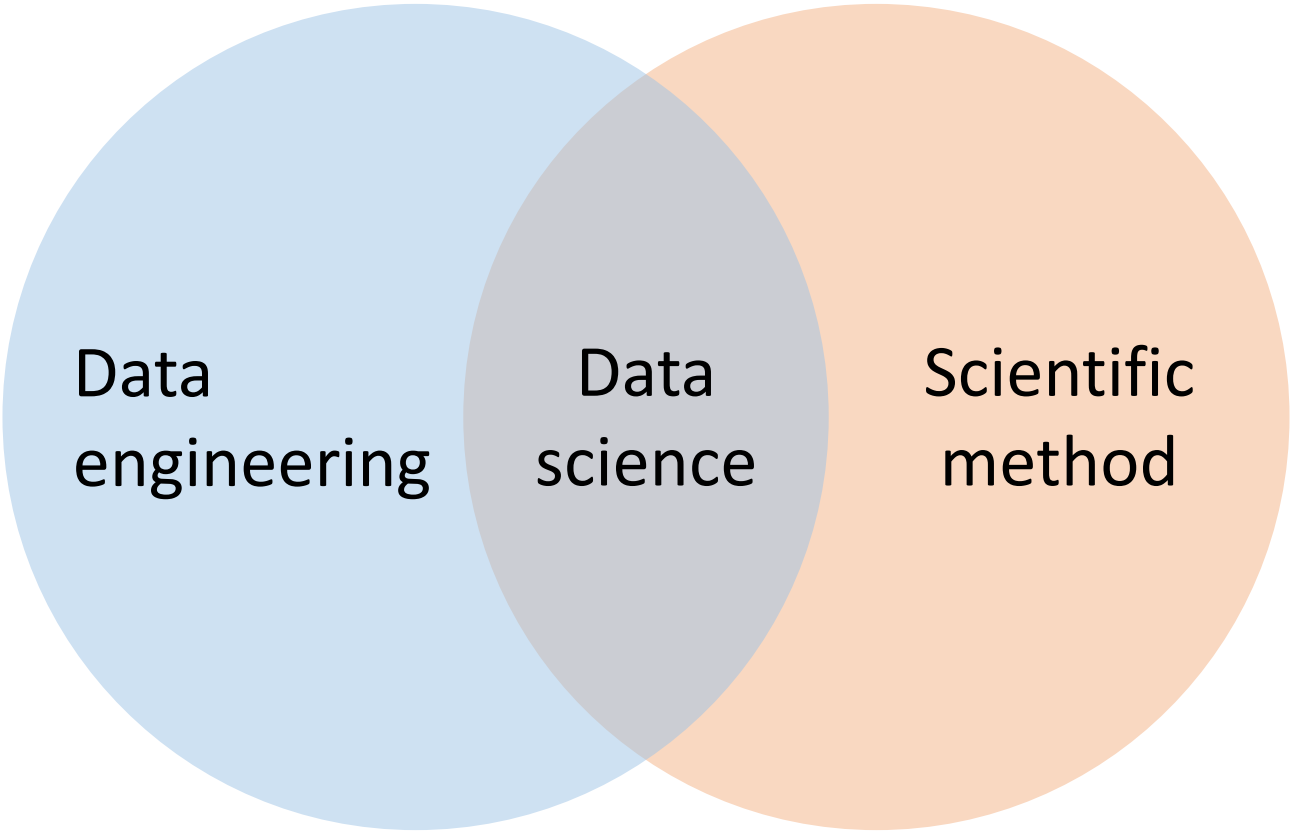
Source: Takashi Hososhima

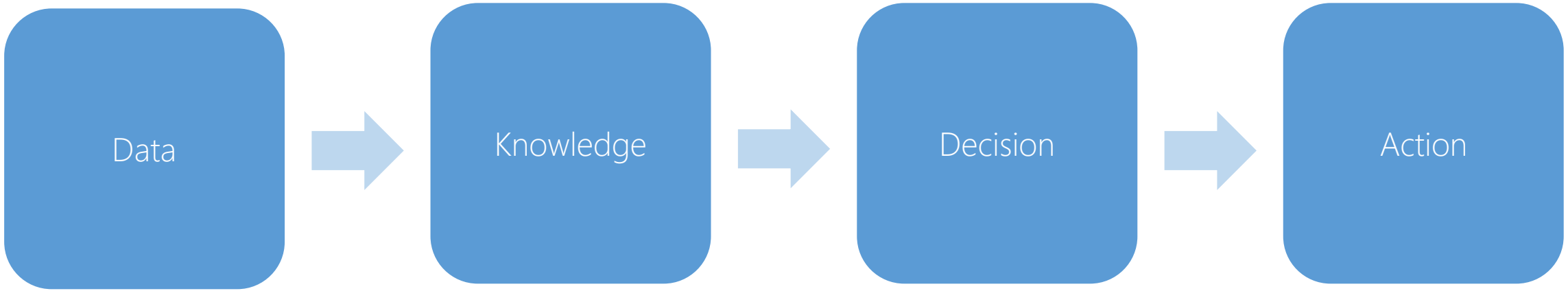

Internet of Things
Data Science
Machine Learning
Big Data


Internet of Things
Data Science
Big Data
Machine Learning

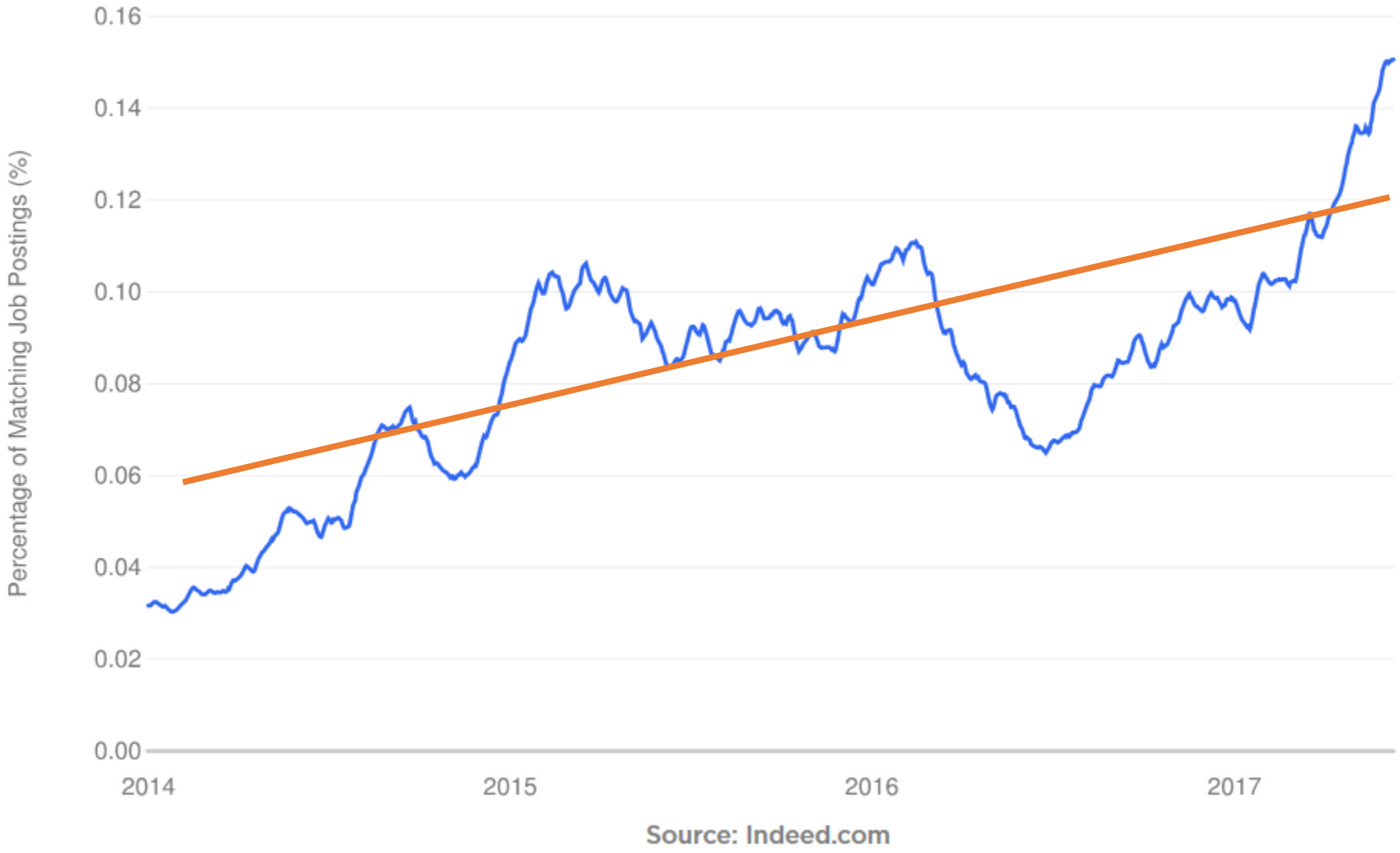
Data Science


Computer Science
Math and Statistics
Data Science
Domain Knowledge


Data engineering
Data science
Scientific method


Data
Knowledge
Decision
Action

Job Postings for Data Scientists



BUSINESS SOLUTION
GLOBAL NETWORK
MARKETING STRATEGIC

4% higher productivity

6% higher profits

Source: https://hbr.org/2012/10/big-data-the-management-revolution

BUSINESS SOLUTION
GLOBAL NETWORK
MARKETING STRATEGIC

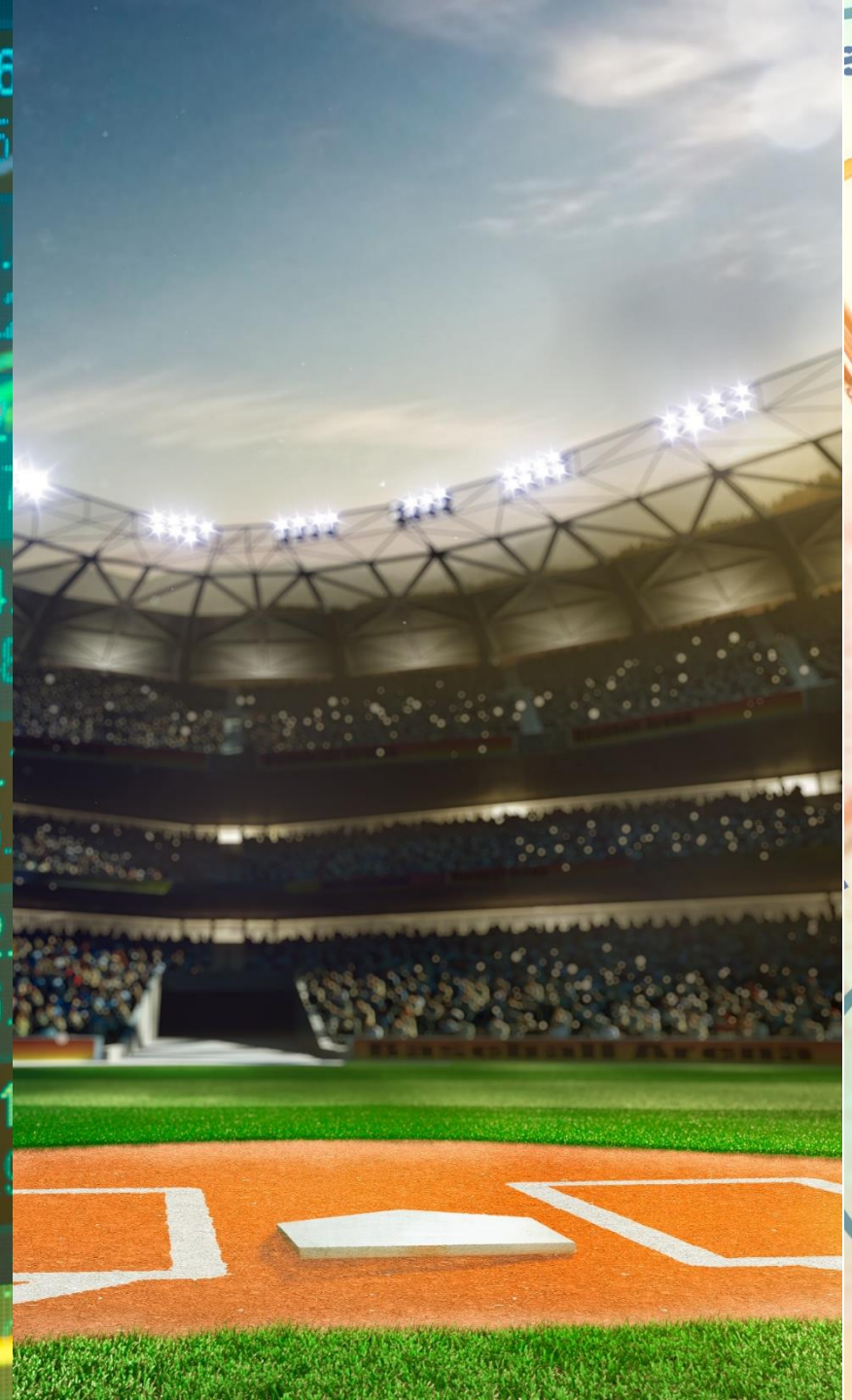
CPK METER

25

Baseball Arena
Baseball Arena
Baseball Arena

Residence
Car
Family life
Factory
InsurTECH
Travel
Medical
Hospital

26,275.30
(+7.62)
137.04
60.44
598.71
685.65
142.09
93.52
(-57.53)
75.41
(-19.36)
143,653.64
(+0.68)
150,028.94
(+4.44)
50.44
726.98

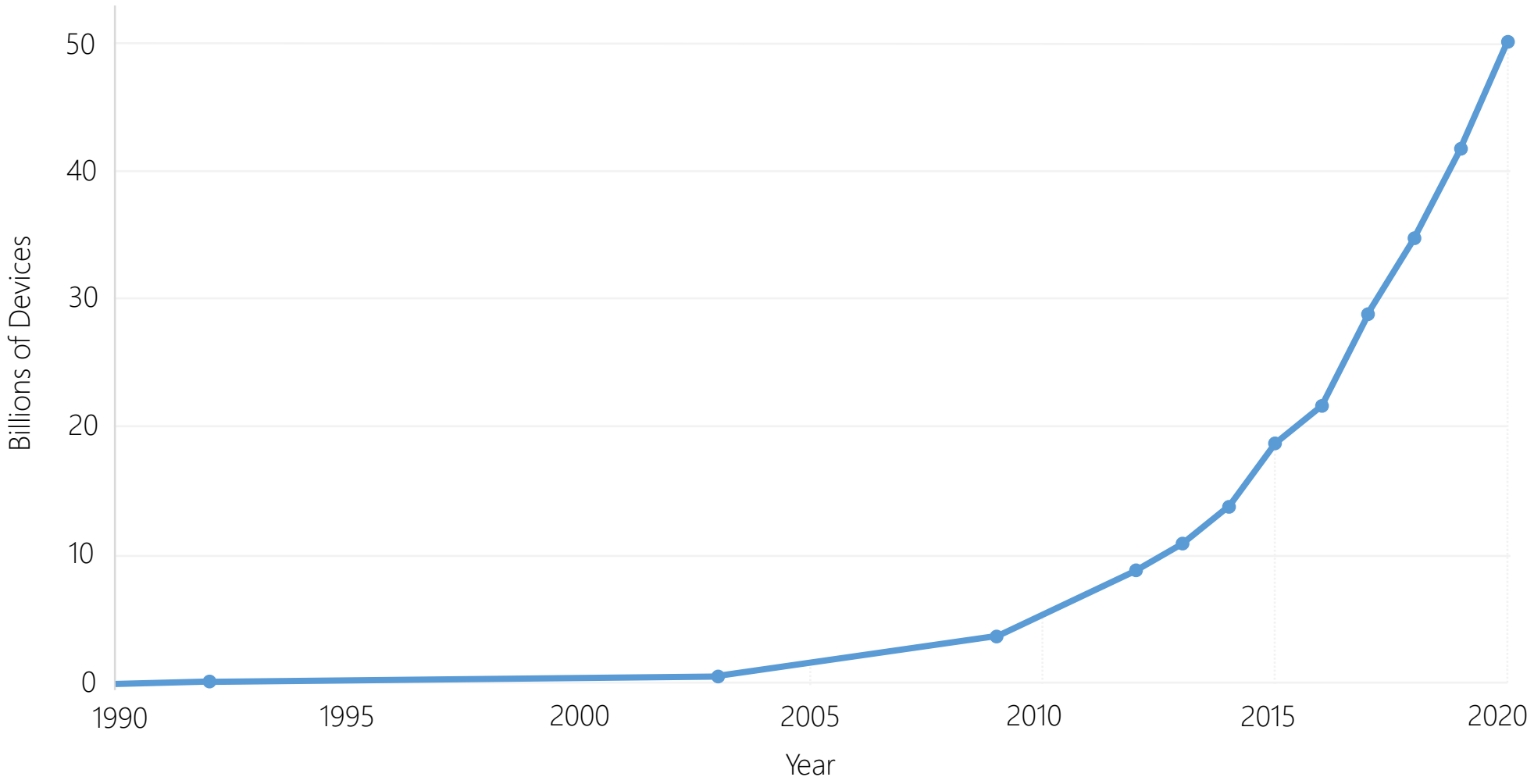


Car
InsurTECH
Hospital

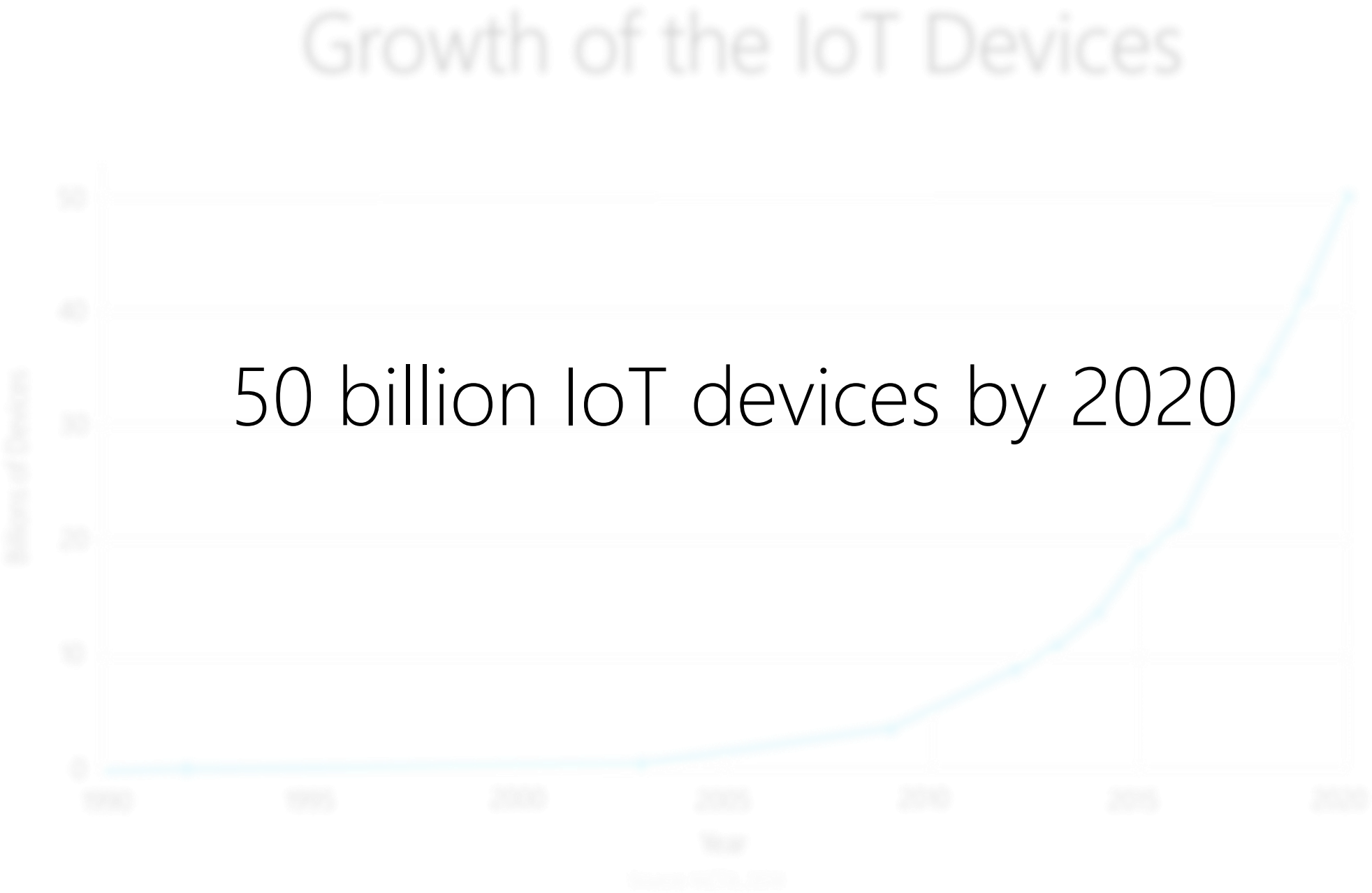
Data science is the heart of AI.

Internet of Things

Growth of the IoT Devices



Source: NCTA, 2014



50 billion IoT devices by 2020

44° F
Media
Nav
Calendar
Energy
Web
Camera
Phone
1:19 PM
PLACES
300 river
Joseph Campau St
Detroit, MI
Grand Blanc Charter Township
Fenton
Waterford Charter Township
West Bloomfie
Brighton
Ann Arbo
Saline
Sylvan
Waterve
Bowler
CONTROLS
72°
Google

REMOTE HOME CONTROL
ONLINE HOME AUTOMATION
CLIMATE
LIGHTING
SECURITY
ENTERTAINMENT
22°C
ECO MODE
NORMAL

PAY
VR
EBOOK
S
SMART
CPU
TV
VC
NFC
SEN SOR
SMOKE

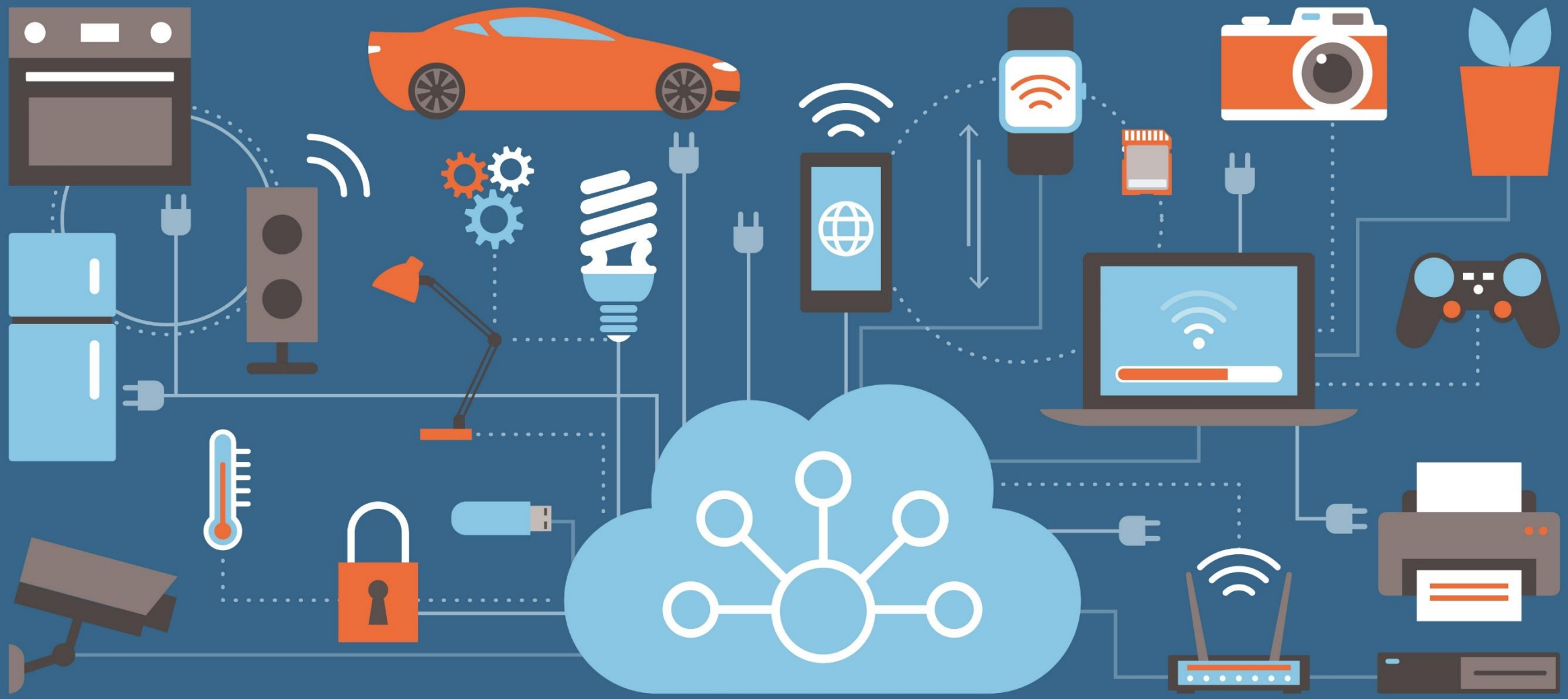
止
おしり
ビデ
STOP
SHOWER
BIDET

Buy Milk!
PAY BILLS
buy milk
PAY BILLS
23°c
MY TOAST
TOASTEROID

PAY
BILL
FOOD
DAY

COW TRACKING
81cows in range
Range 100m
Map | List

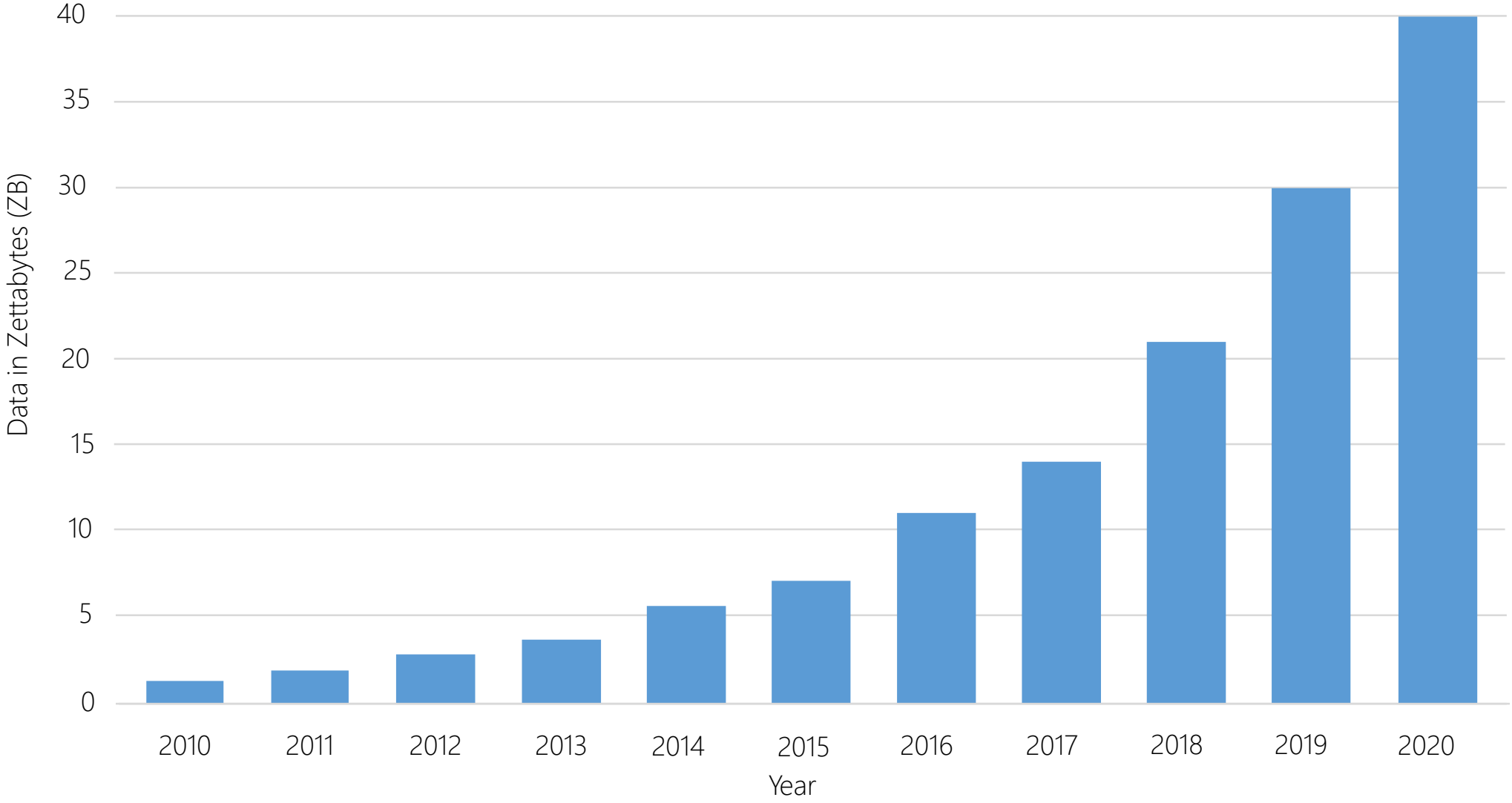
75%



IoT is the body for AI.

