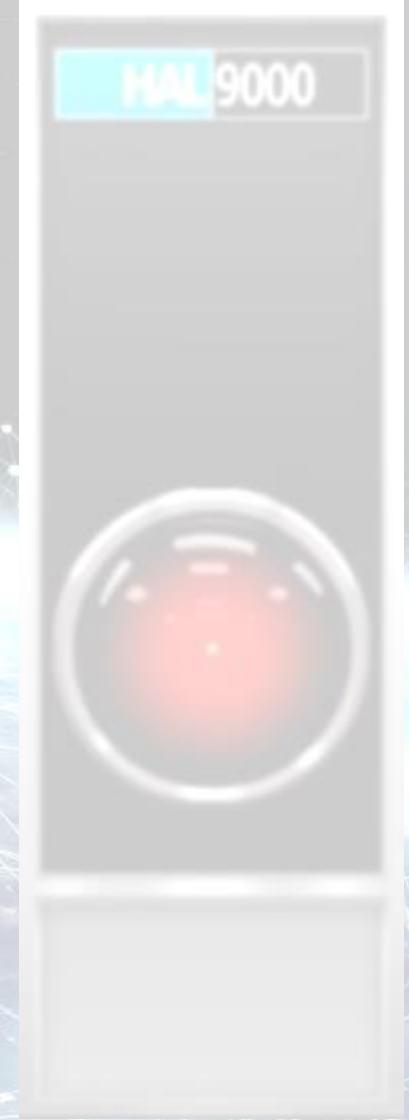


Artificial Intelligence: The Future of Software

@MatthewRenze
#BuildStuffLT



General AI



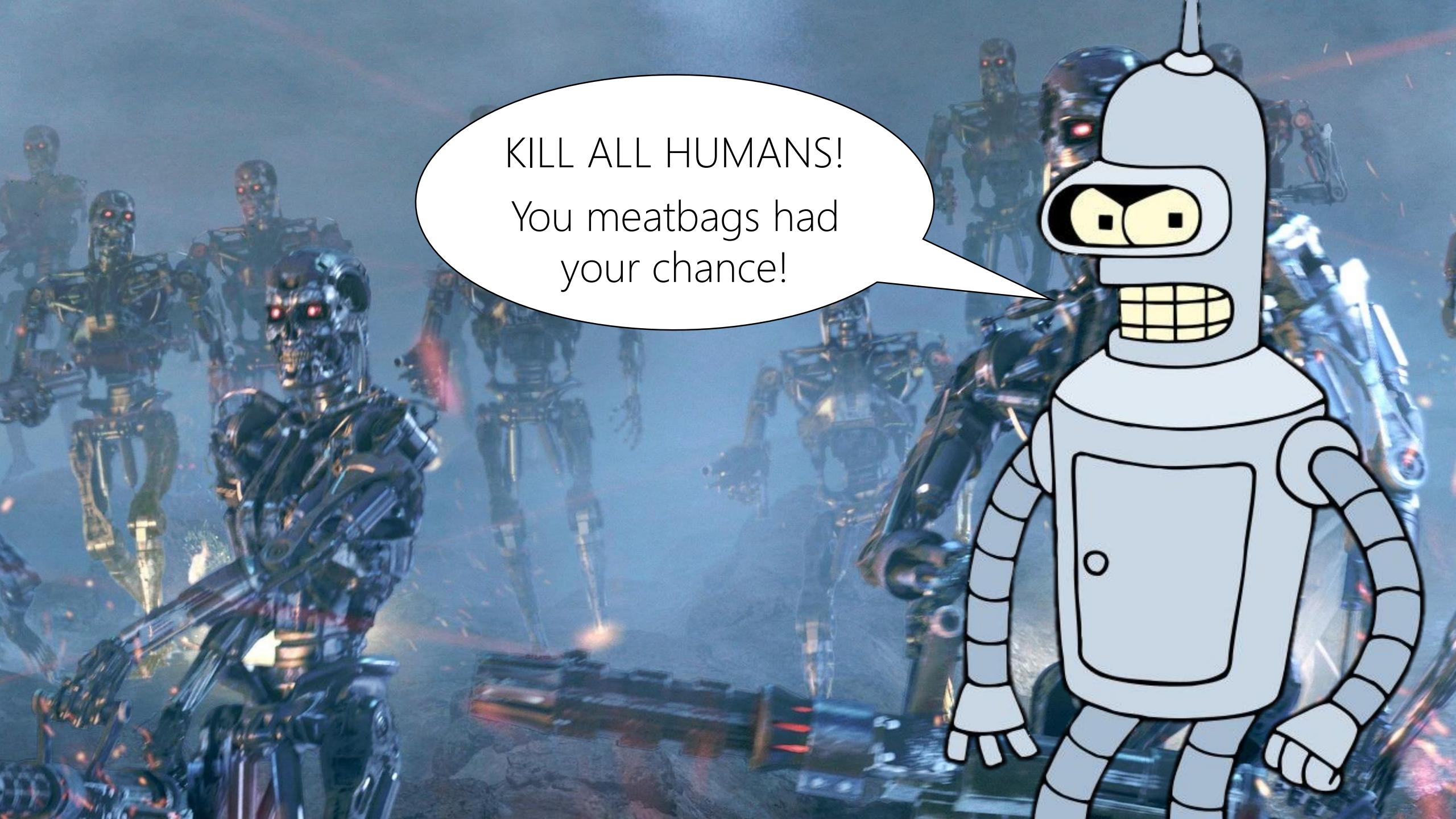


Source: IBM, Amazon, Google



Narrow AI

Source: IBM, Amazon, Google



KILL ALL HUMANS!
You meatbags had
your chance!



A dense crowd of Terminators from the movie Terminator Genisys. The robots are metallic and heavily armored, with glowing red eyes. They are packed closely together, filling the frame. Some are in the foreground, while others are visible through the haze in the background.

Crazy-Killer-Robot AI

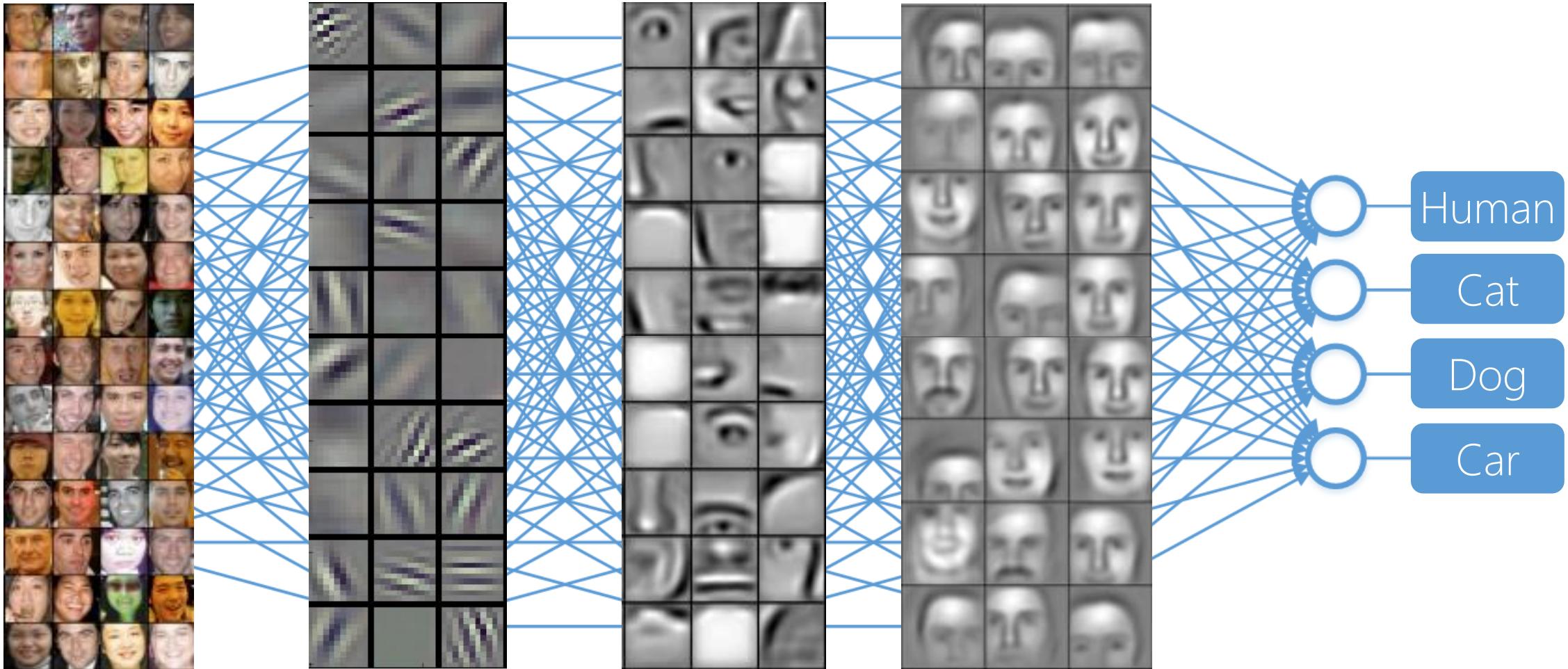




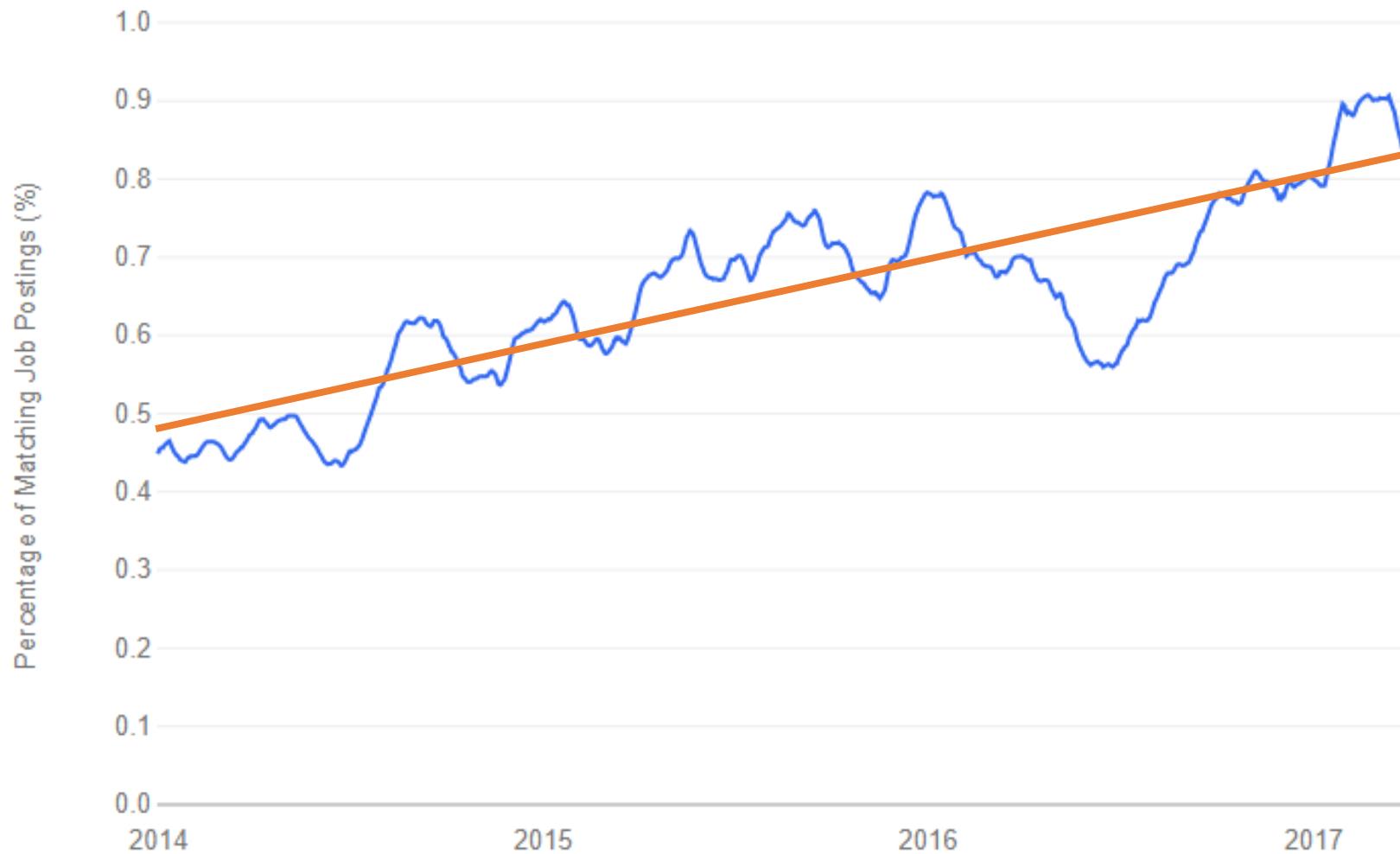




```
55 ■■■ function updatePhotoDescription() {
56 ■■■■ if (descriptions.length > (page * 9) + (currentImage - subImage)) {
57 ■■■■■ document.getElementById('bigImageDesc').innerHTML = descriptions[page * 9 + currentImage - subImage];
58 ■■■}
59 }
60
61 ■■■ function updateAllImages() {
62 ■■■■ var i = 1;
63 ■■■■■ while (i < 10) {
64 ■■■■■■ var elementId = 'foto' + i;
65 ■■■■■■ var elementIdBig = 'bigImage' + i;
66 ■■■■■■ if (page * 9 + i - 1 < photos.length) {
67 ■■■■■■■ document.getElementById( elementId ).src = 'image' + page + '/' + photos[page * 9 + i - 1];
68 ■■■■■■■ document.getElementById( elementIdBig ).src = 'image' + page + '/' + photos[page * 9 + i - 1];
69 ■■■■■■ } else {
70 ■■■■■■■ document.getElementById( elementId ).src = '';
```

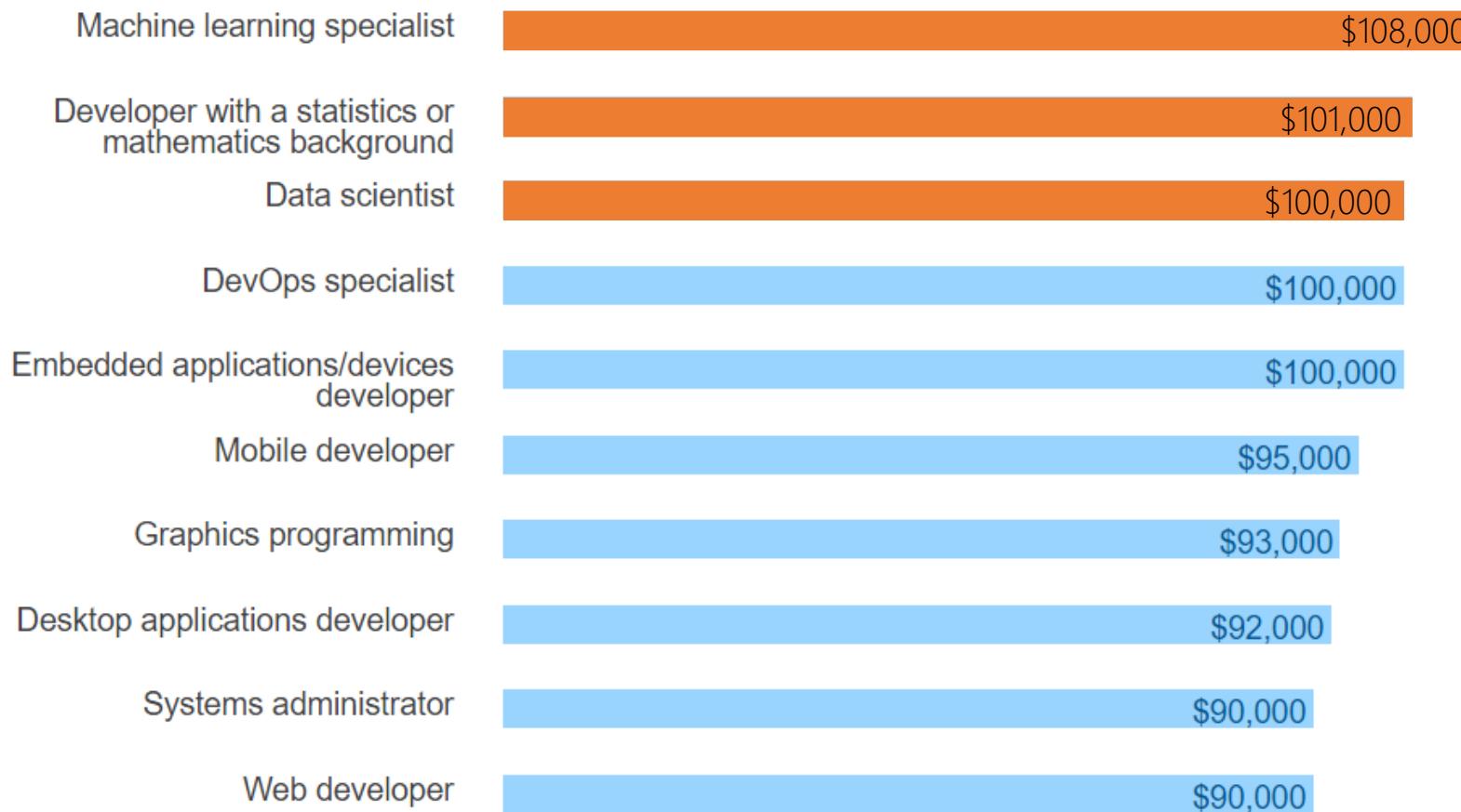


Job Postings for Machine Learning



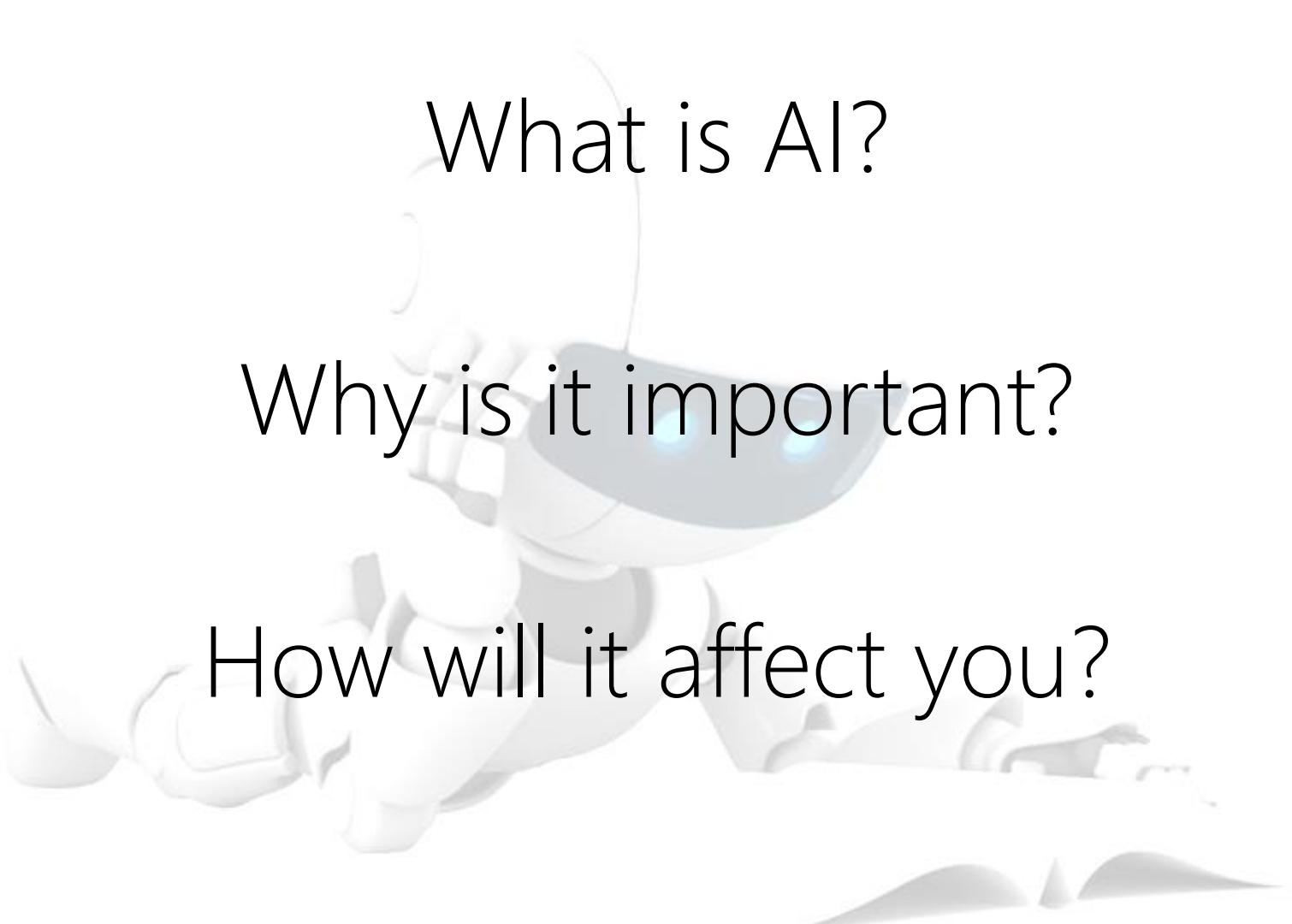
Source: Indeed.com

Average Salary by Job Type (USA)