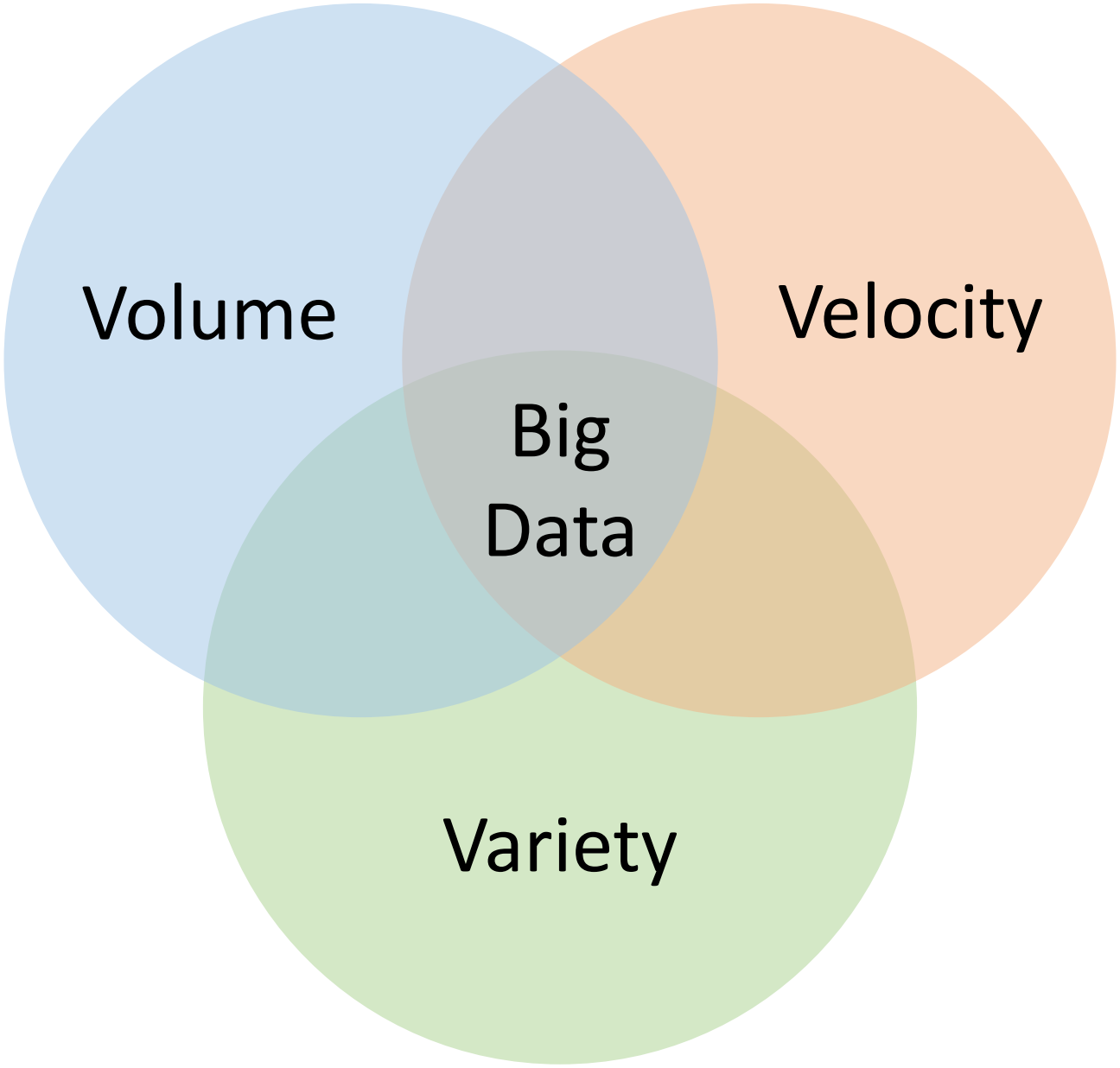
Big Data

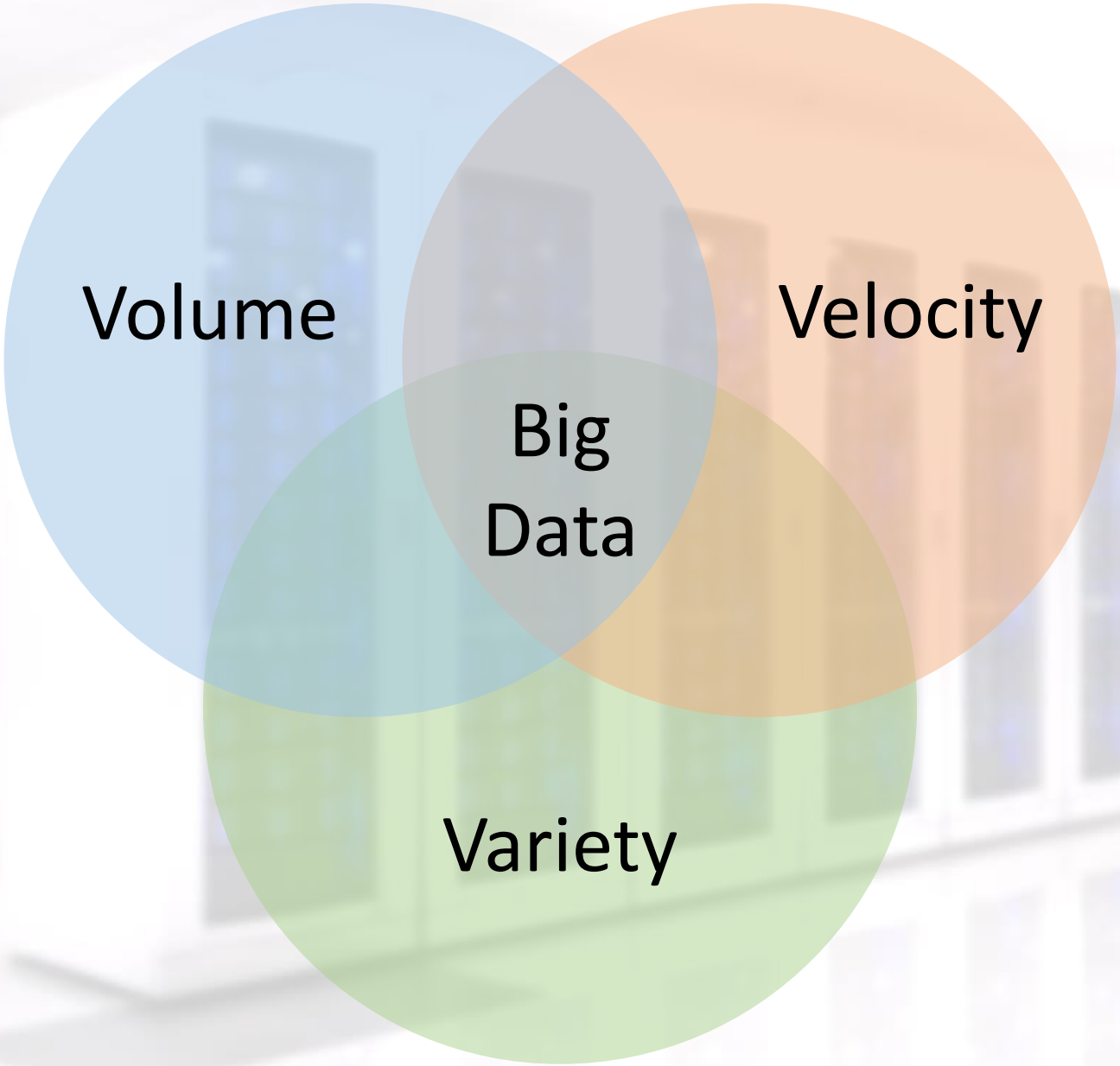
Global Data Growth



Source: UNECE Statistics Wikis

Doubling every two years


Volume
Velocity
Big
Data
Variety

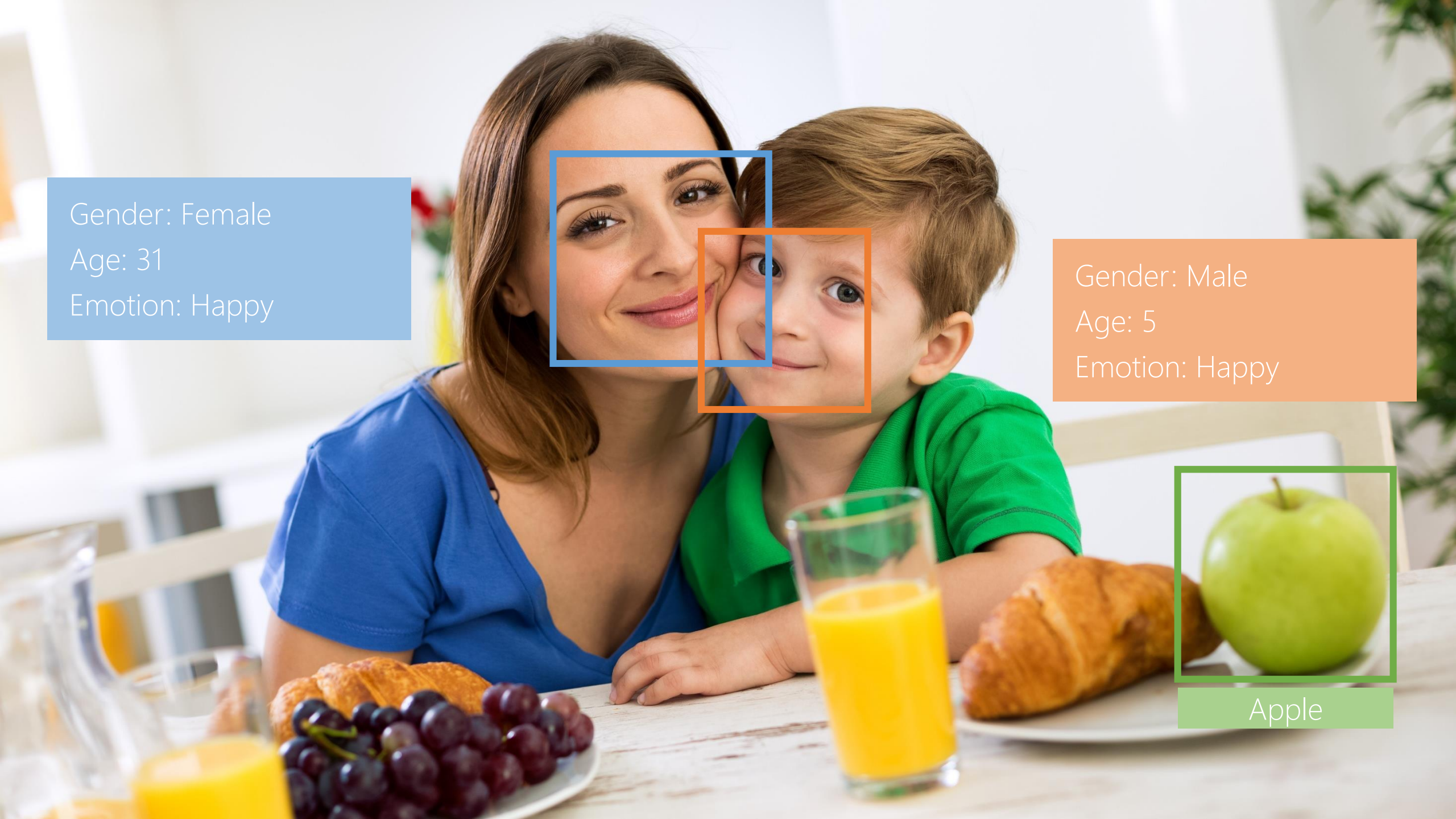

Volume
Velocity
Big
Data
Variety

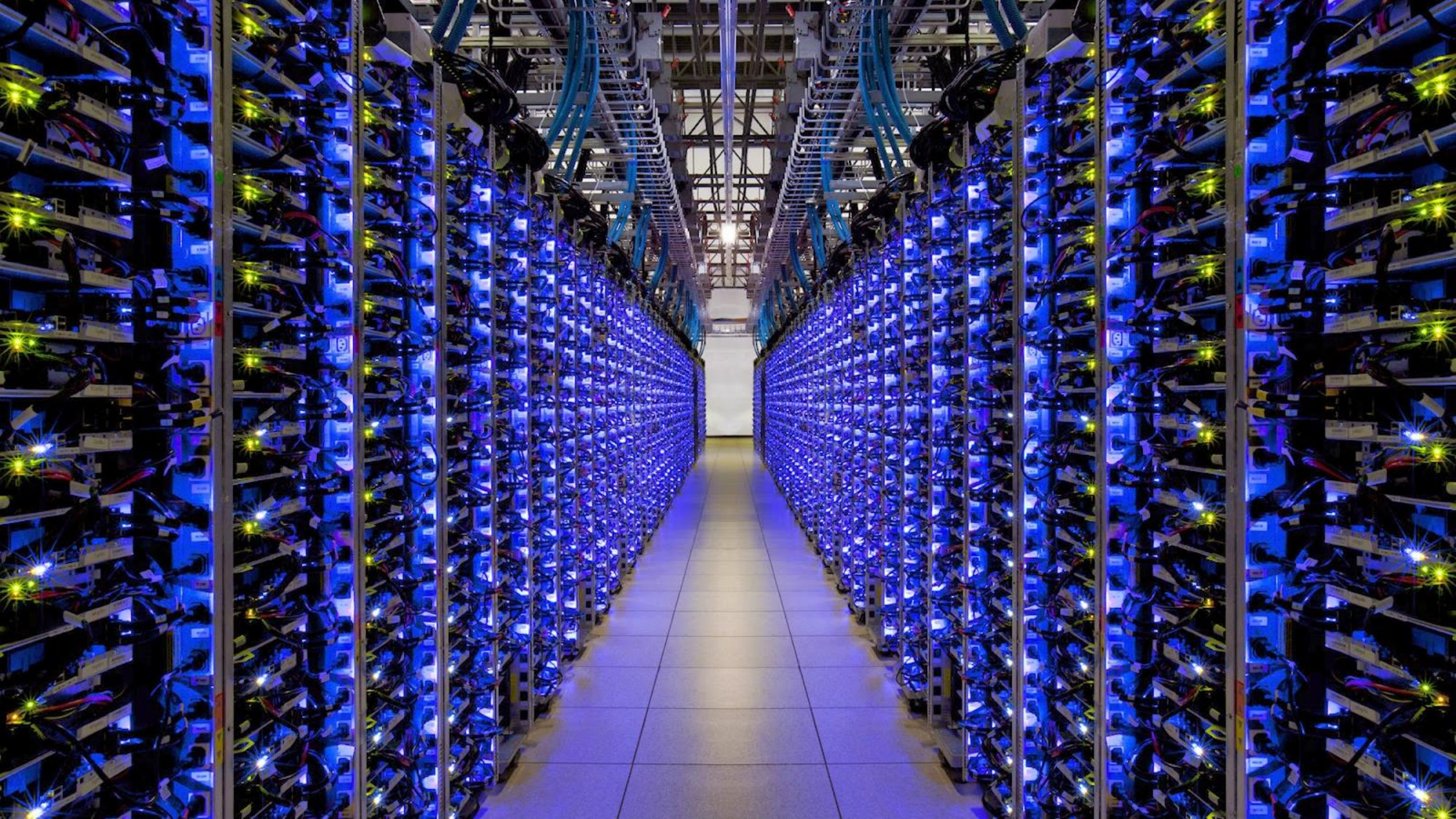
A 3
Volume

Power
Active
Power
Active
Power
Active
Power
Active
Power
Active
Power
Active
Power
Active

Velocity

Variety


Gender: Female
Age: 31
Emotion: Happy
Gender: Male
Age: 5
Emotion: Happy
Apple



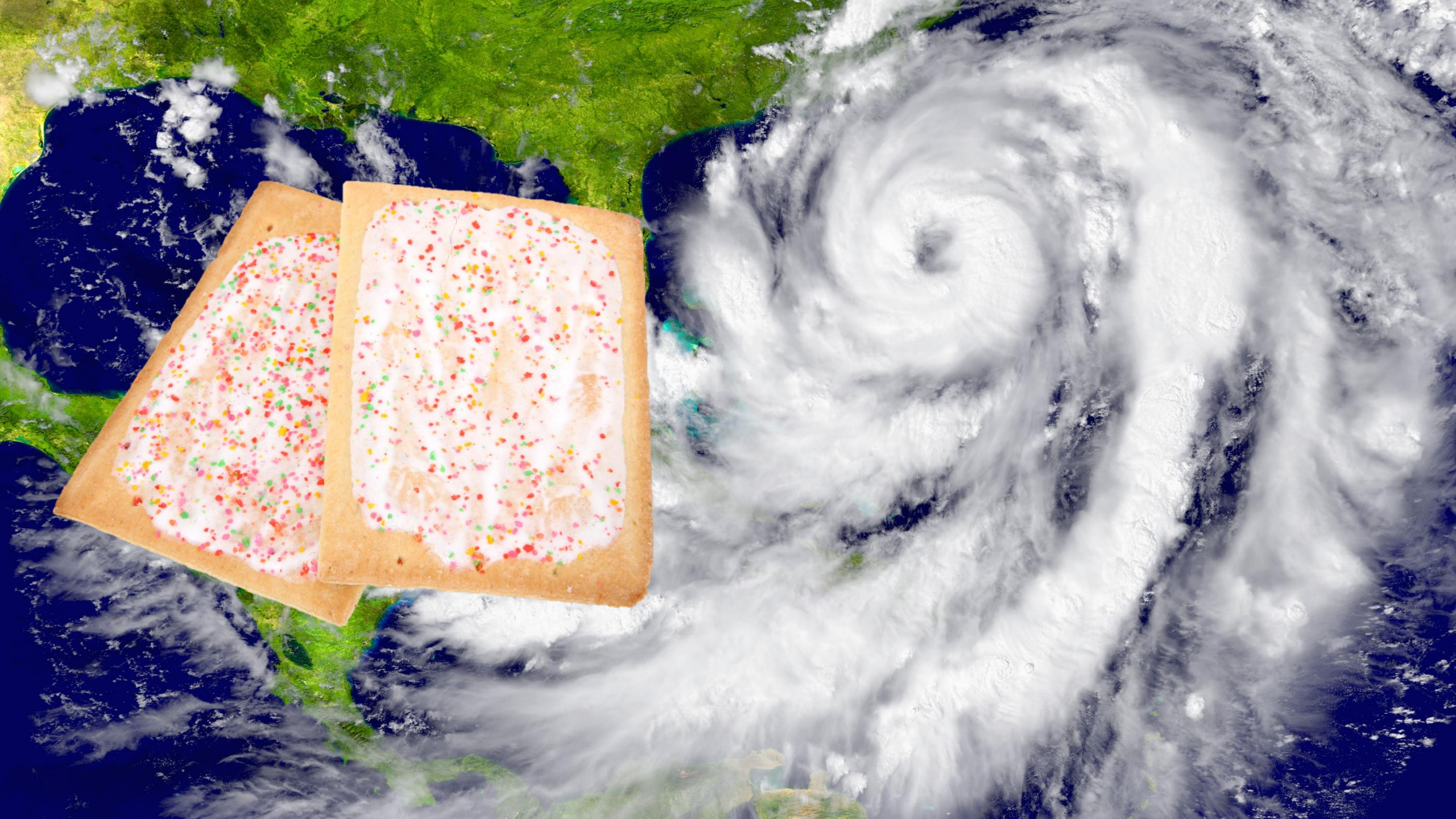
Extra Quality
4,8 Vol Alc.
Regular
BEER
WINNER 1981
330ml
Traditionally brewed

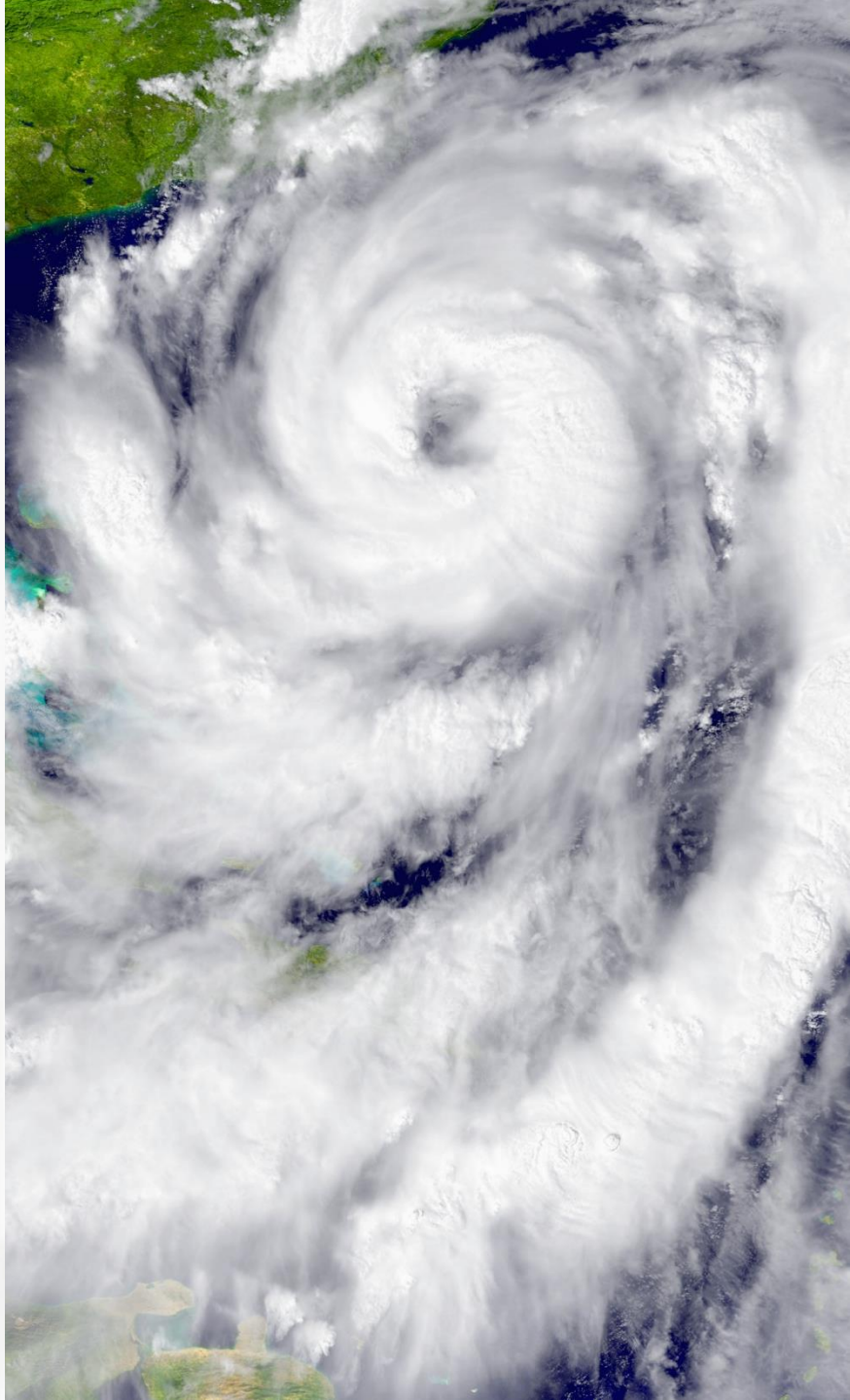
BEER
BEER
BEER

Mg
Magnesium

Unscented
Lotion

August						2017
Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

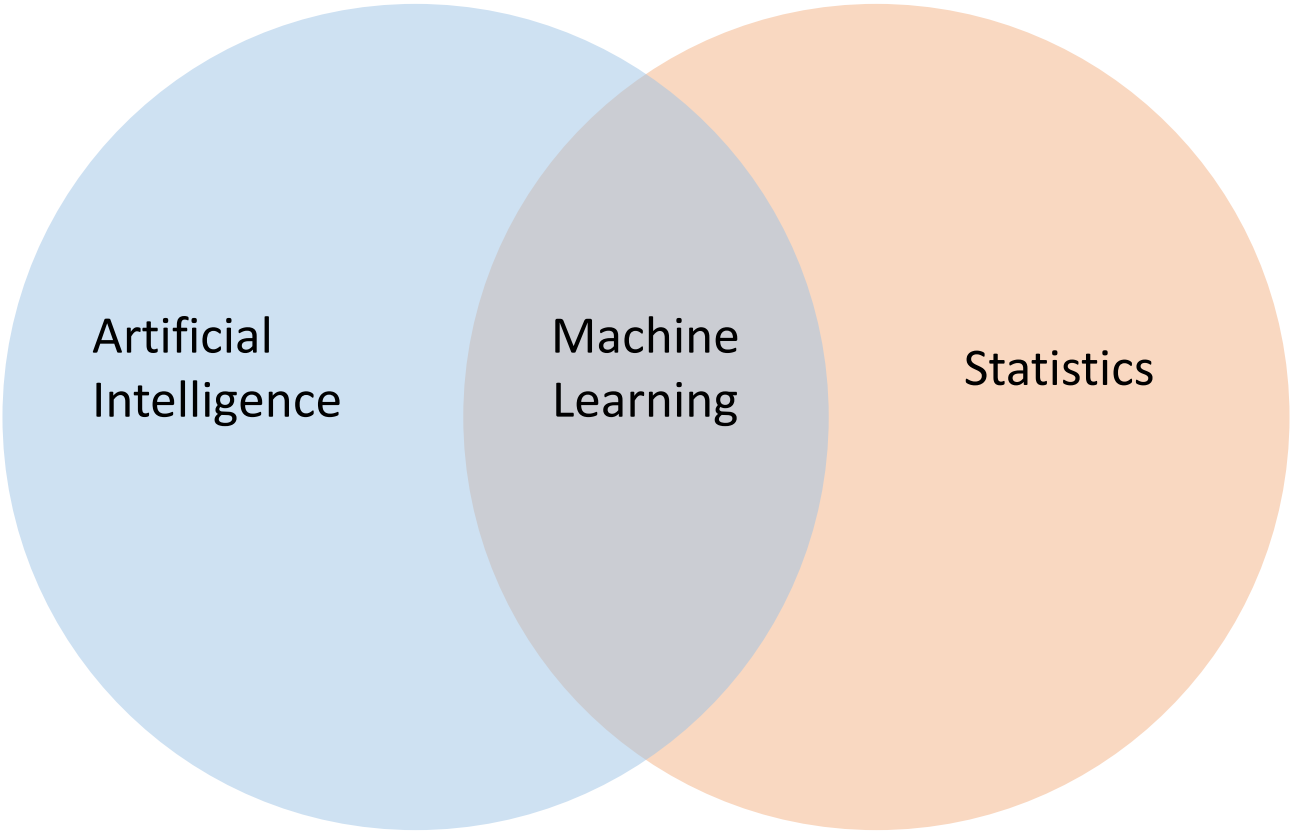


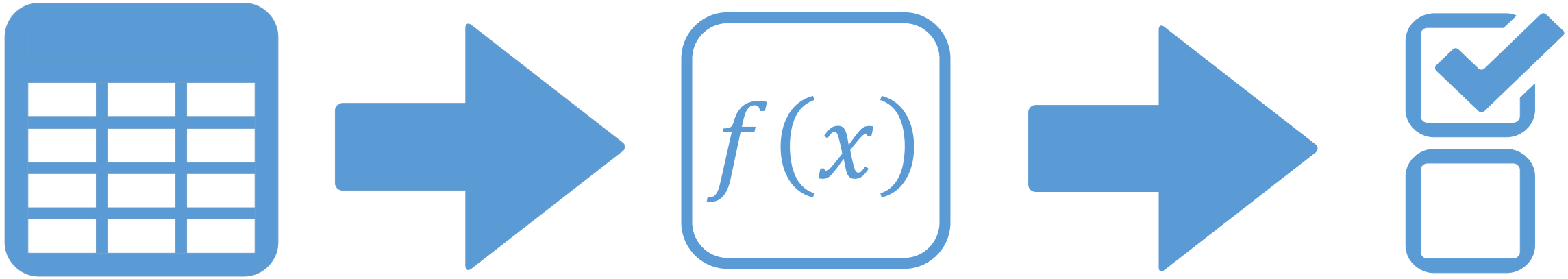


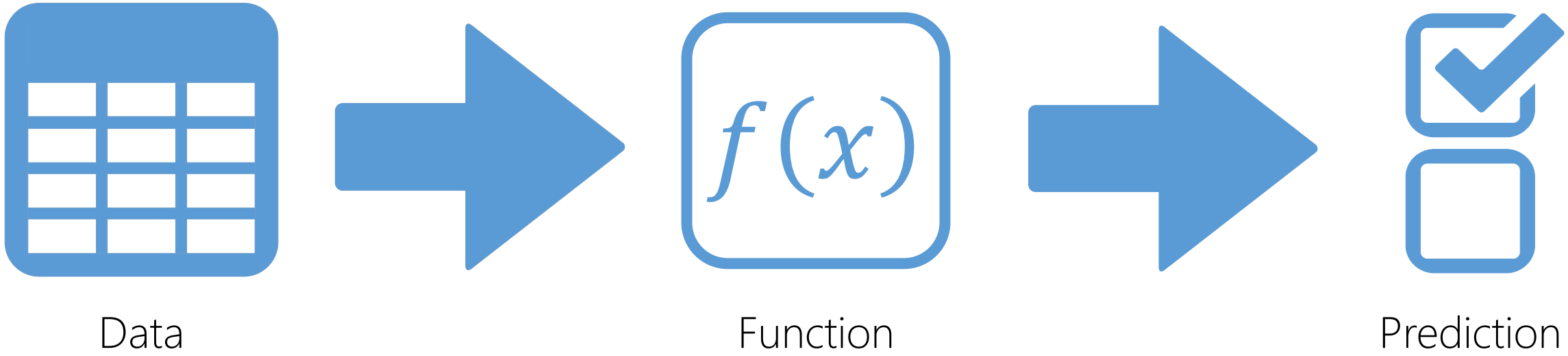
A 3

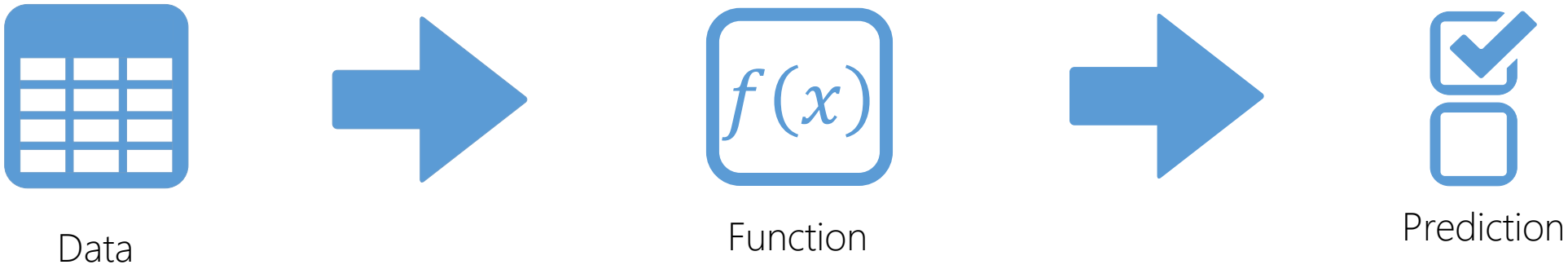
Big Data is the brain for AI.

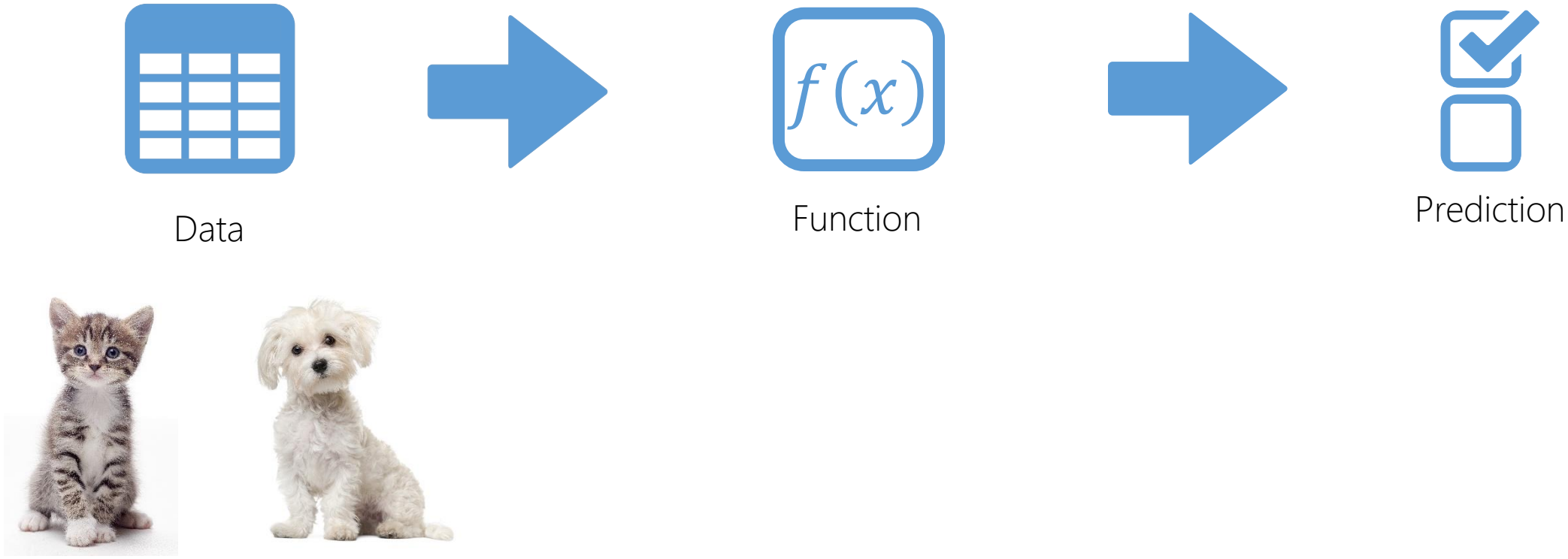
Machine Learning

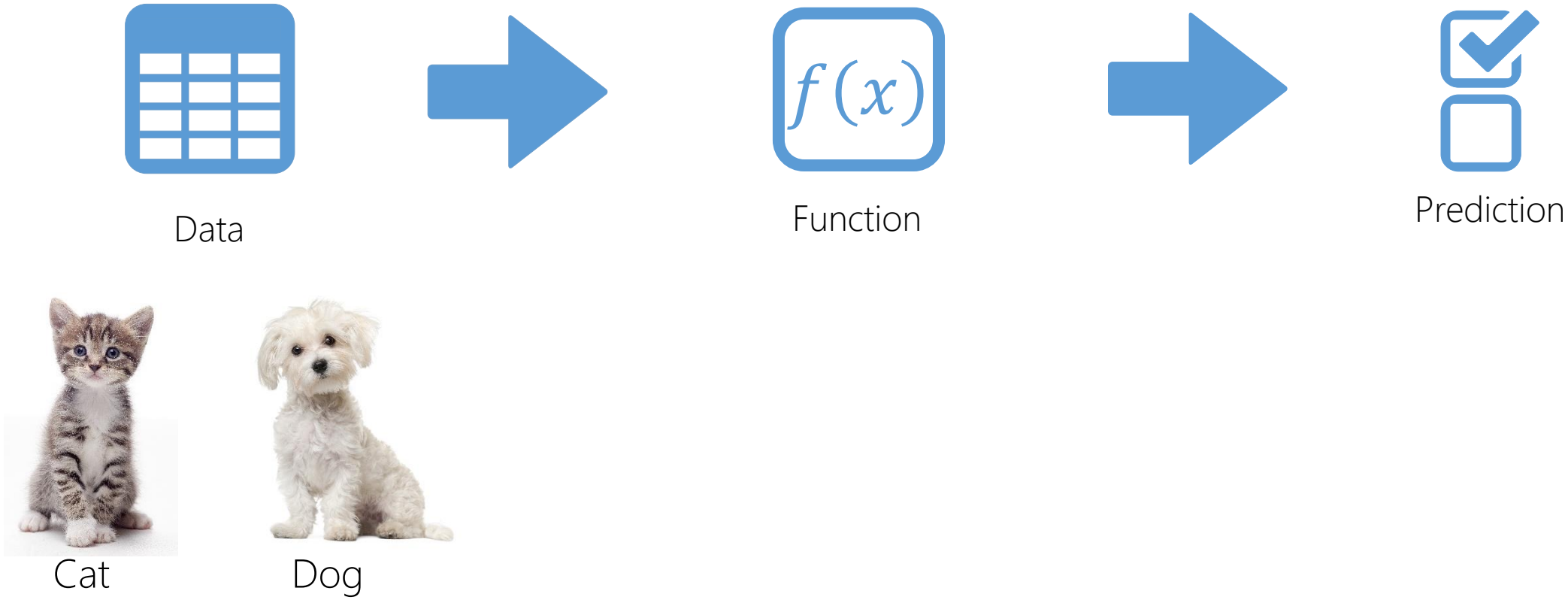

Artificial Intelligence
Machine Learning
Statistics

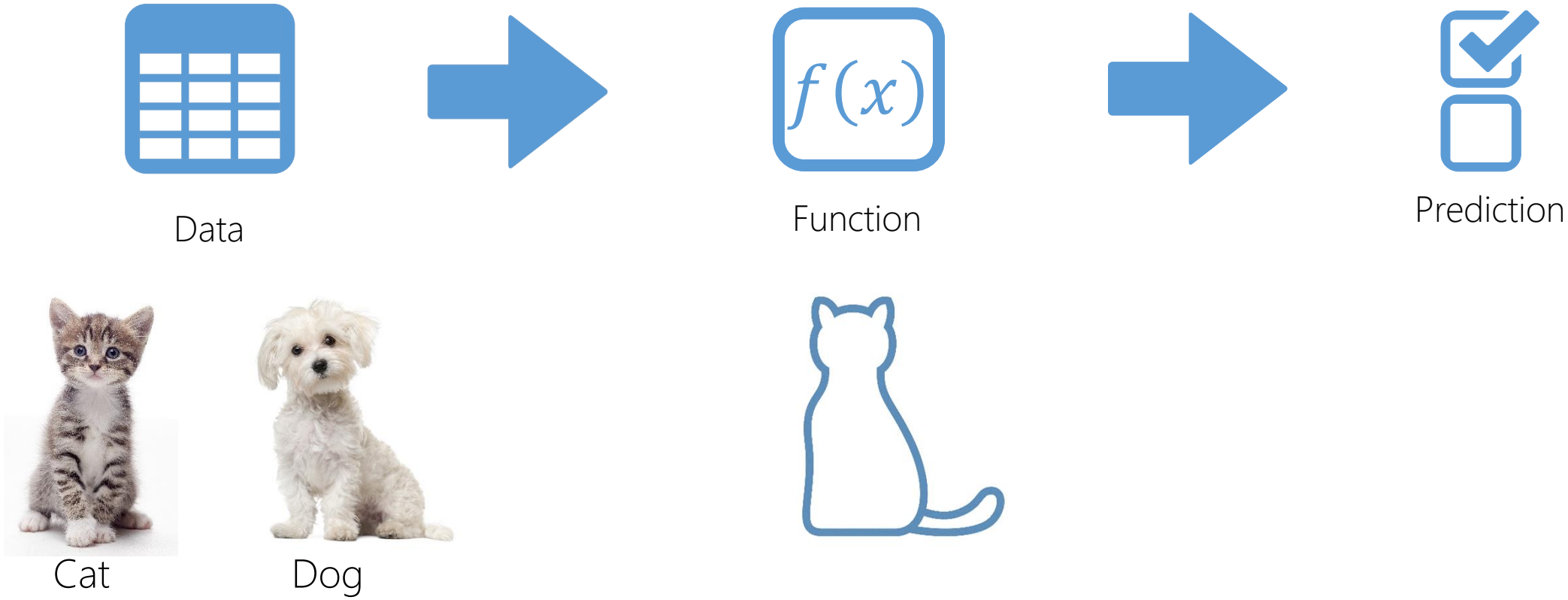

$f(x)$

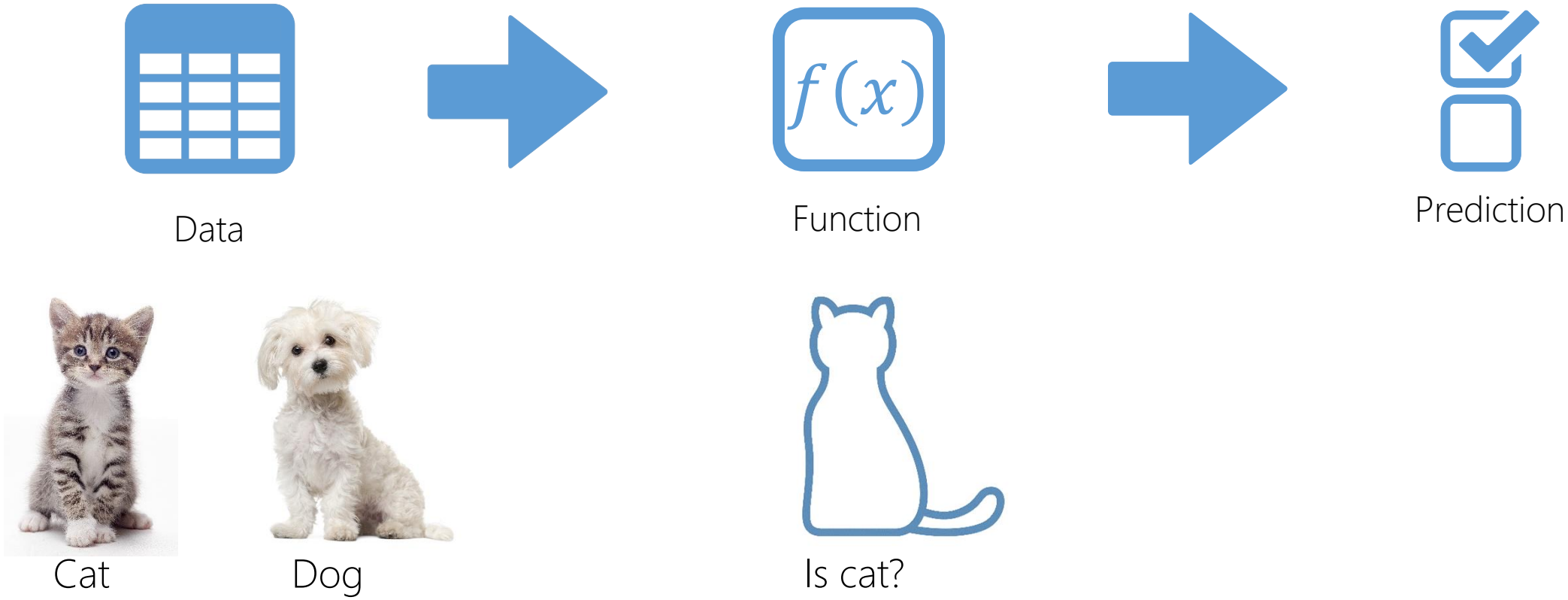

$f(x)$
Data
Function
Prediction

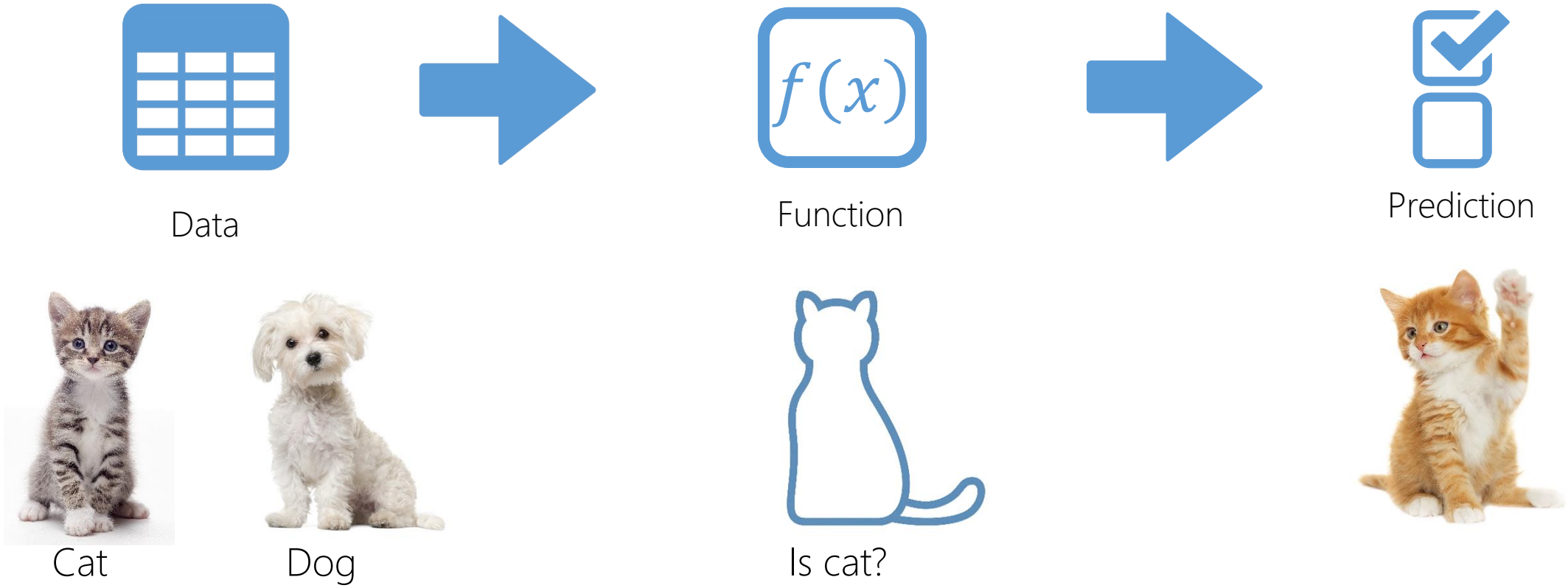

Data
$f(x)$
Function
Prediction

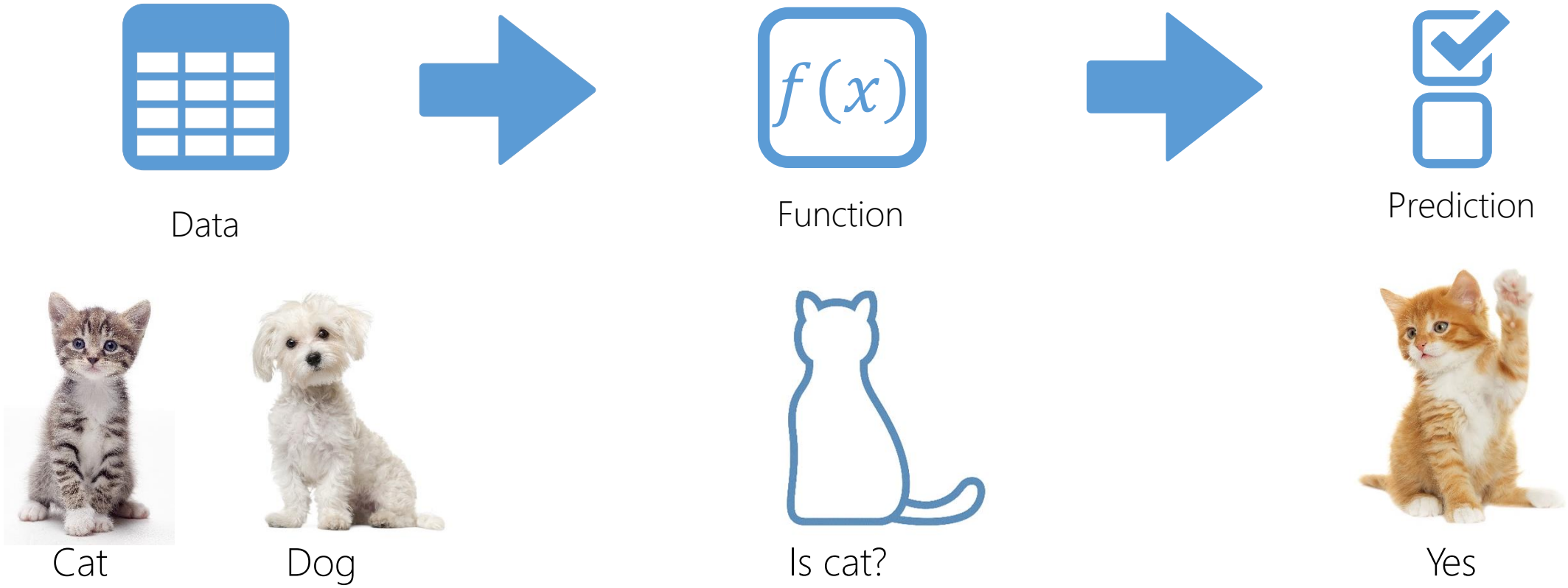

Data
$f(x)$
Function
Prediction

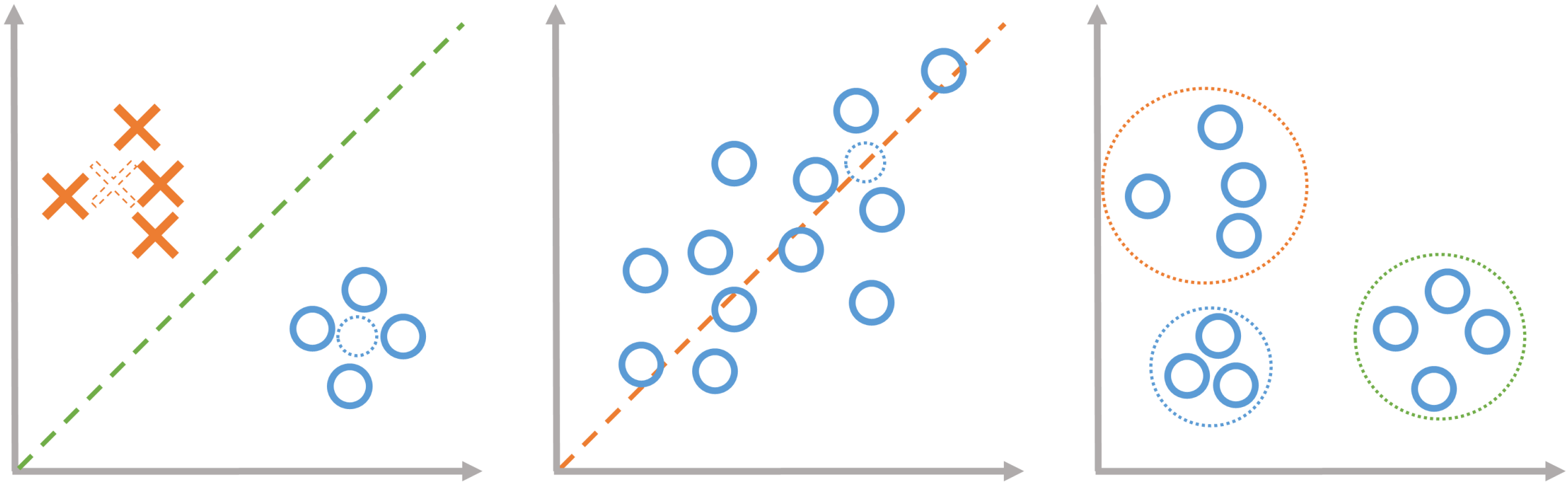

Data
$f(x)$
Function
Prediction
Cat
Dog

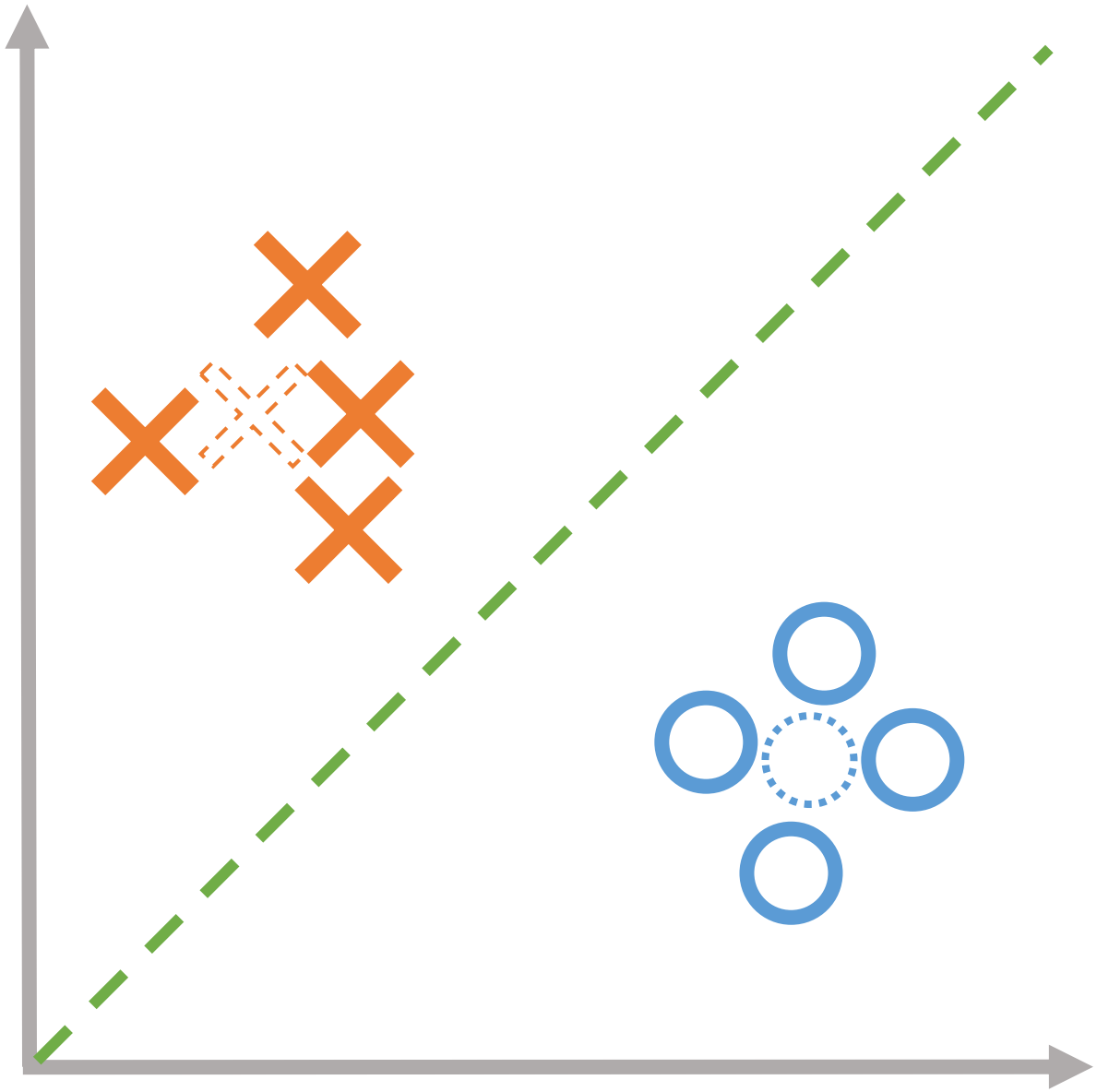

Data
$f(x)$
Function
Prediction
Cat
Dog

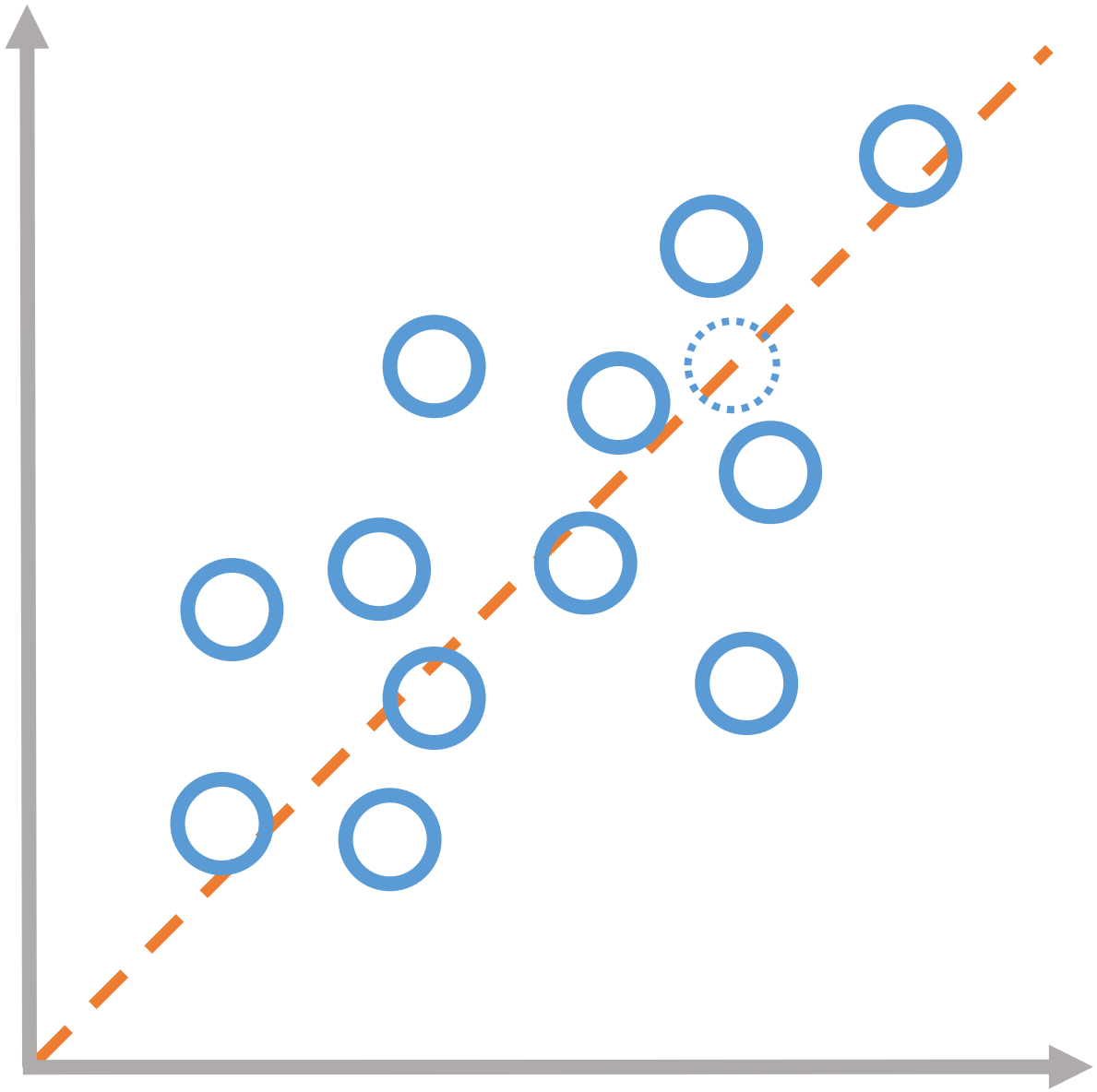

Data
$f(x)$
Function
Prediction
Cat
Dog
Is cat?

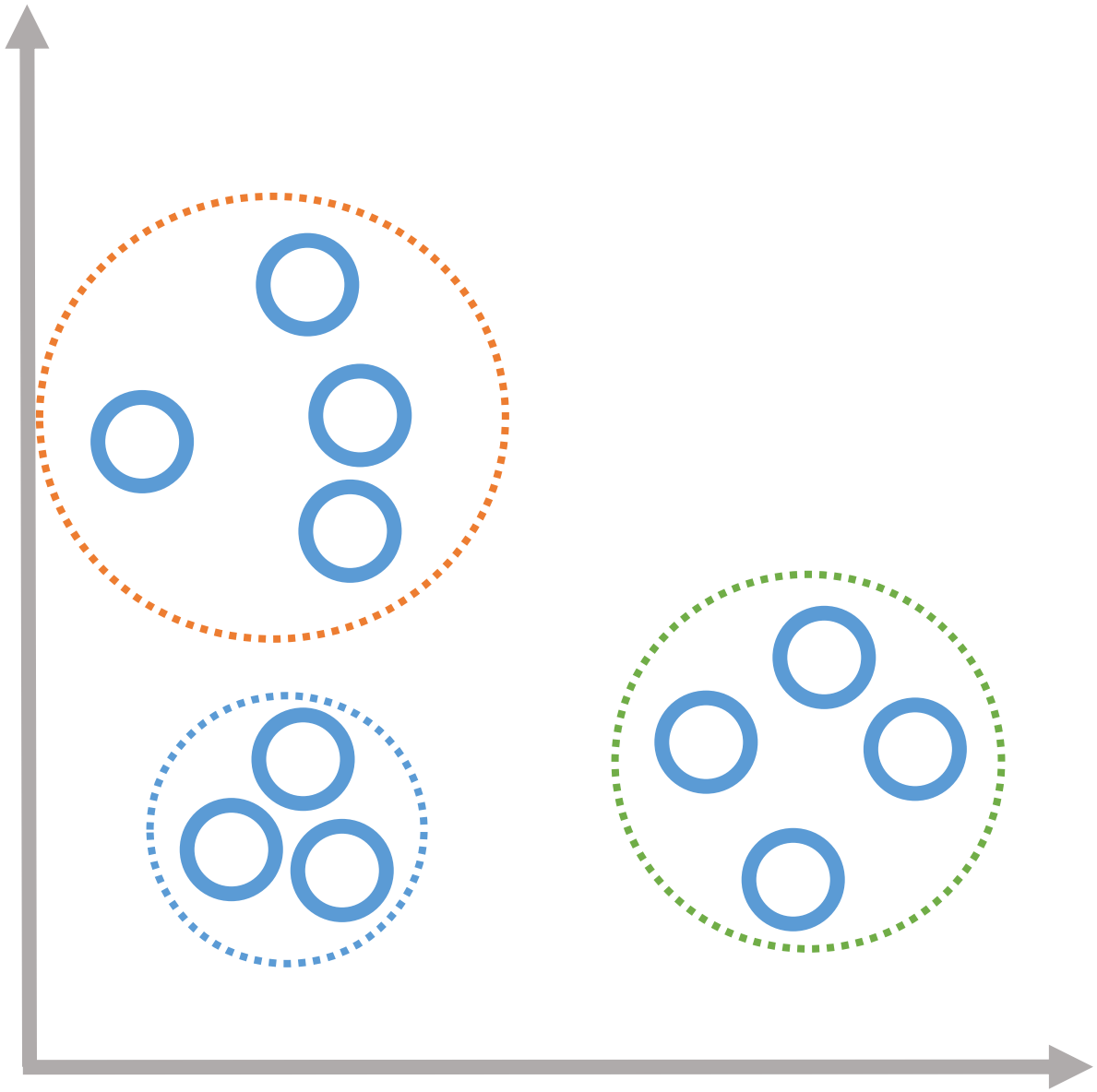

Data
$f(x)$
Function
Prediction
Cat
Dog
Is cat?