Source: Stack Overflow 2017

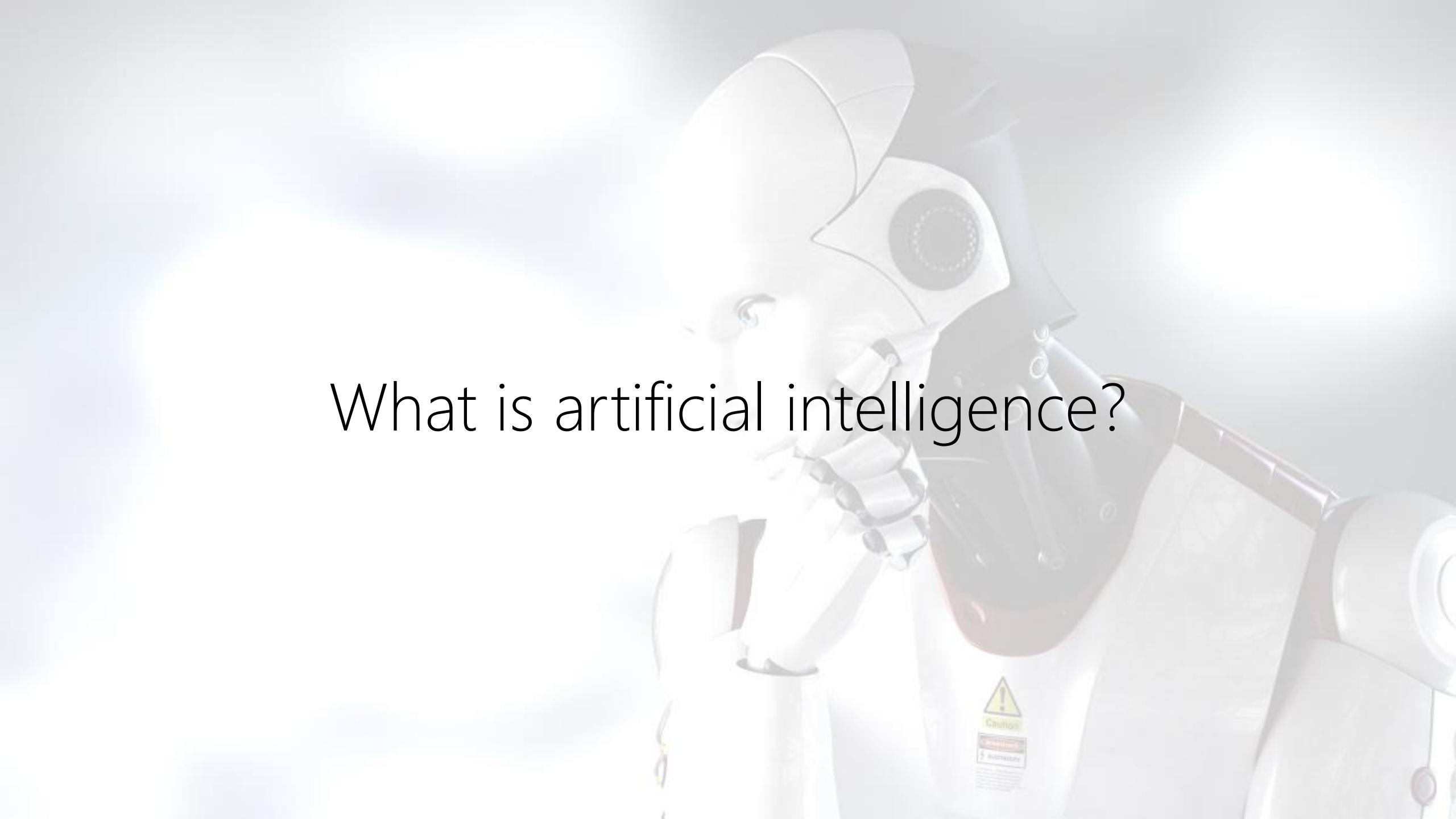




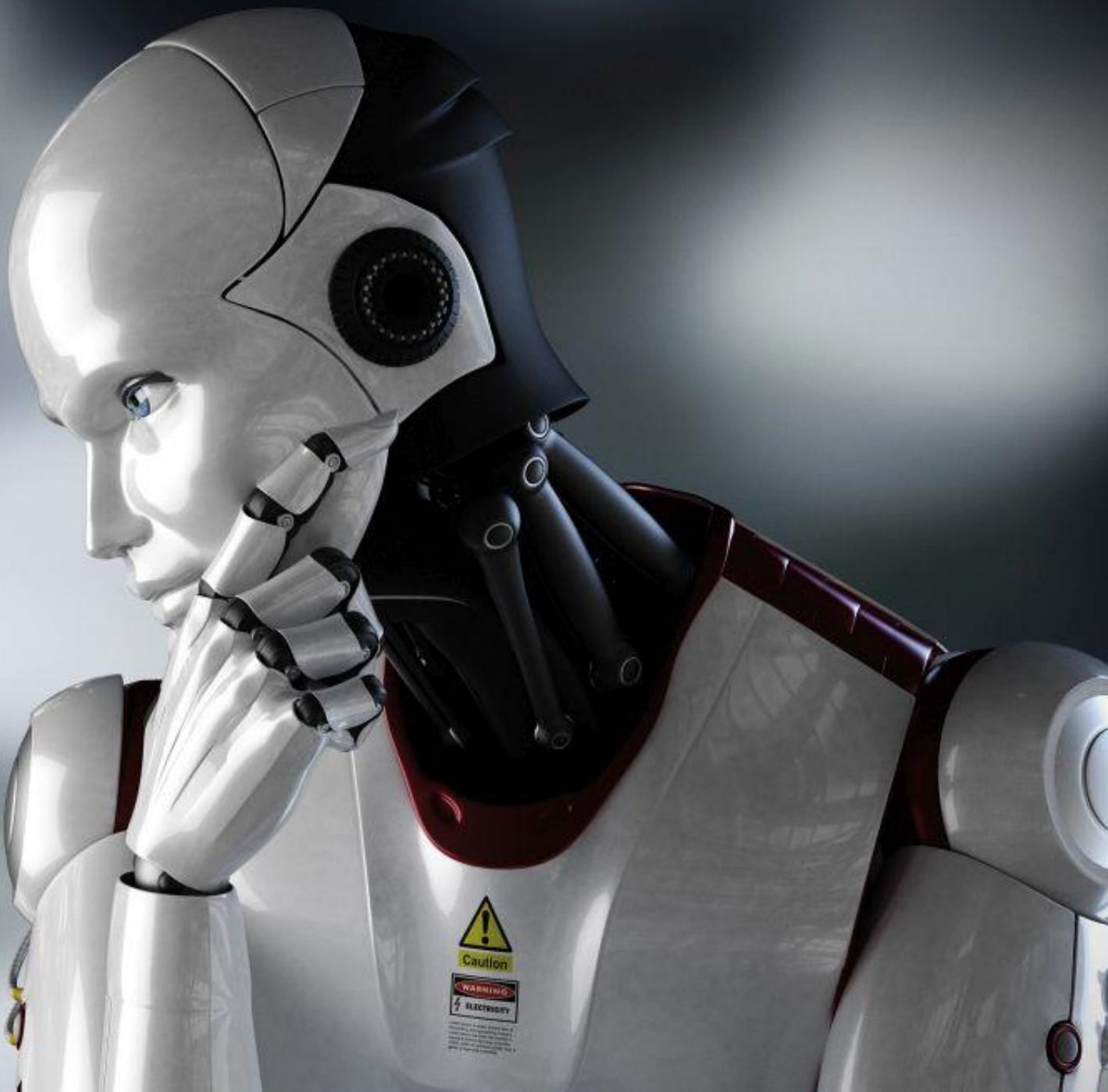
What is AI?

Why is it important?

How will it affect you?

A white humanoid robot with a red arm and a warning label on its chest.

What is artificial intelligence?



HUMAN
BRAIN

WIN

ELECTRONIC
BRAIN

'BERTIE
BRAIN'
by
Rogers Majestic



CHOOSE Rogers Majestic for LASTING SATISFACTION

Rogers Majestic
Tele & Television
Radio & Electronics

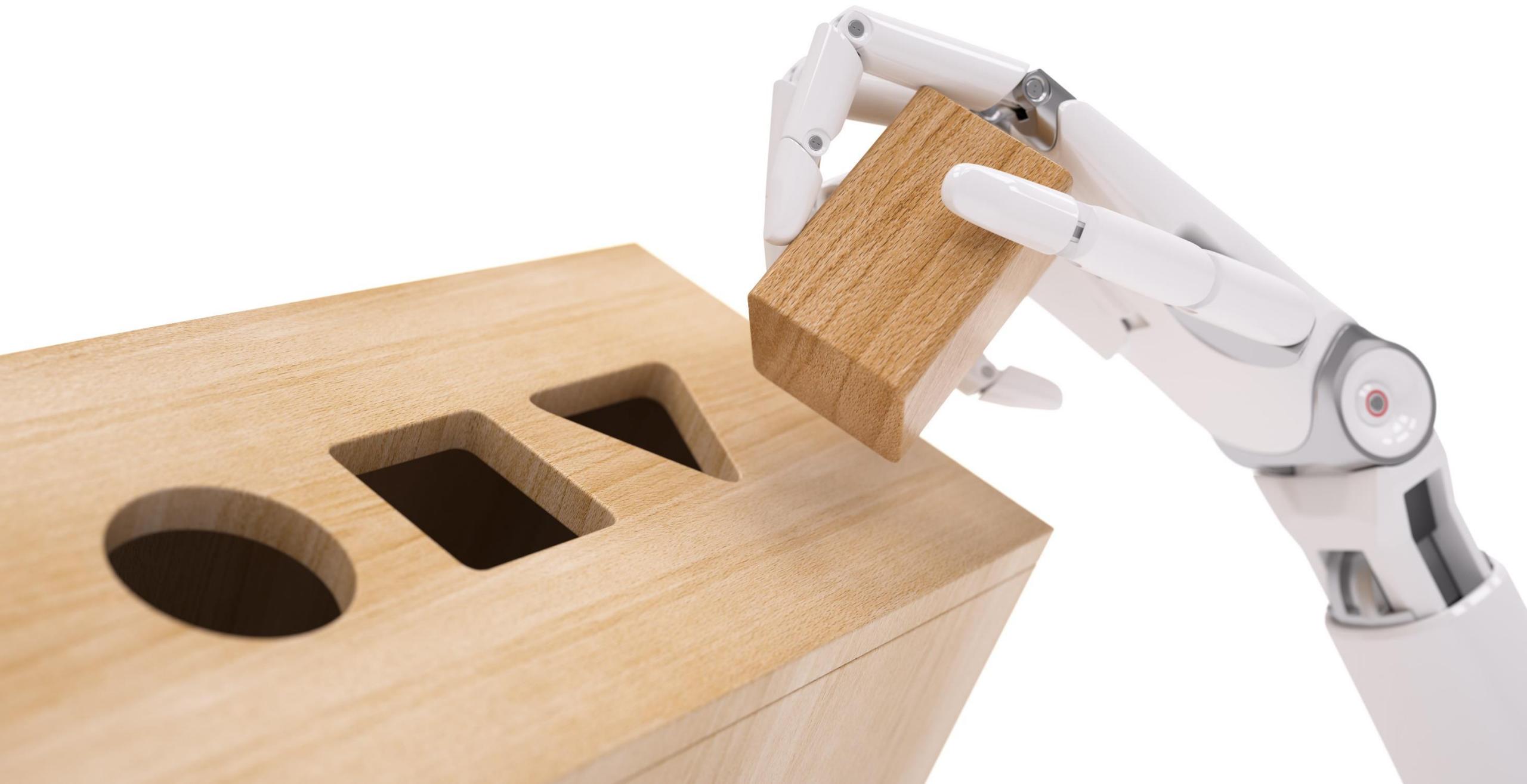


ROGERS MAJESTIC
SILVER JUBILEE
Designed, Engineered and built in Canada's

1925
ROGERS



Source: Evan Amos





A dark, blurry silhouette of a person standing in a field of tall grass under a cloudy sky.

AI Winter
1970s – 2000s

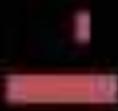
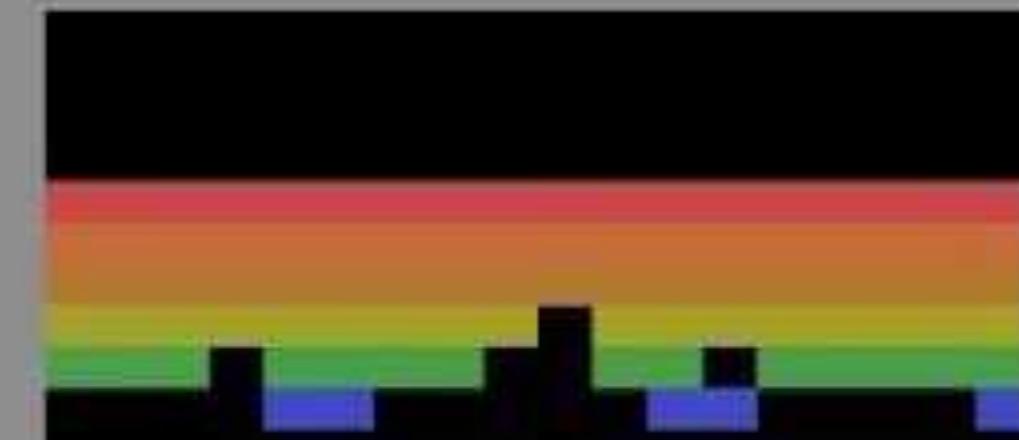


Source: Takashi Hososhima

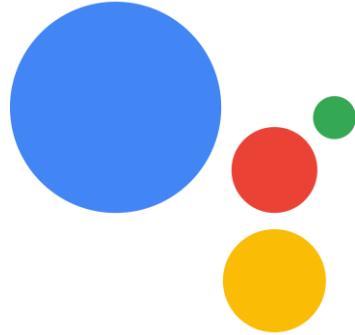




021 3 1



100 Training Episodes



Hi, how can I help?

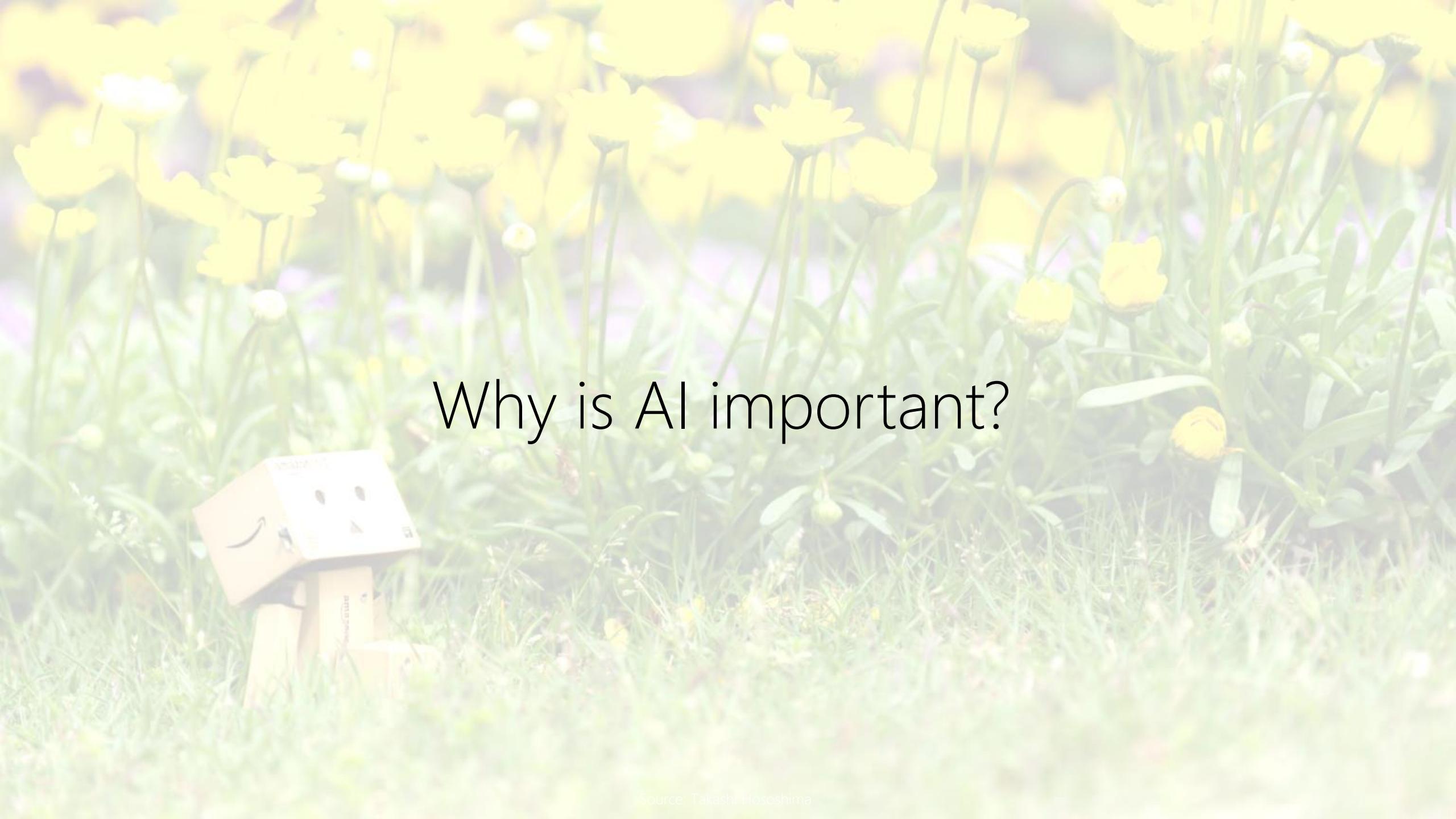
Make me a haircut appointment on Tuesday
anytime between 10 and 12.

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

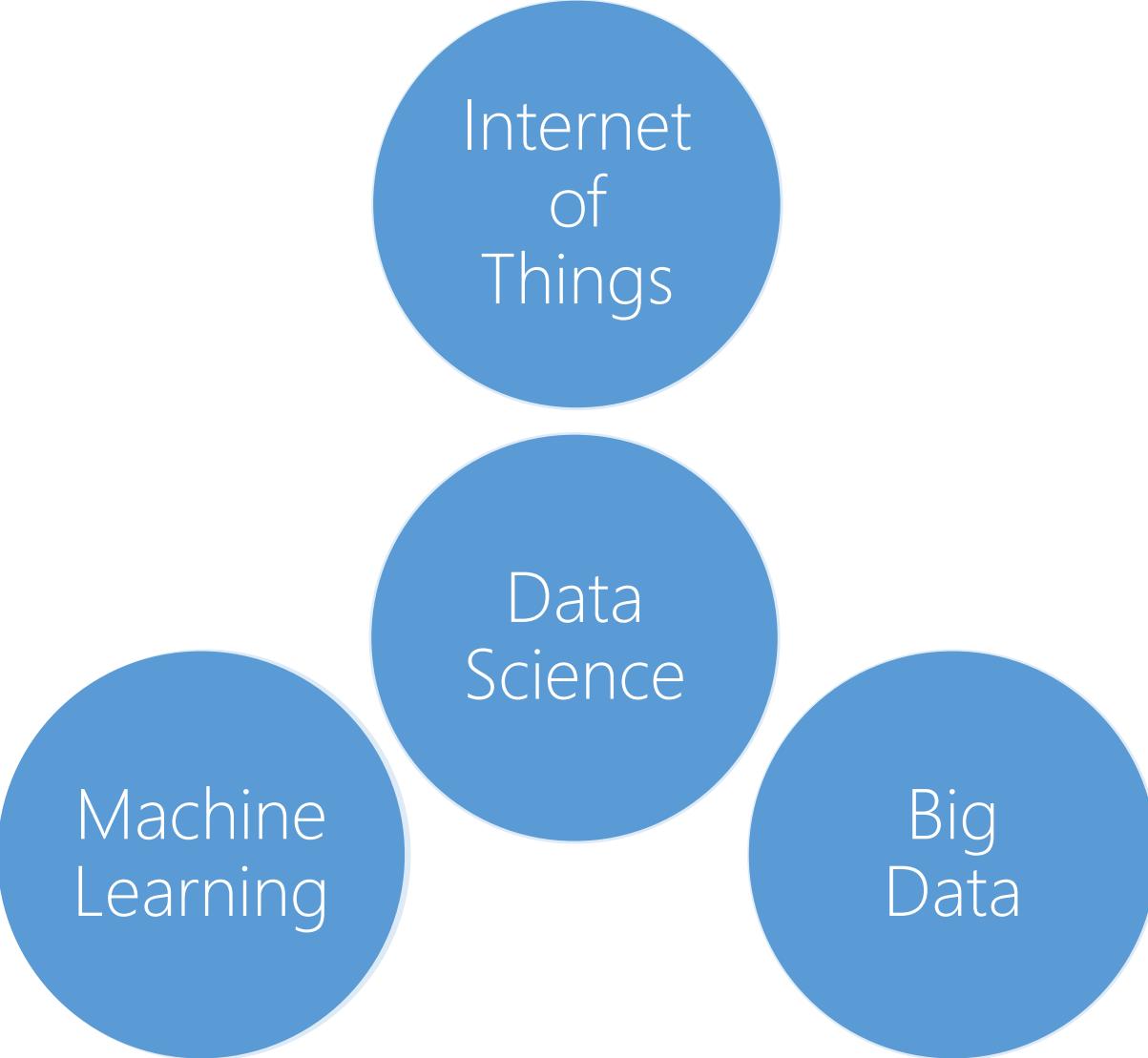
GOOGLE

Mashable



A photograph of a field of yellow flowers, likely buttercups, with a small Amazon delivery box resting on the grass in the foreground.

Why is AI important?