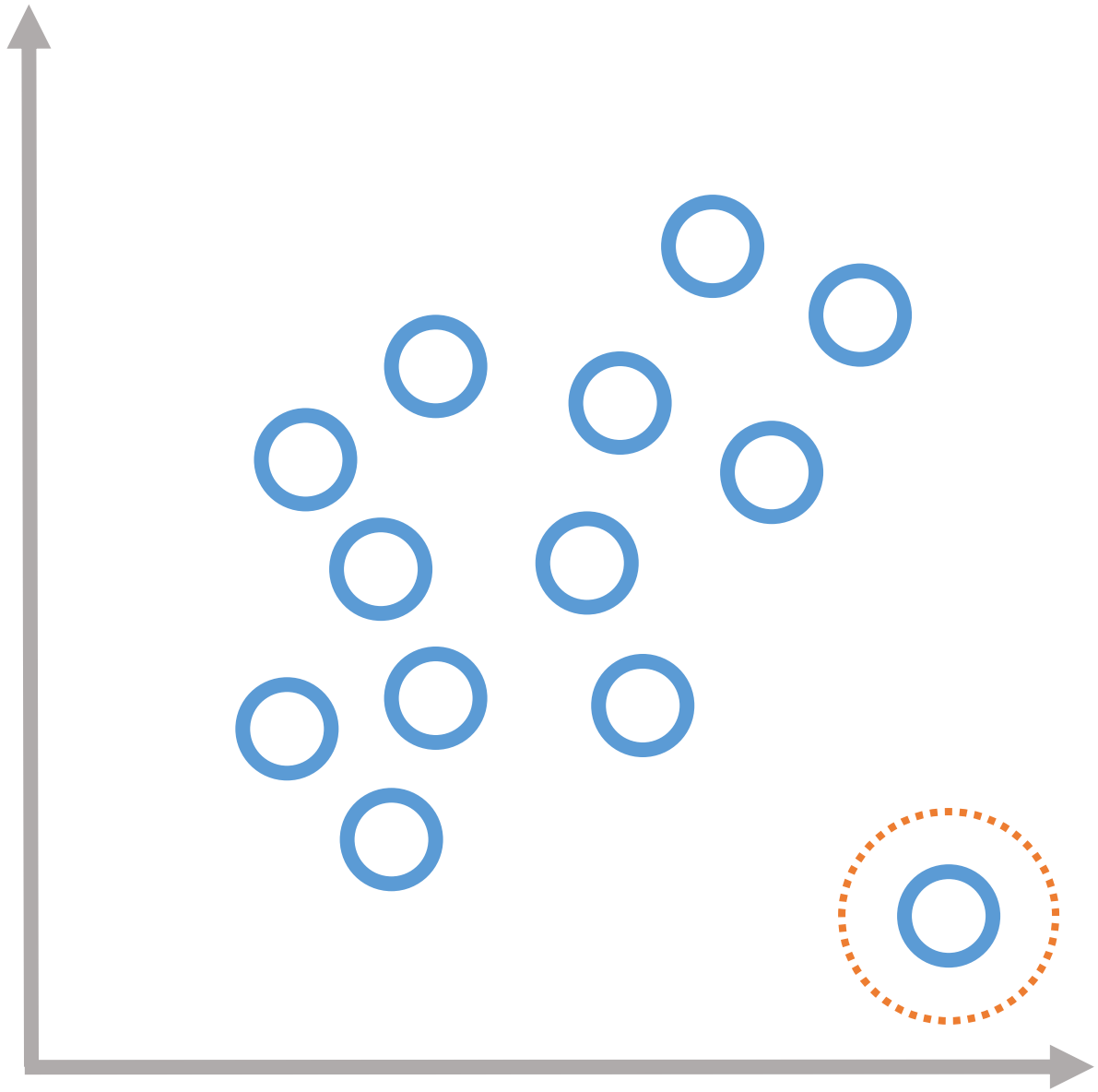

Data
$f(x)$
Function
Prediction
Cat
Dog
Is cat?
Yes

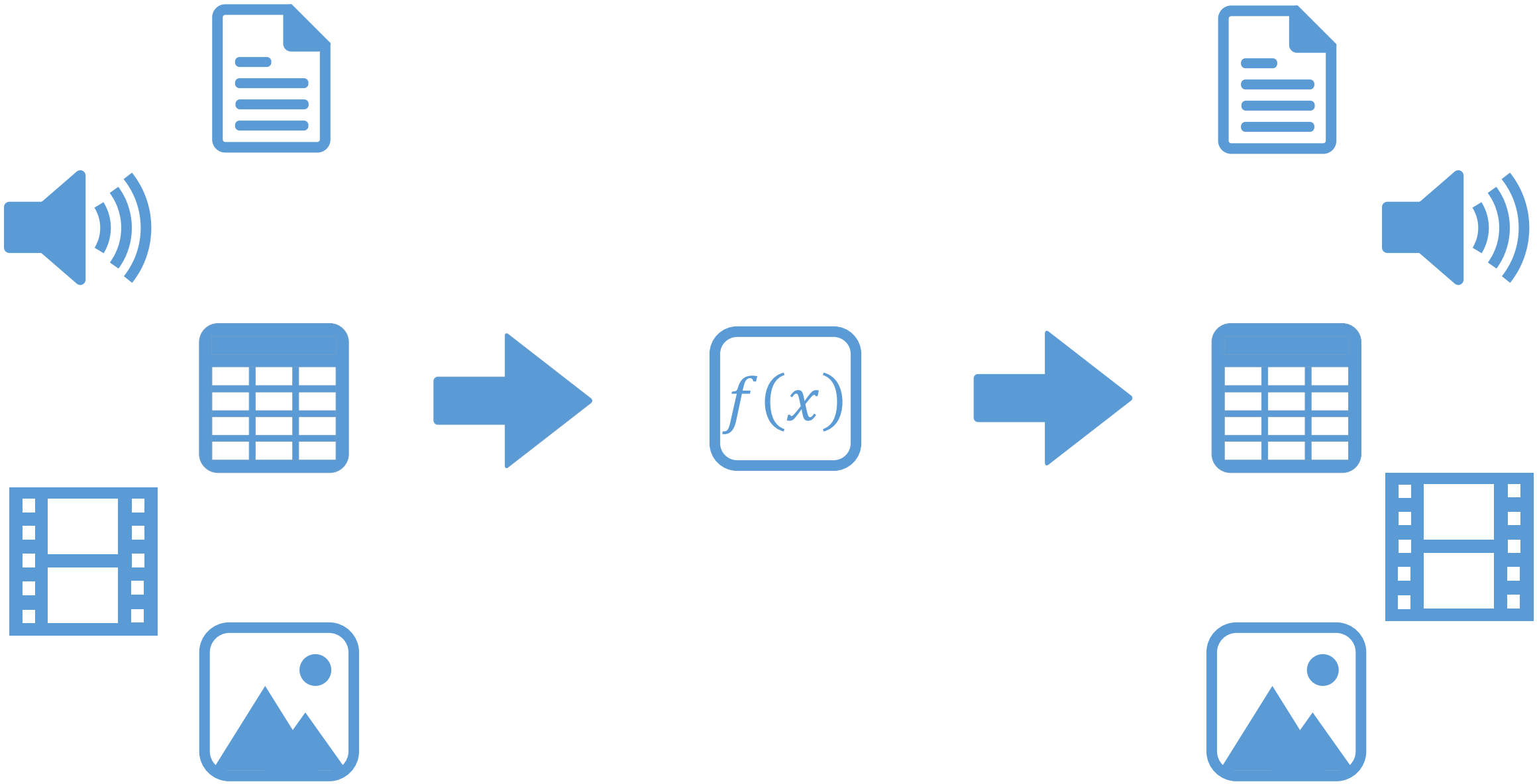


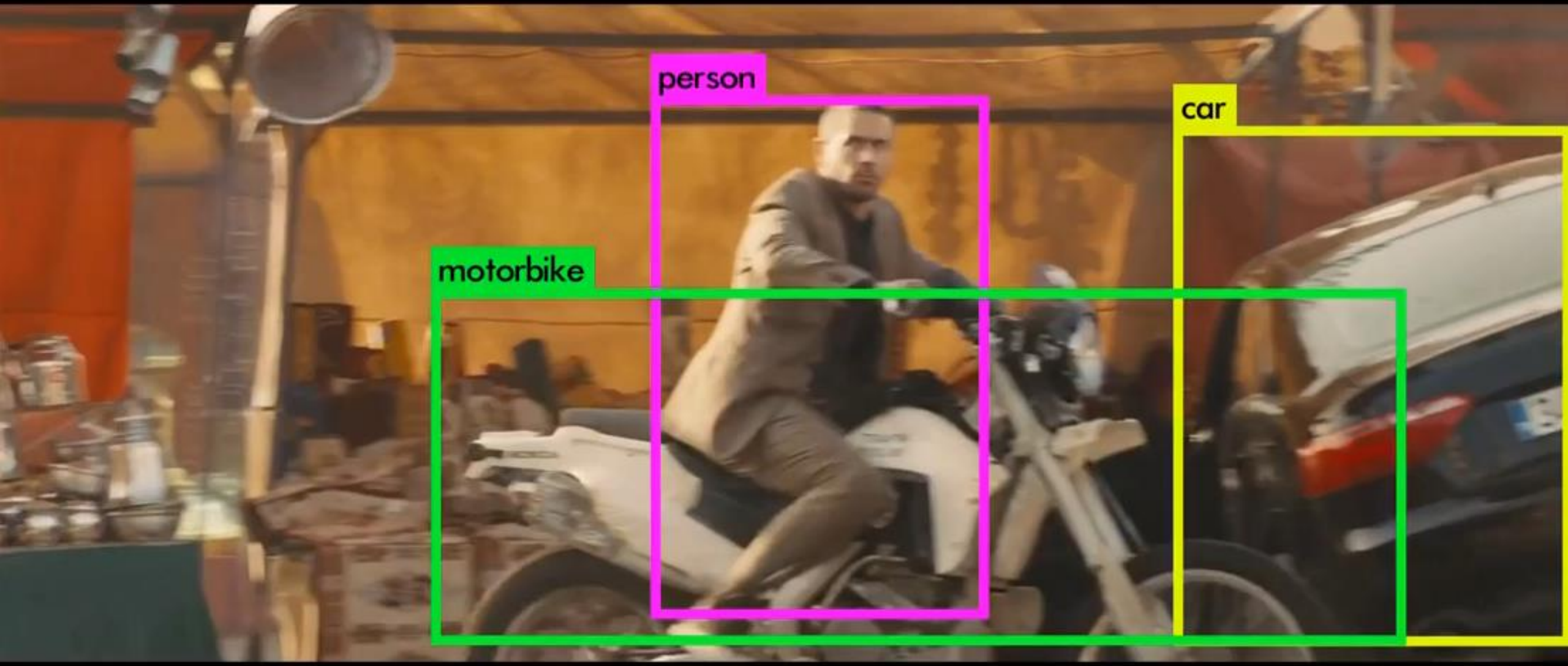









$f(x)$

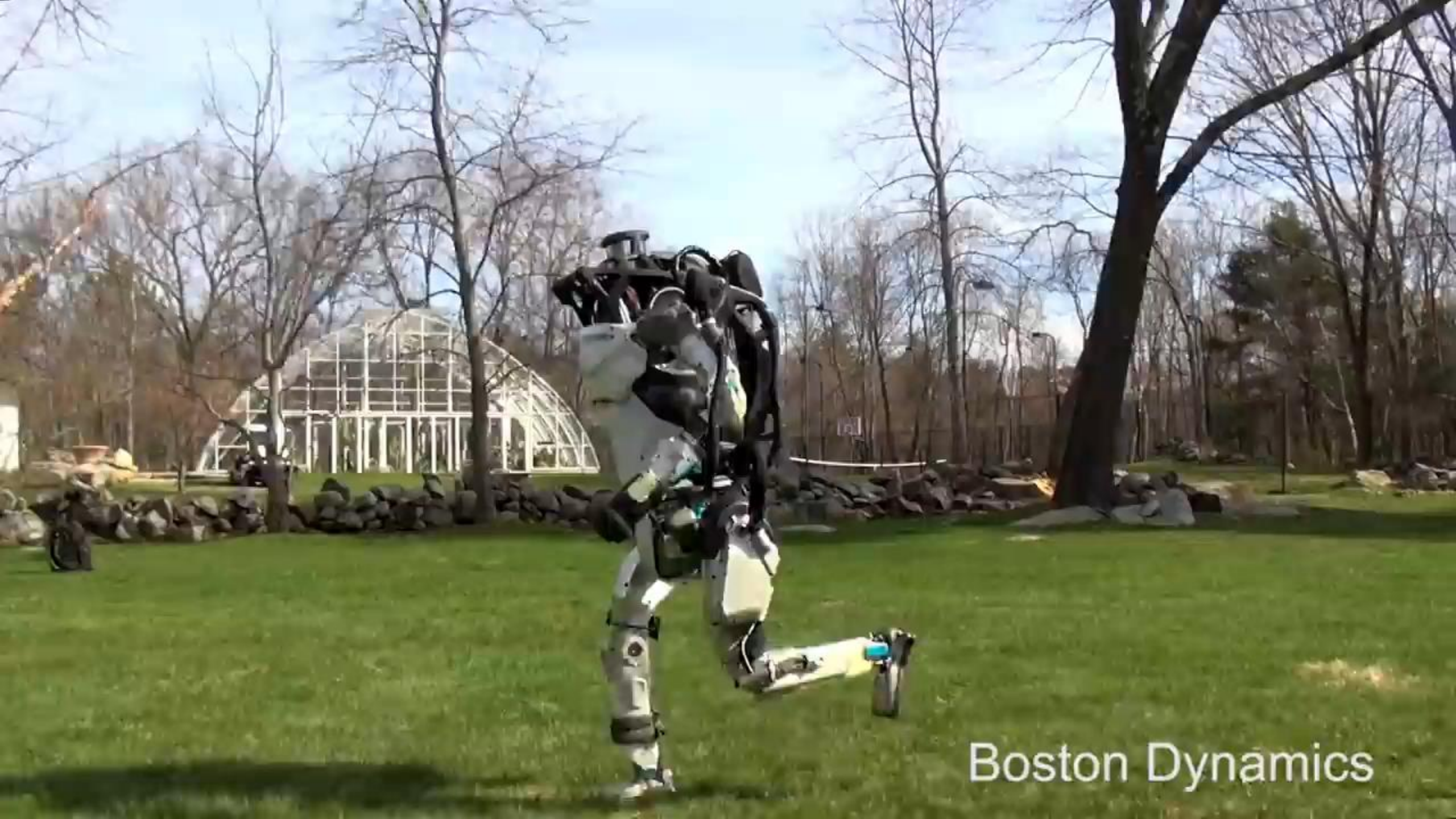


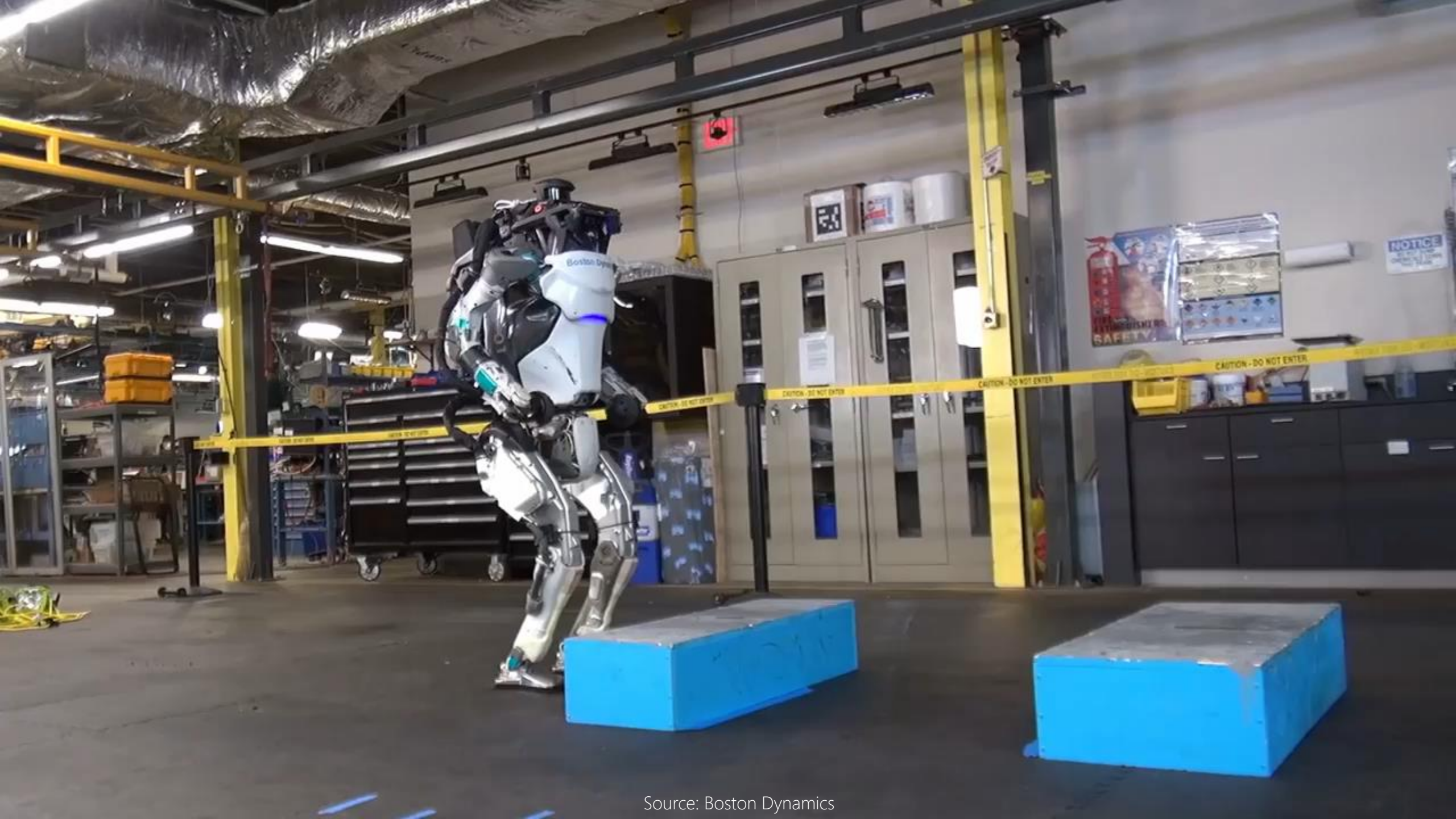
Source: YOLO: Real-Time Object Detection

Source: Nvidia

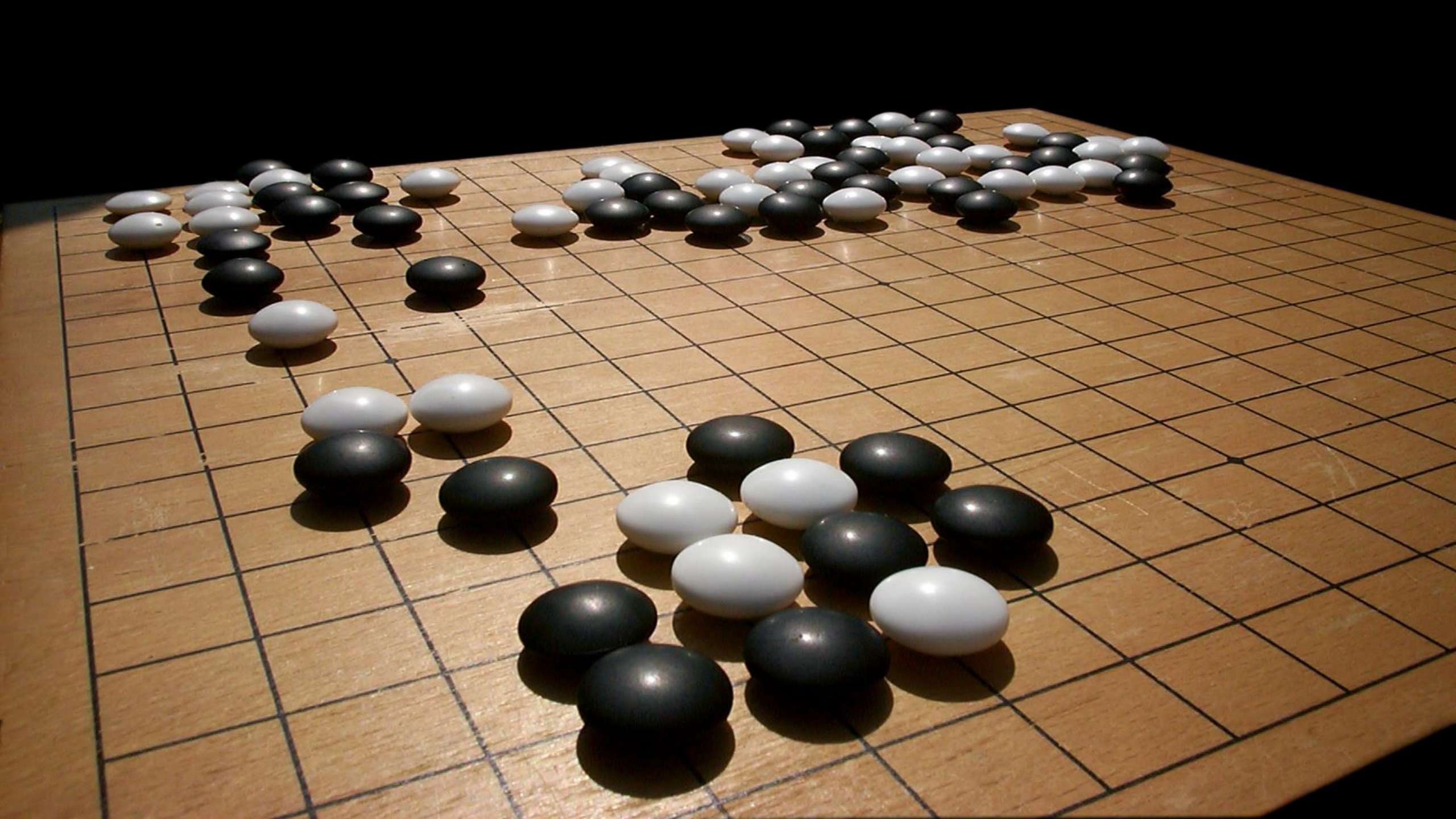
Source: http://grail.cs.washington.edu/projects/AudioToObama/

Source: Google Deep Mind


Boston Dynamics



Source: Boston Dynamics



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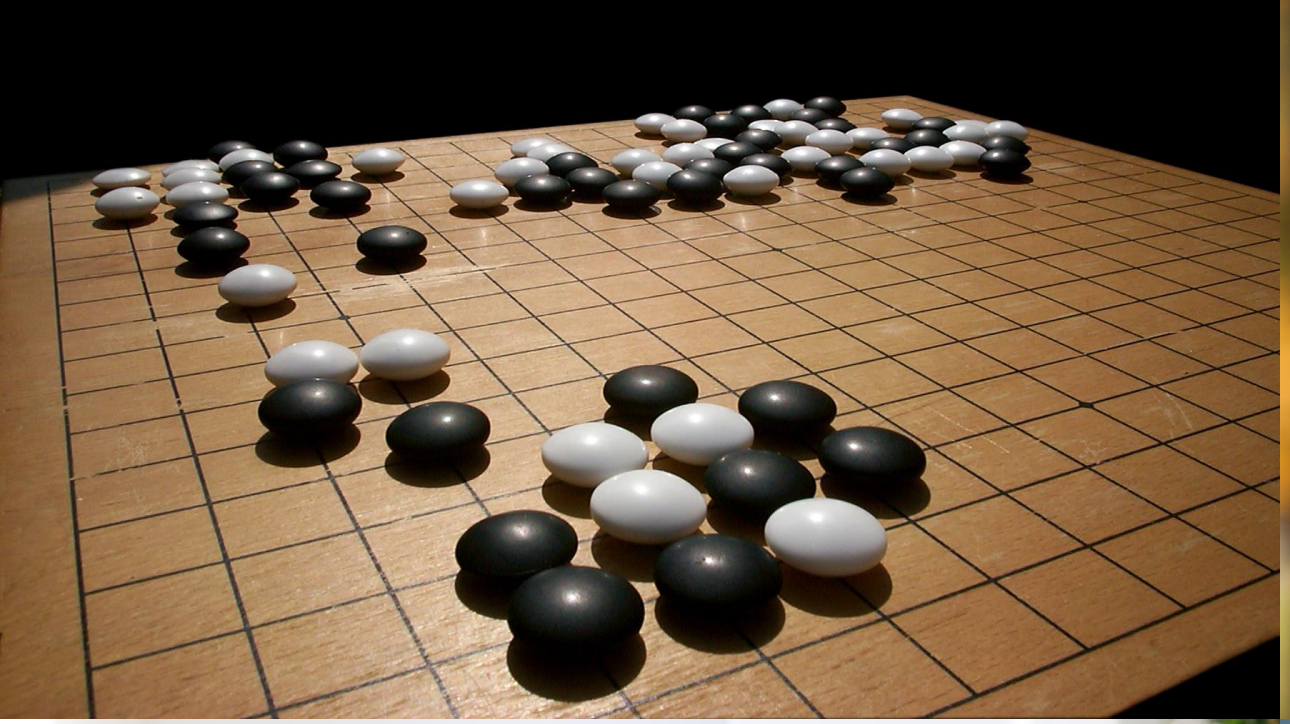
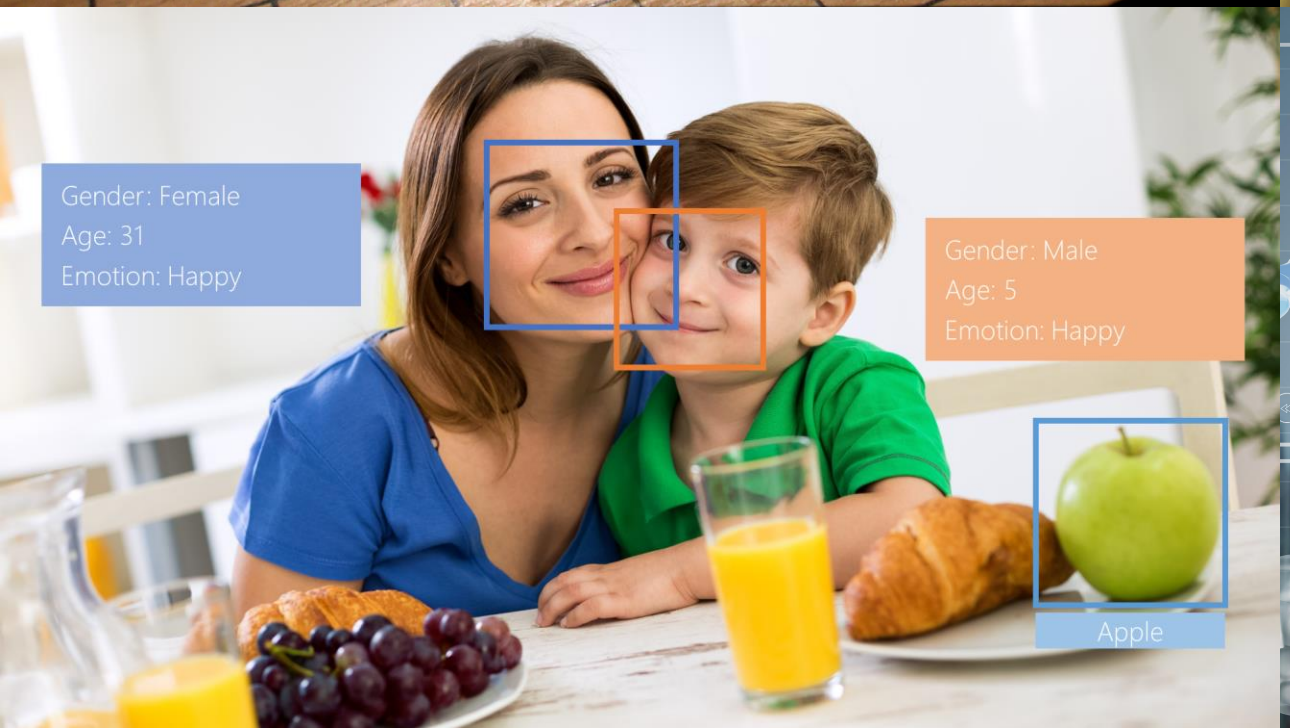
739
min
max

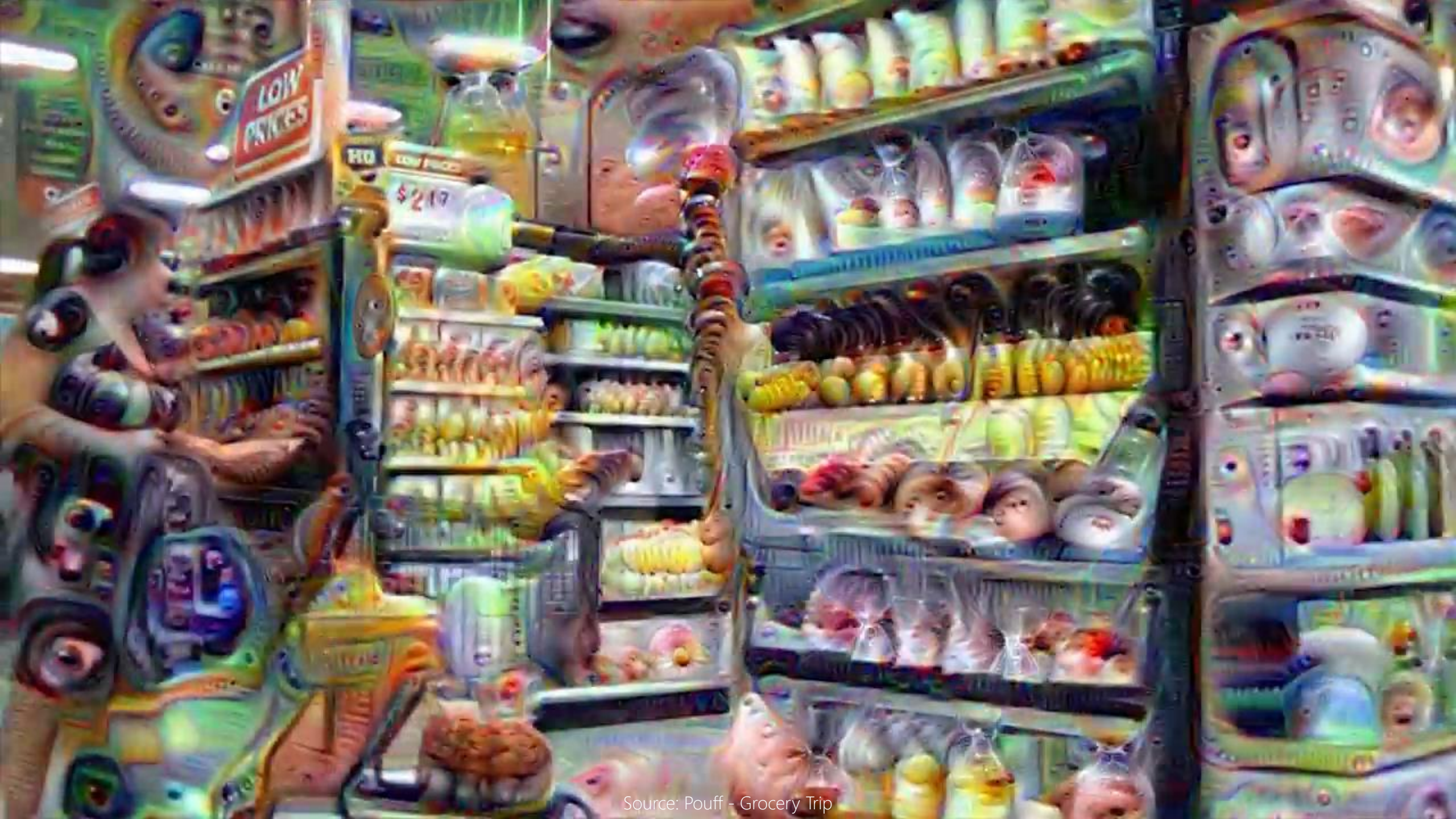



Gender: Female
Age: 31
Emotion: Happy
Gender: Male
Age: 5
Emotion: Happy
Apple

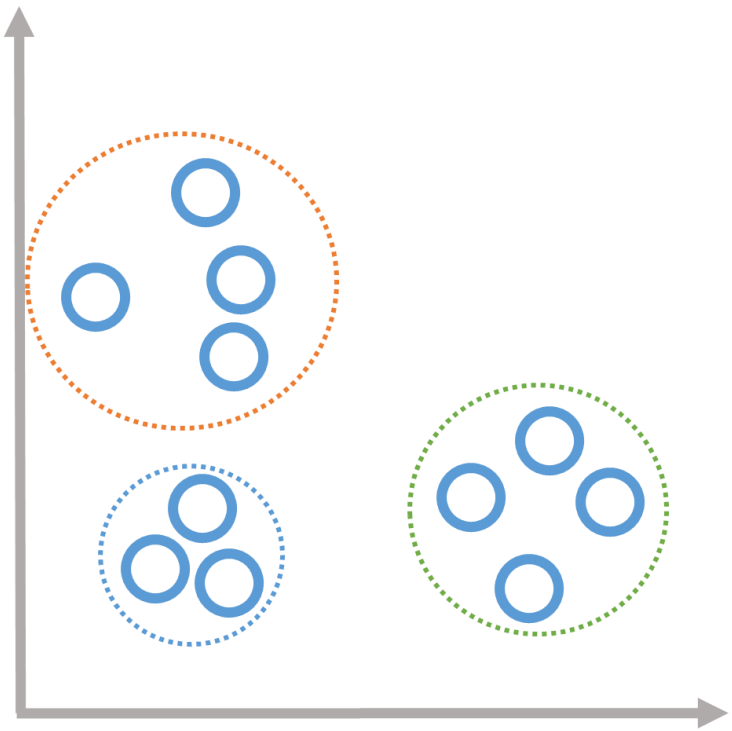
01:03:32.500

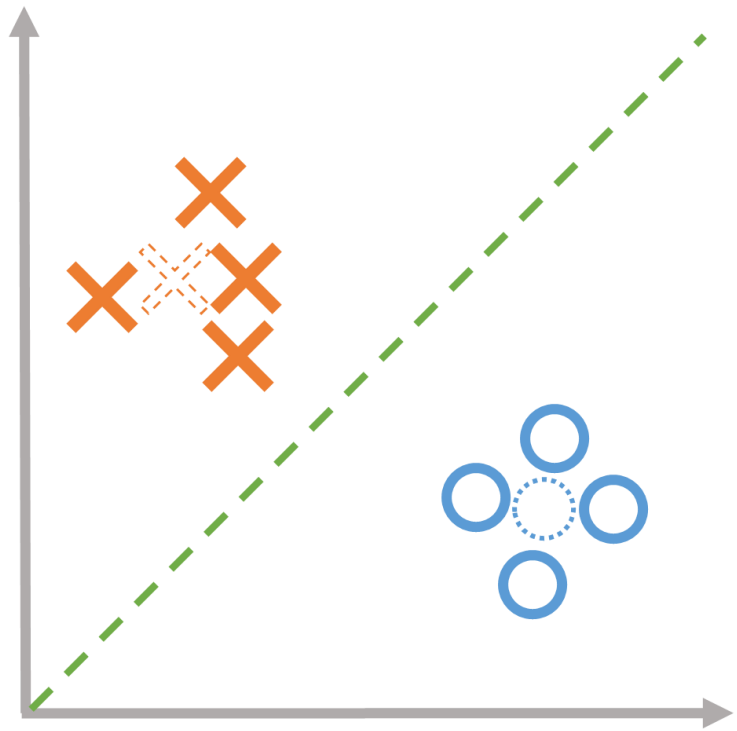
CAUTION
ACHTUNG
ATTENTION
CUIDADO

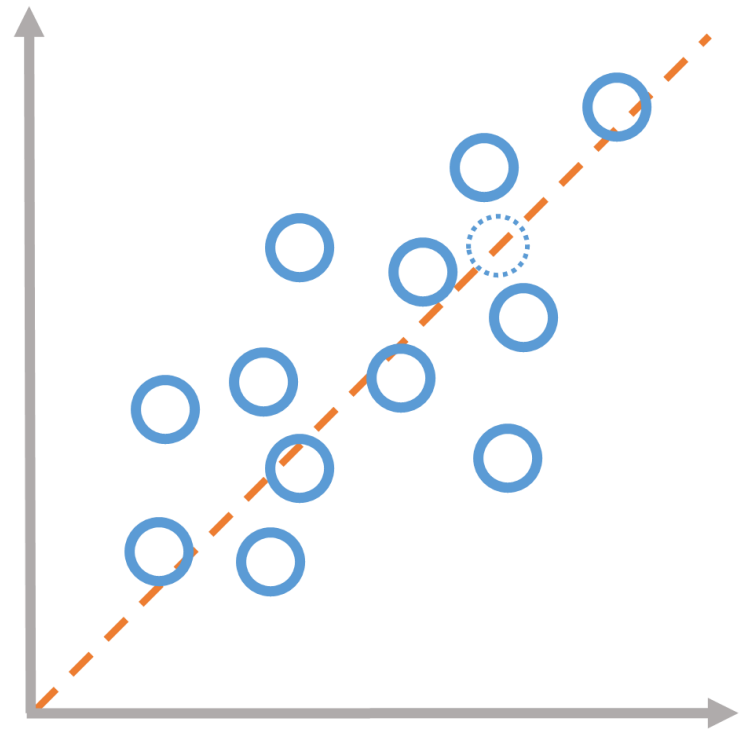
© Twitter – @teenybiscuit



Source: Pouff - Grocery Trip







Machine learning is the mind for AI.