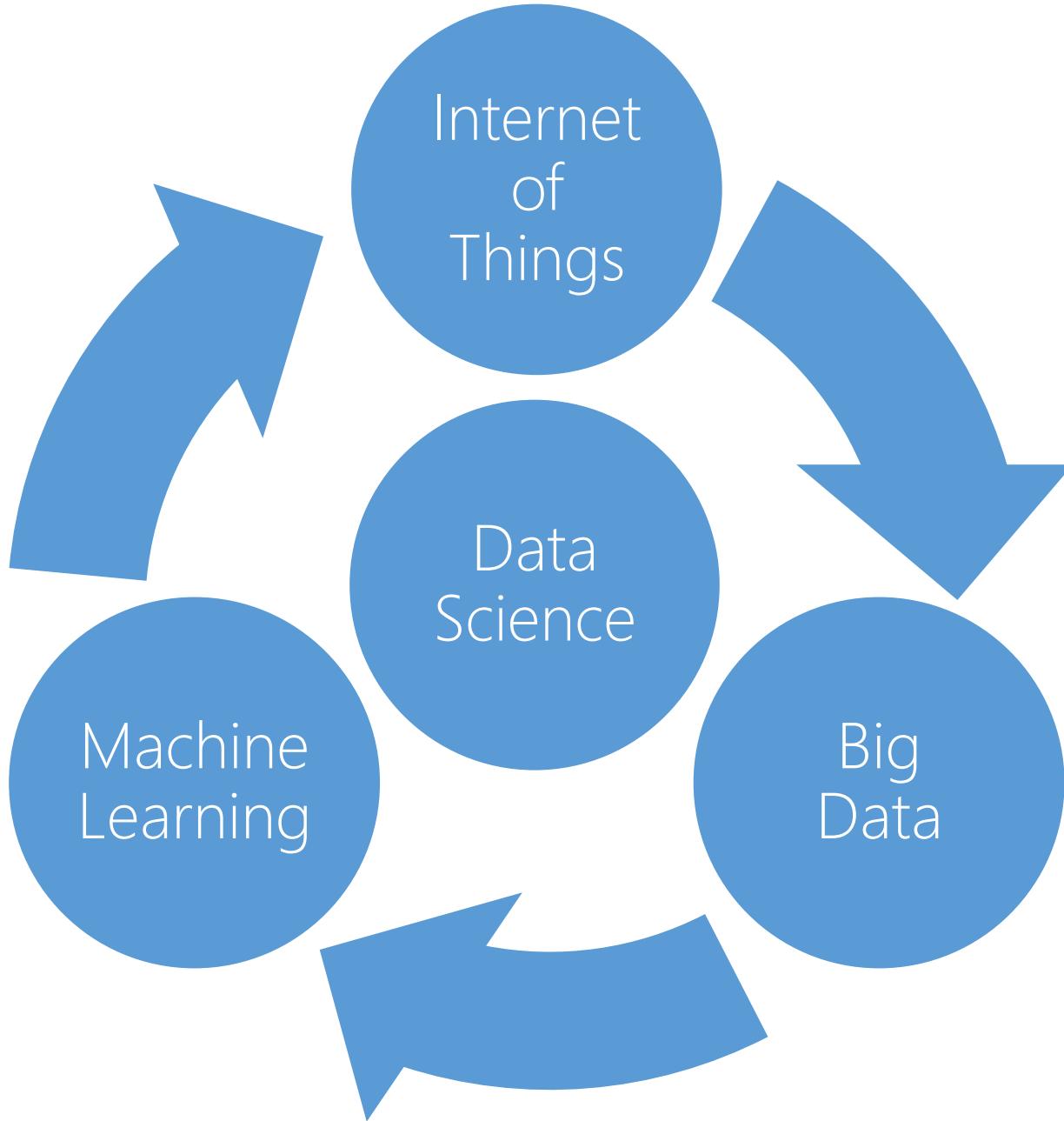


Internet
of
Things

Data
Science

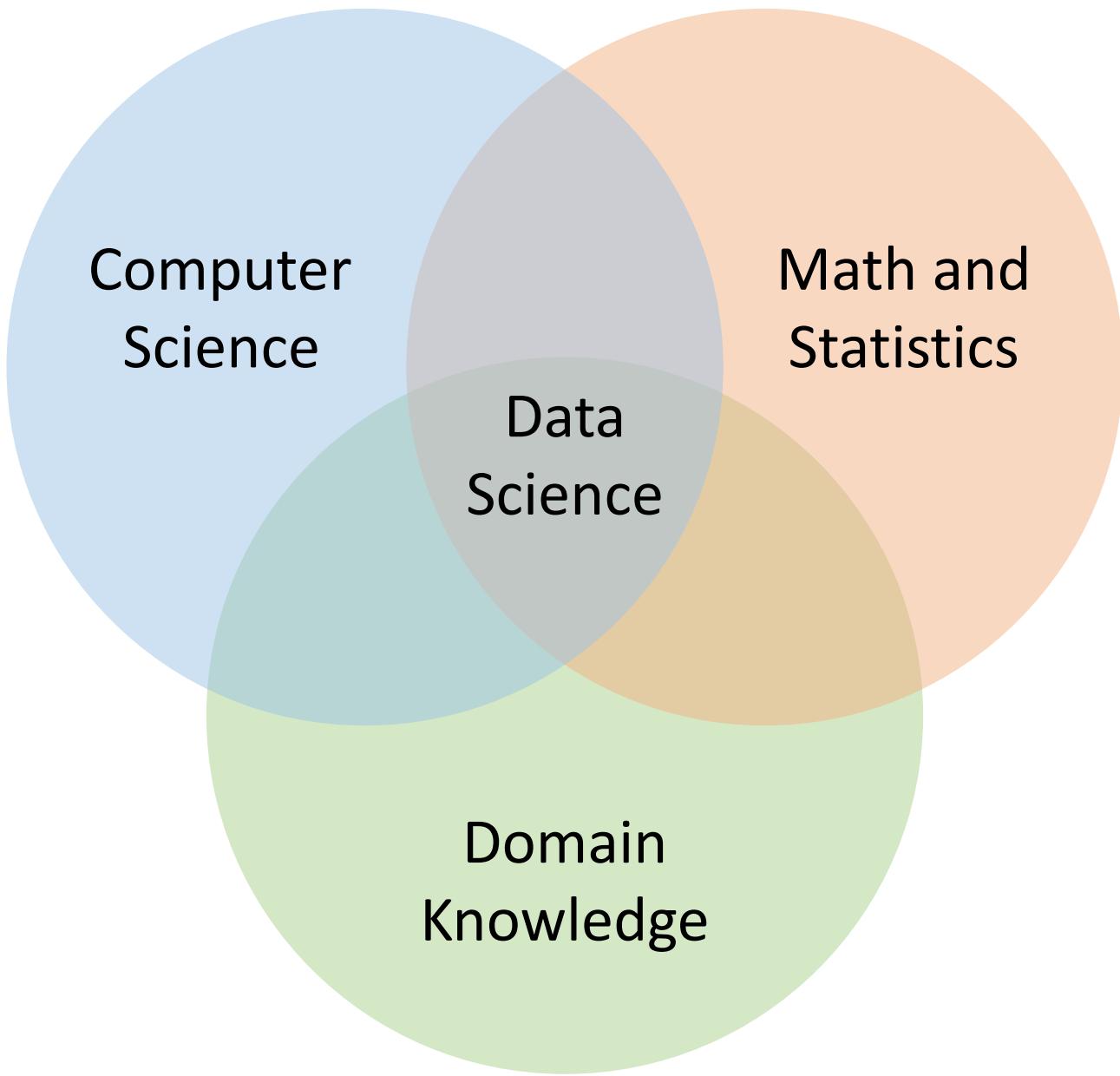
Machine
Learning

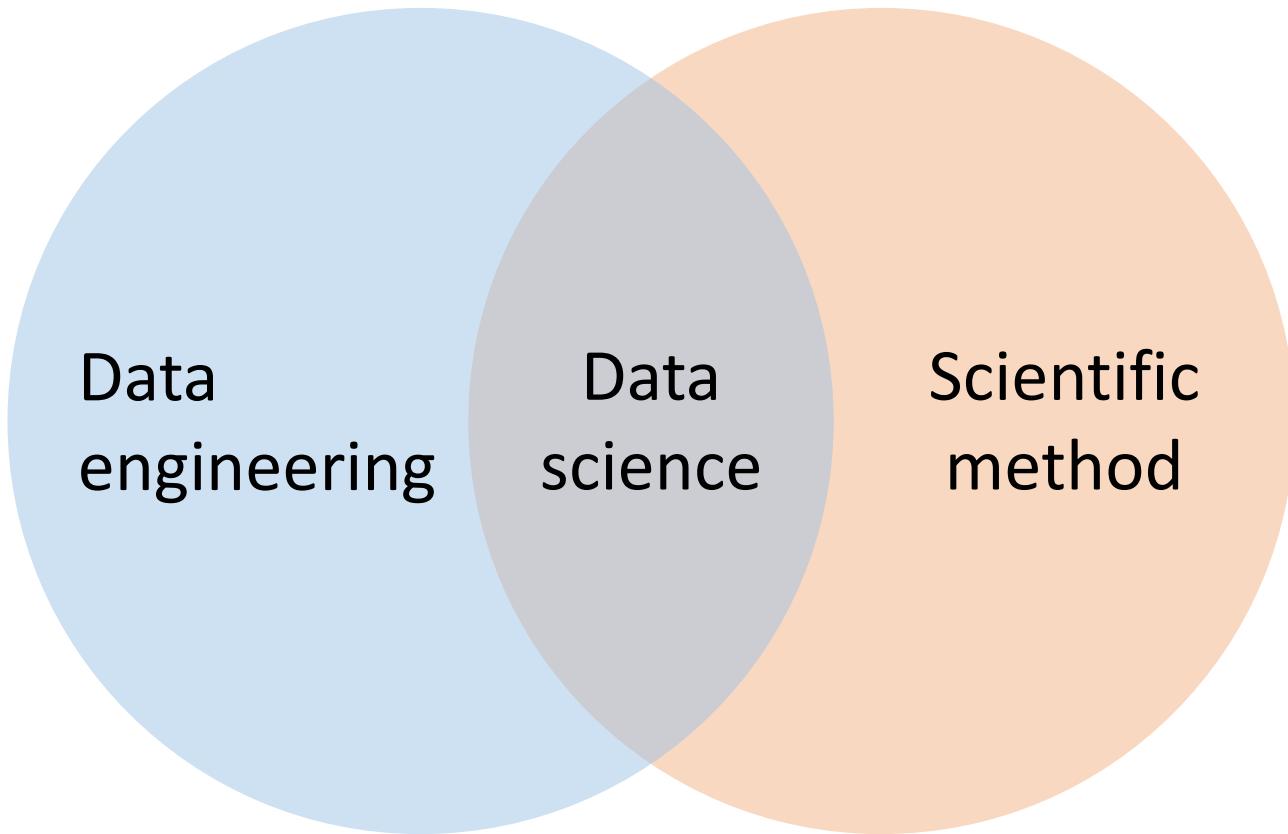
Big
Data

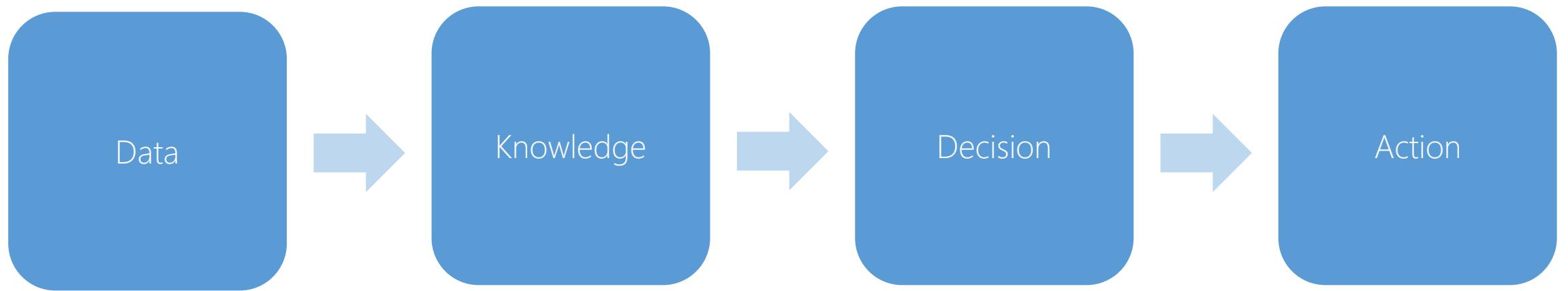




Data Science





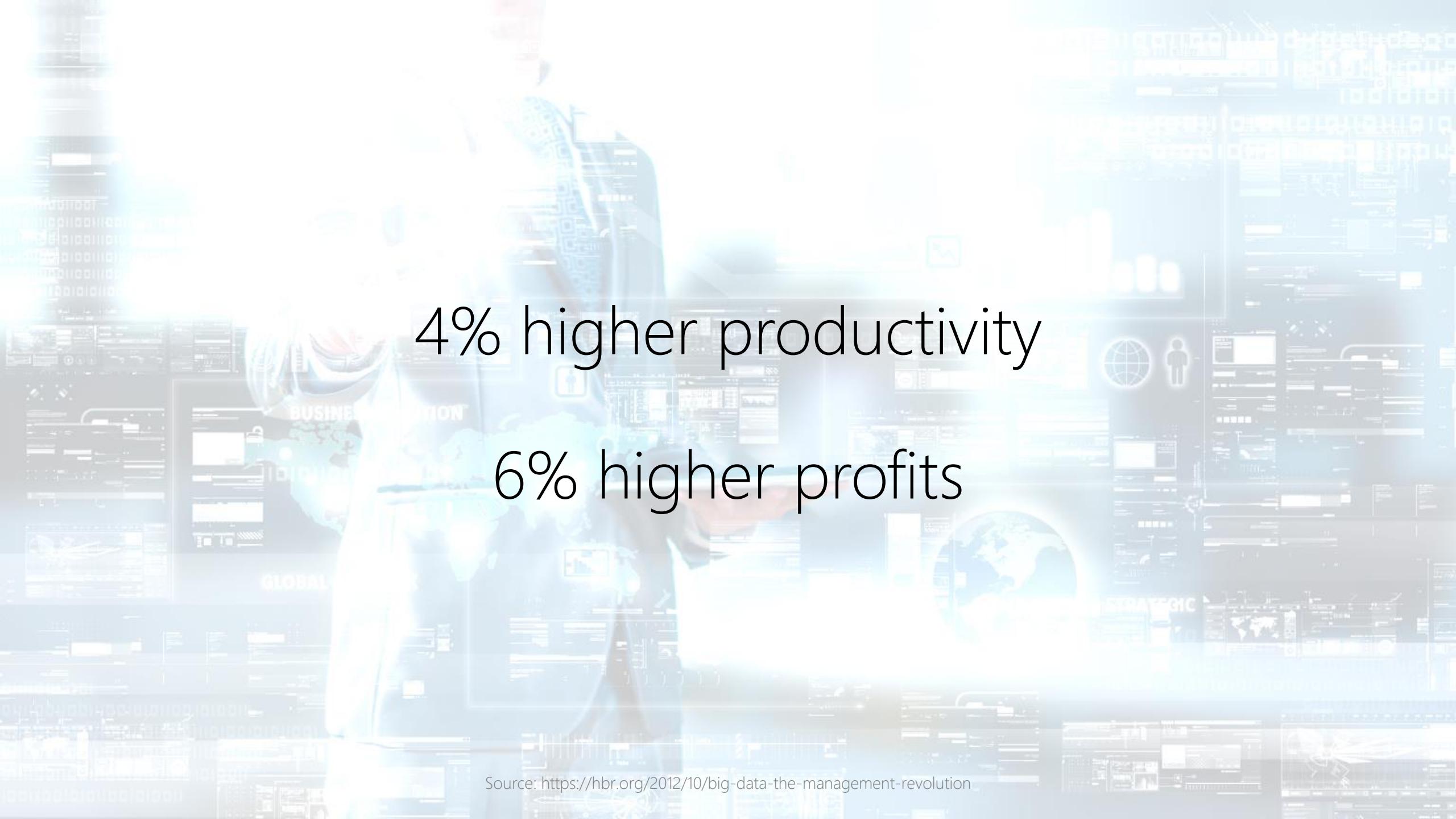


Job Postings for Data Scientists









4% higher productivity

6% higher profits



















Family life



Medical



Hospital



Residence

Car



Factory



Travel

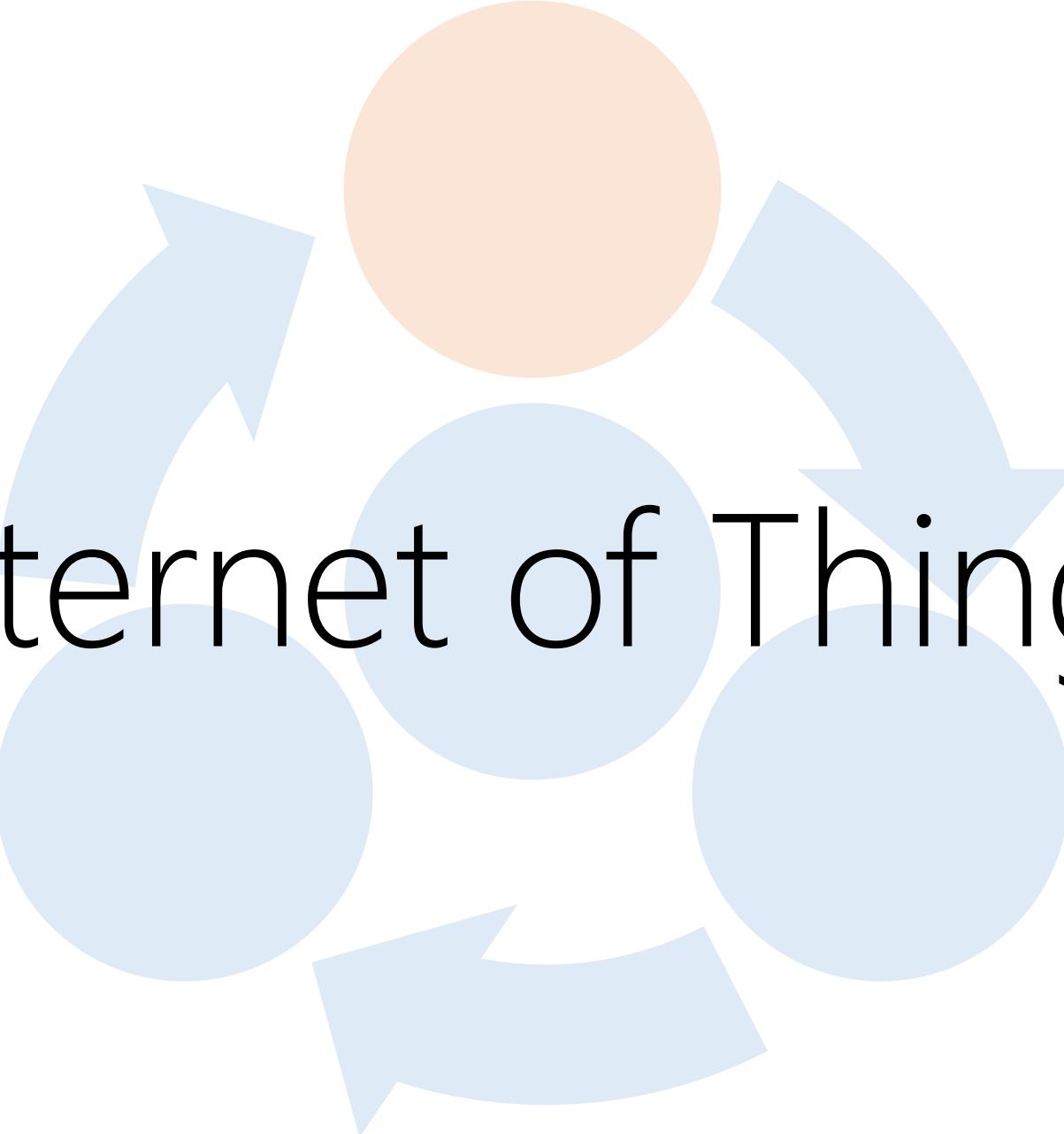








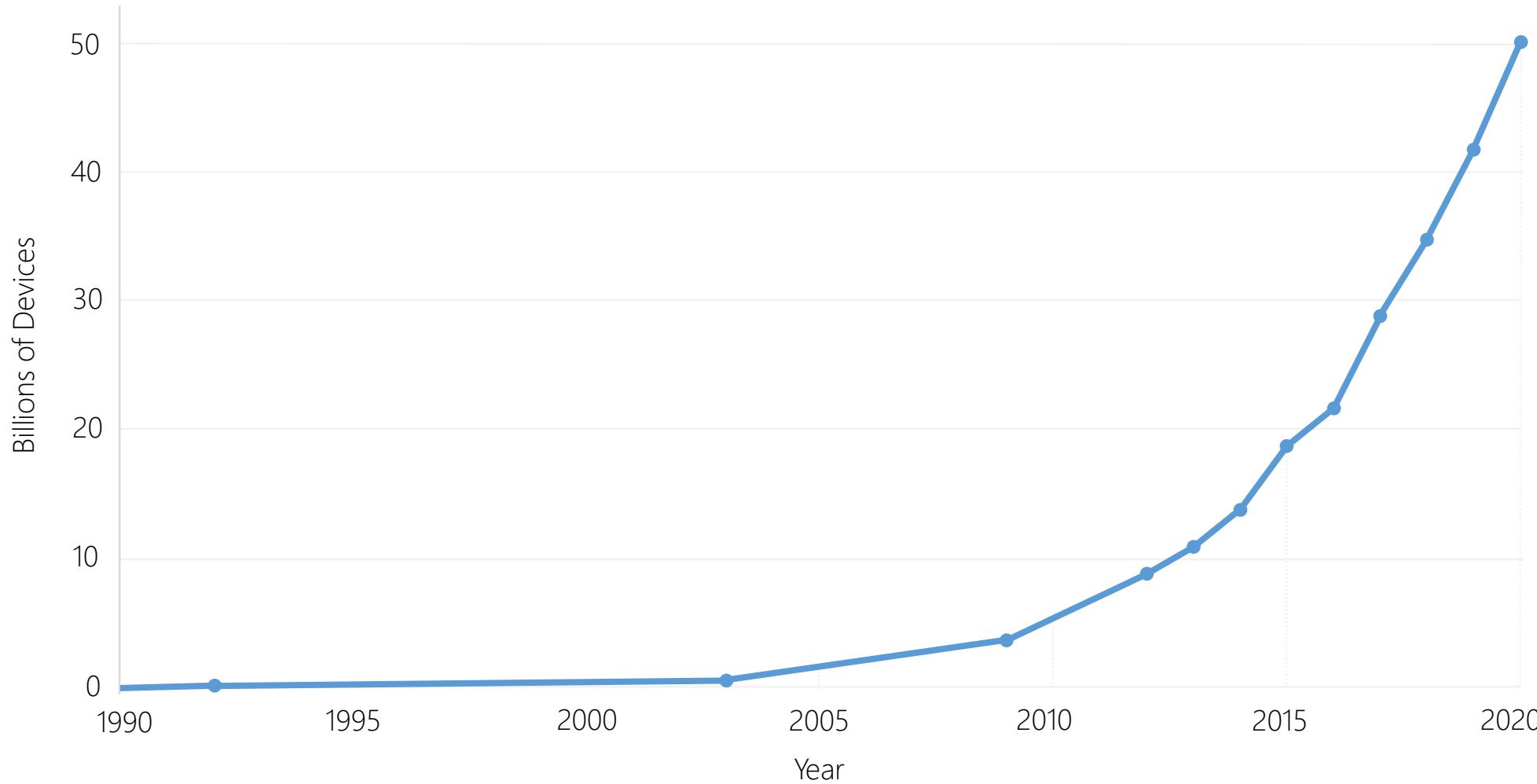
Data science is the heart of AI.



Internet of Things



Growth of the IoT Devices



Source: NCTA, 2014

Growth of the IoT Devices

50 billion IoT devices by 2020





REMOTE HOME CONTROL

ONLINE HOME AUTOMATION



CLIMATE



LIGHTING



SECURITY



ENTERTAINMENT

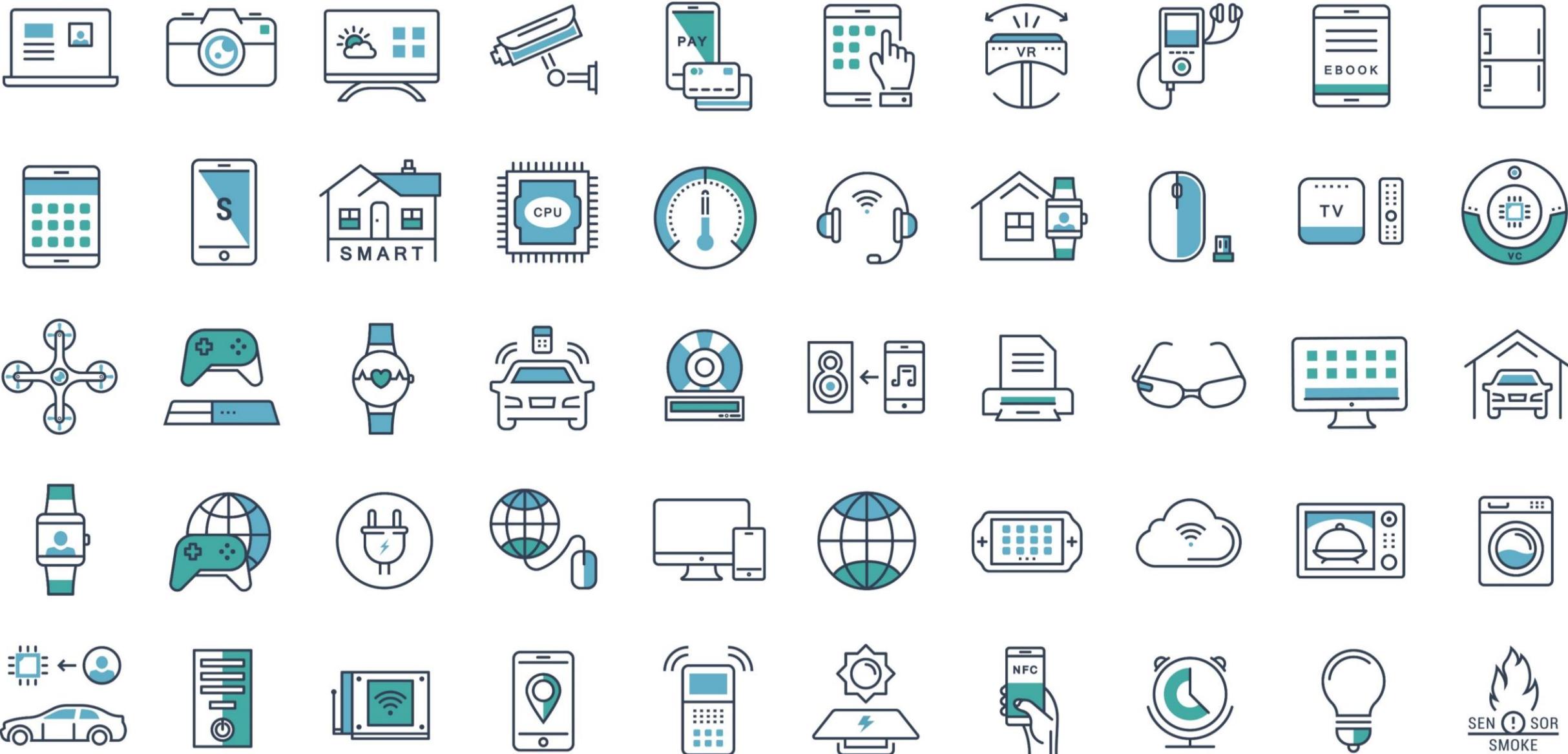


ECO MODE

NORMAL

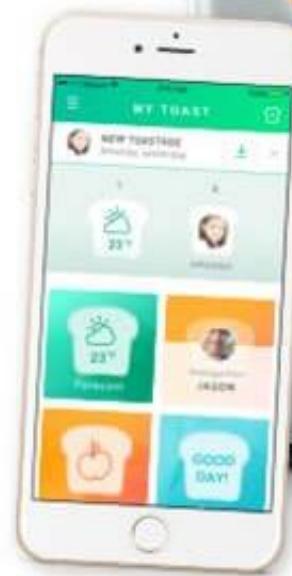
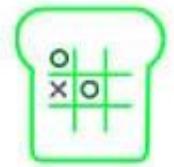
OFF

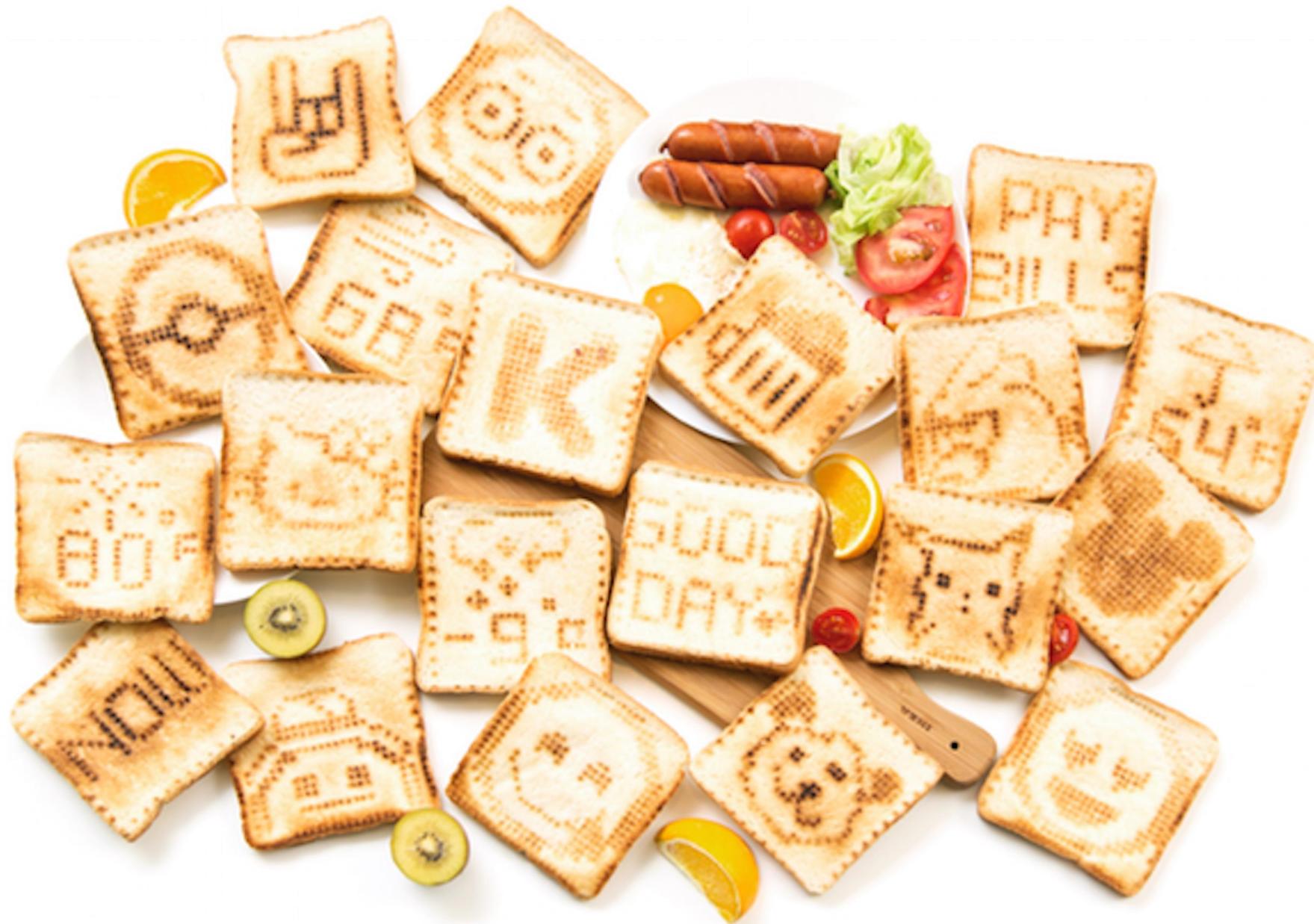














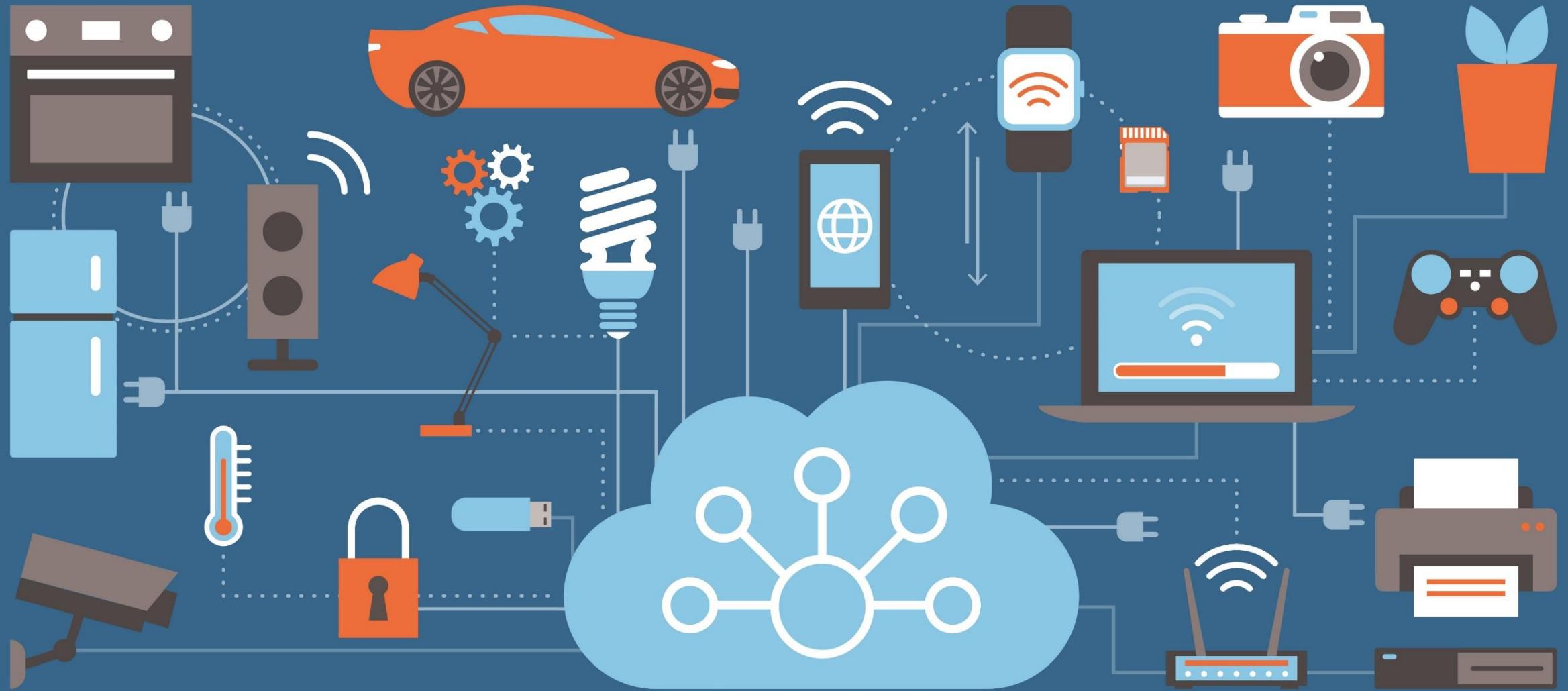
COW TRACKING



81cows in range
Range 100m

Map | List







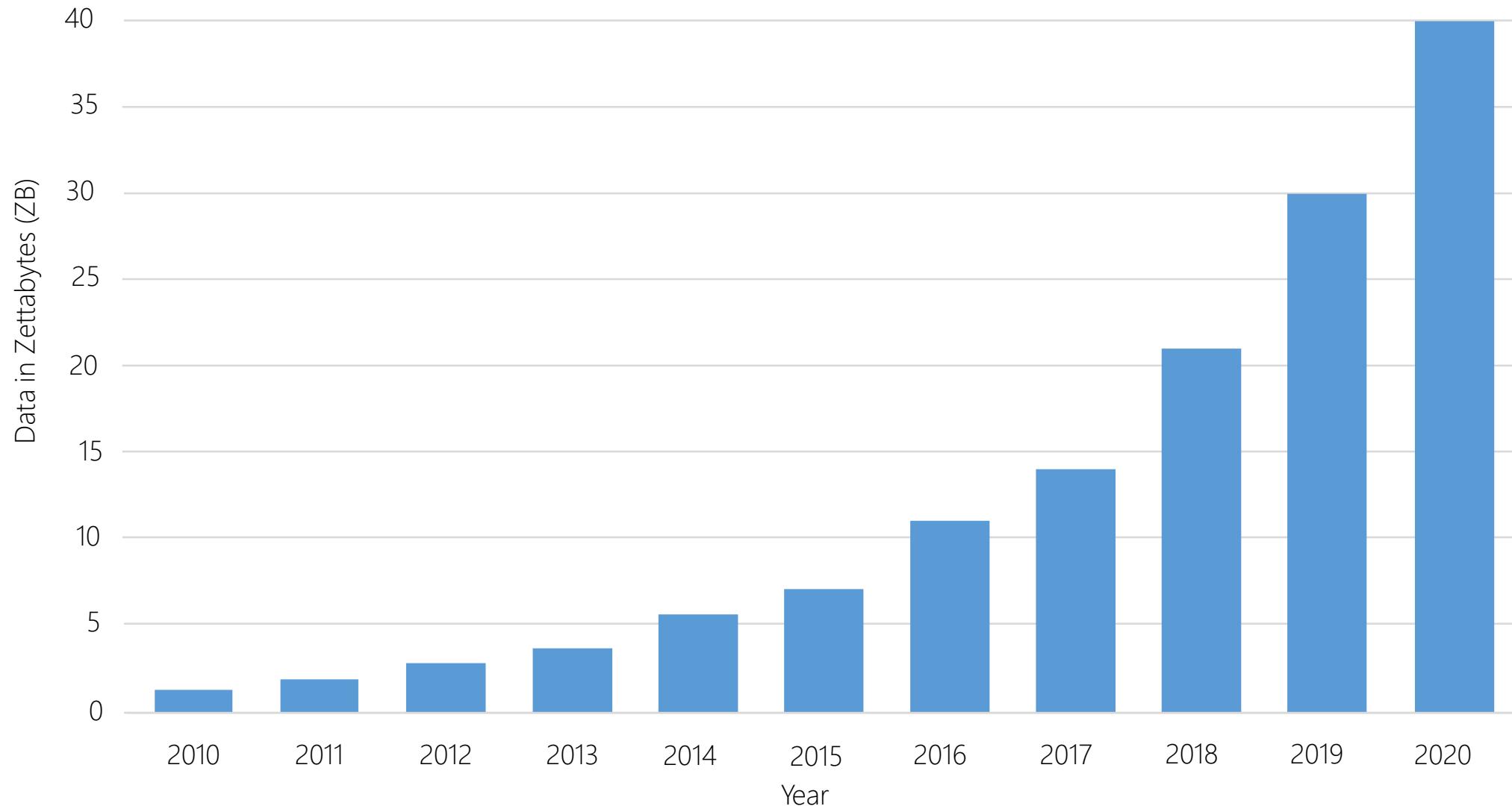


IoT is the body for AI.