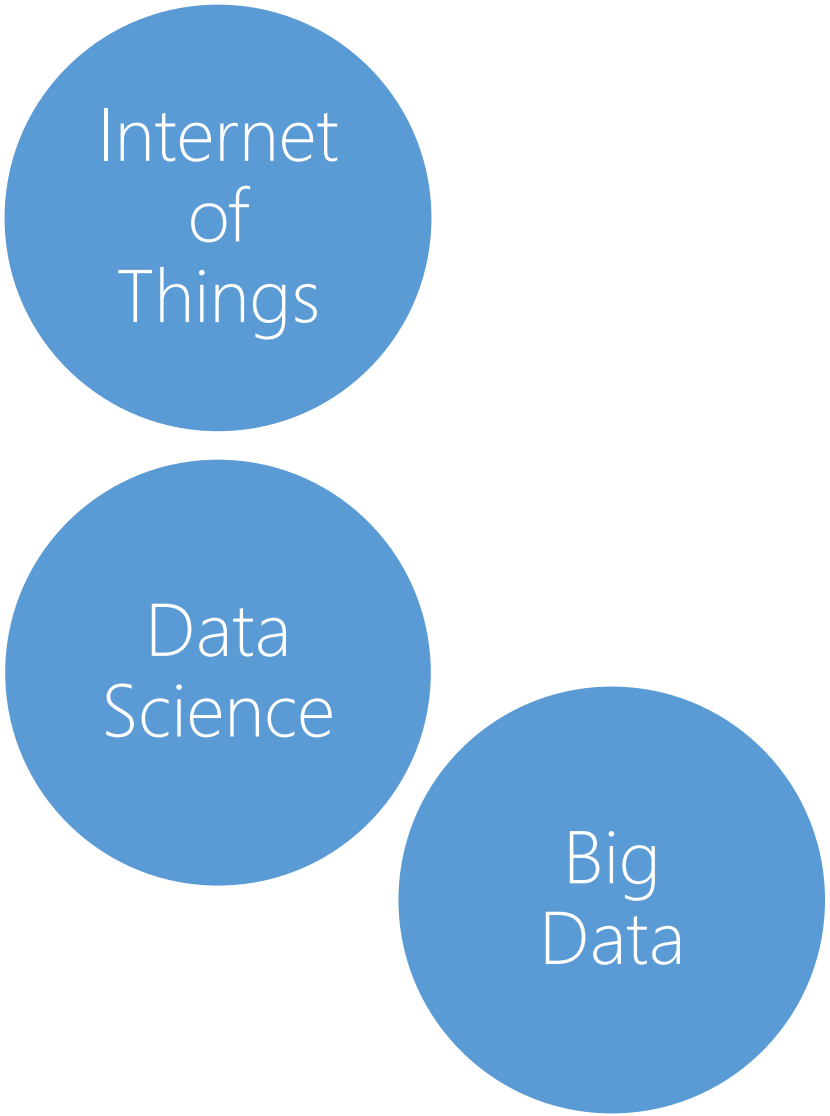
Closing the Loop

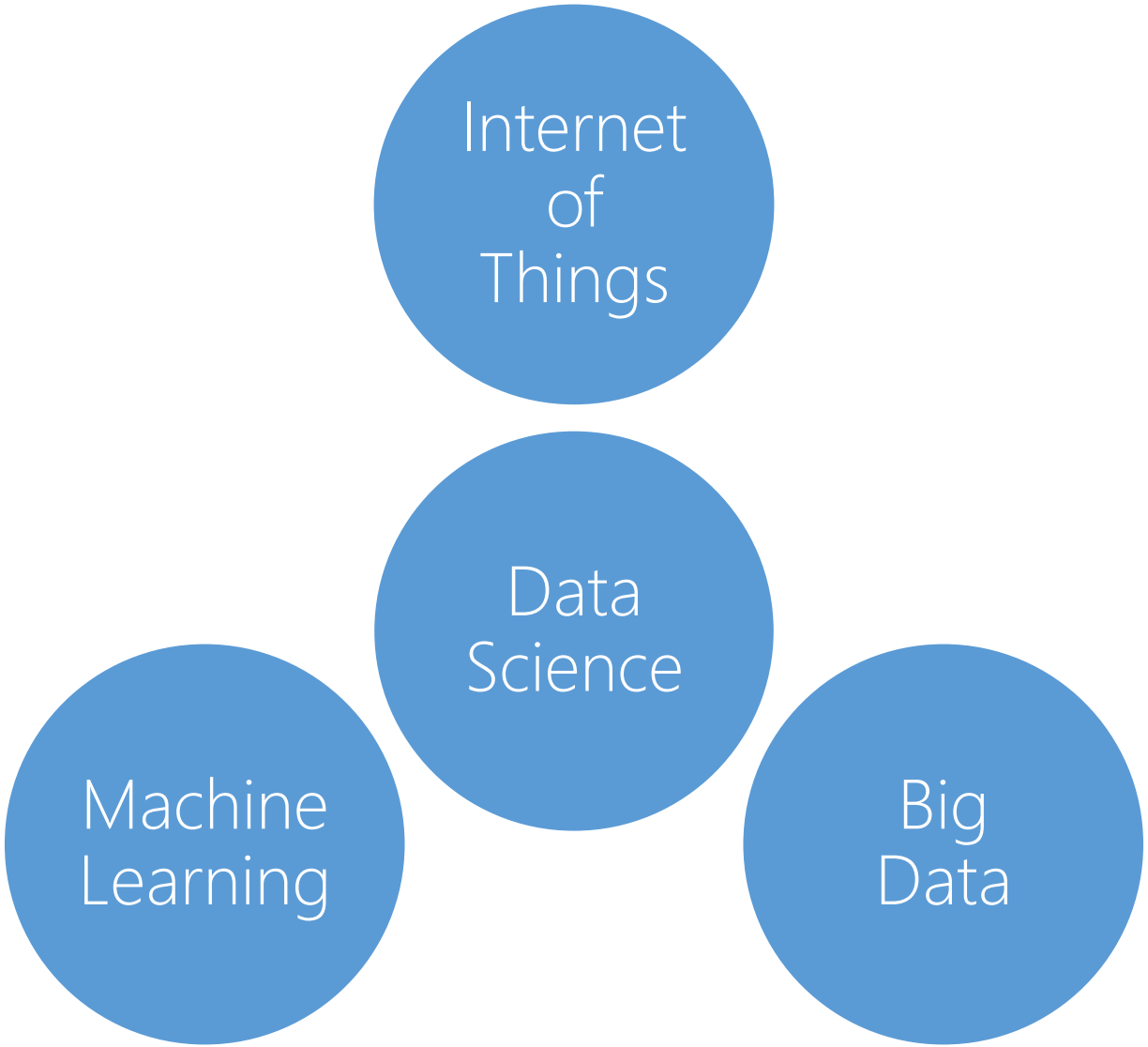
How will AI affect you?

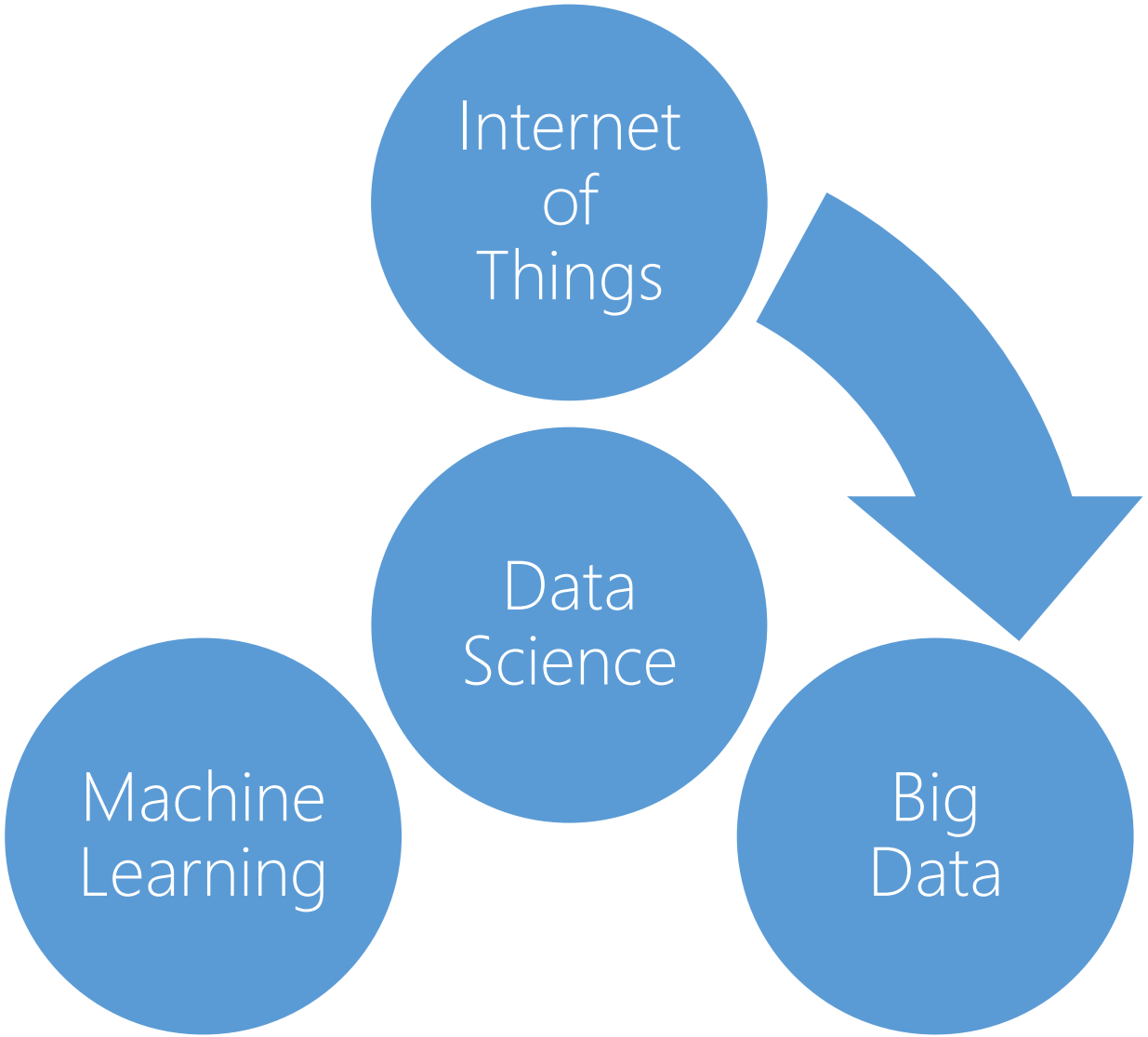
Data
Science

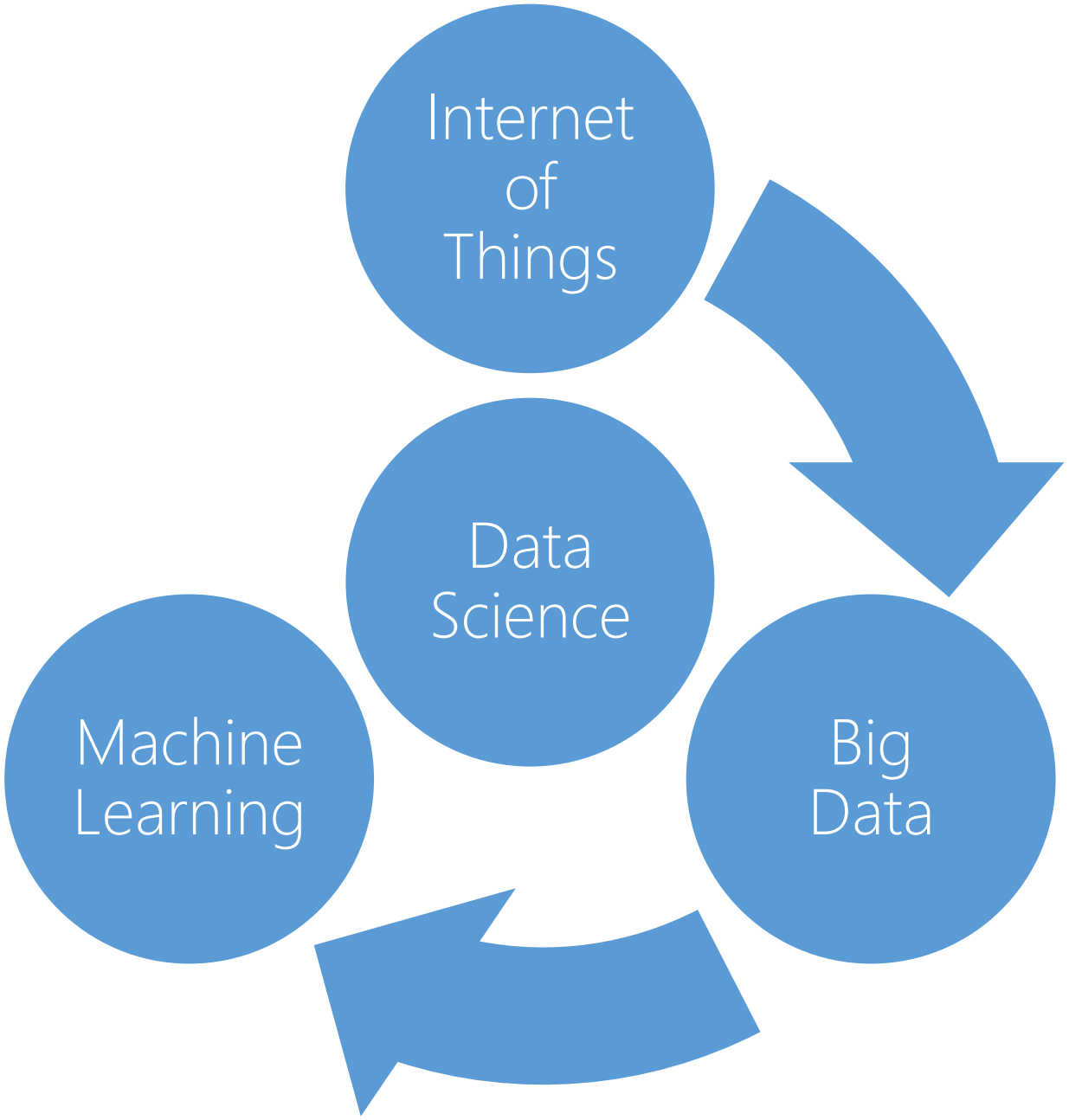
Internet of Things

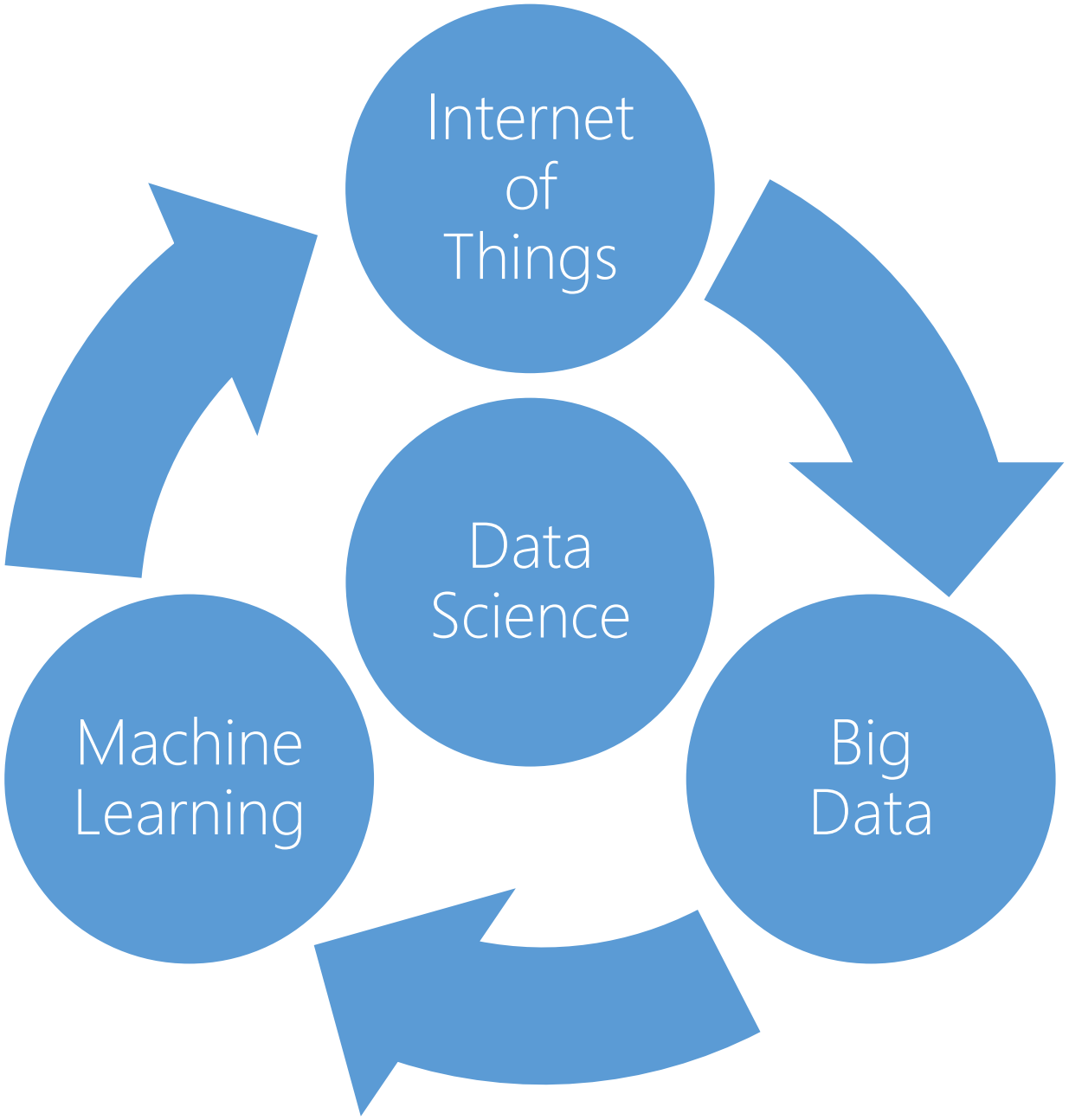
Data Science

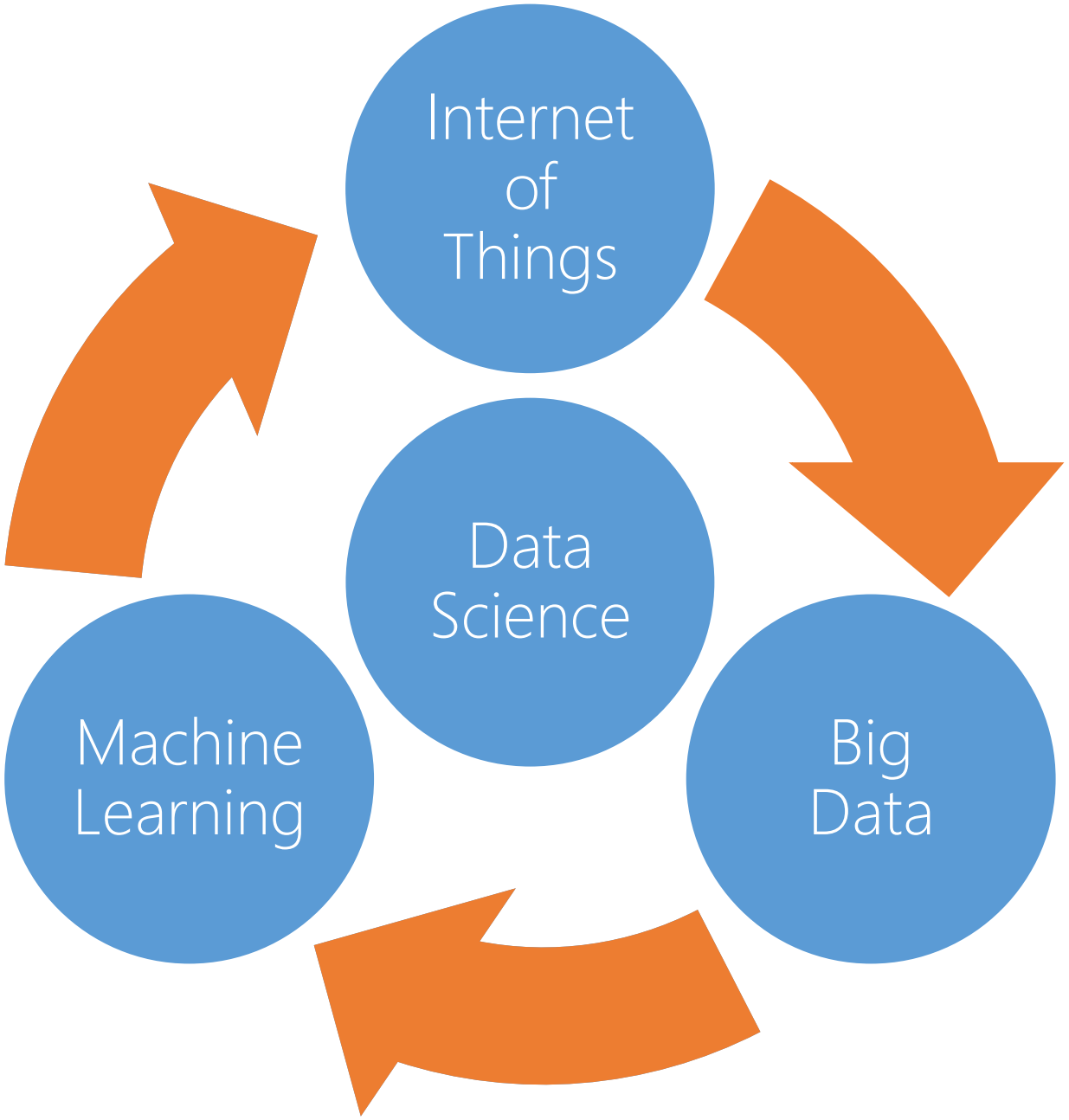

Internet of Things
Data Science
Big Data

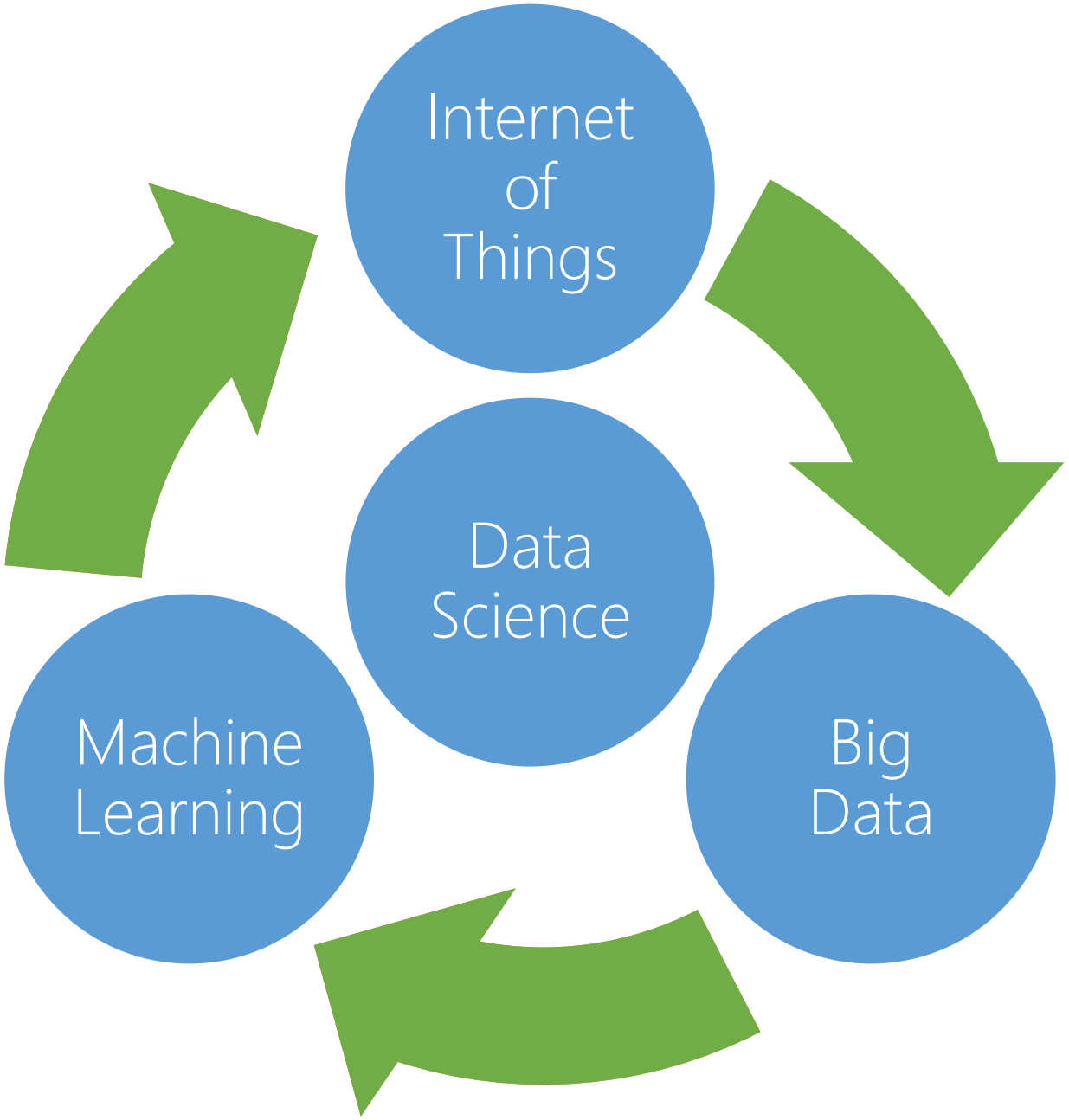

Internet of Things
Data Science
Machine Learning
Big Data

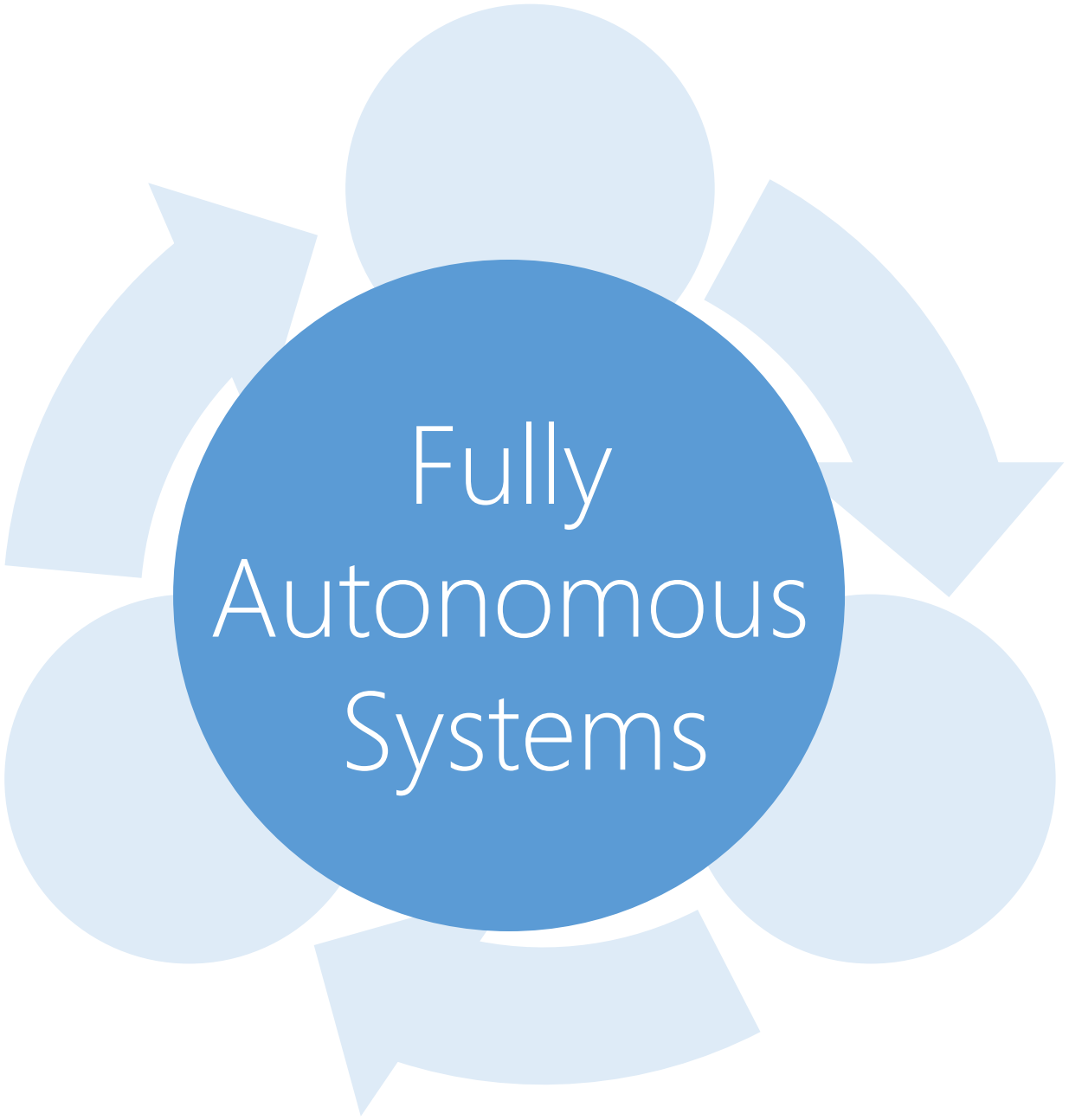

Internet of Things
Data Science
Machine Learning
Big Data


Internet of Things
Data Science
Big Data
Machine Learning


Internet of Things
Data Science
Big Data
Machine Learning


Internet of Things
Data Science
Big Data
Machine Learning


Internet of Things
Data Science
Big Data
Machine Learning

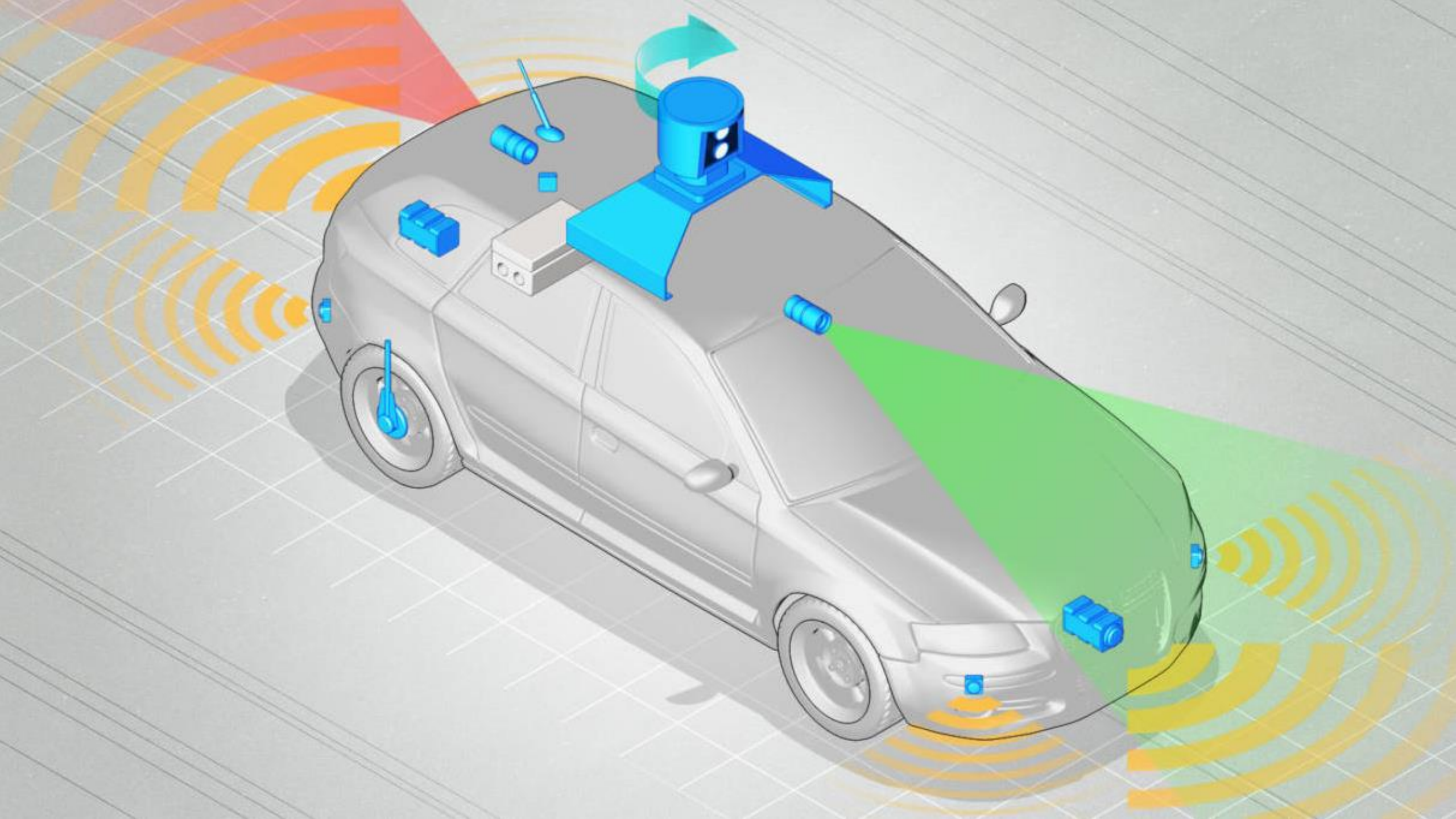

Fully
Autonomous
Systems

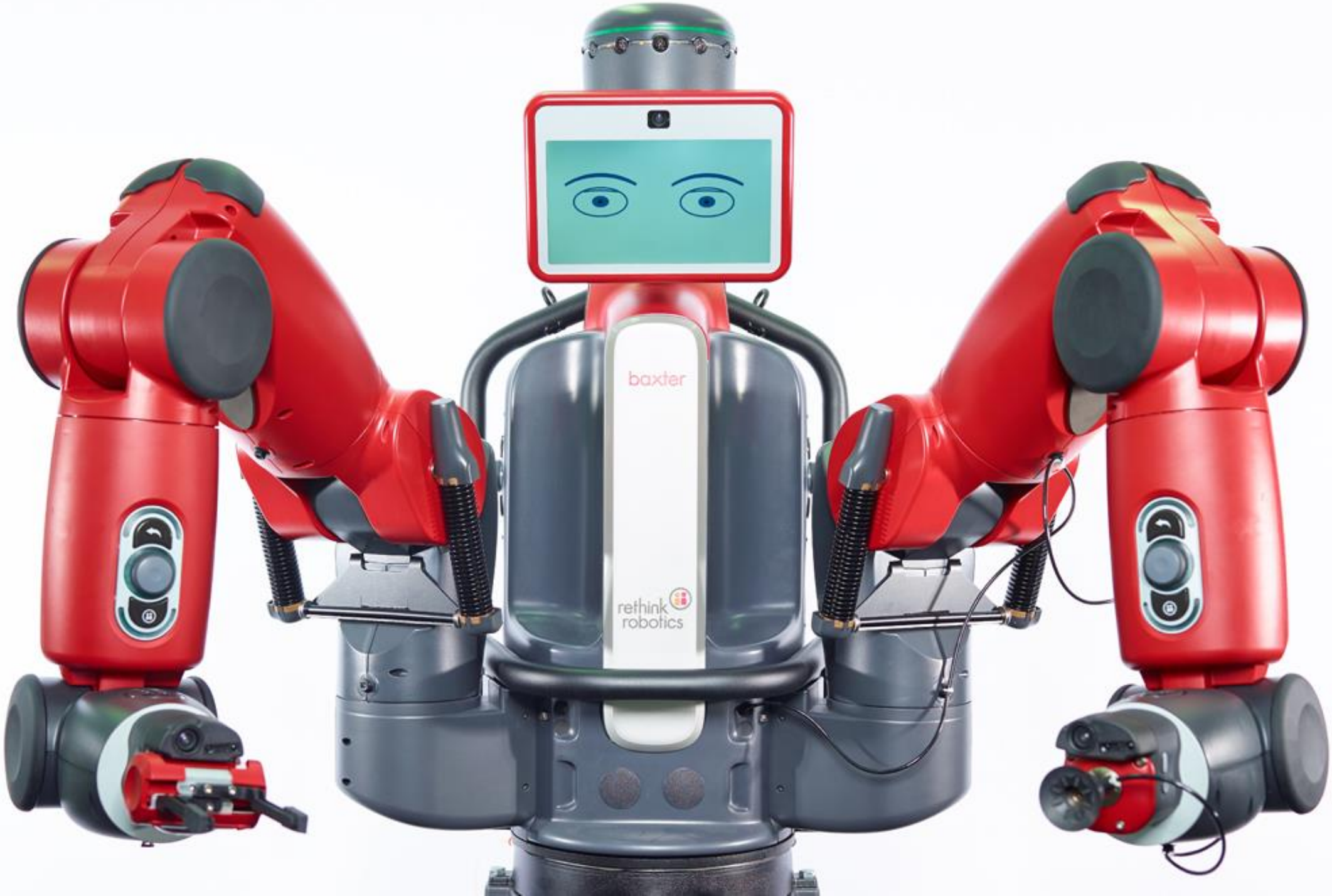
Smart systems

Cloud robotics

Cyber-physical systems

Artificial intelligence



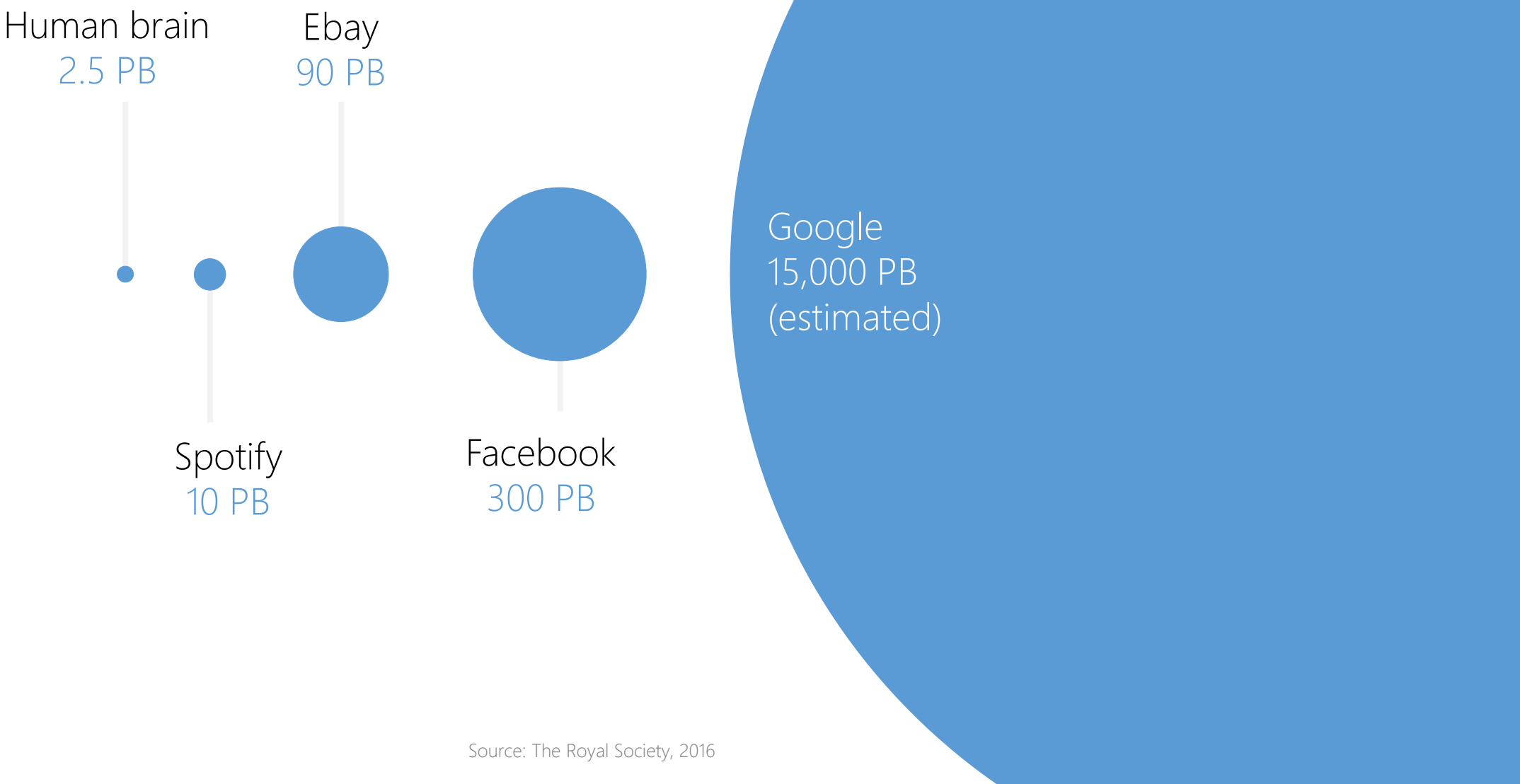

baxter
rethink
robotics

Artificial intelligence will be woven into the fabric of our society.