Big Data

Global Data Growth

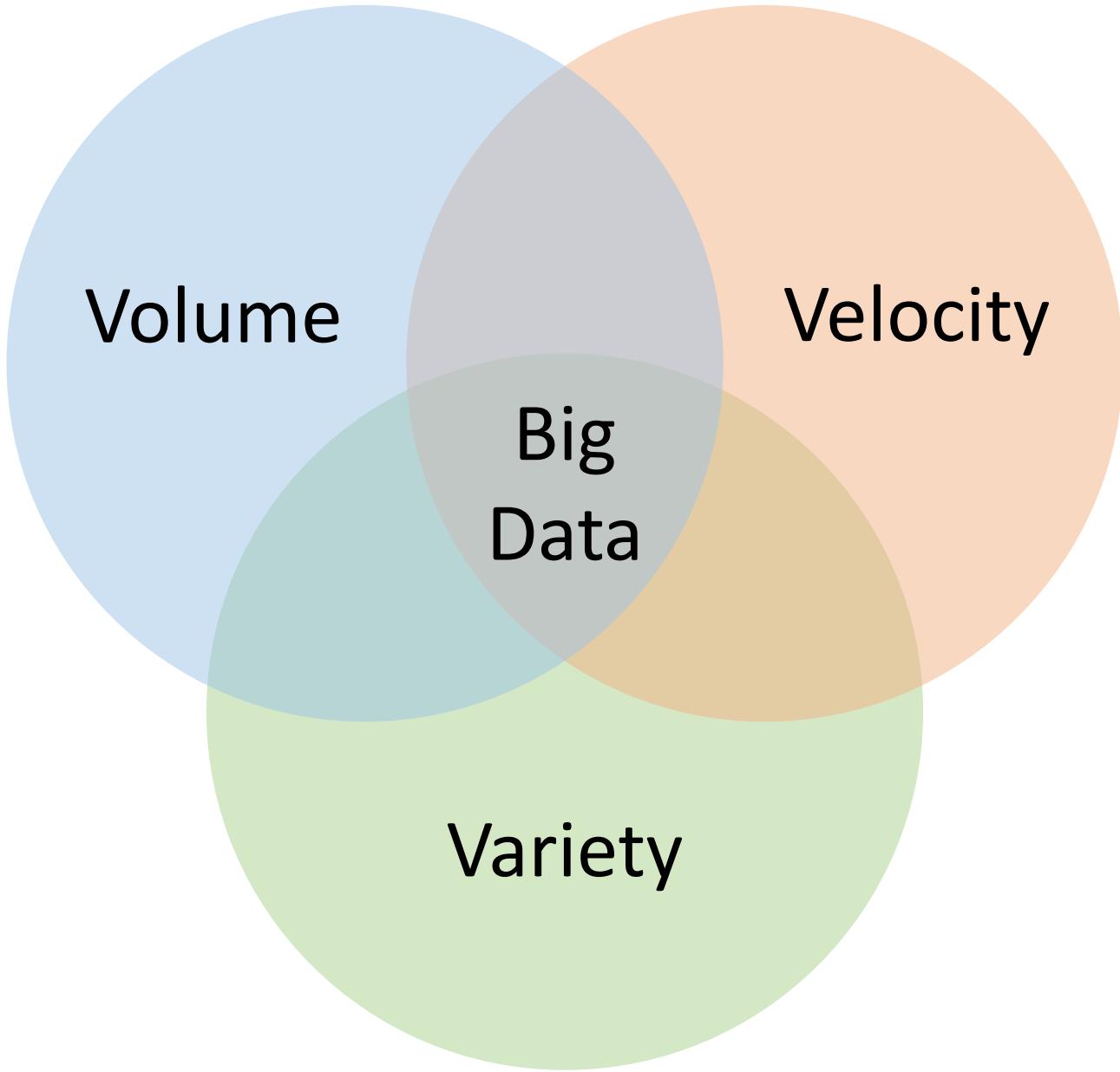


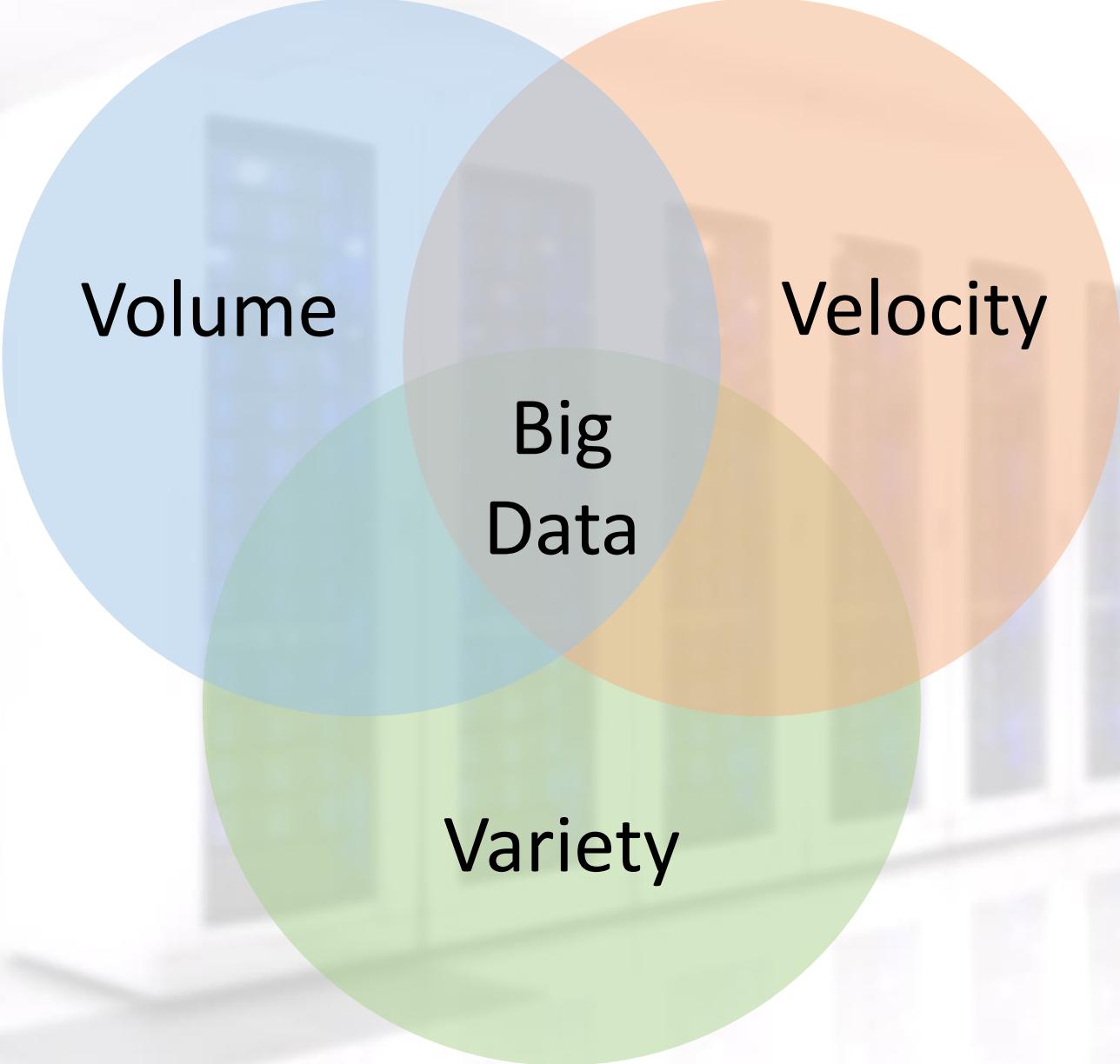
Source: UNECE Statistics Wikis

Global Data Growth

Doubling every two years







Volume

Velocity

Big
Data

Variety



Volume

A 3

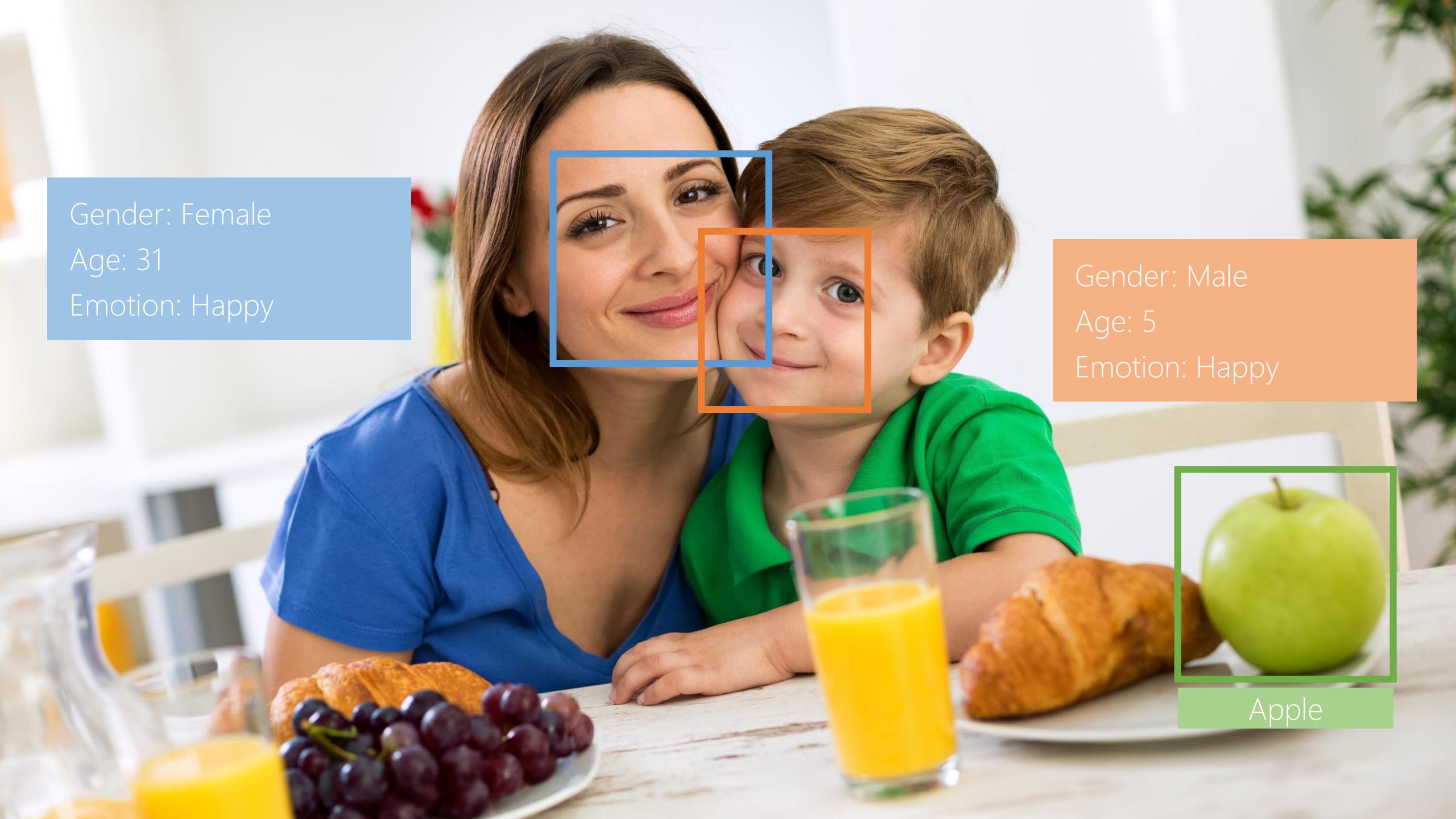


Velocity





Variety



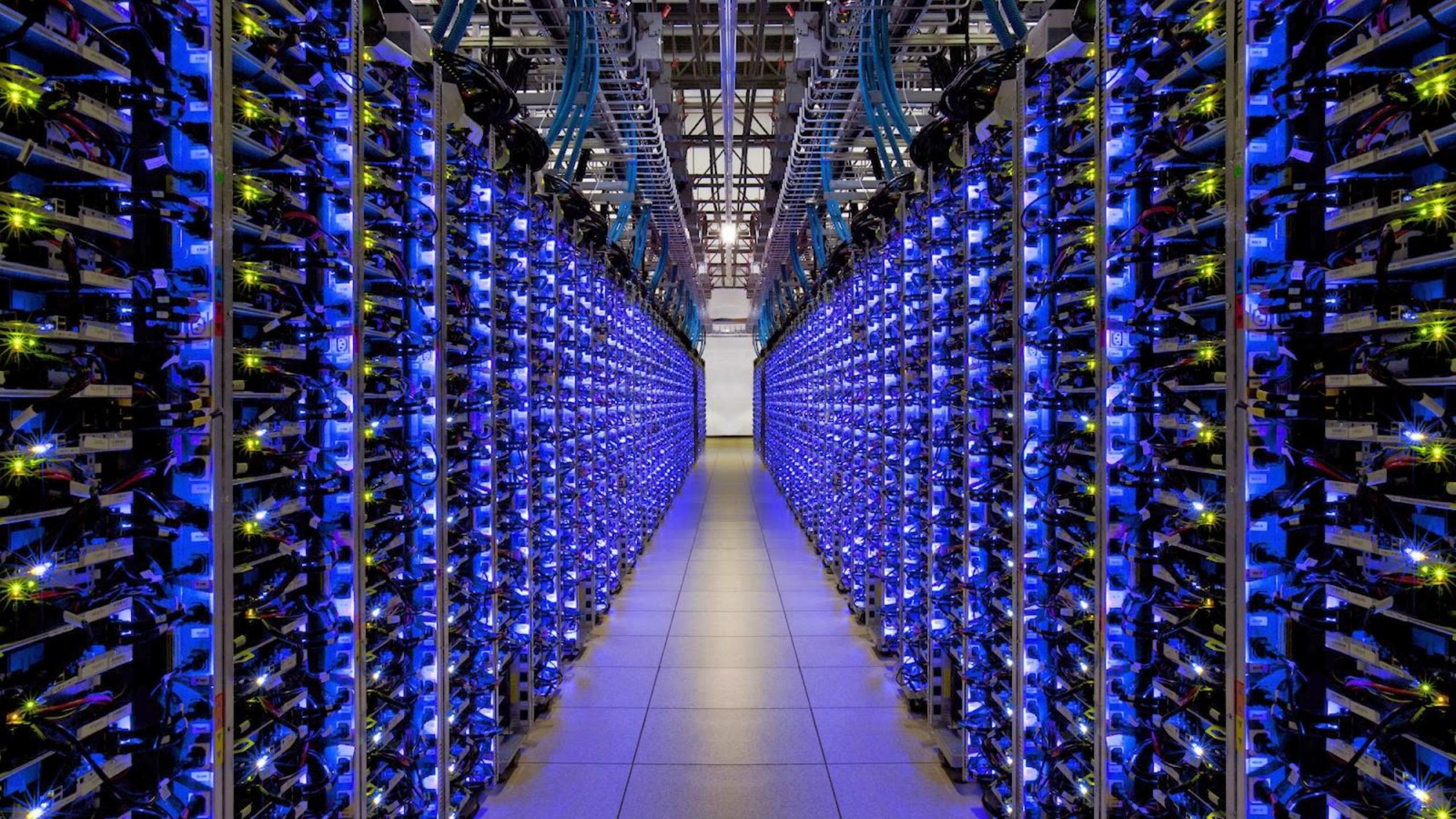
Gender: Female
Age: 31
Emotion: Happy



Gender: Male
Age: 5
Emotion: Happy



Apple





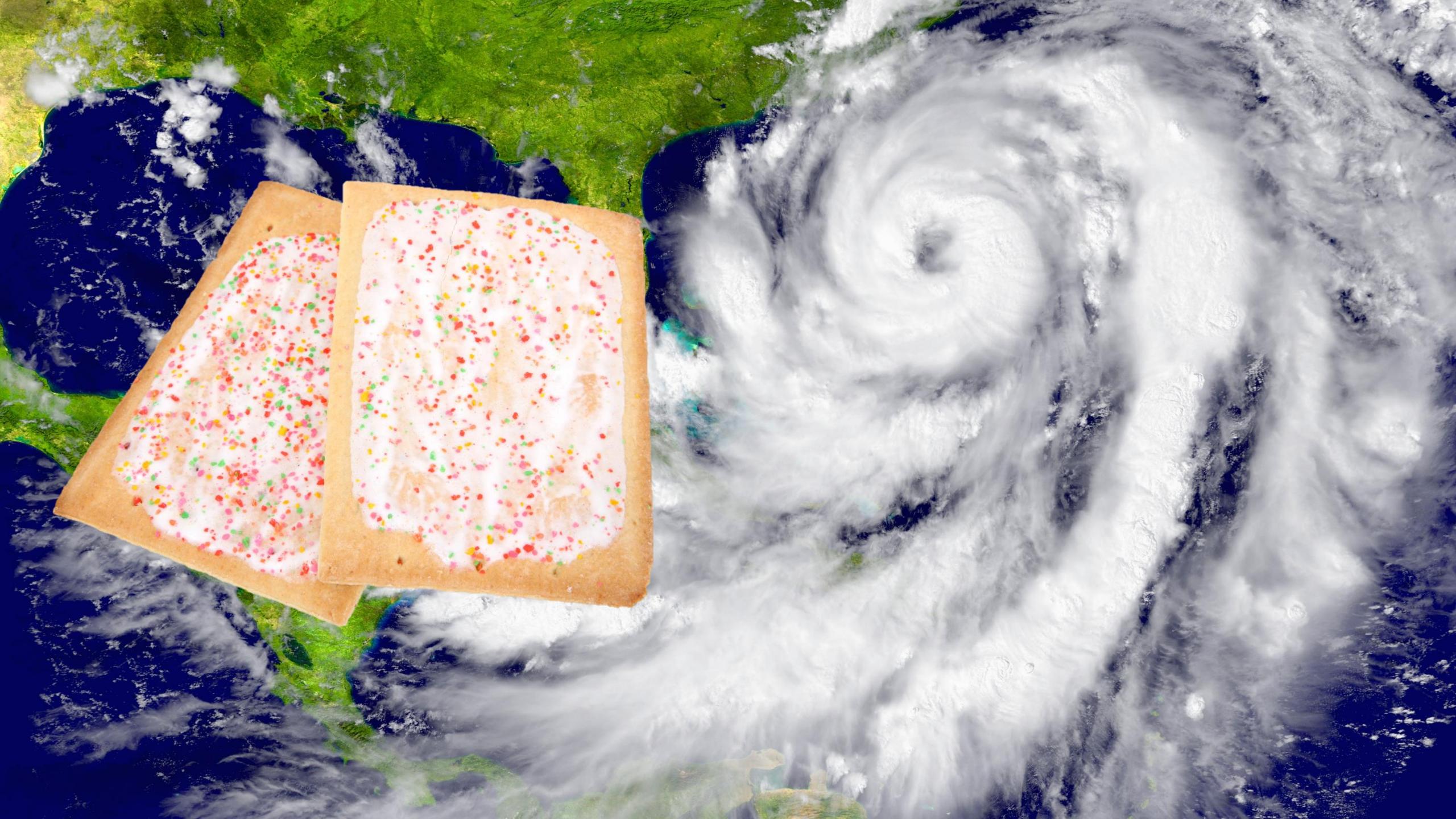


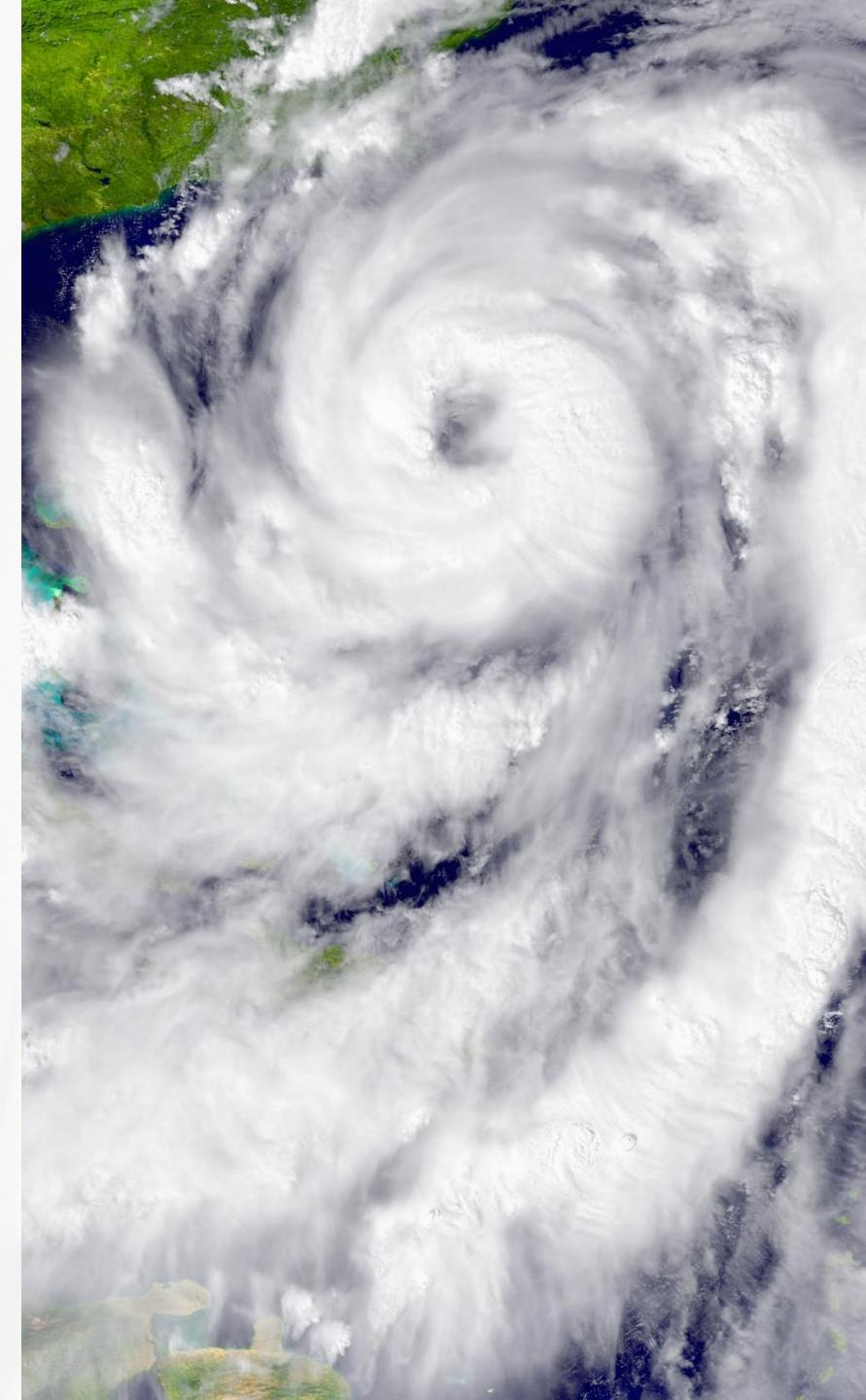




August 2017						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



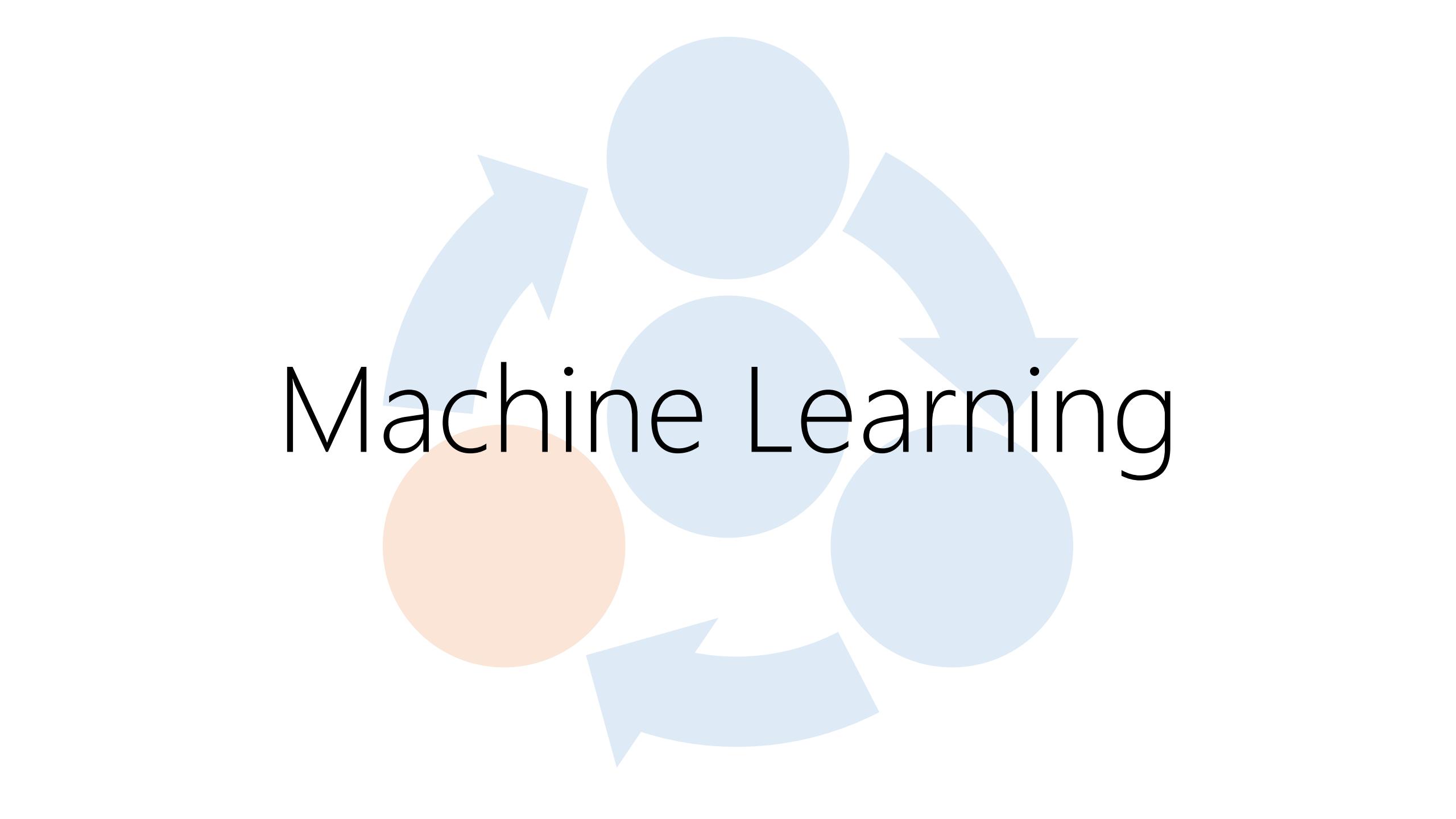




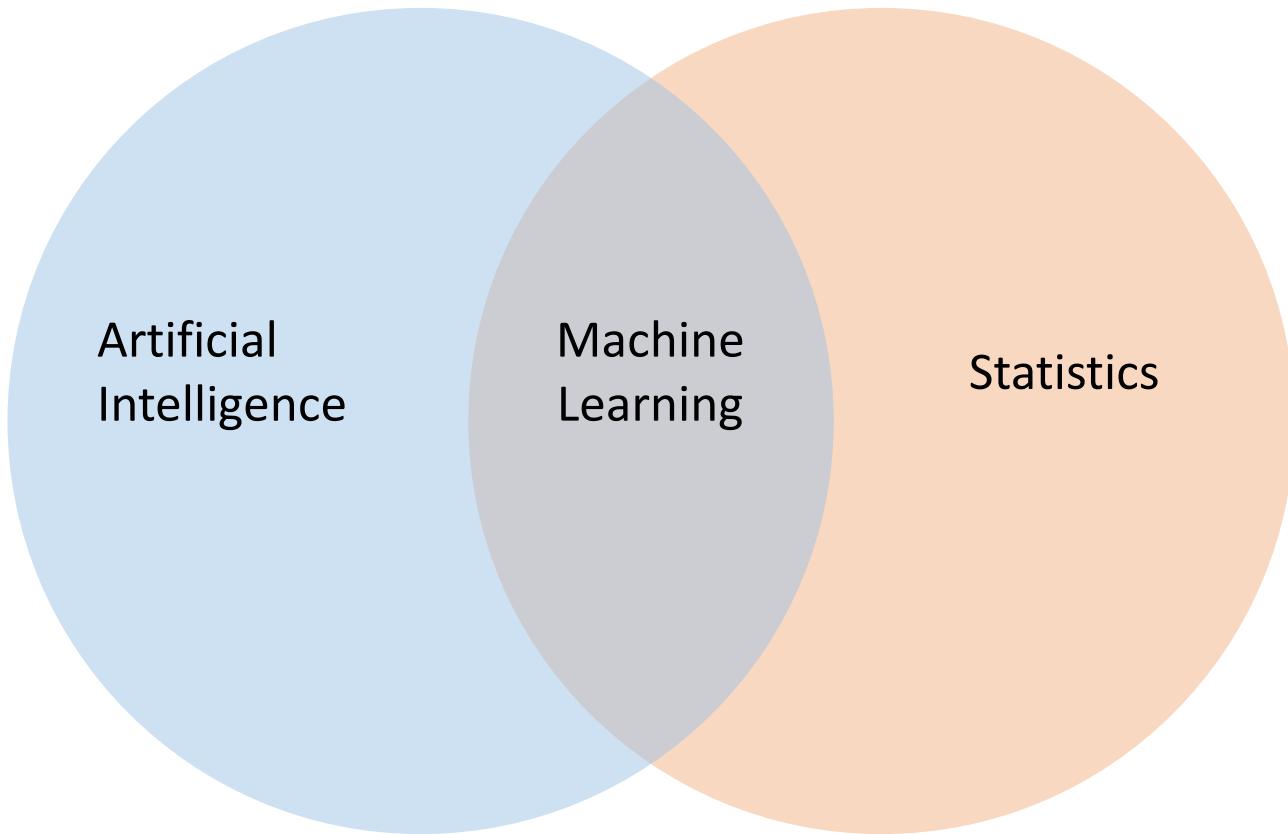


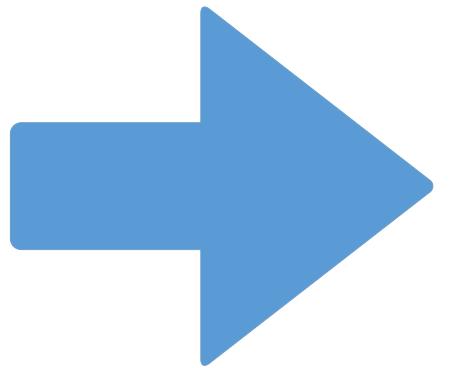
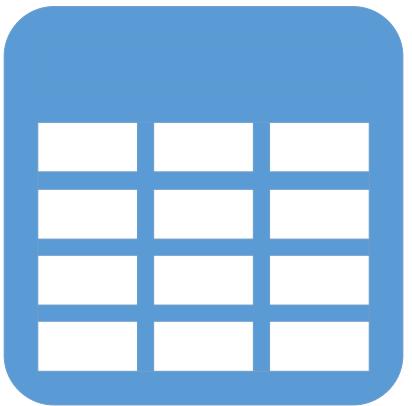
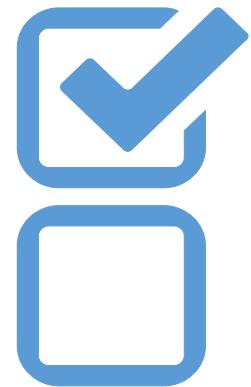
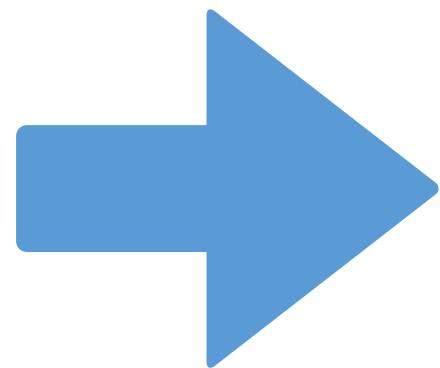
A perspective view of a long row of server racks in a data center. The racks are white with dark grey doors. Blue lights are visible through the glass panels of the doors, showing the internal server components. The ceiling above is white with a grid of recessed lighting. A small green sign with the letters "A3" is mounted on the ceiling above the third rack from the left.

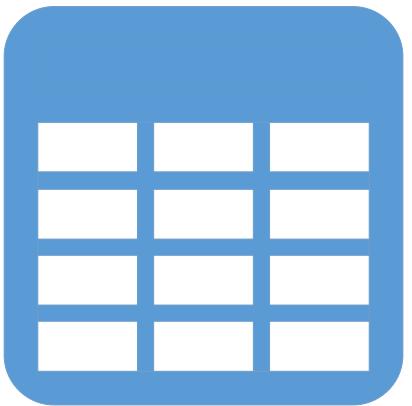
Big Data is the brain for AI.

The background of the image features a circular arrangement of overlapping circles in light blue, light orange, and white. Four large, semi-transparent chevron-shaped arrows point clockwise around the circle, each in a different shade of light blue.

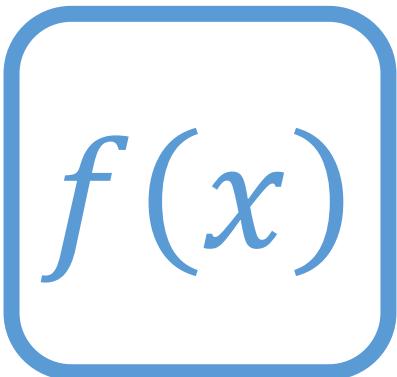
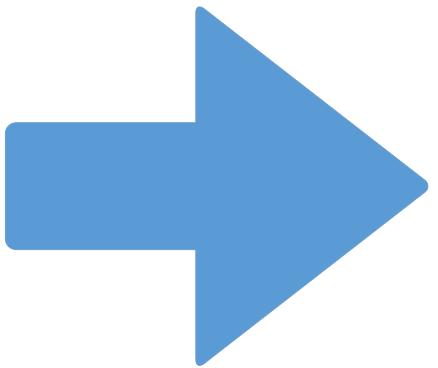
Machine Learning



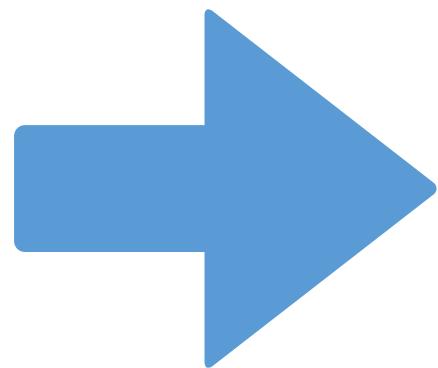
 $f(x)$ 



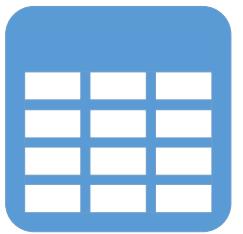
Data



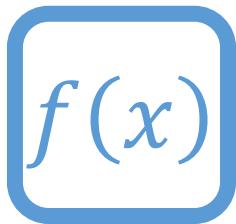
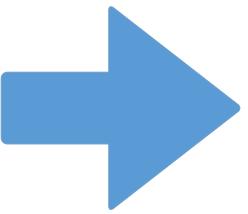
Function



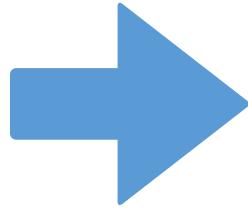
Prediction



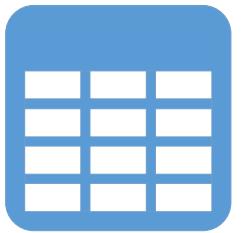
Data



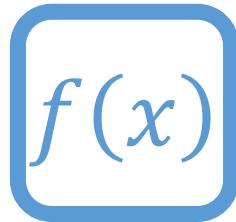
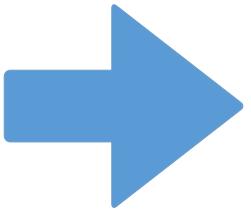
Function



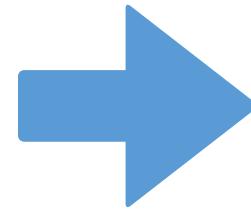
Prediction



Data

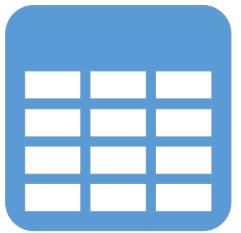


Function

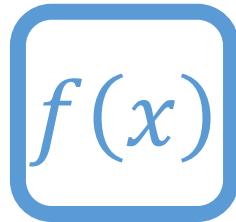
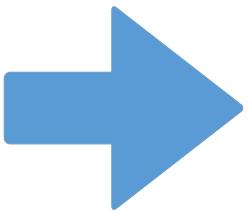


Prediction

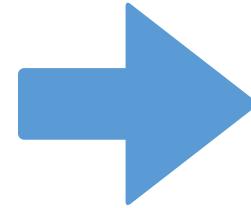




Data



Function



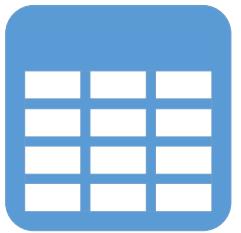
Prediction



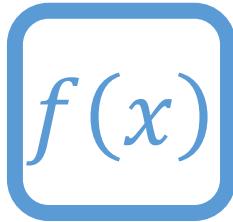
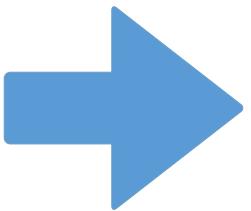
Cat



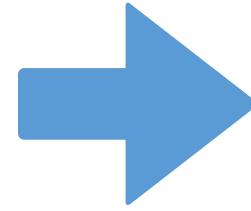
Dog



Data



Function



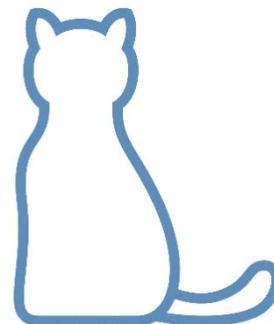
Prediction

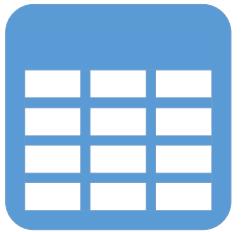


Cat

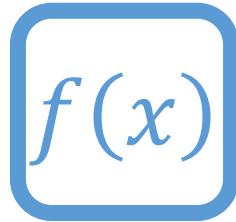
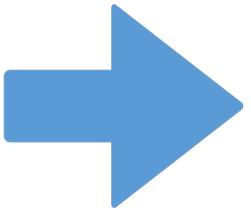


Dog

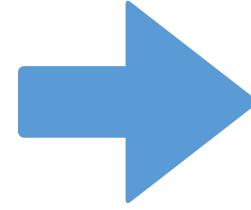




Data



Function



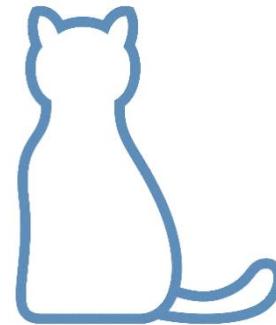
Prediction



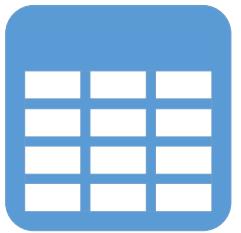
Cat



Dog



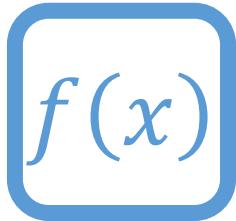
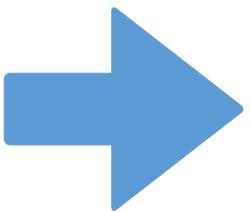
Is cat?



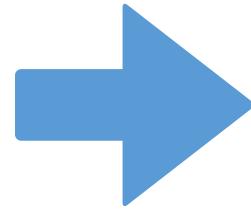
Data



Cat



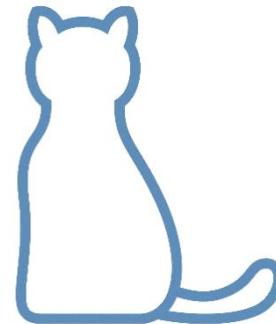
Function



Prediction

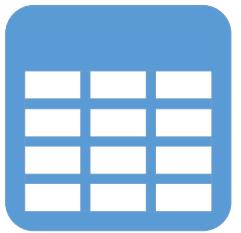


Dog



Is cat?