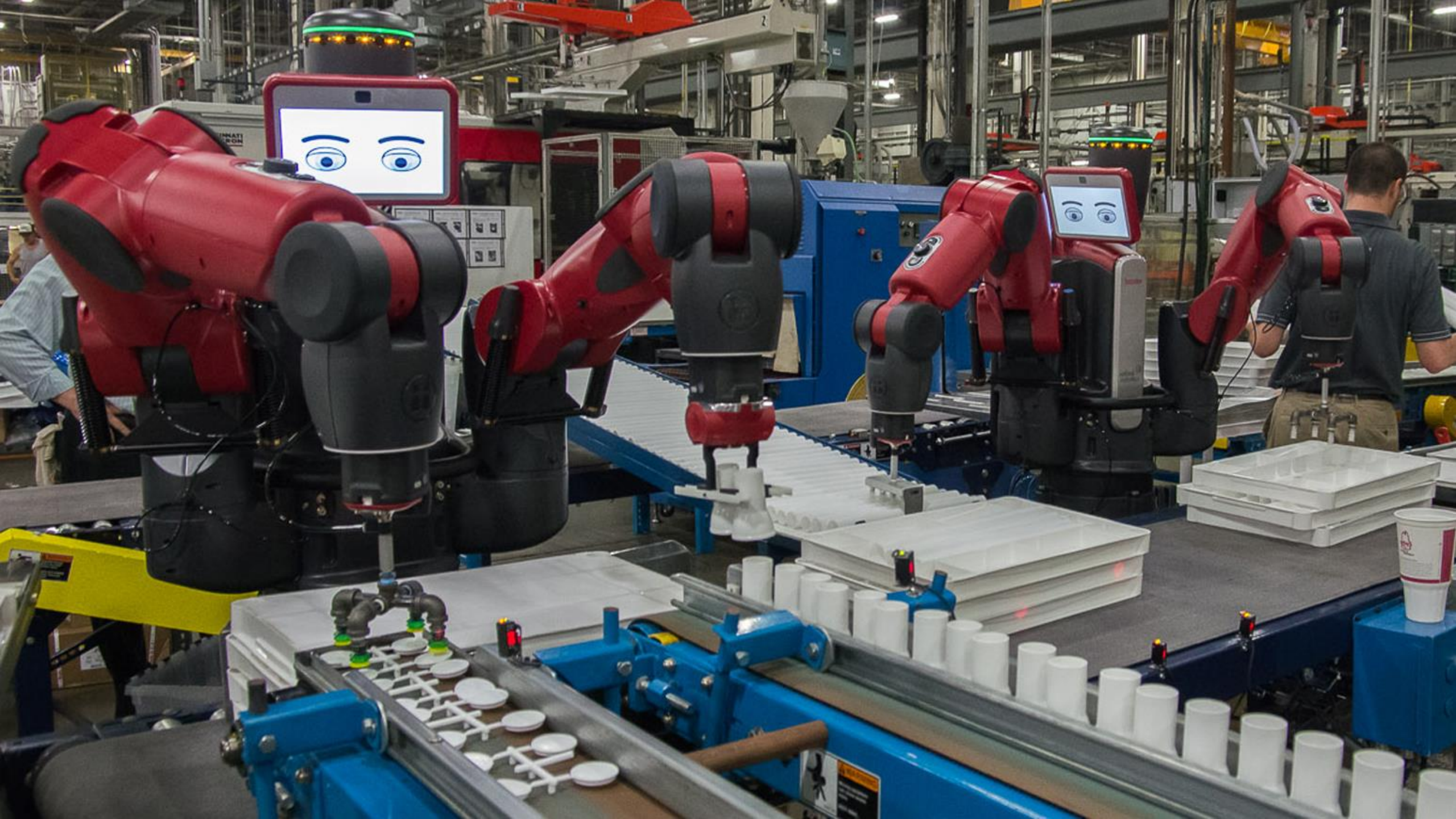
$8,007,195
+$0.450
$13.100
$1.940
3.47%
$3.400
-2.56%

The Big Data Universe

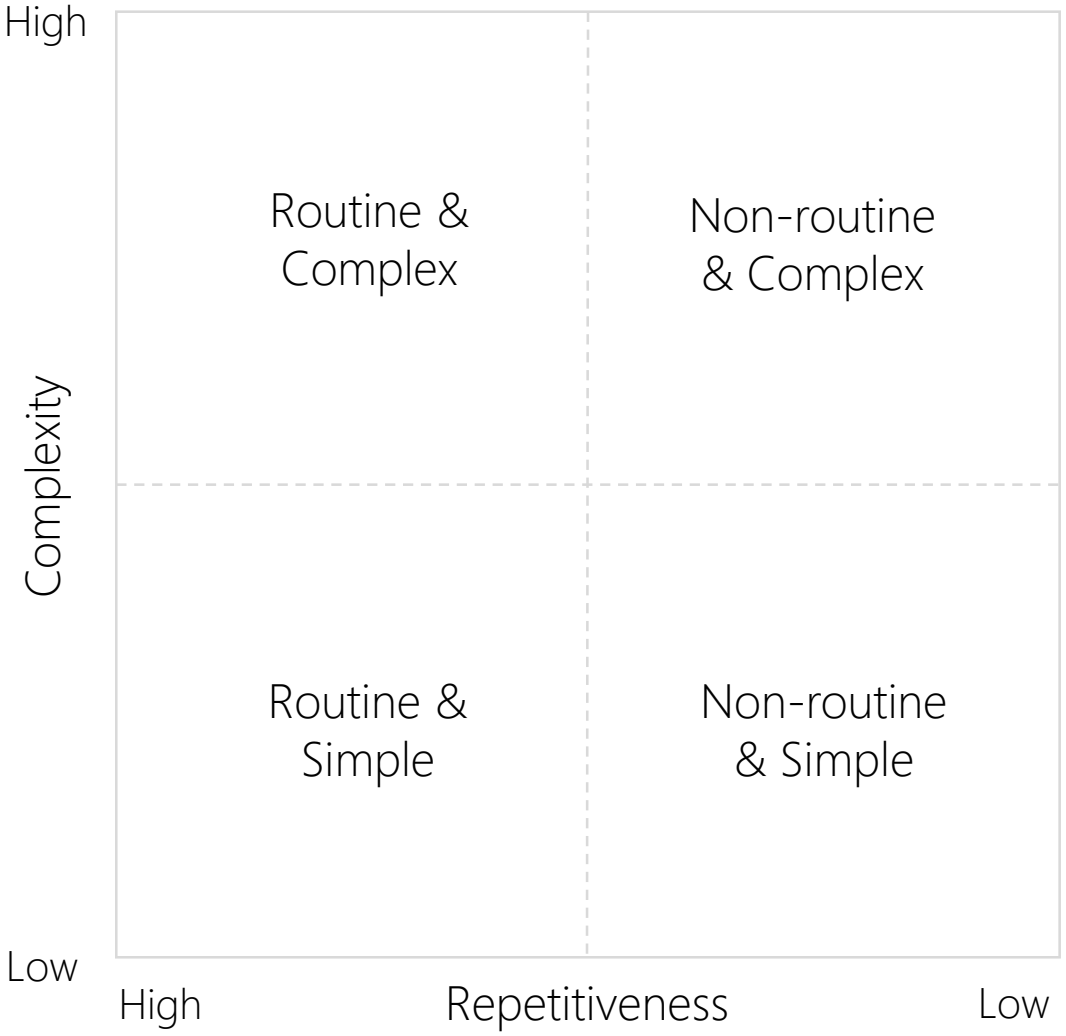
Amount of data as of 2016 in petabytes



Source: The Royal Society, 2016

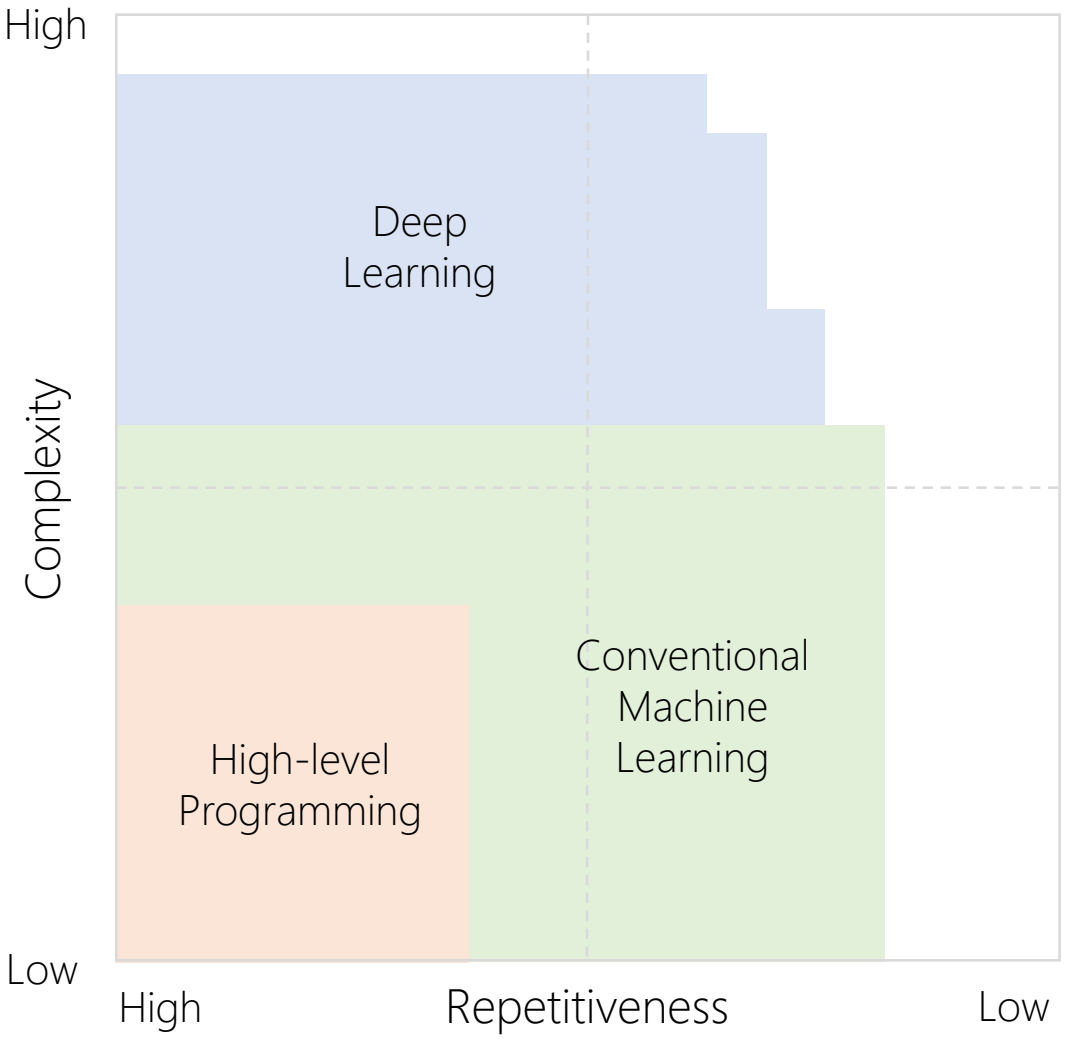


Automation Framework



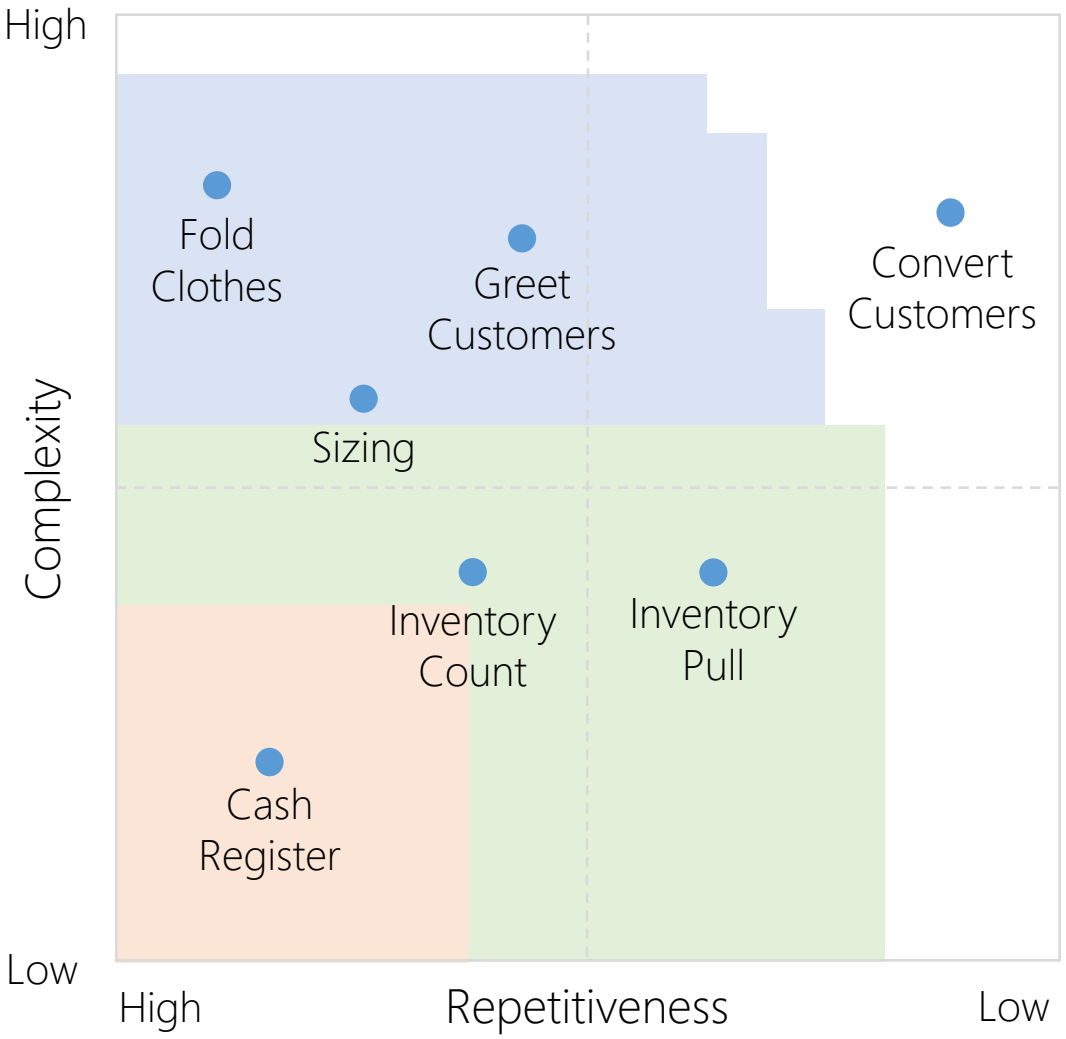
Source: Abhas Gupta -The Automation Framework

Automation Technology



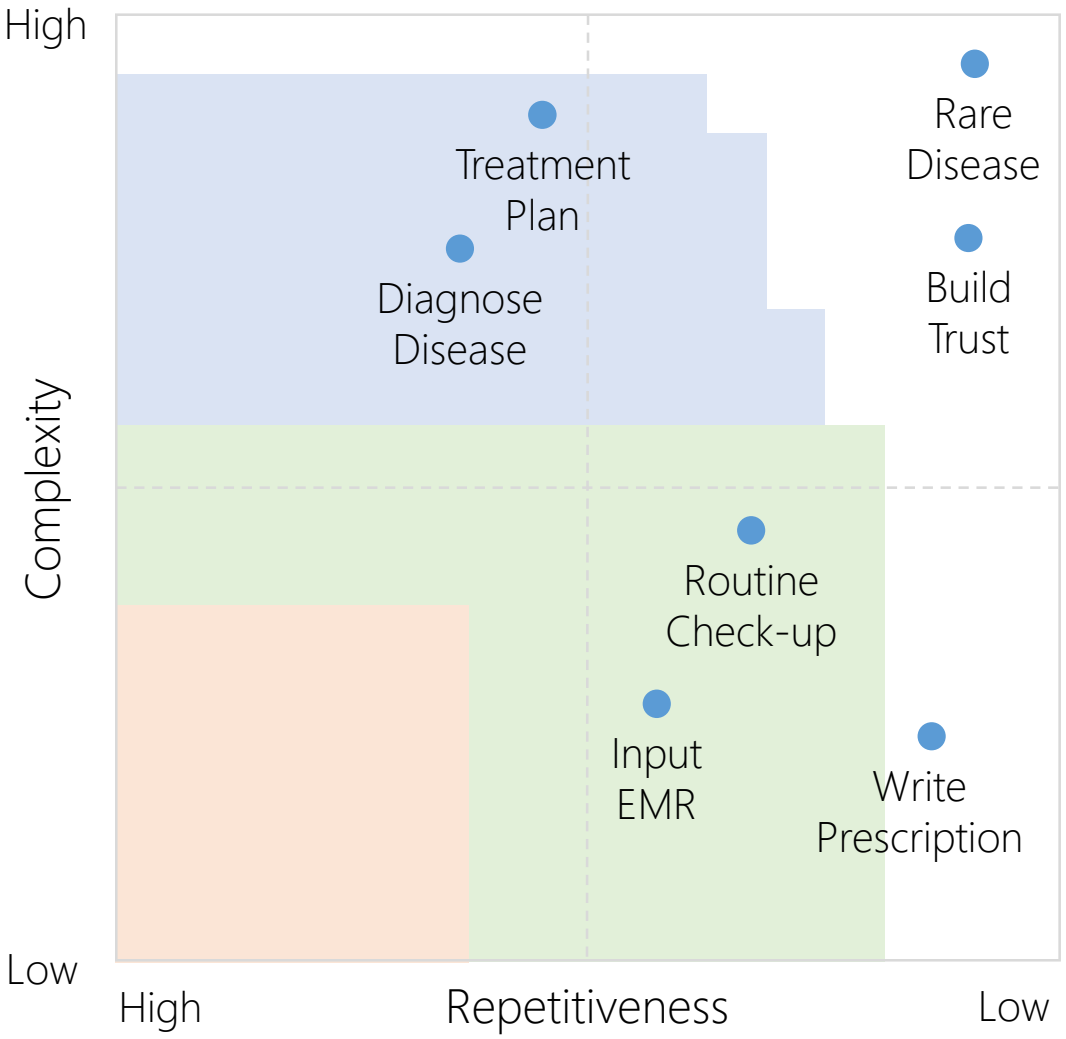
Source: Abhas Gupta -The Automation Framework

Retail Salesperson



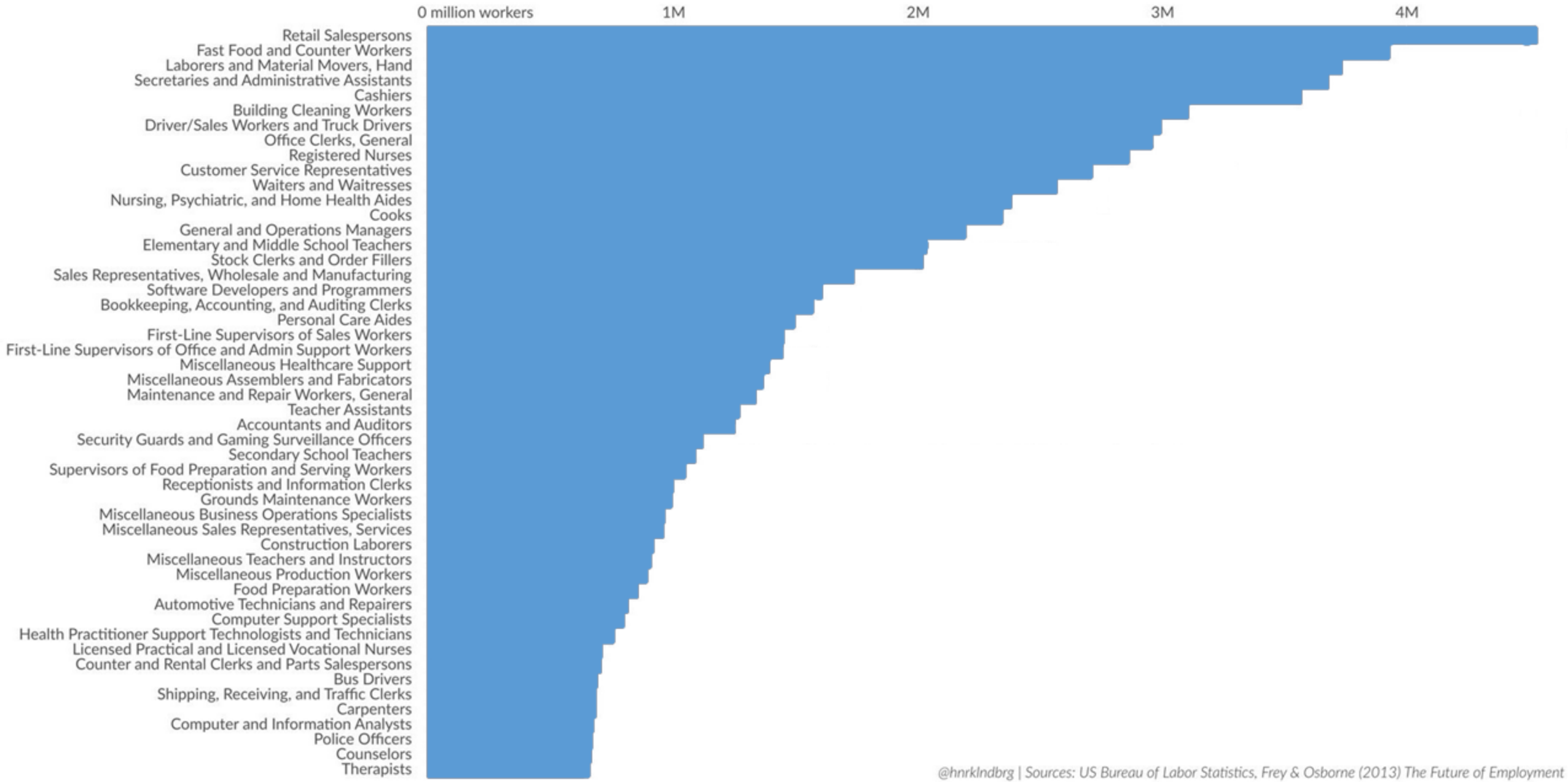
Source: Abhas Gupta -The Automation Framework