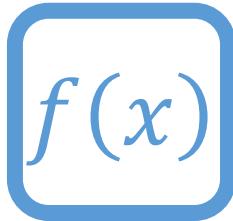
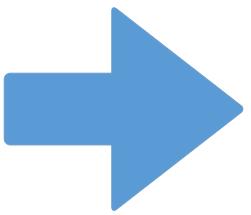




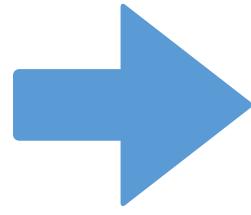
Data



Cat



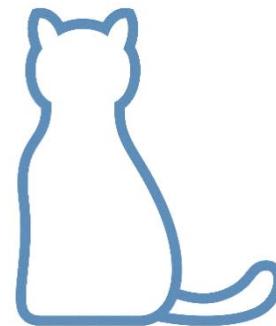
Function



Prediction



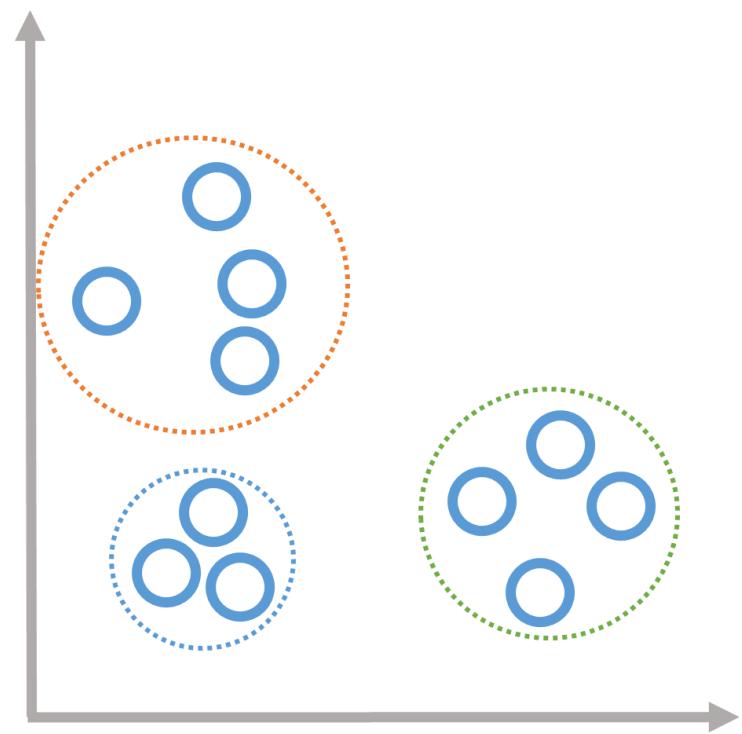
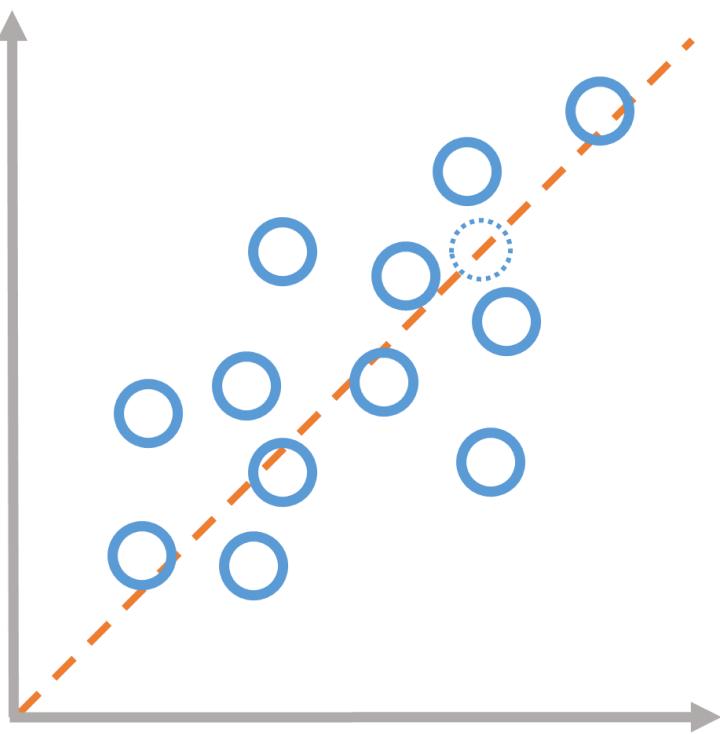
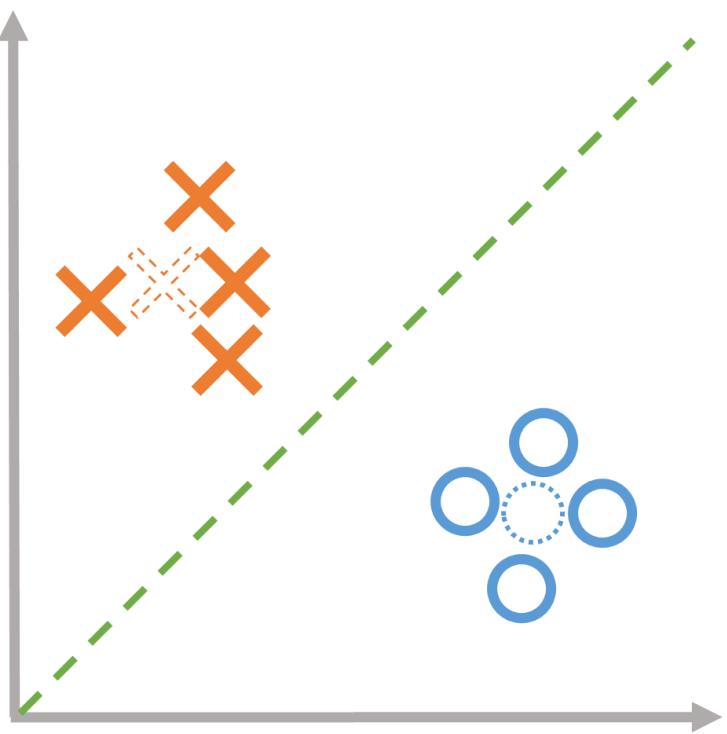
Dog

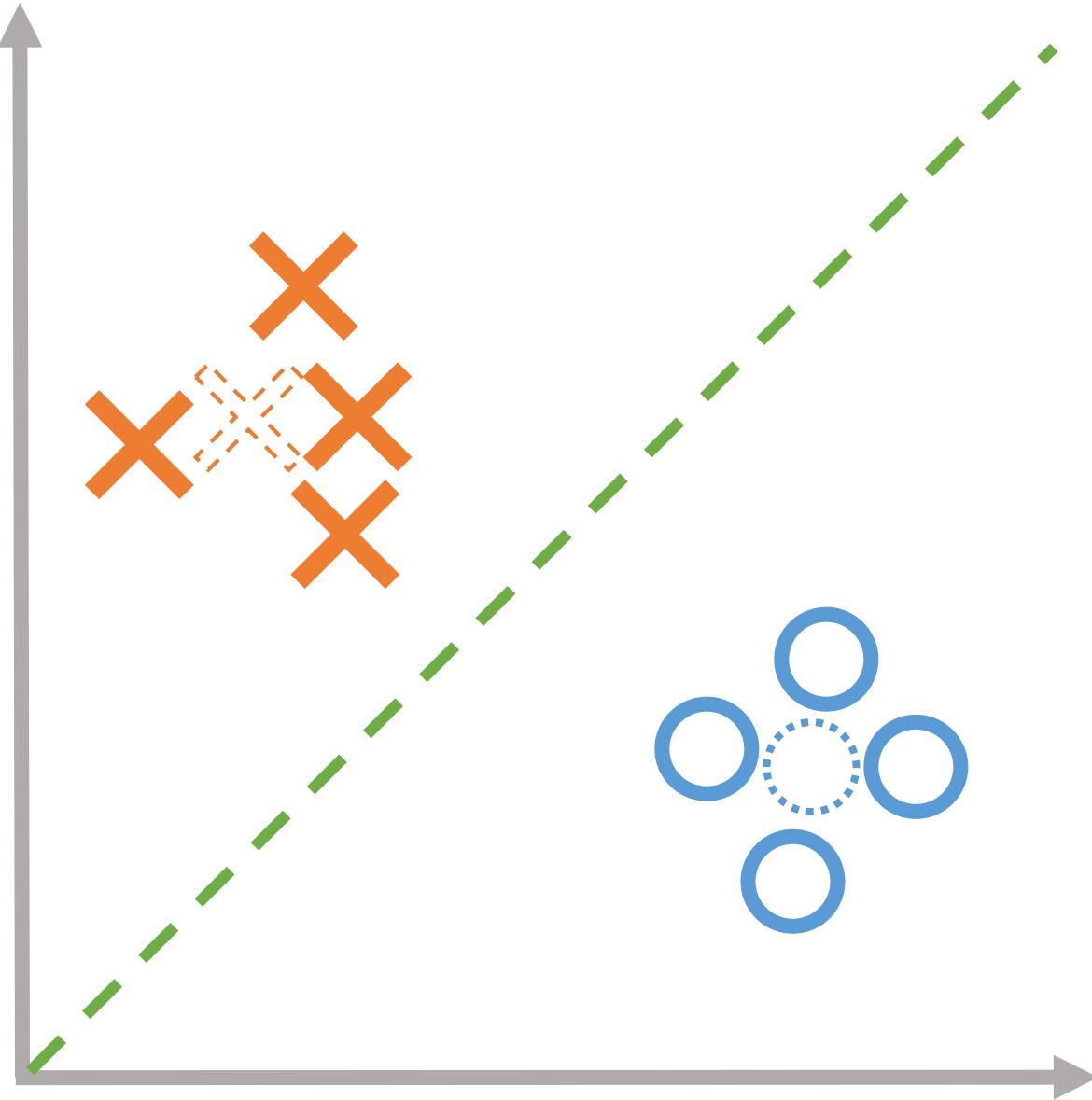


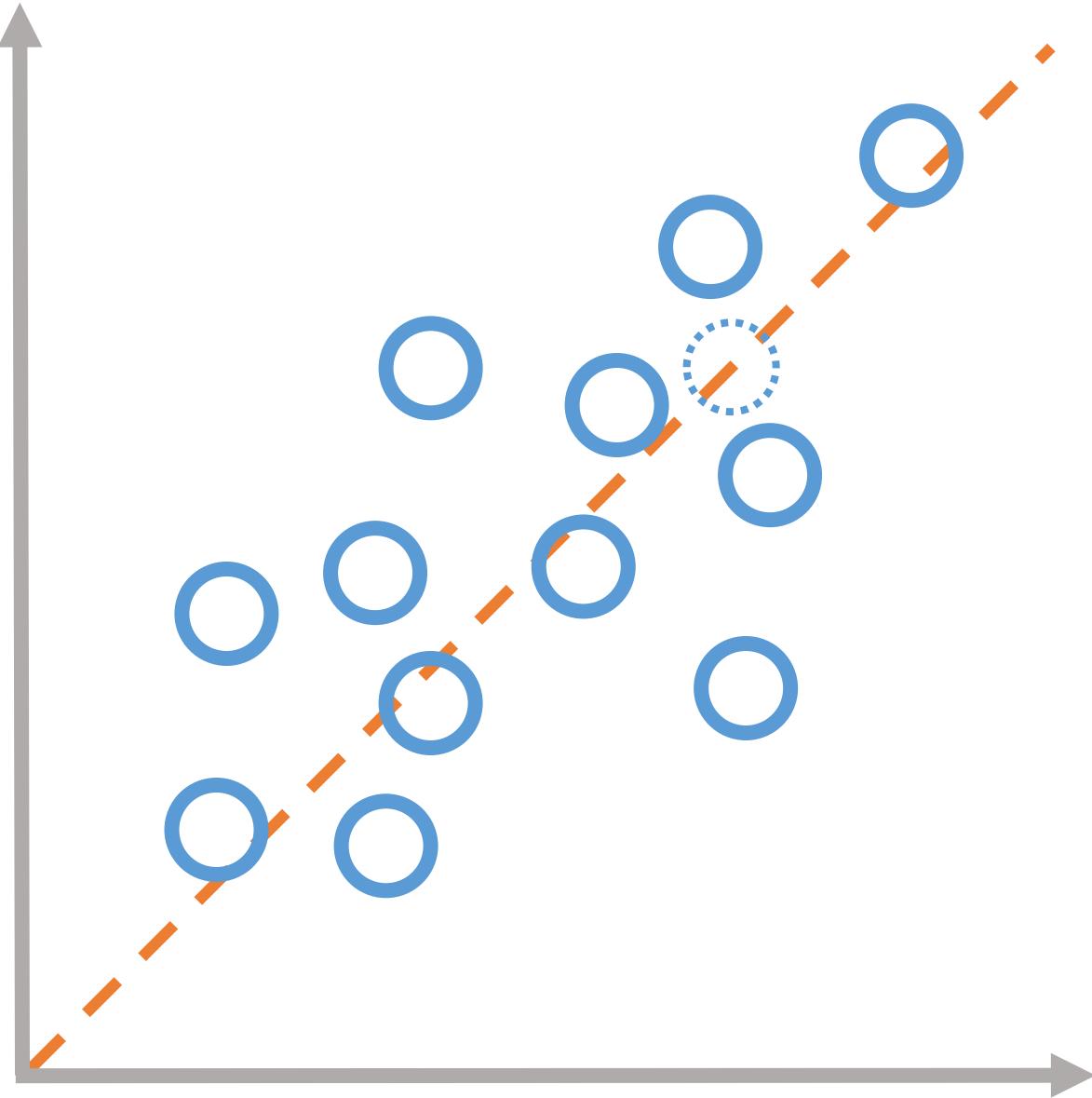
Is cat?