Medical Doctor

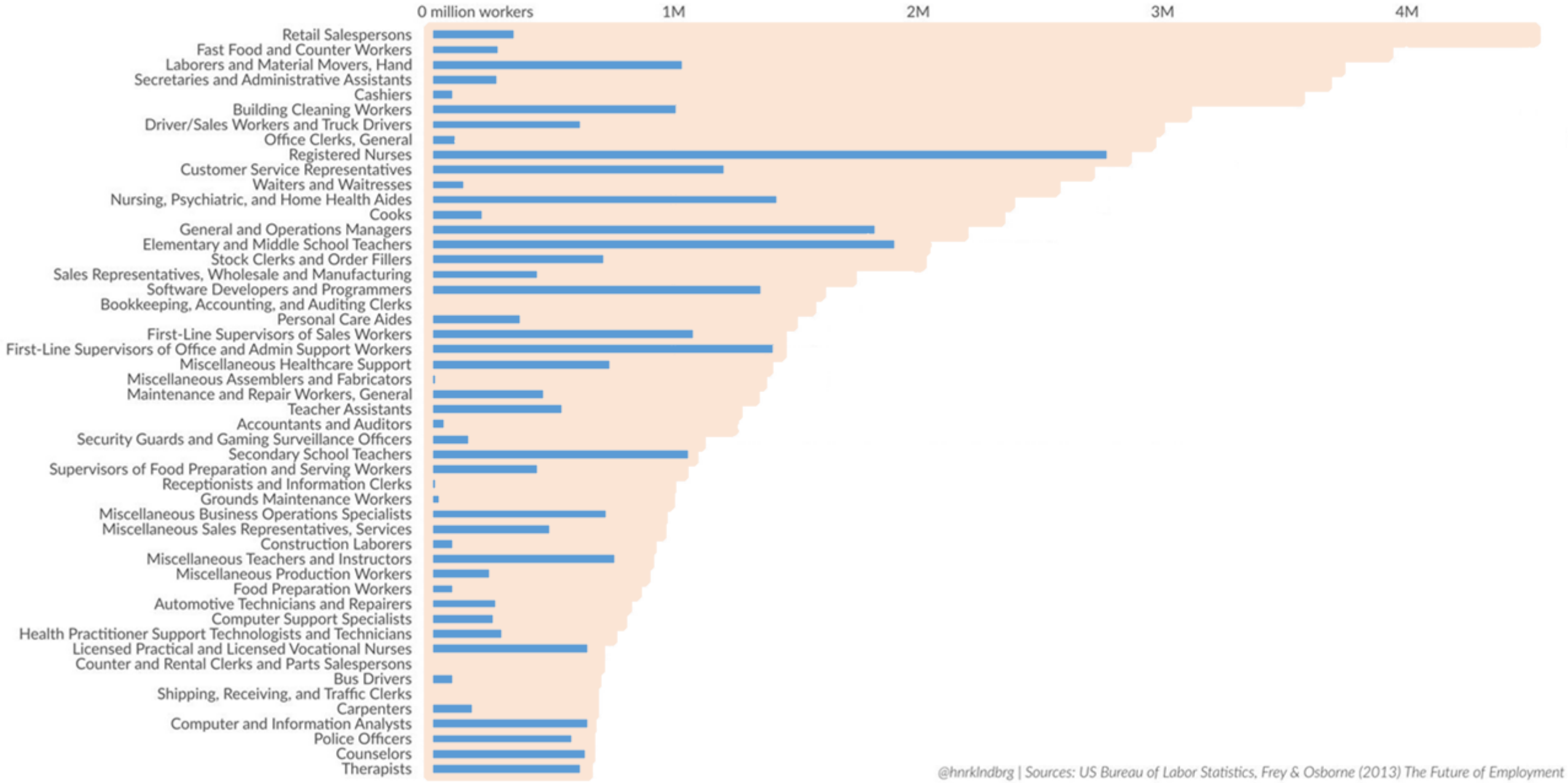


Source: Abhas Gupta -The Automation Framework

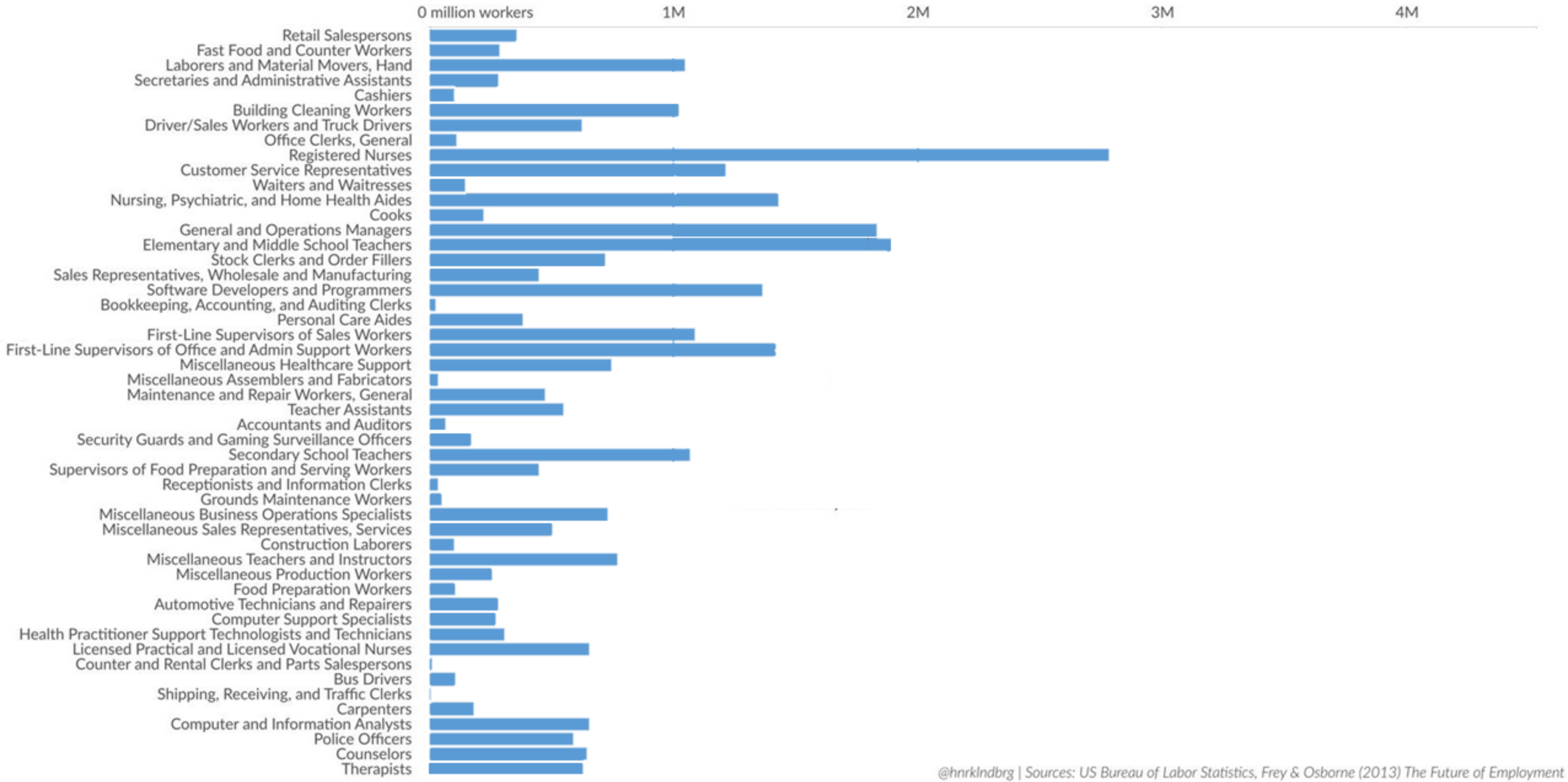
The Future of Labor



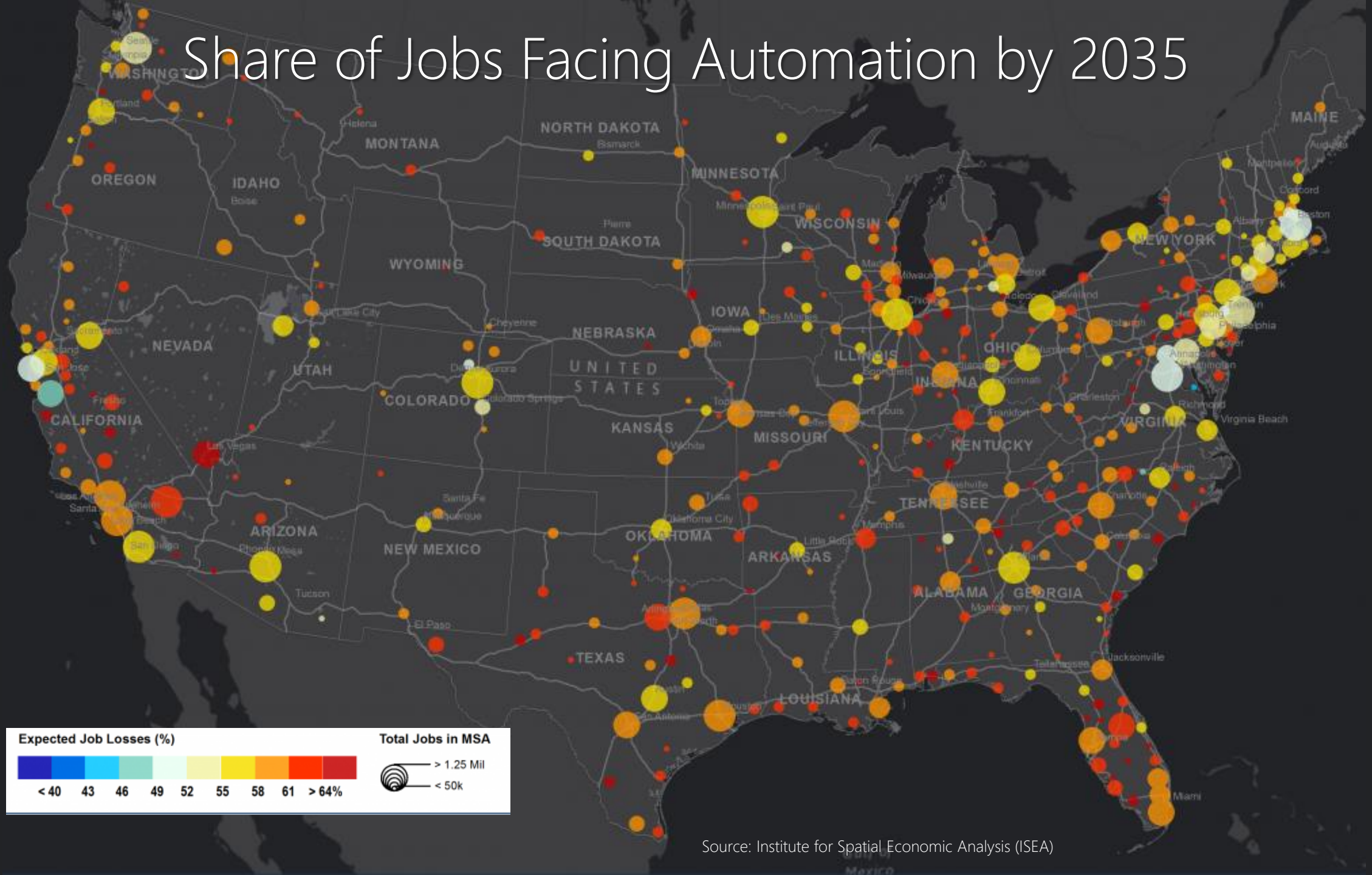
The Future of Labor



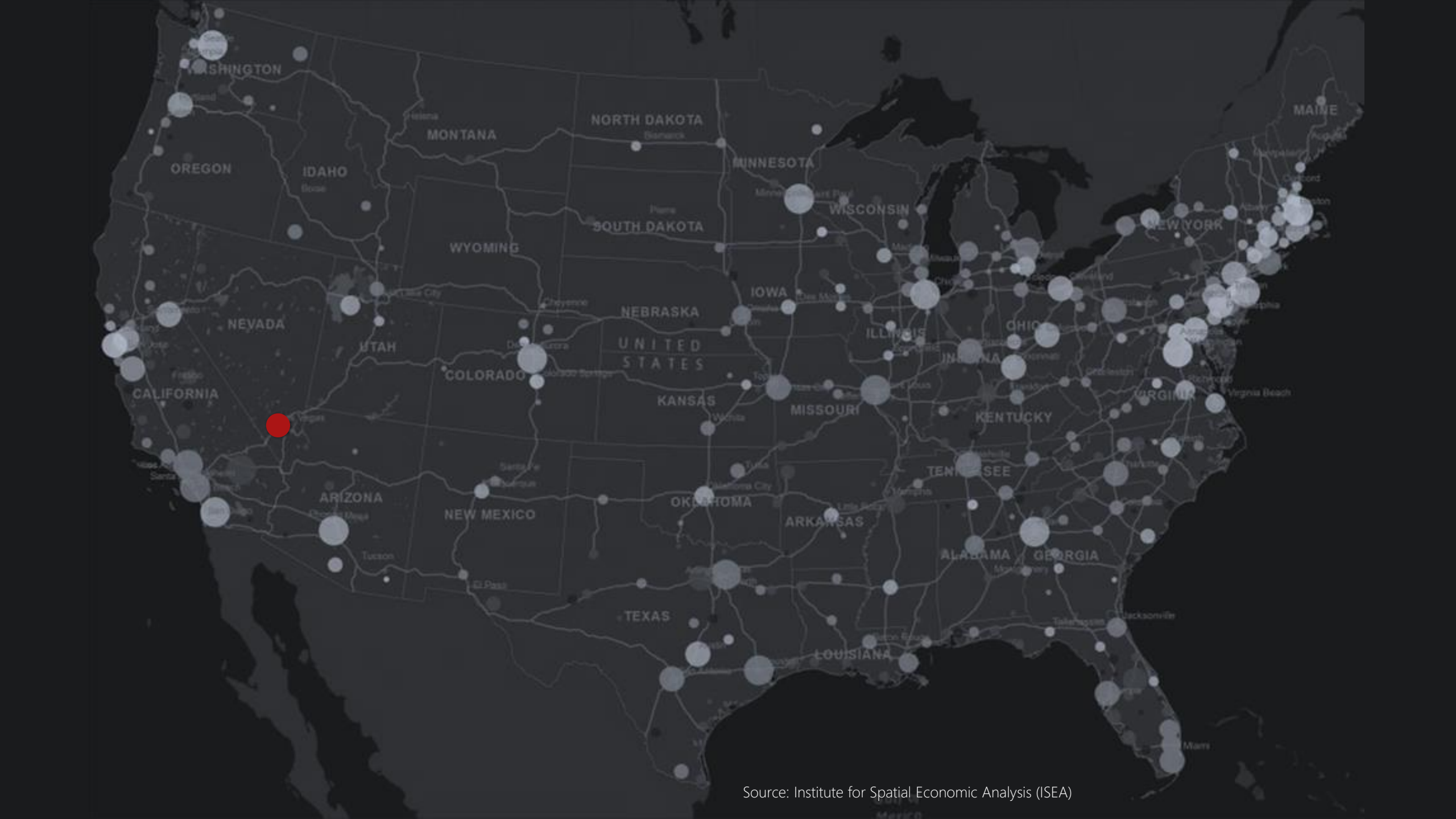
The Future of Labor



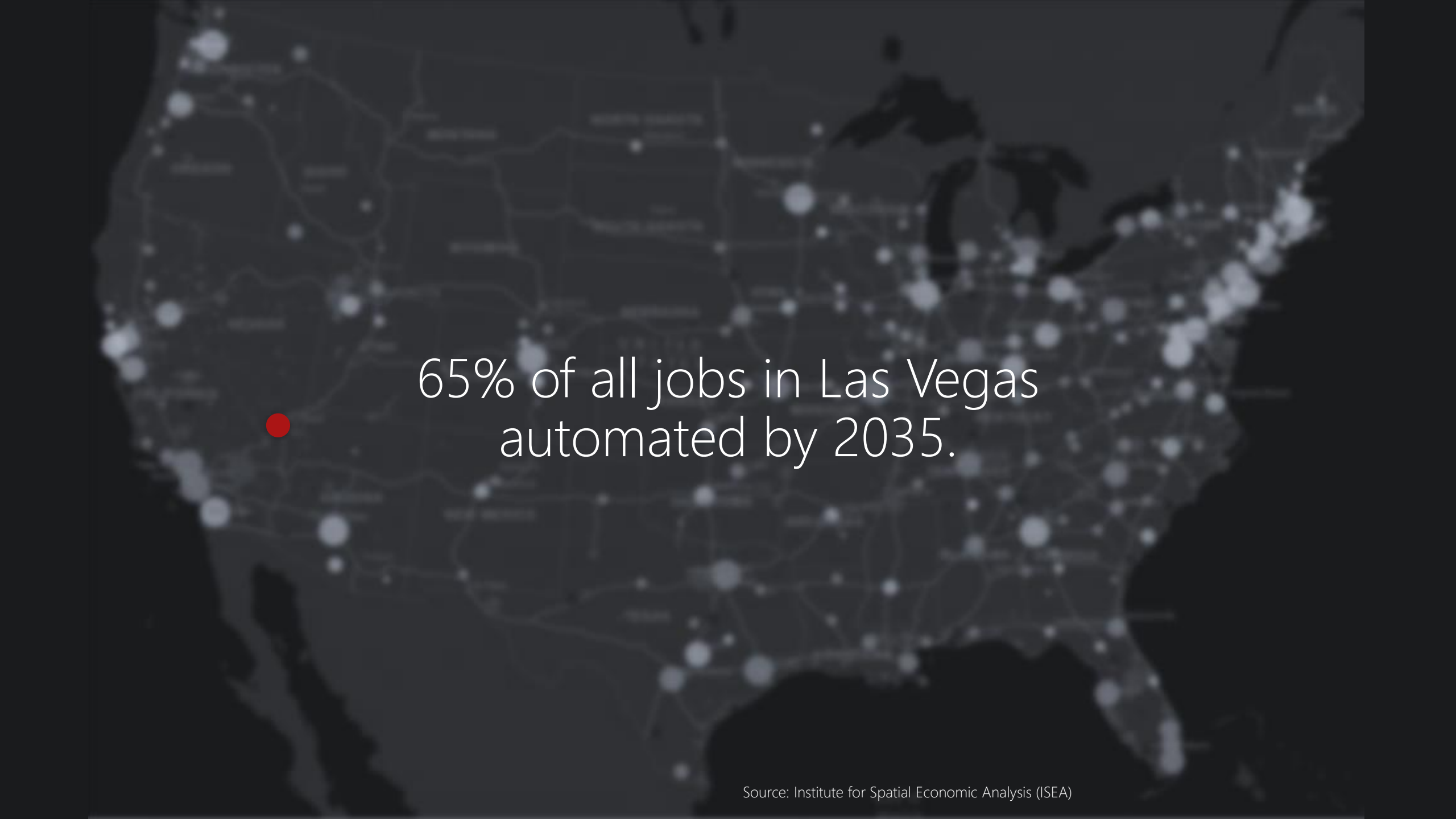
Share of Jobs Facing Automation by 2035



Source: Institute for Spatial Economic Analysis (ISEA)



Source: Institute for Spatial Economic Analysis (ISEA)



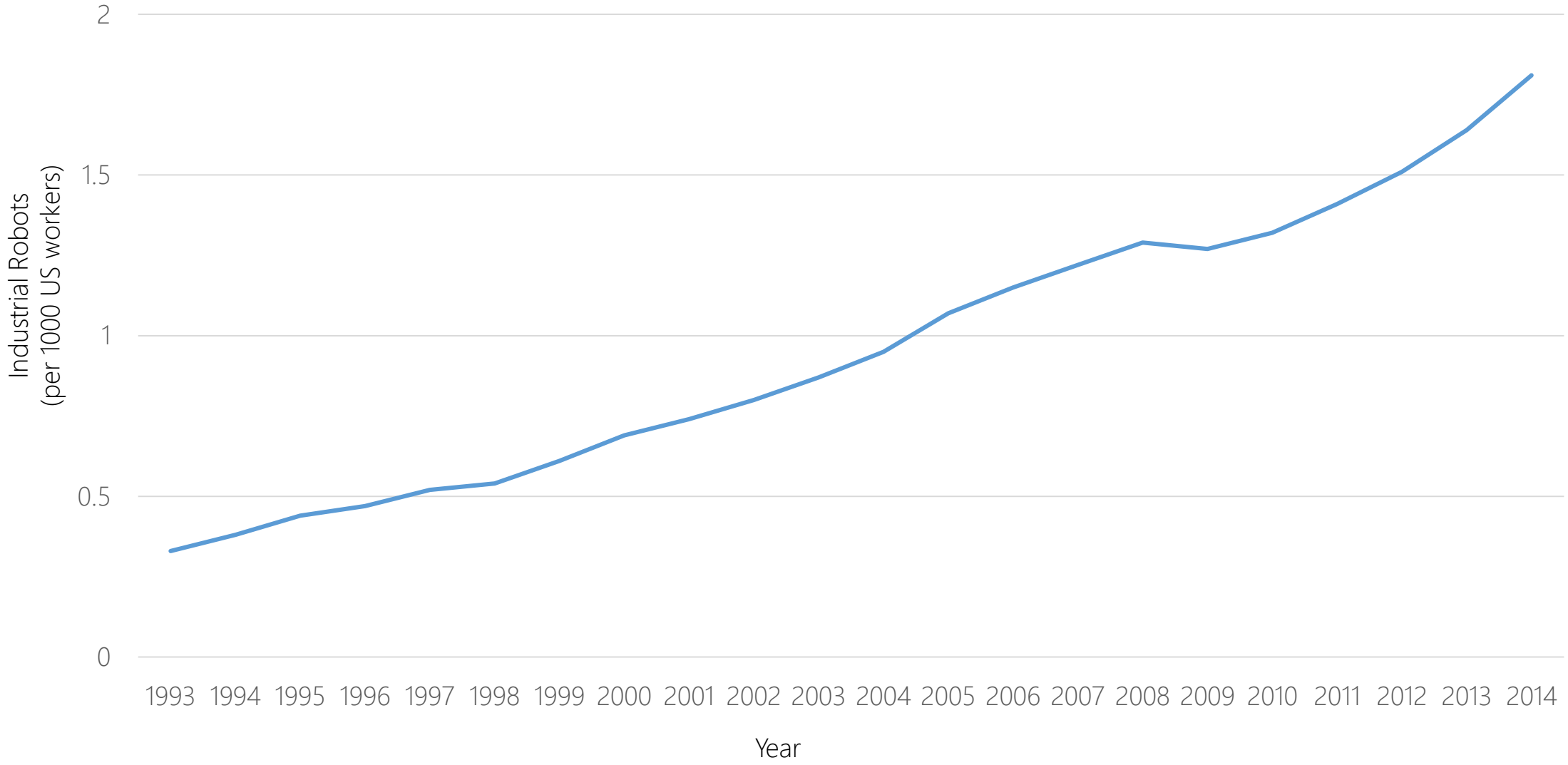
65% of all jobs in Las Vegas automated by 2035.

Source: Institute for Spatial Economic Analysis (ISEA)

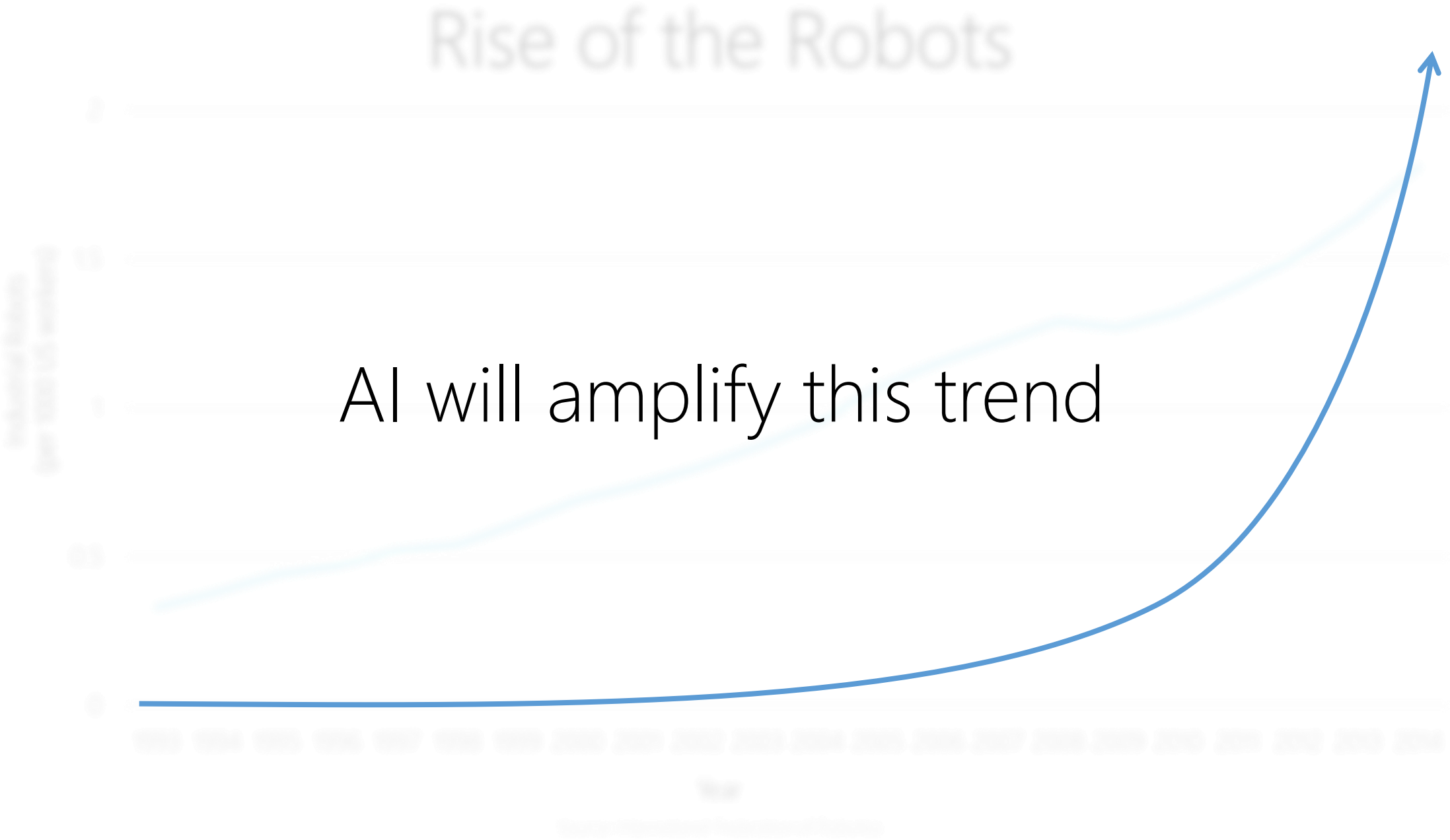
Half of all jobs in USA at risk
in the next two decades.

Source: Frey and Osborne (2013)

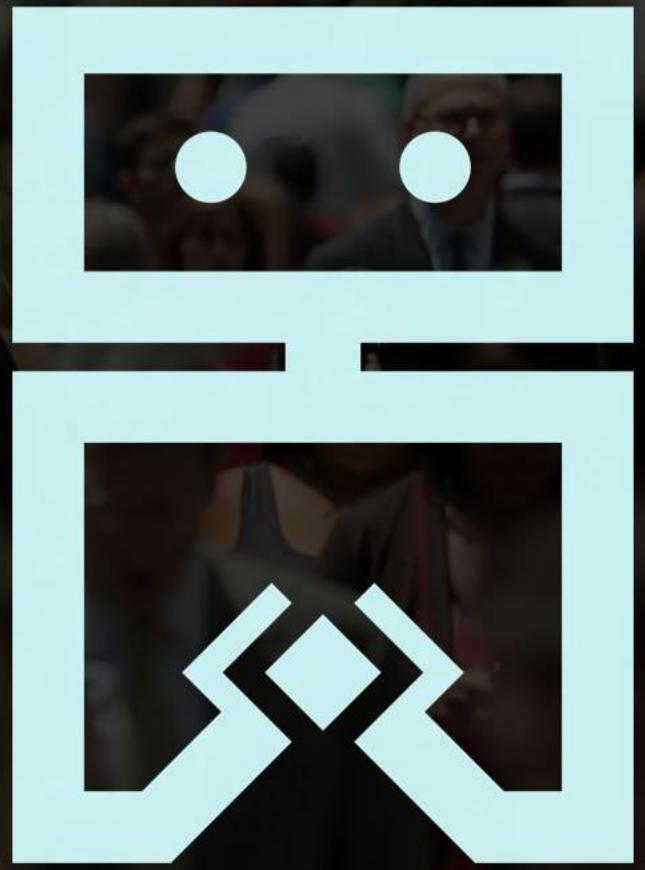
Rise of the Robots



Source: International Federation of Robotics


Rise of the Robots
AI will amplify this trend

Humans Need Not Apply



Source: CGP Grey

Which side of this new economy will your job be on?

The side that's leading…

… or the side being eliminated.

How should we allocate resources?

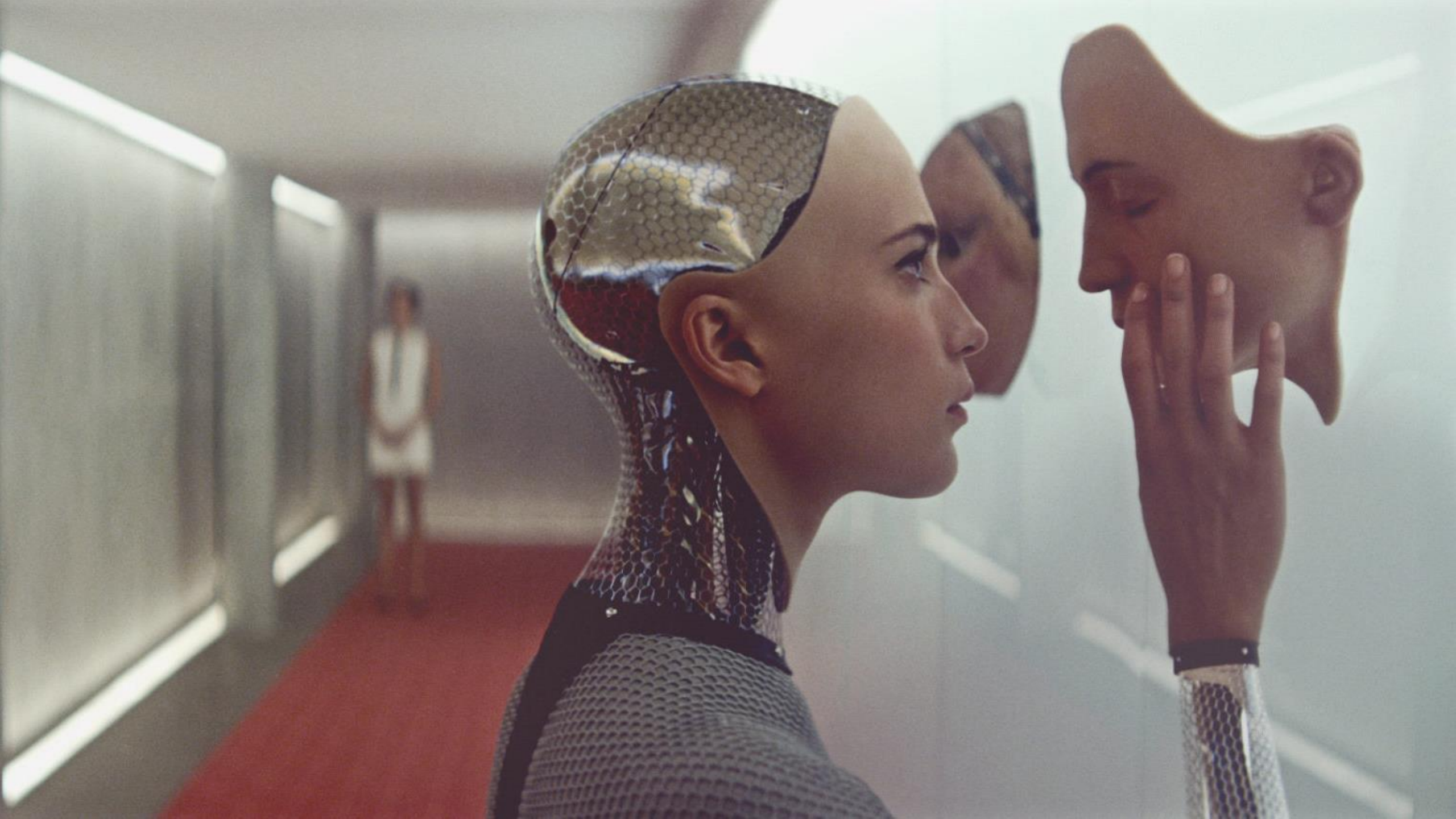
How should we allocate resources?

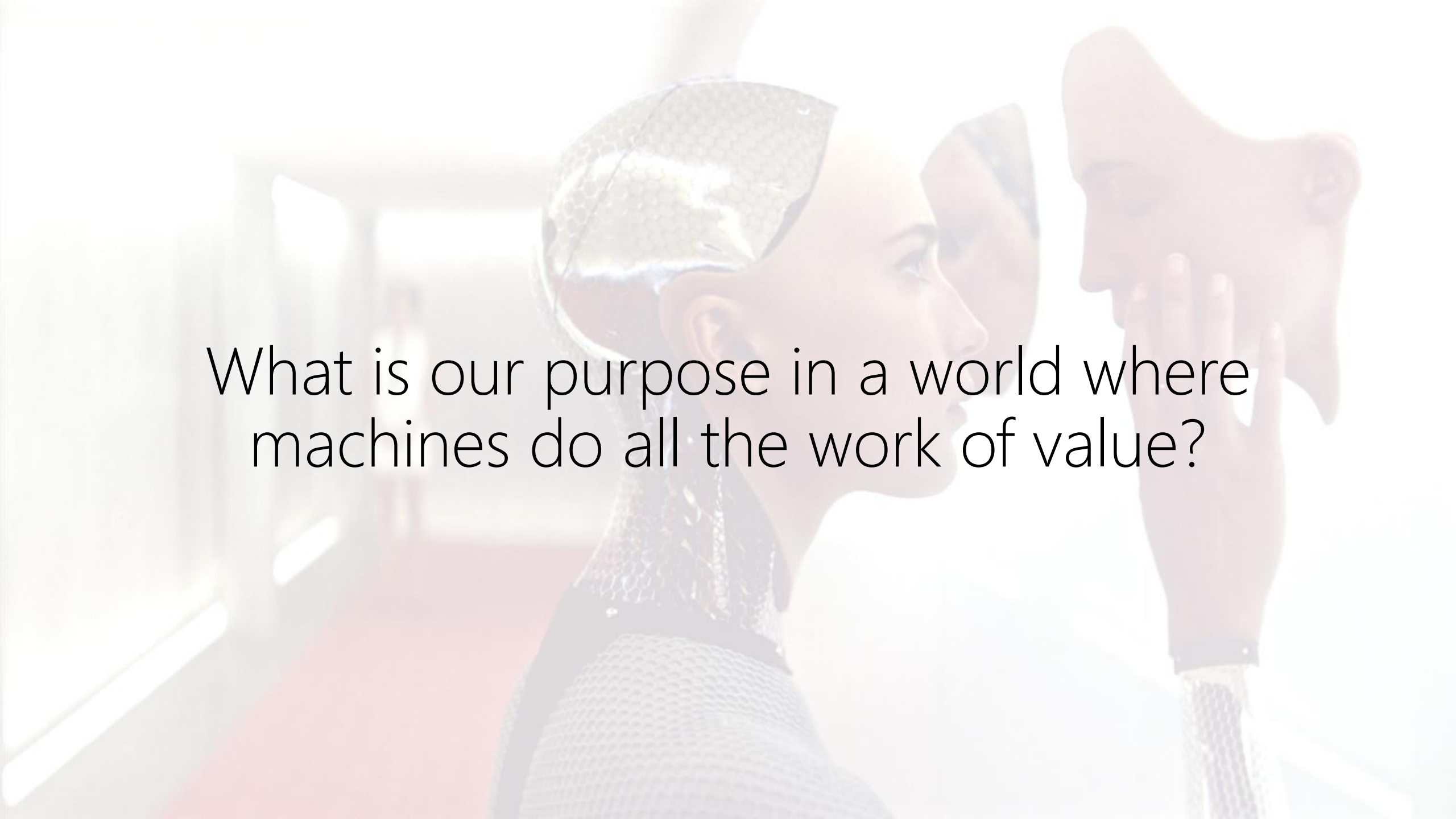
Should we tax robots?

How should we allocate resources?

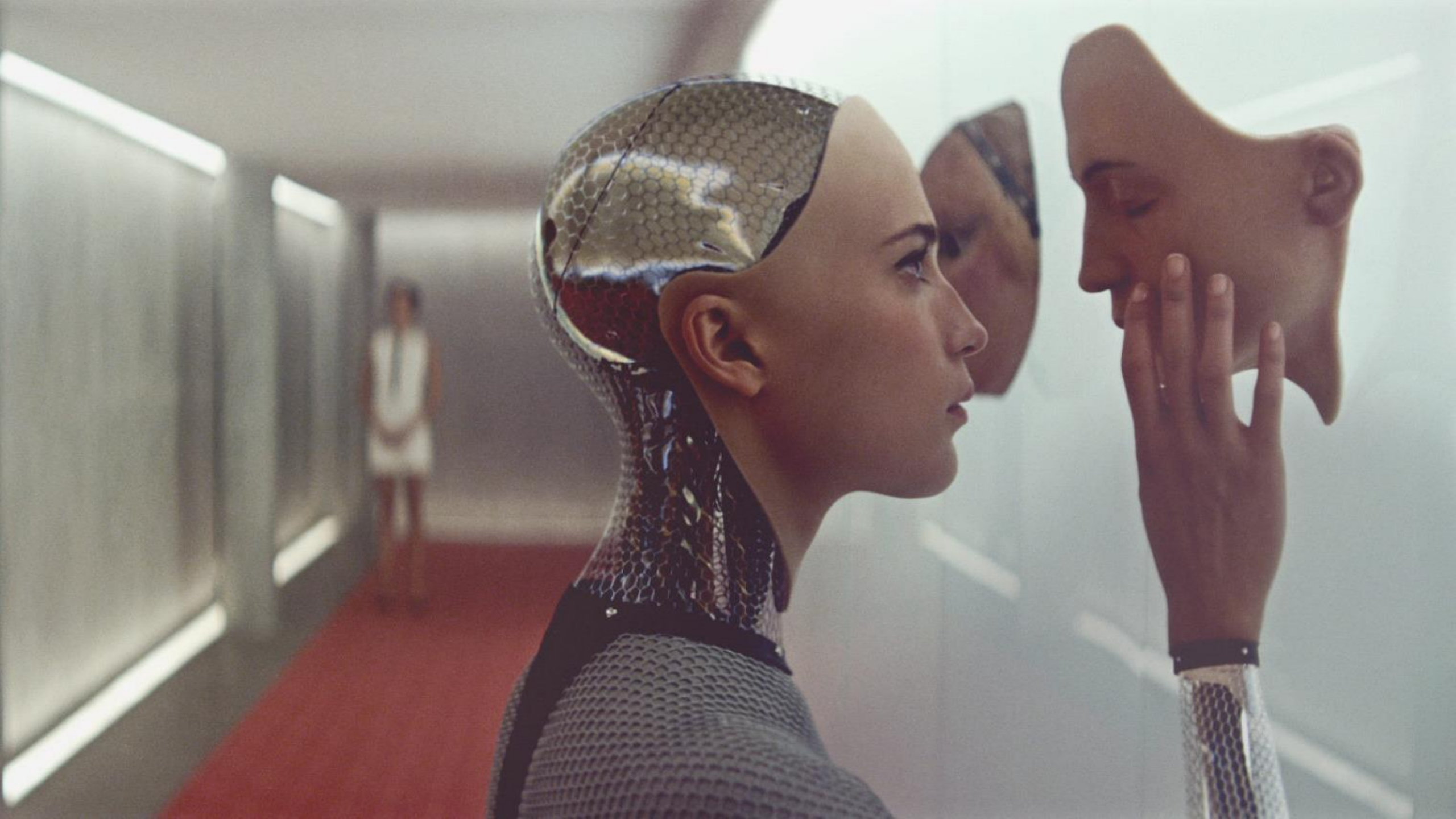
Should we tax robots?