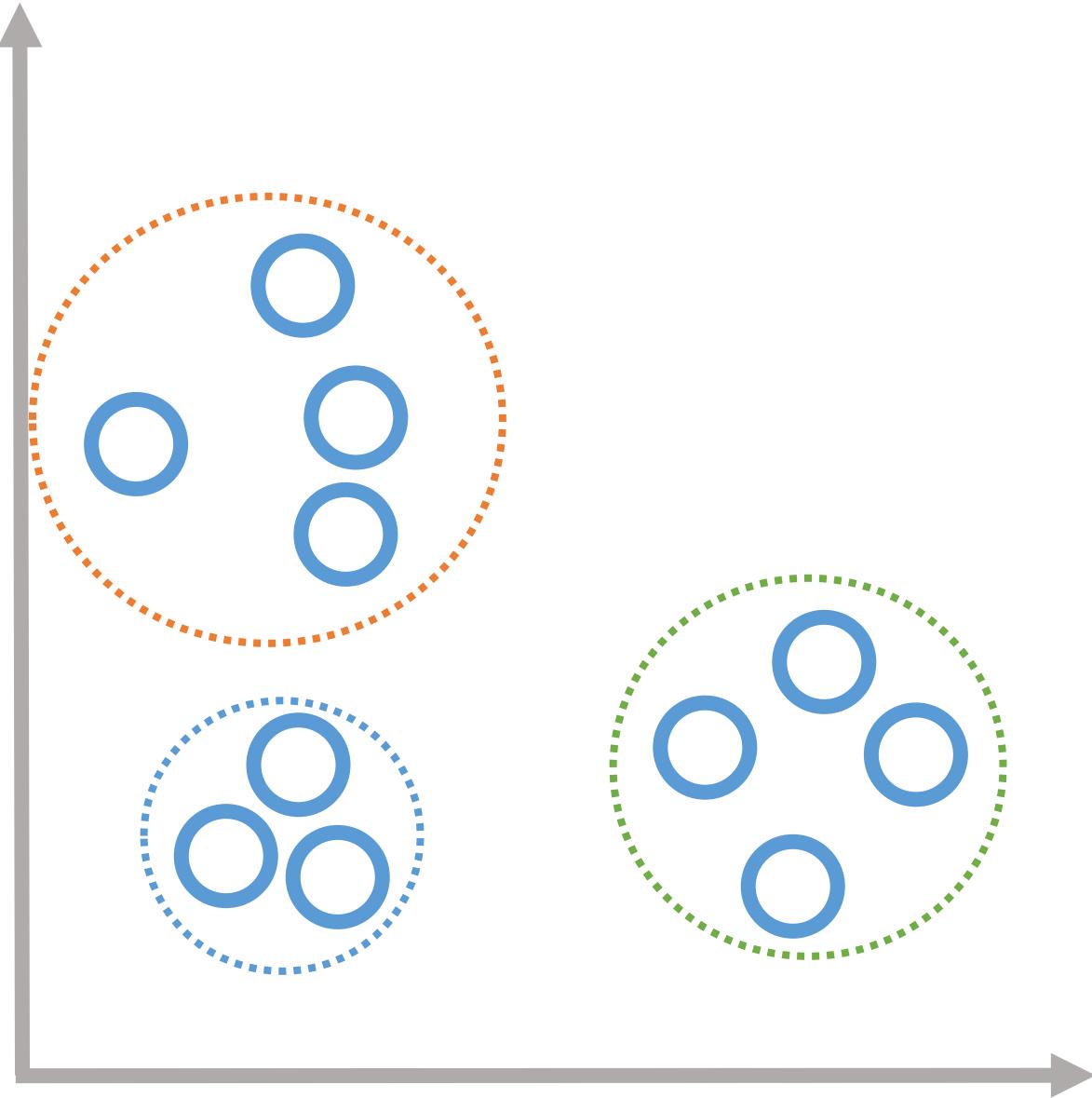


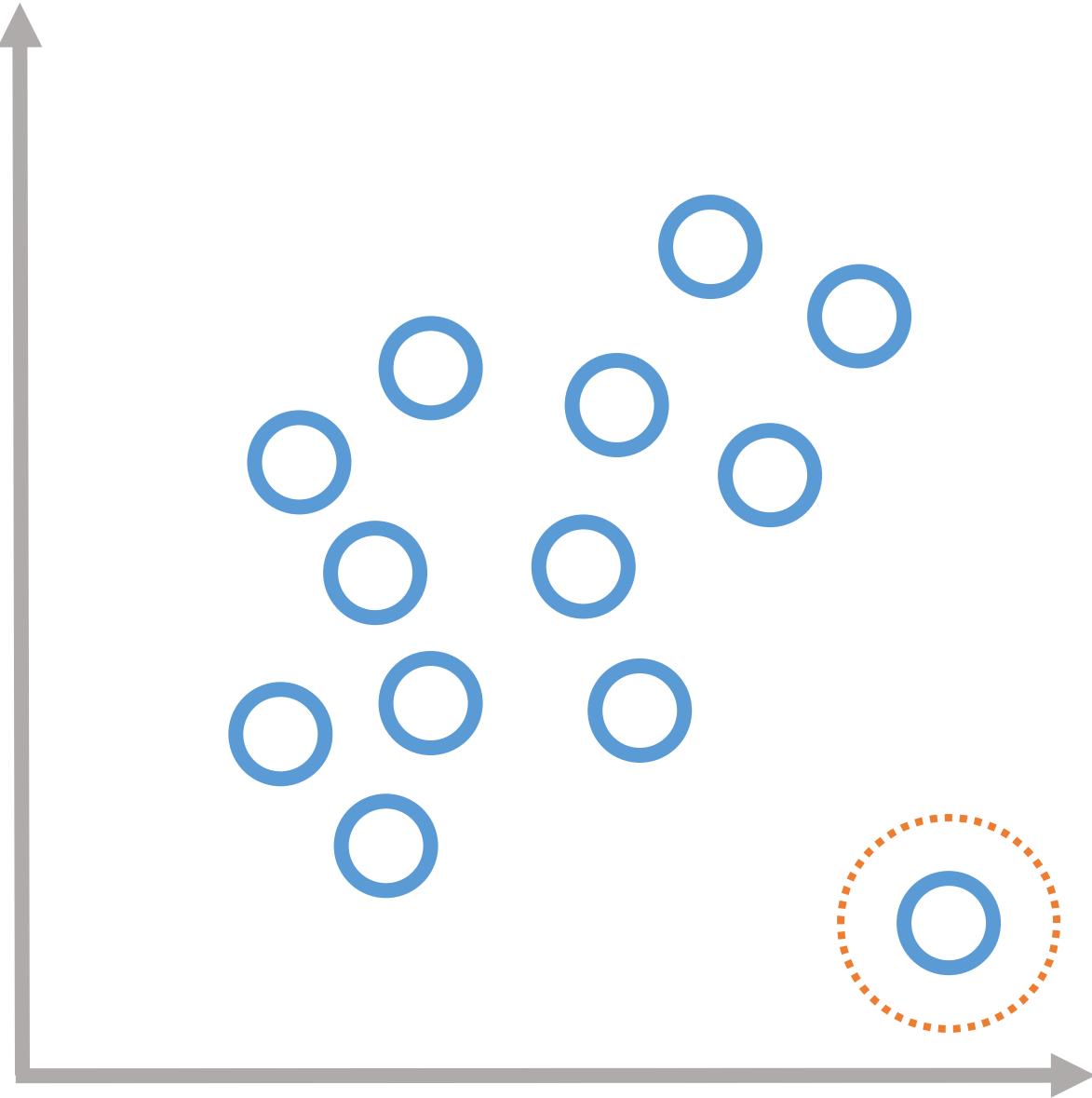
Yes

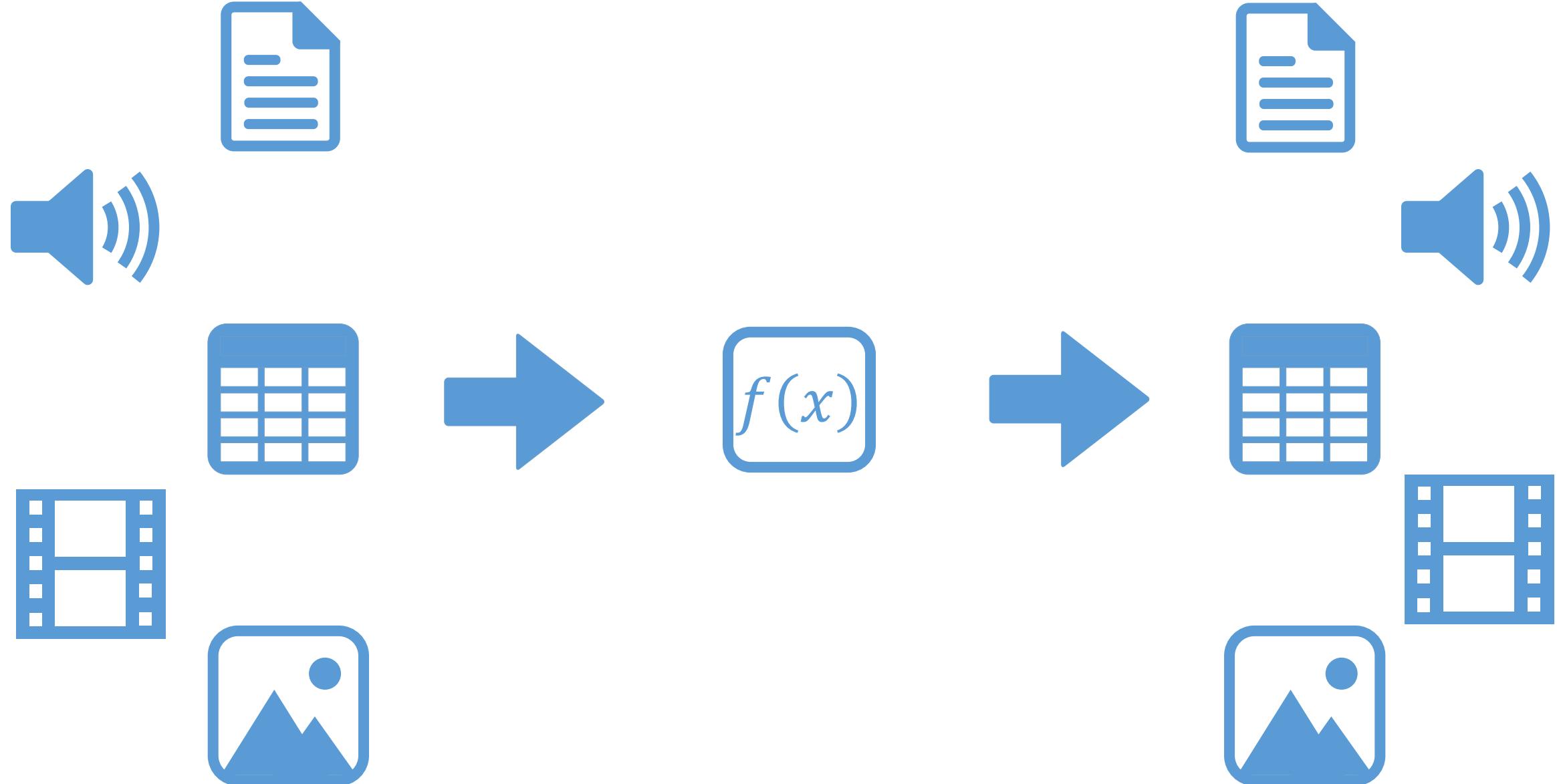


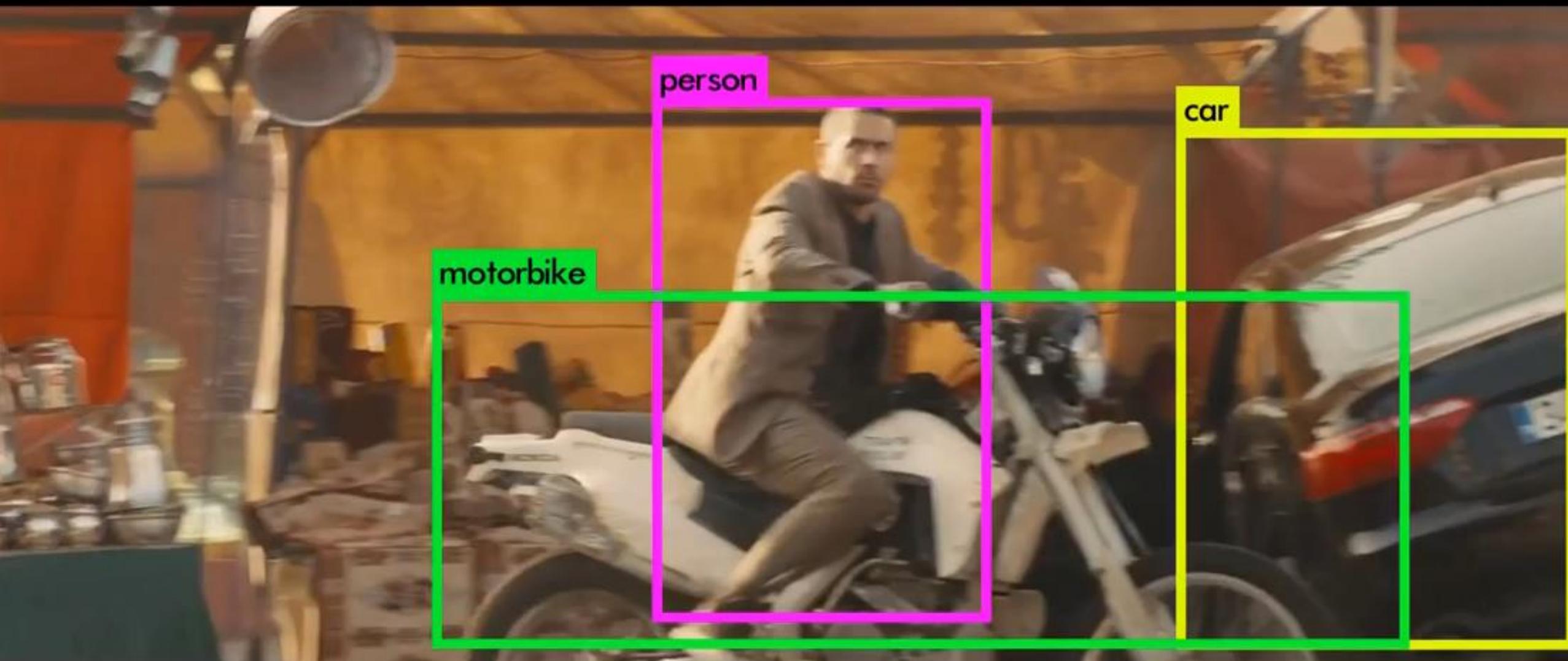










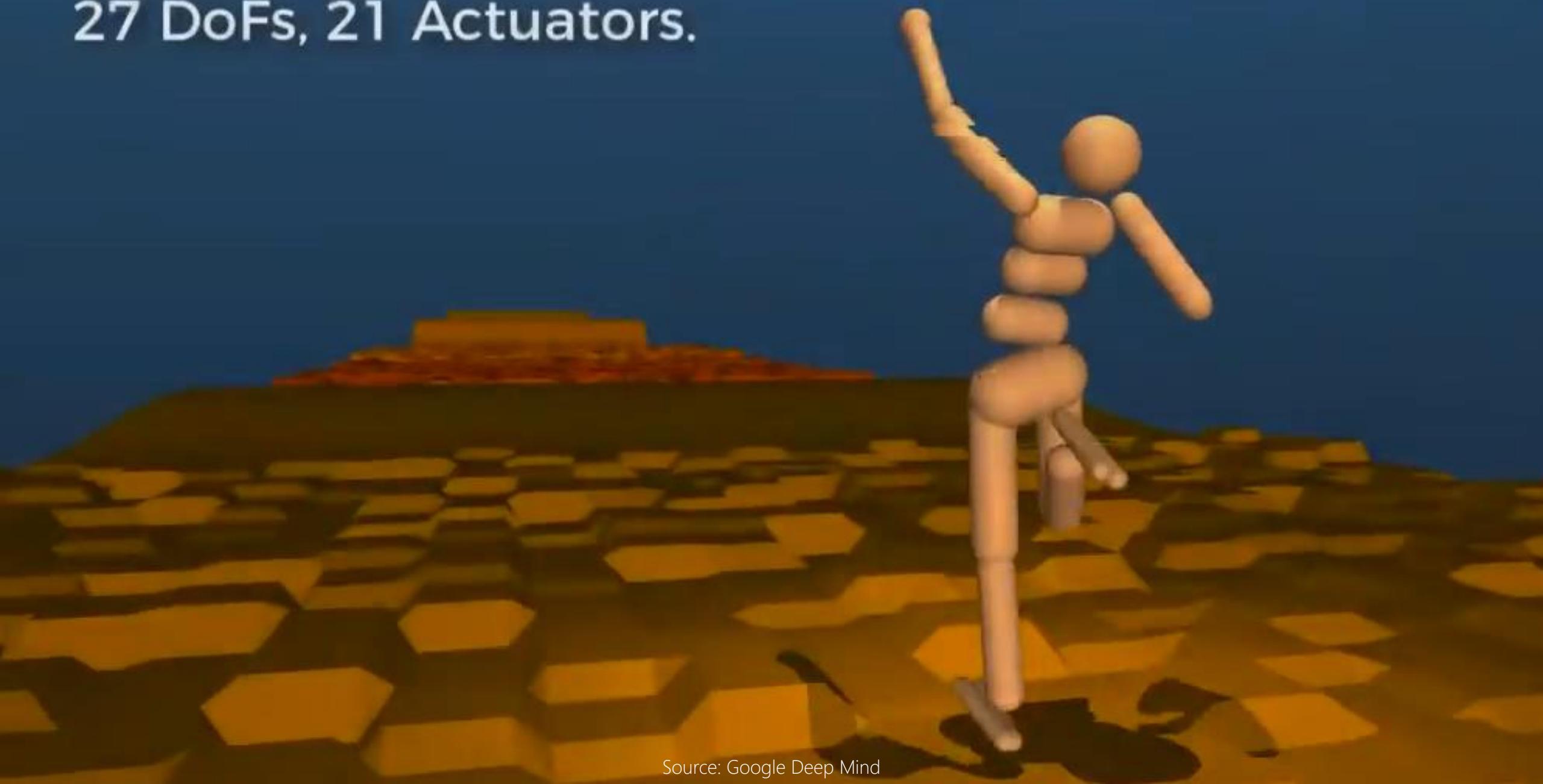


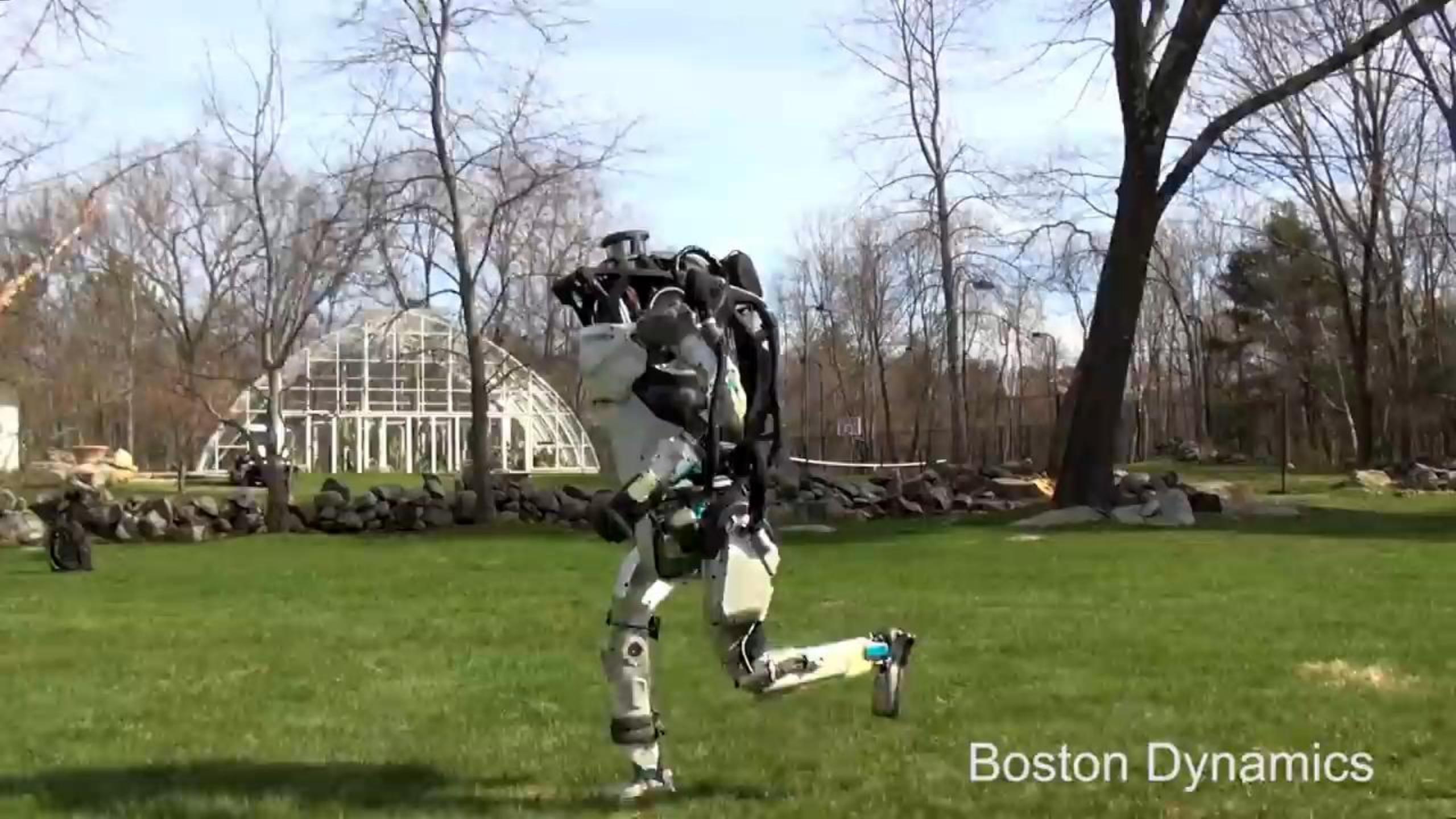


Source: Nvidia



Humanoid:
27 DoFs, 21 Actuators.

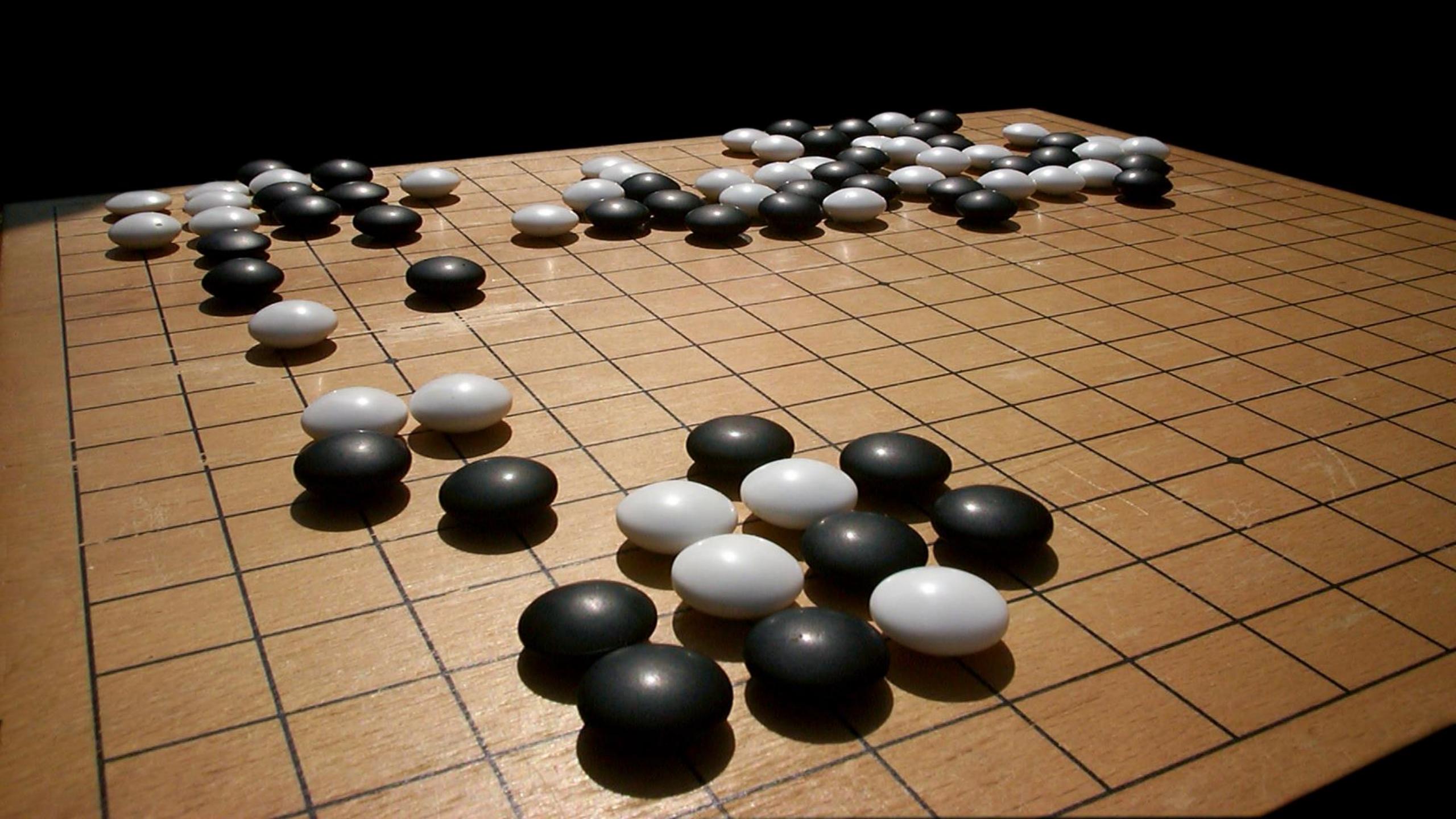




Boston Dynamics

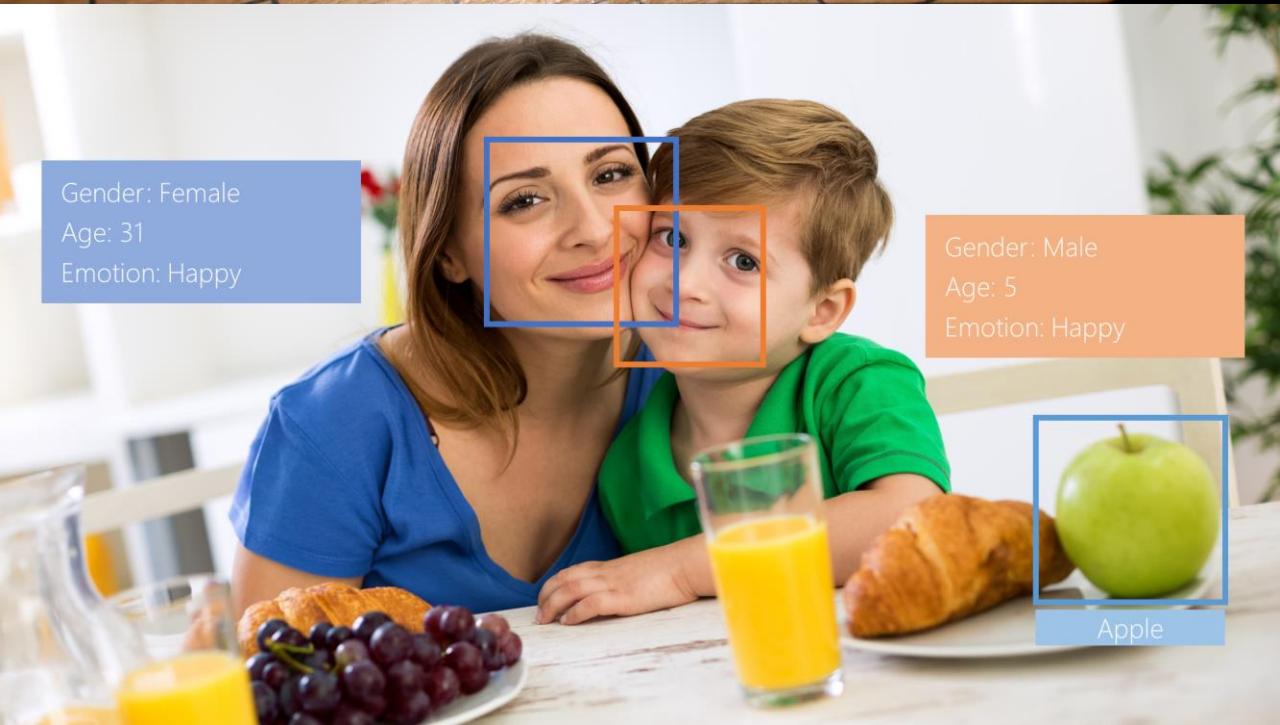
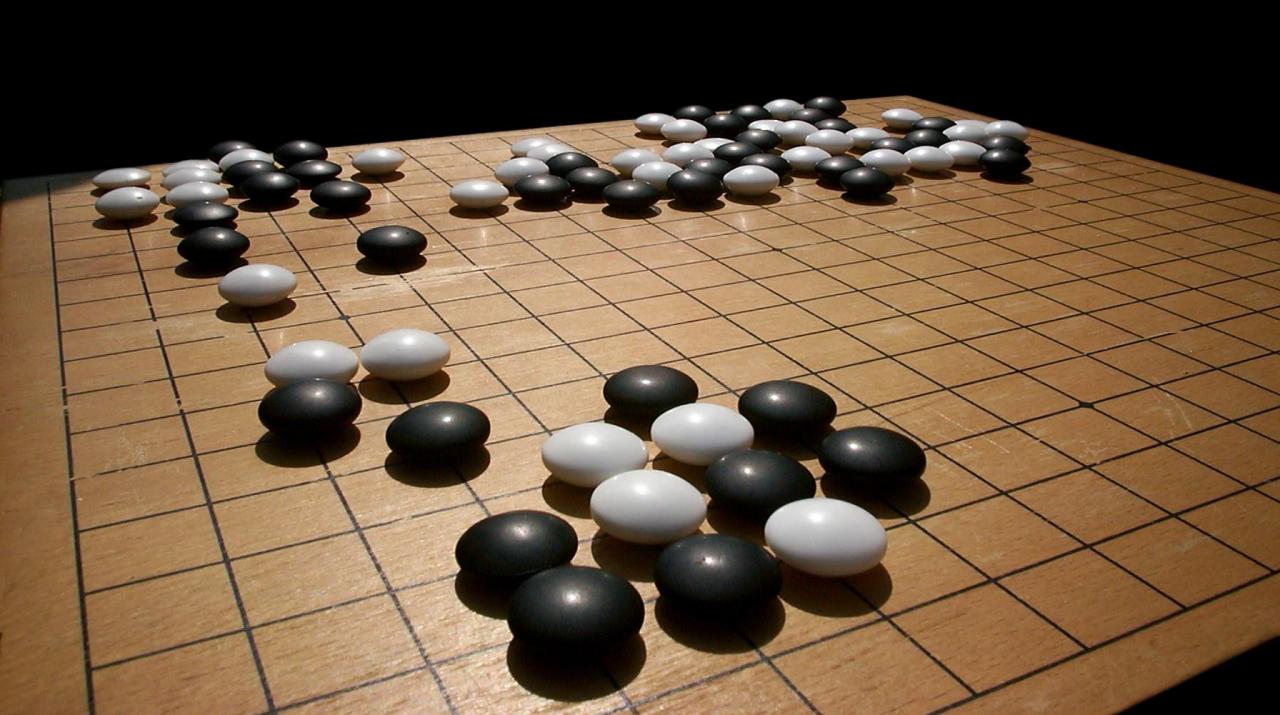


Source: Boston Dynamics













CAUTION





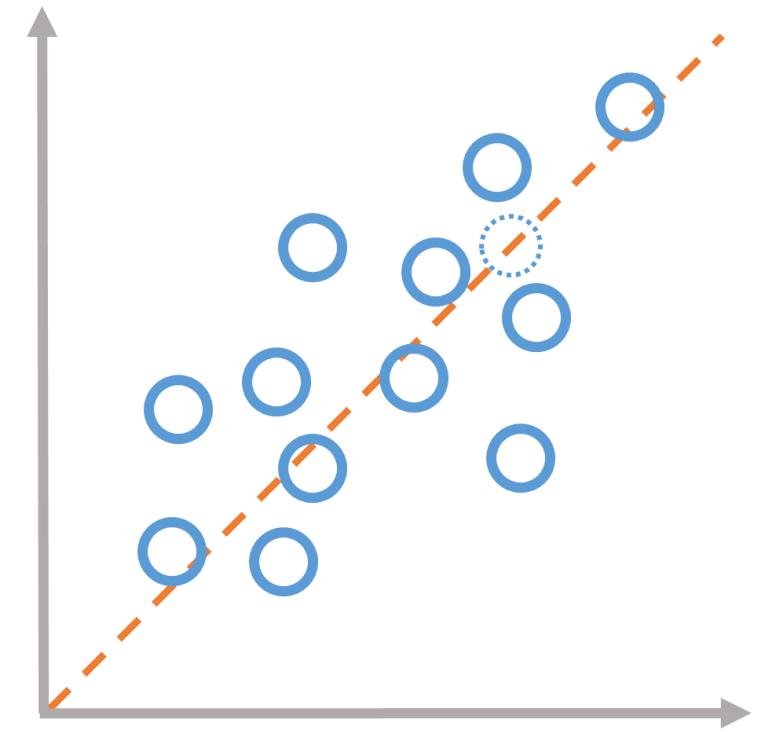
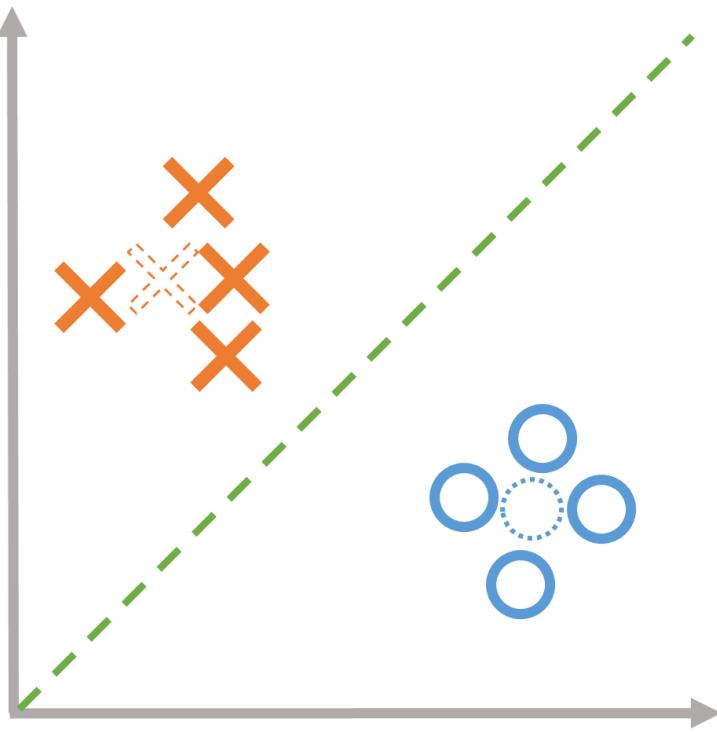
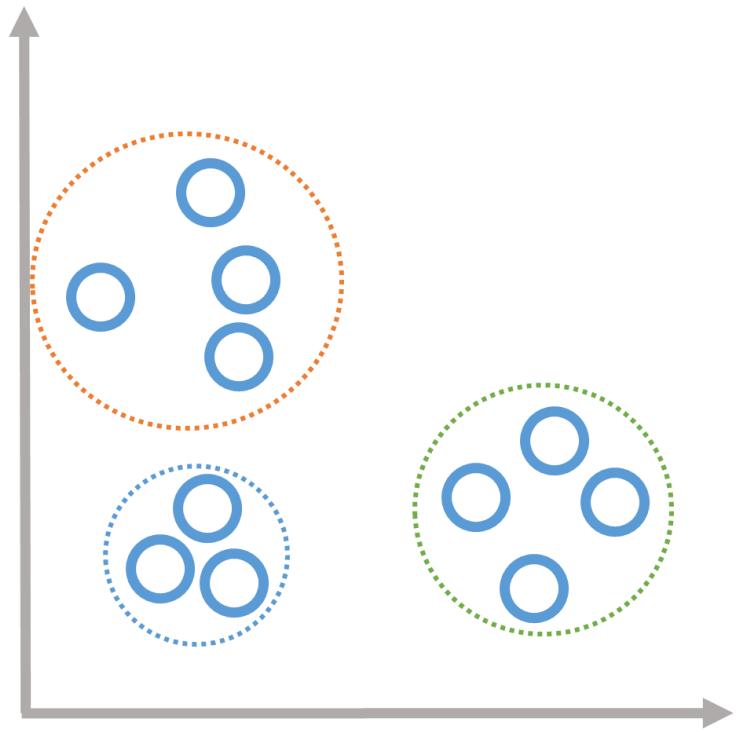