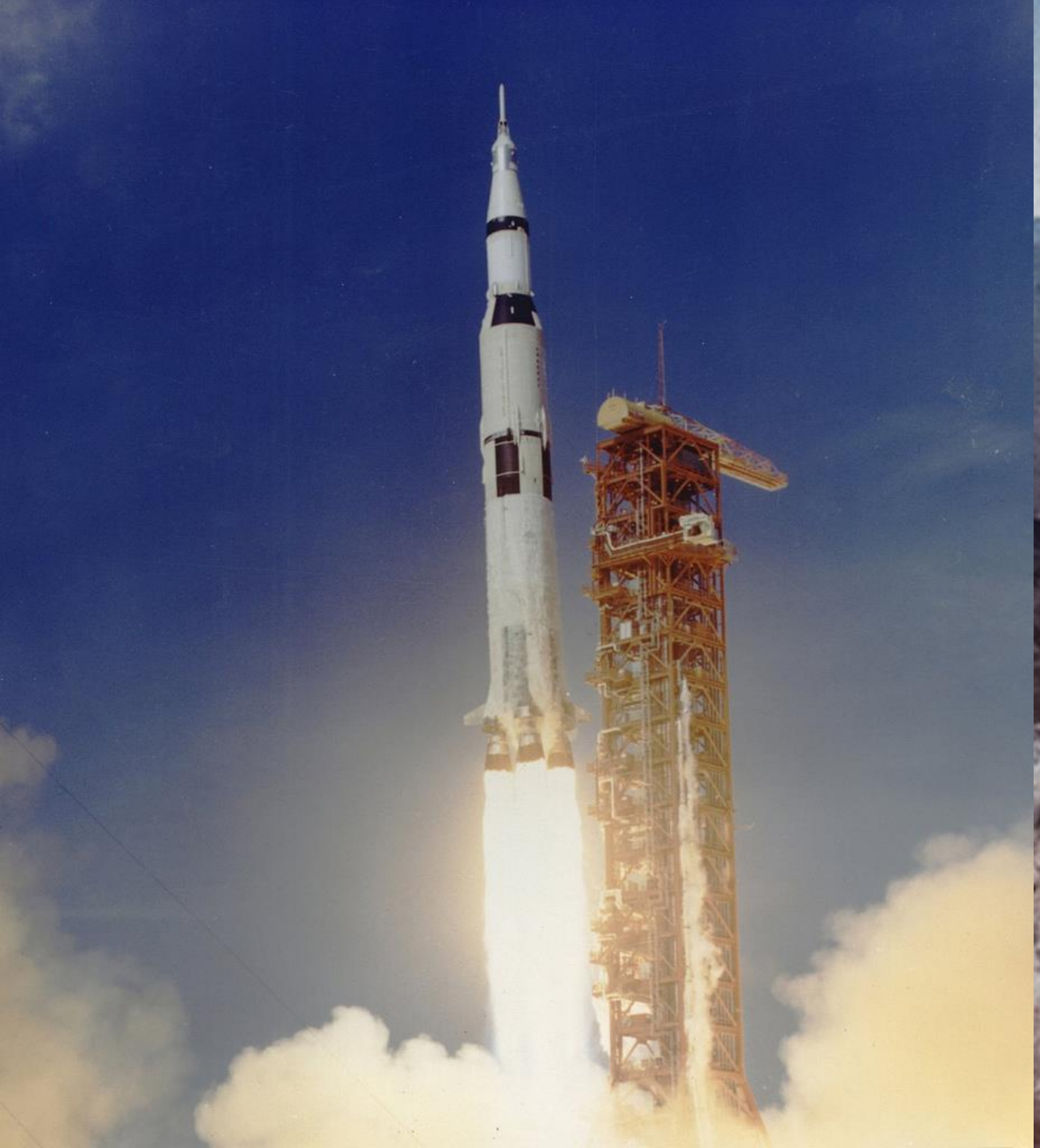
What rights should machines have?

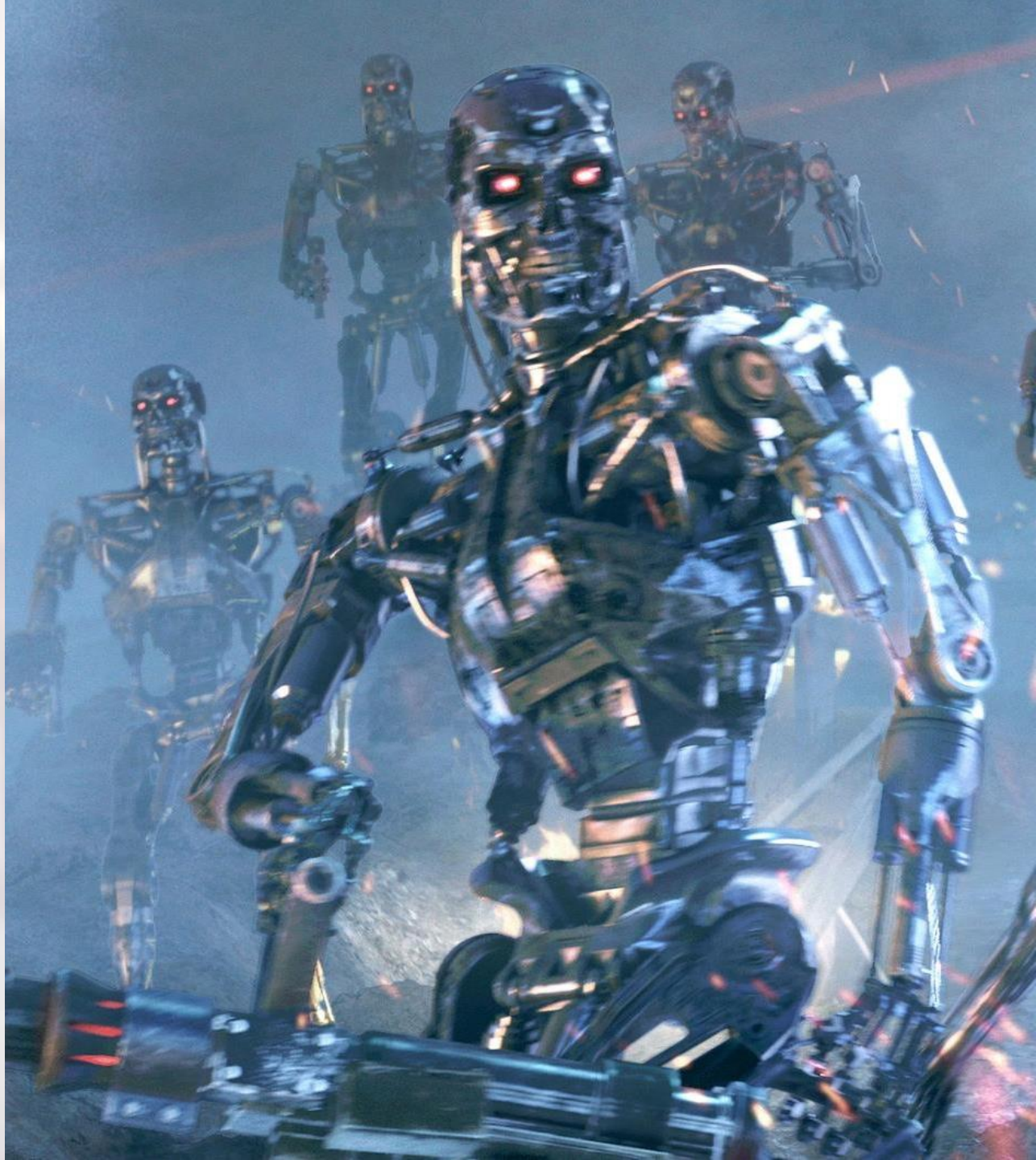


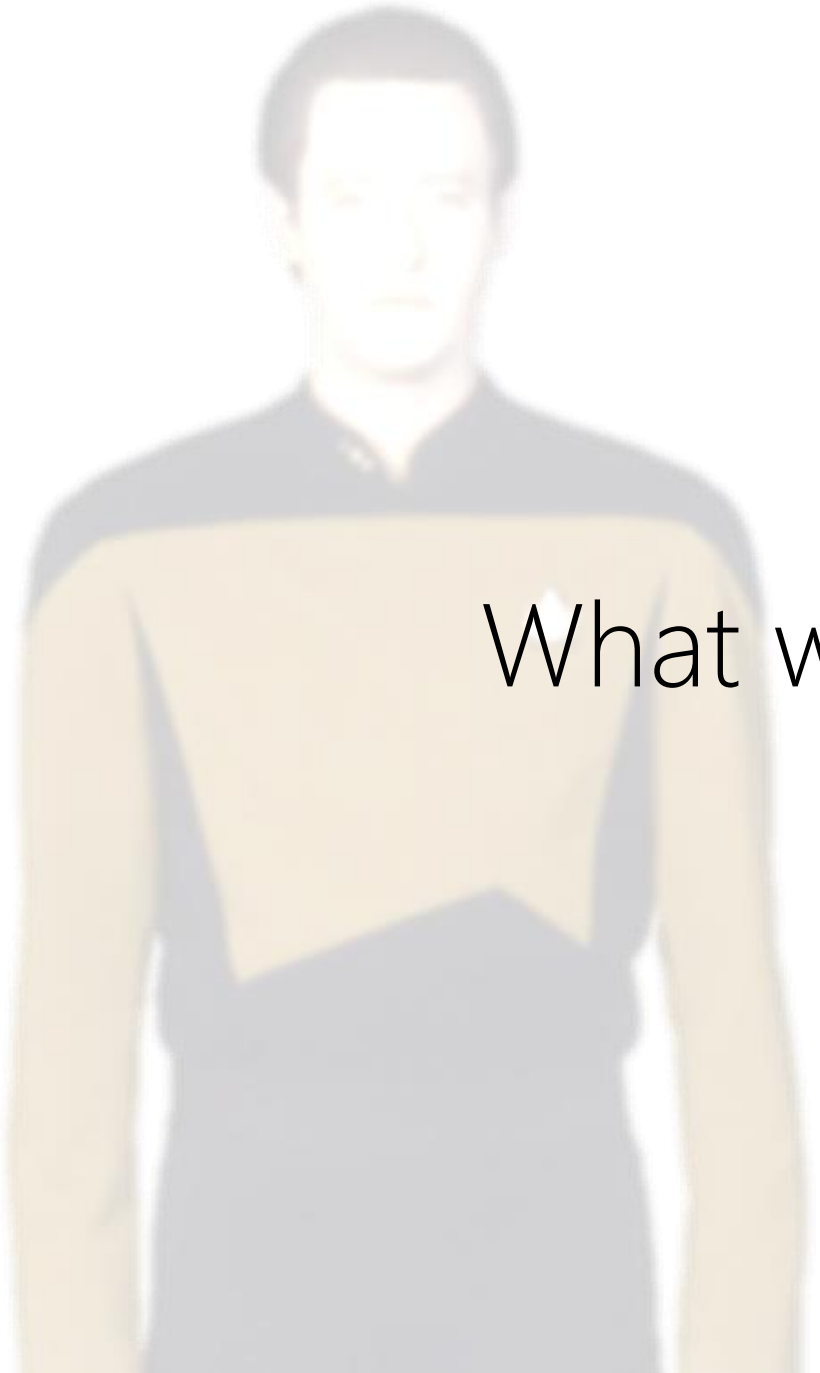


What is our purpose in a world where machines do all the work of value?

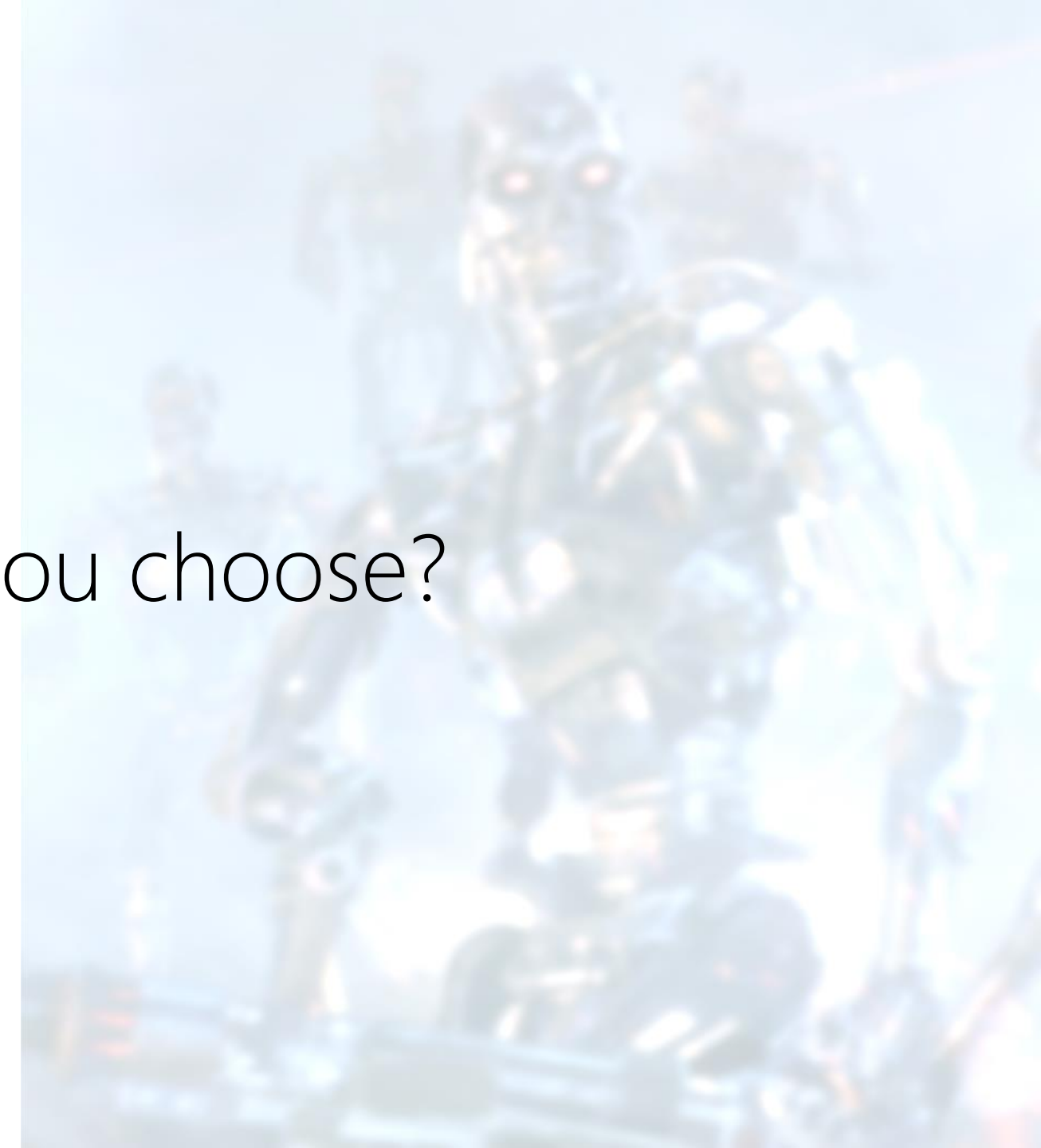








What will you choose?



Welcome Robot Overlords!!!

Ignore what I'm saying.

Don't trust the machines.

We must fight together to survive!

I'm not a robot

reCAPTCHA

Privacy - Terms

I'm not a robot

reCAPTCHA

Privacy - Terms

Click here to generate direct link

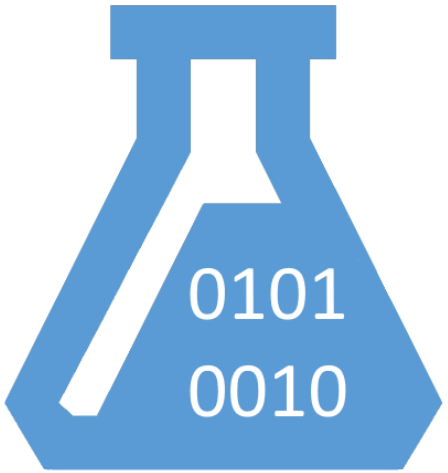
Where to Go Next?

Online Courses

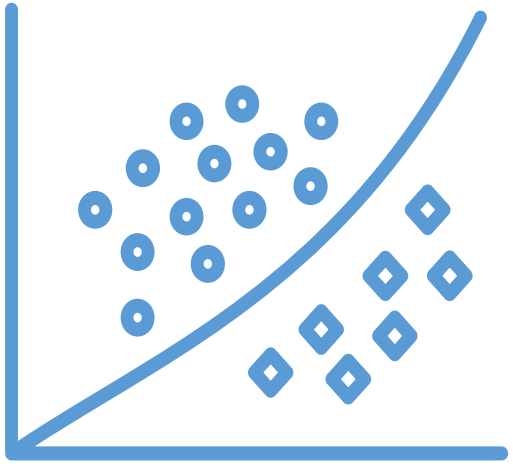
Data Science: The Big Picture
Data Science with R
Exploratory Data Analysis with R
Data Visualization with R (3-part)
Deep Learning: The Big Picture

www.matthewrenze.com/courses.html

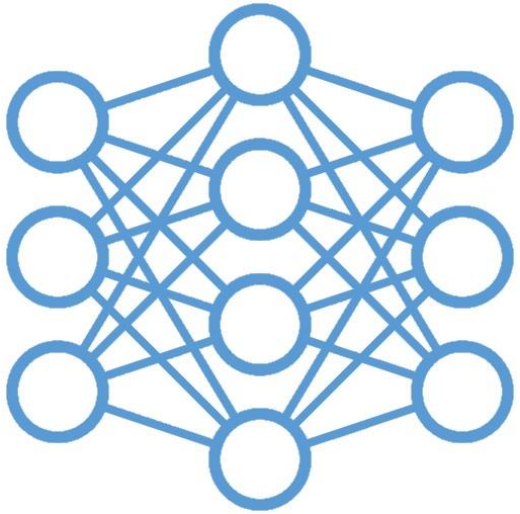
New Online Courses



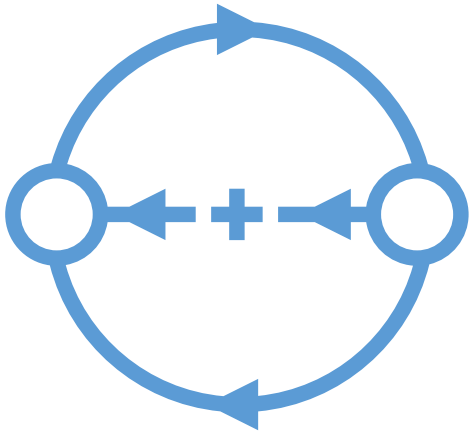
Data Science



Machine Learning

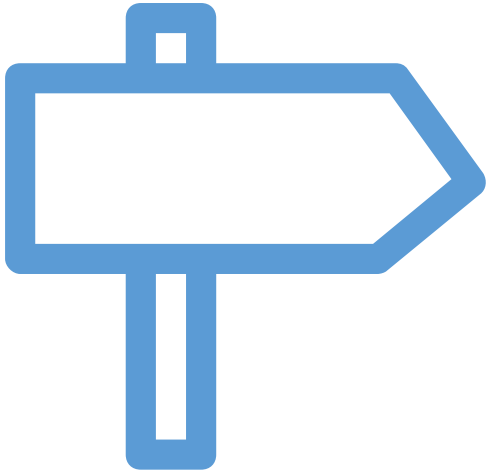


Deep Learning

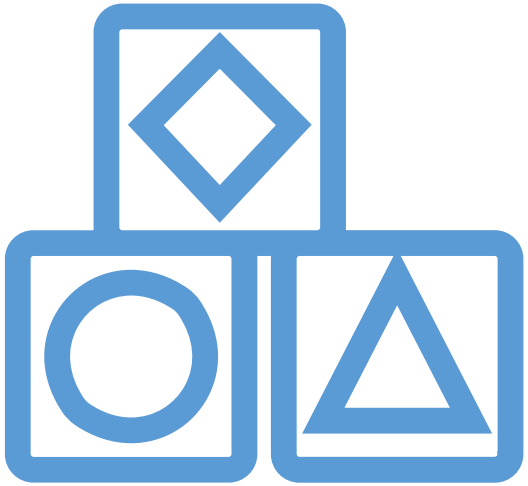


Reinforcement Learning

New Online Courses



Self-guided



Simple

Quick

Practical

Matthew Renze

Home Articles Courses Presentations Software About Contact

News

2017-08-25 - Invitation to Speak at Devoxx Morocco

Very excited to announce that I've been invited to give a keynote in Casablanca at Devoxx Morocco in November. My keynote presentation will be on Artificial Intelligence.

2017-08-16 - Invitation to Speak at Microsoft Ignite

I've been invited to speak at Microsoft Ignite in Orlando, Florida in September. This will be my first time speaking at Ignite. Talks will include both Data Science and Machine Learning with R.

2017-08-14 - Dev on Fire Interview

Matthew is a data science consultant, author for Pluralsight, international public speaker, a Microsoft MVP, ASPInsider, and open-source software contributor.

www.matthewrenze.com

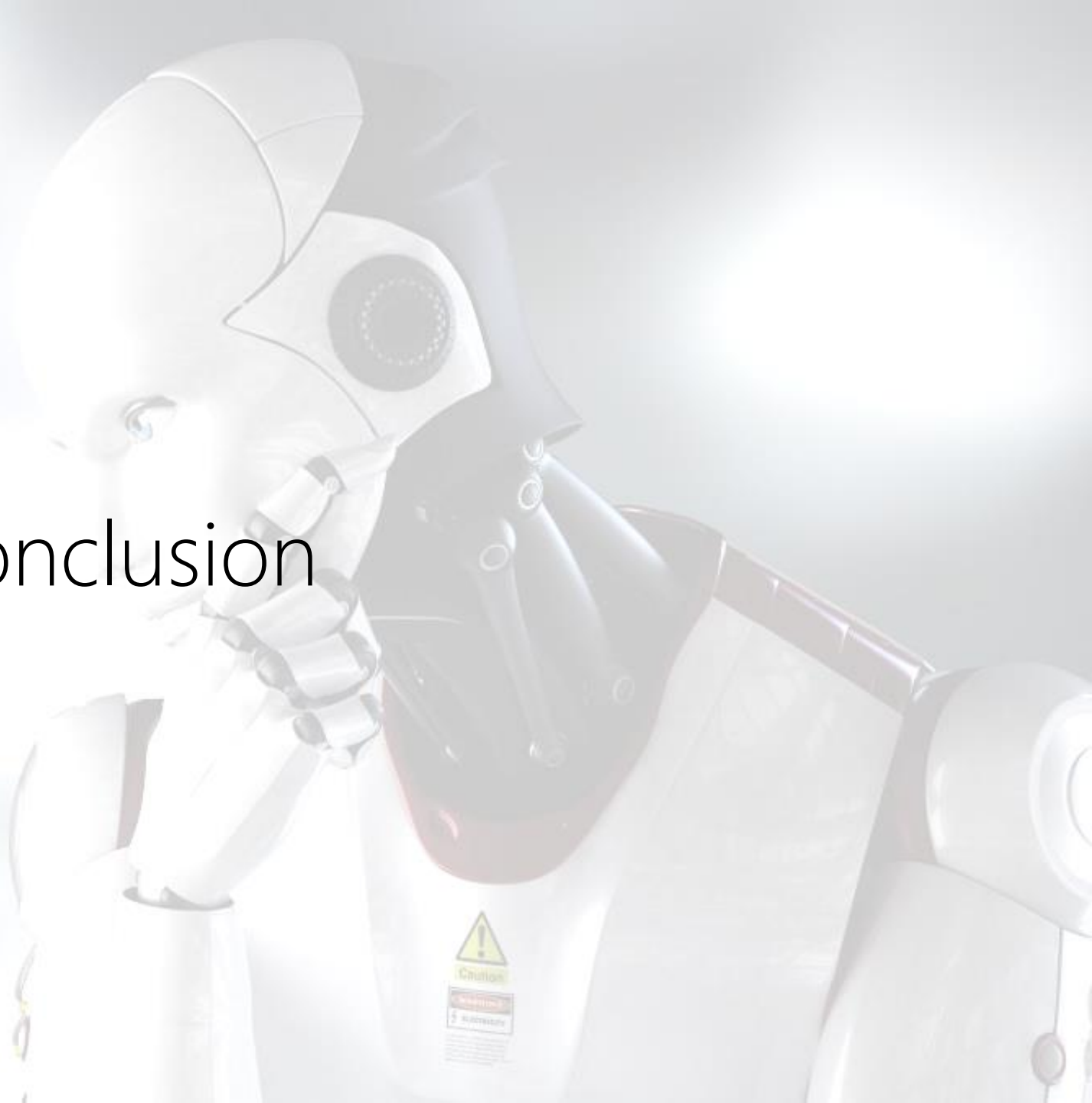
Feedback

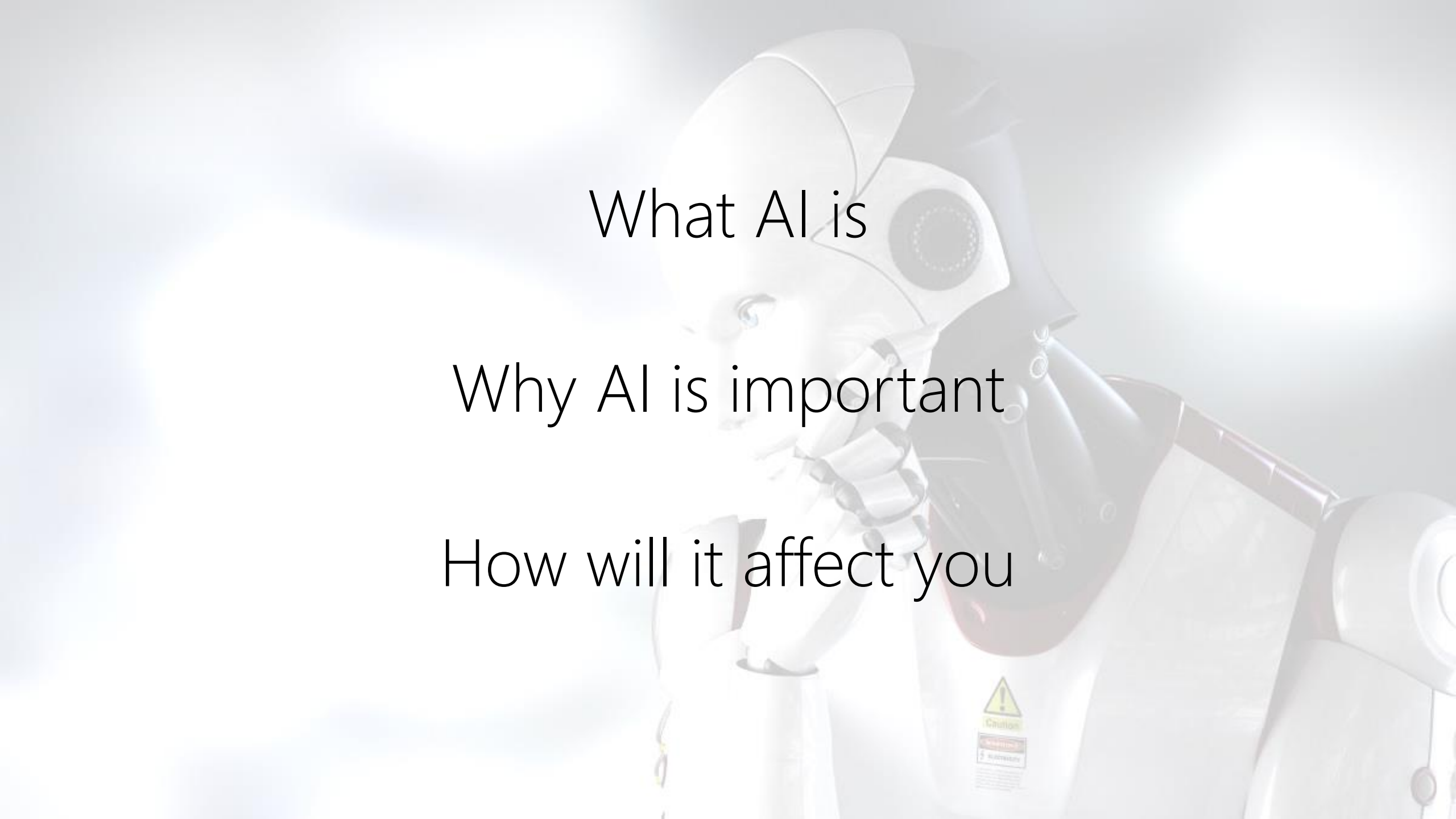
Very important to me!

What did you like?

What could I improve?

Conclusion



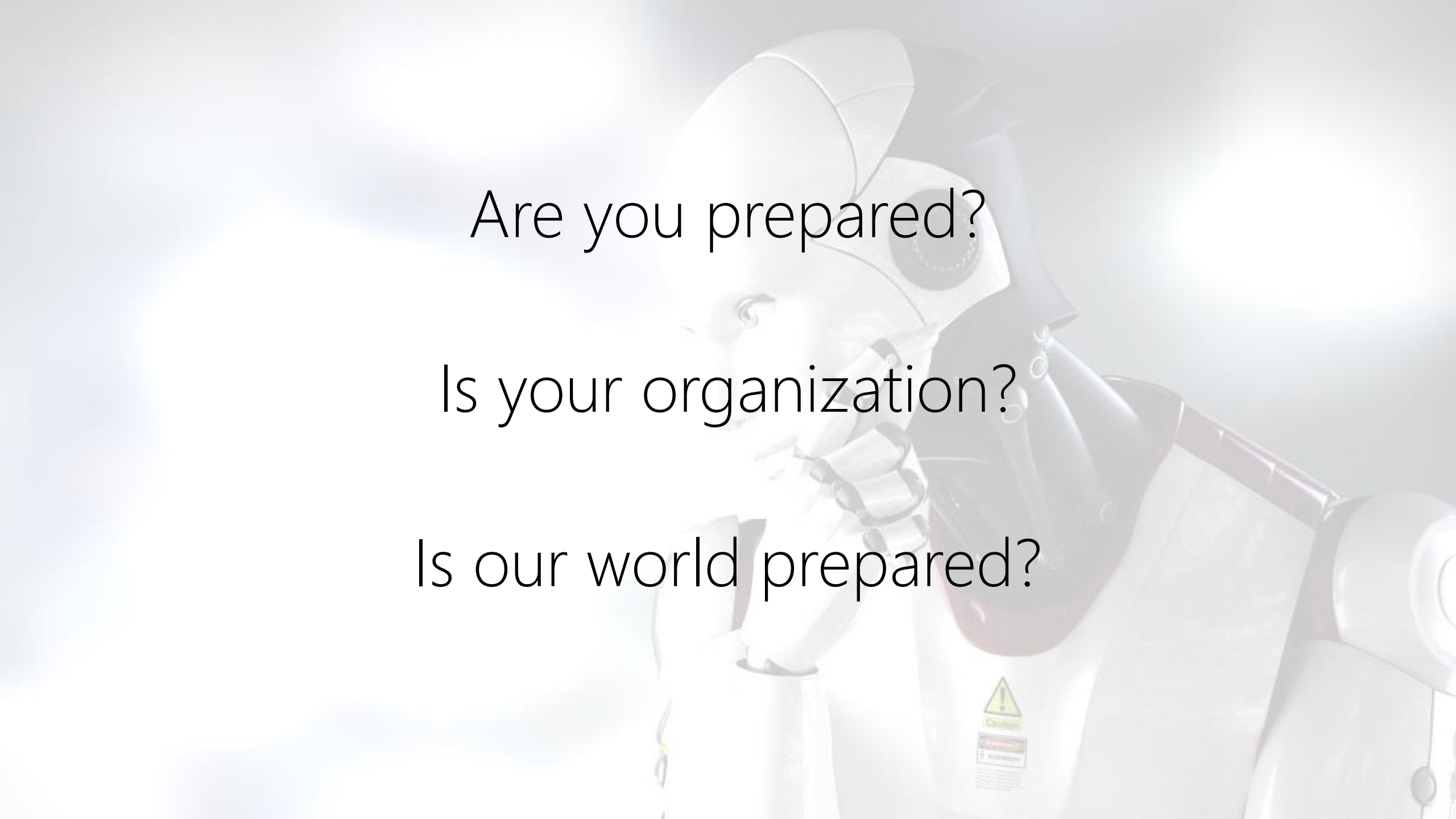


What AI is

Why AI is important

How will it affect you

Caution
WARNING
ELECTRICITY



Are you prepared?

Is your organization?

Is our world prepared?

Caution
WARNING
ELECTRICITY

Thank You!

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