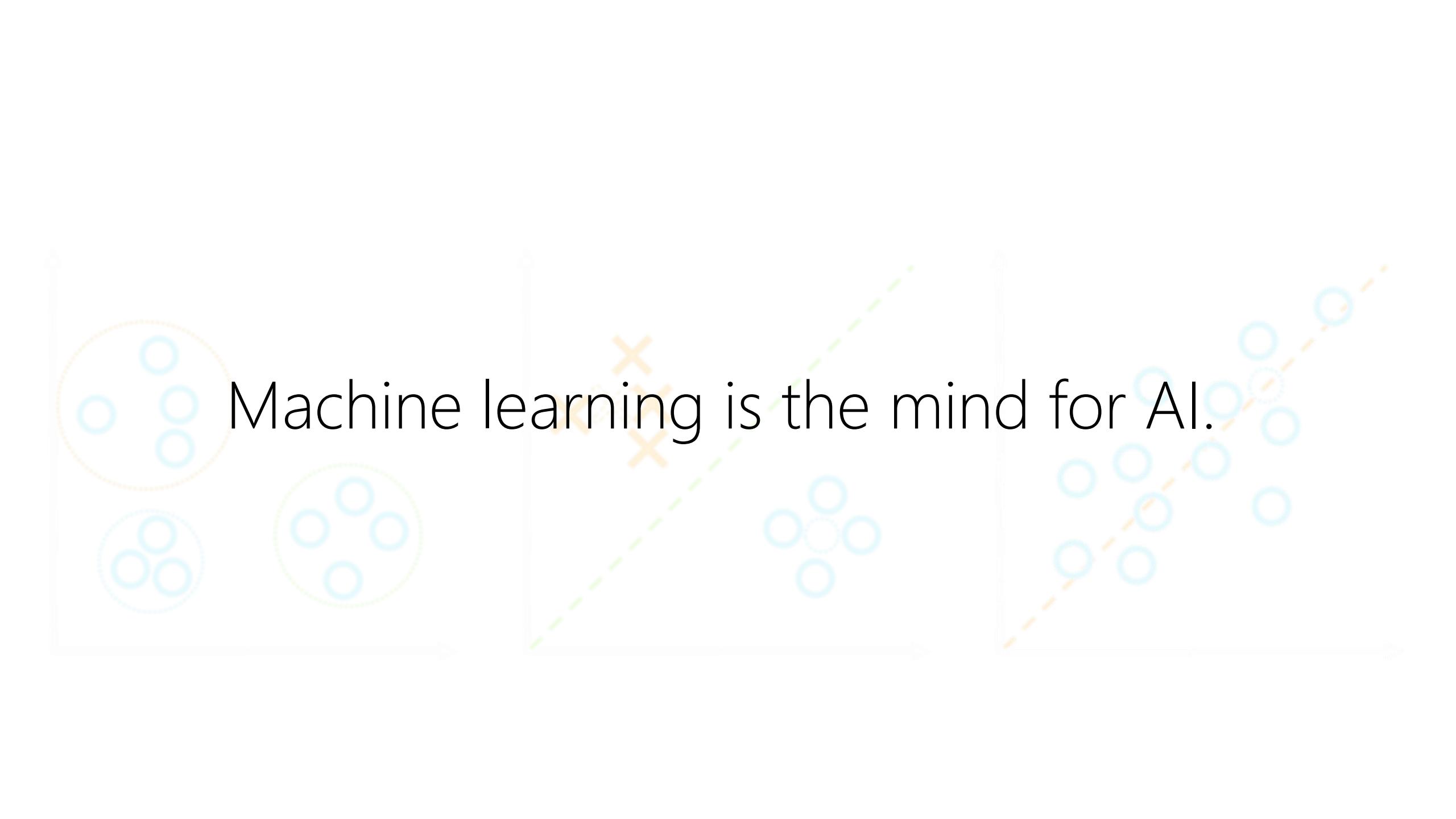






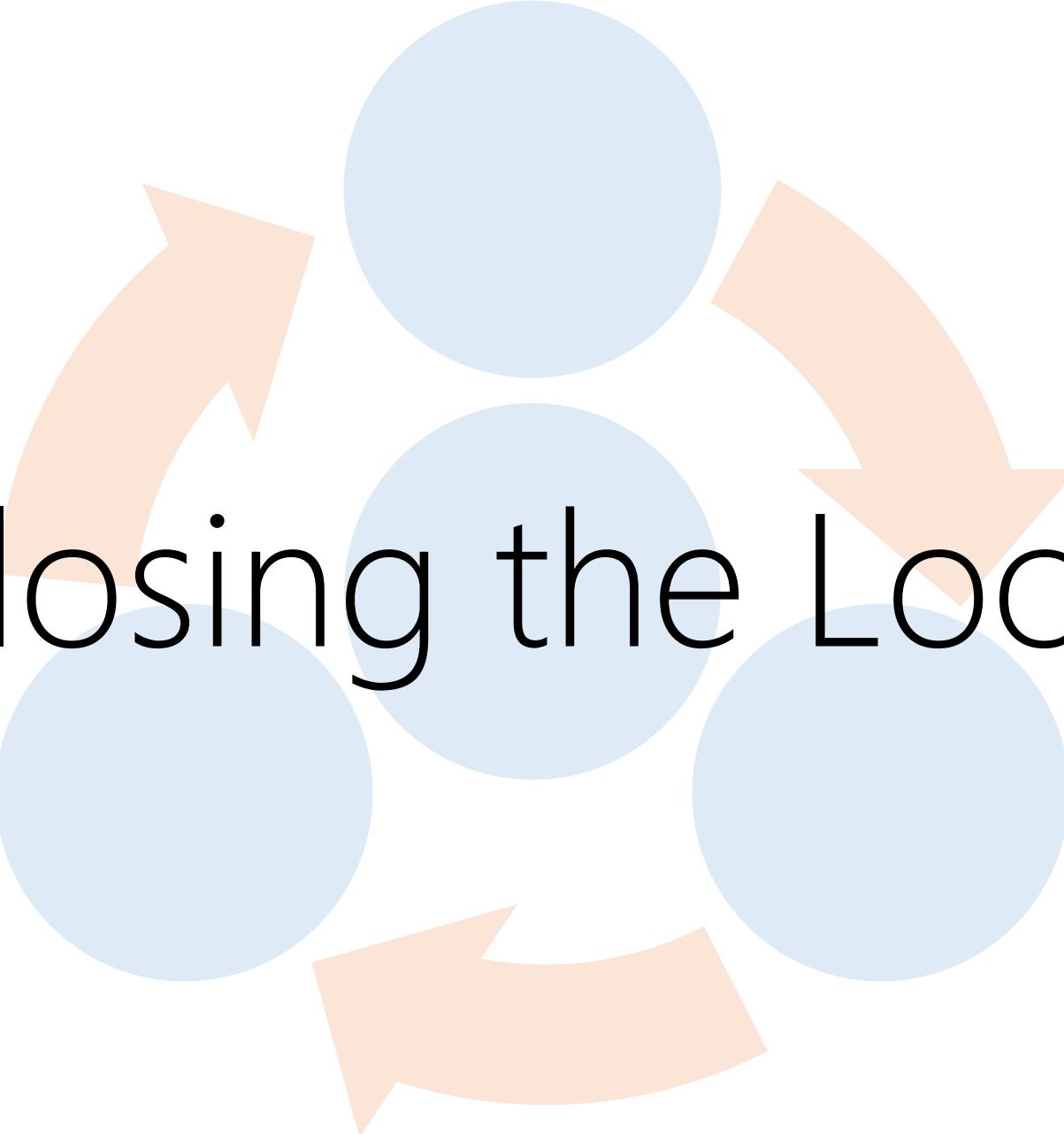
Source: Pouff - Grocery Trip



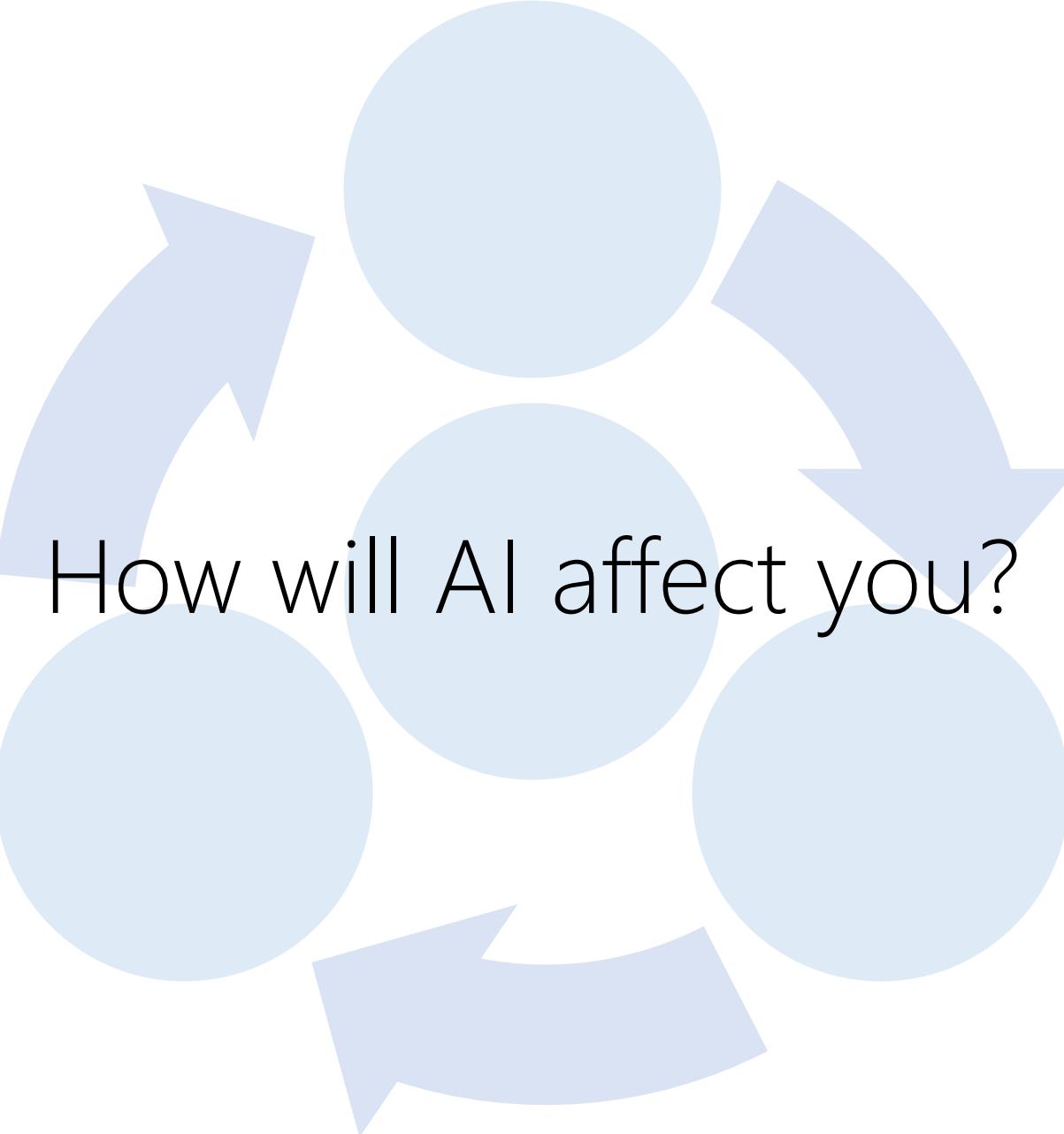


Machine learning is the mind for AI.

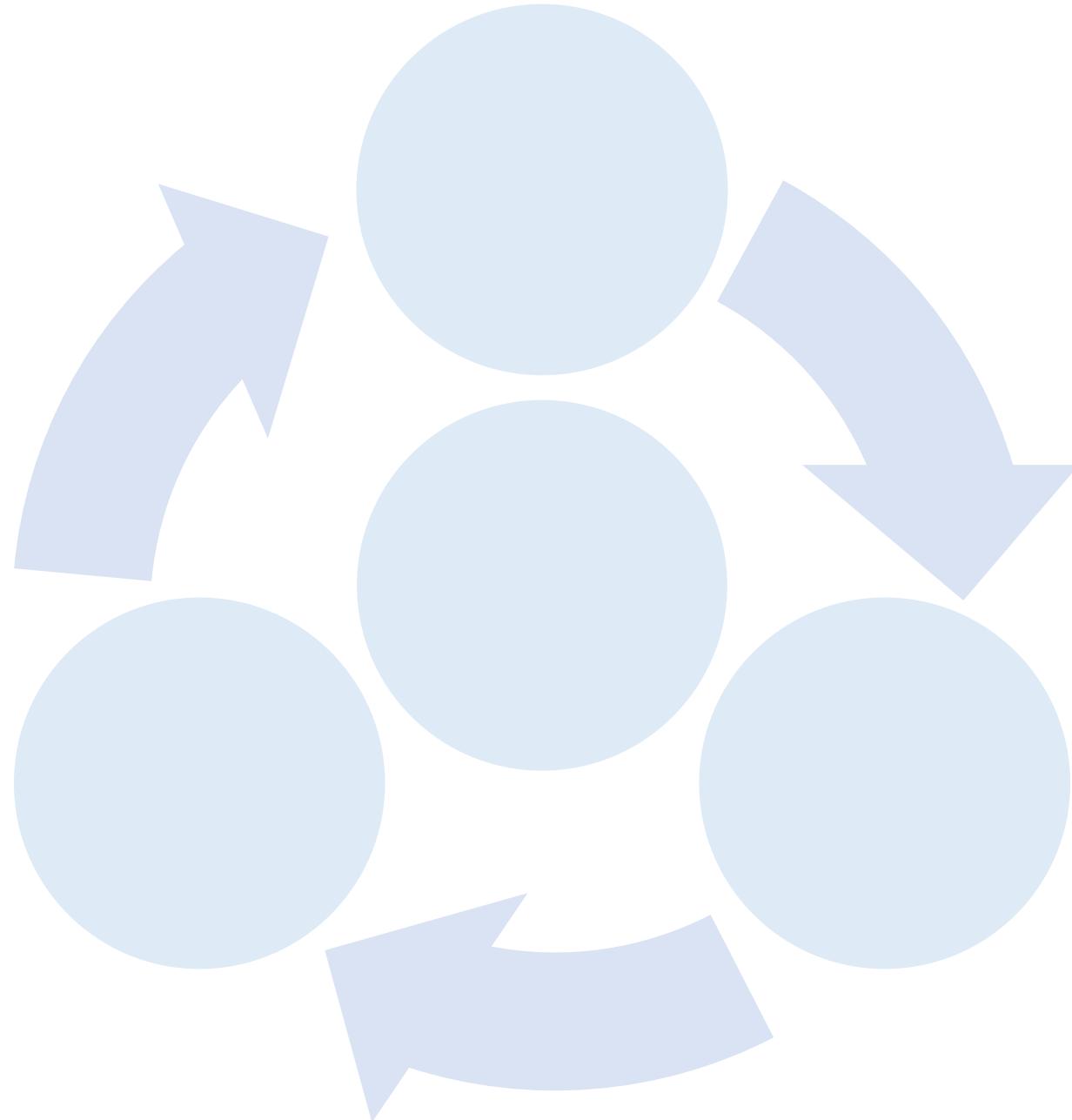
The background features several clusters of light blue circles of varying sizes, some enclosed in dotted outlines. A large orange dashed 'X' is positioned above the text. Two green dashed lines intersect behind the text. A vertical orange dashed line is on the right side, and a horizontal orange dashed arrow points to the right at the bottom.



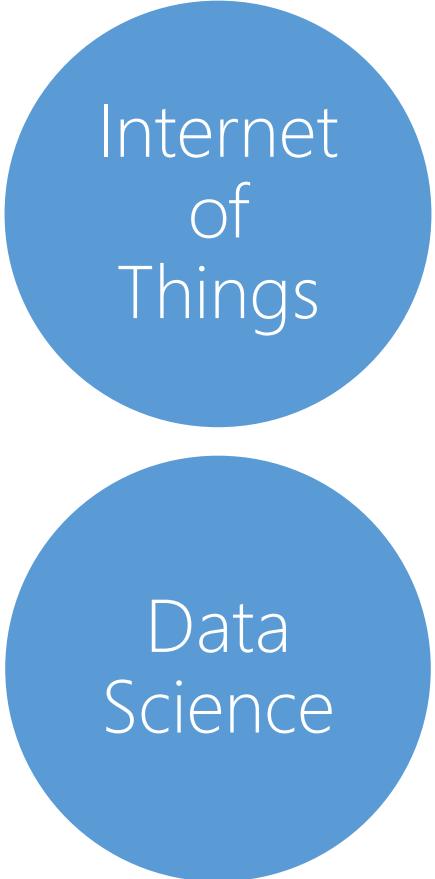
Closing the Loop



How will AI affect you?

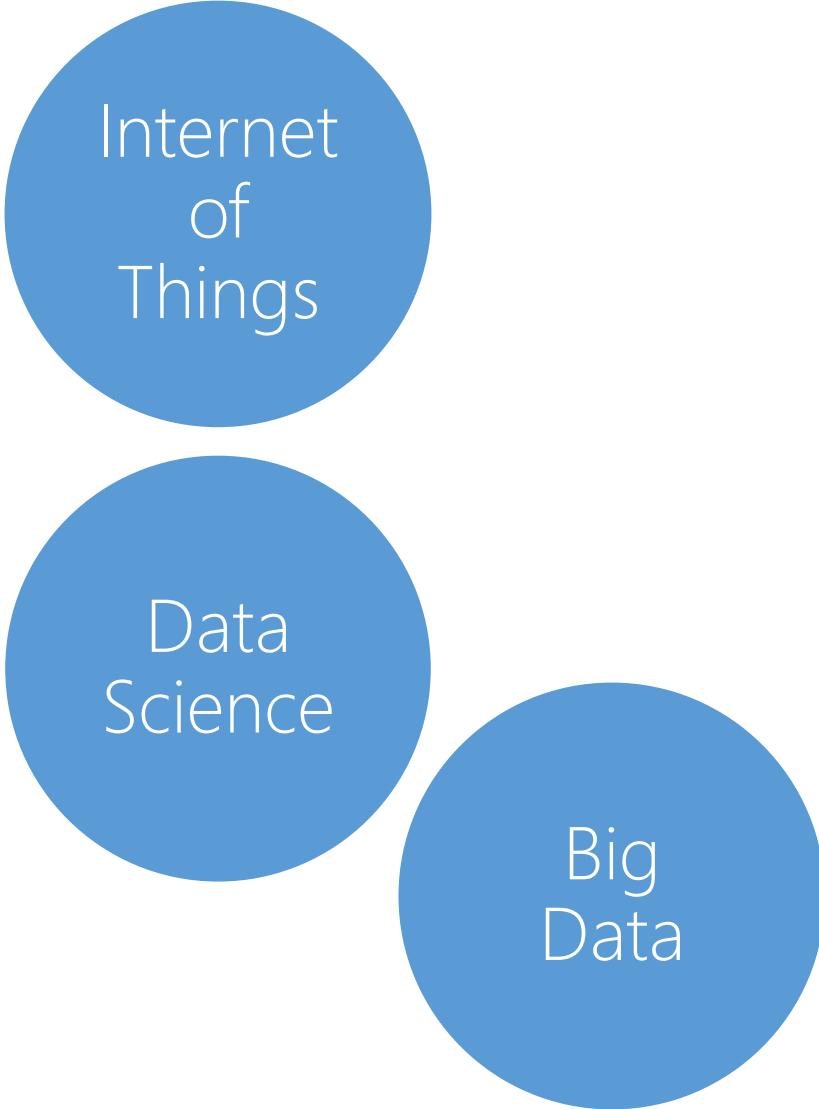


Data
Science



Internet
of
Things

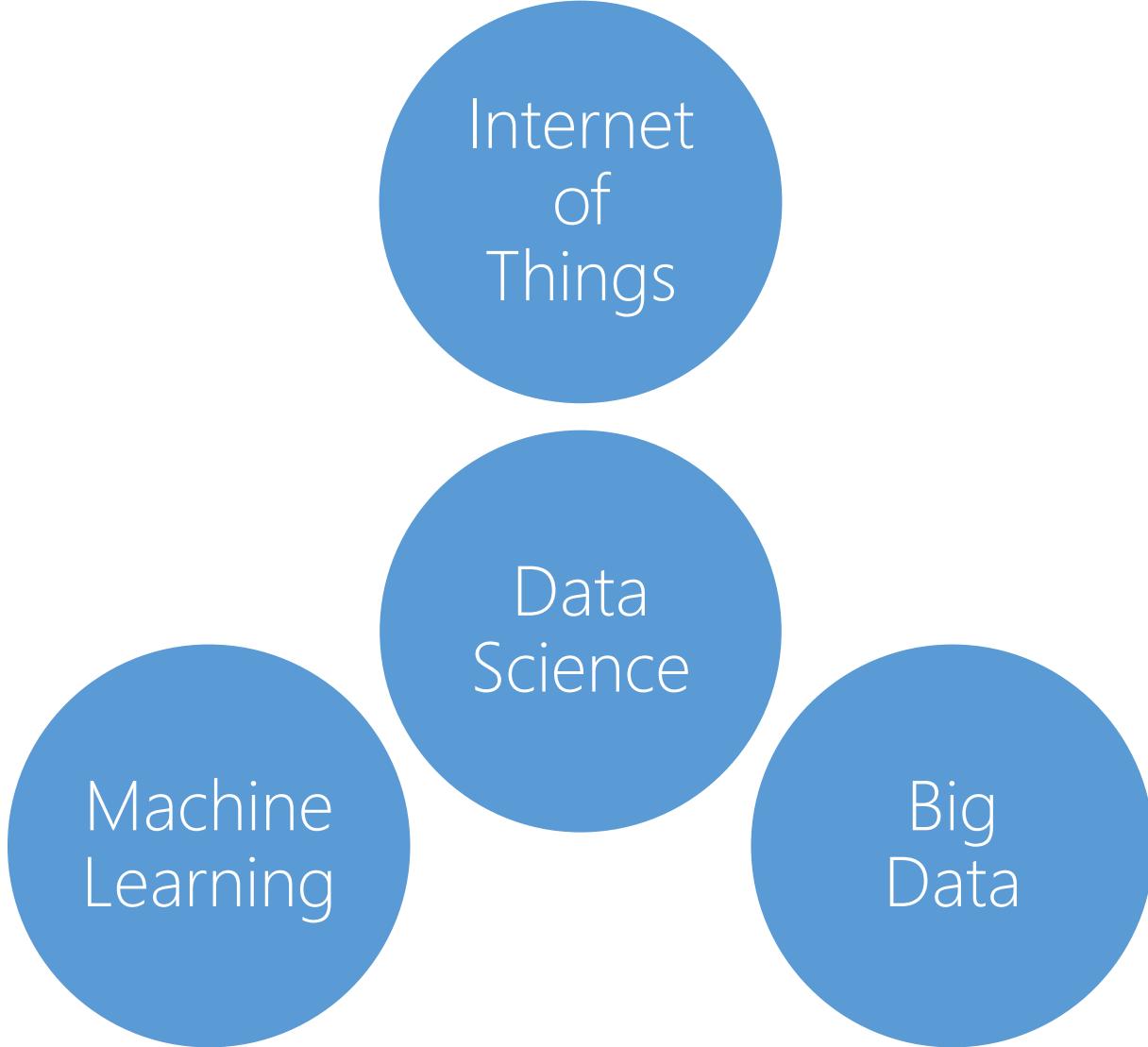
Data
Science



Internet
of
Things

Data
Science

Big
Data

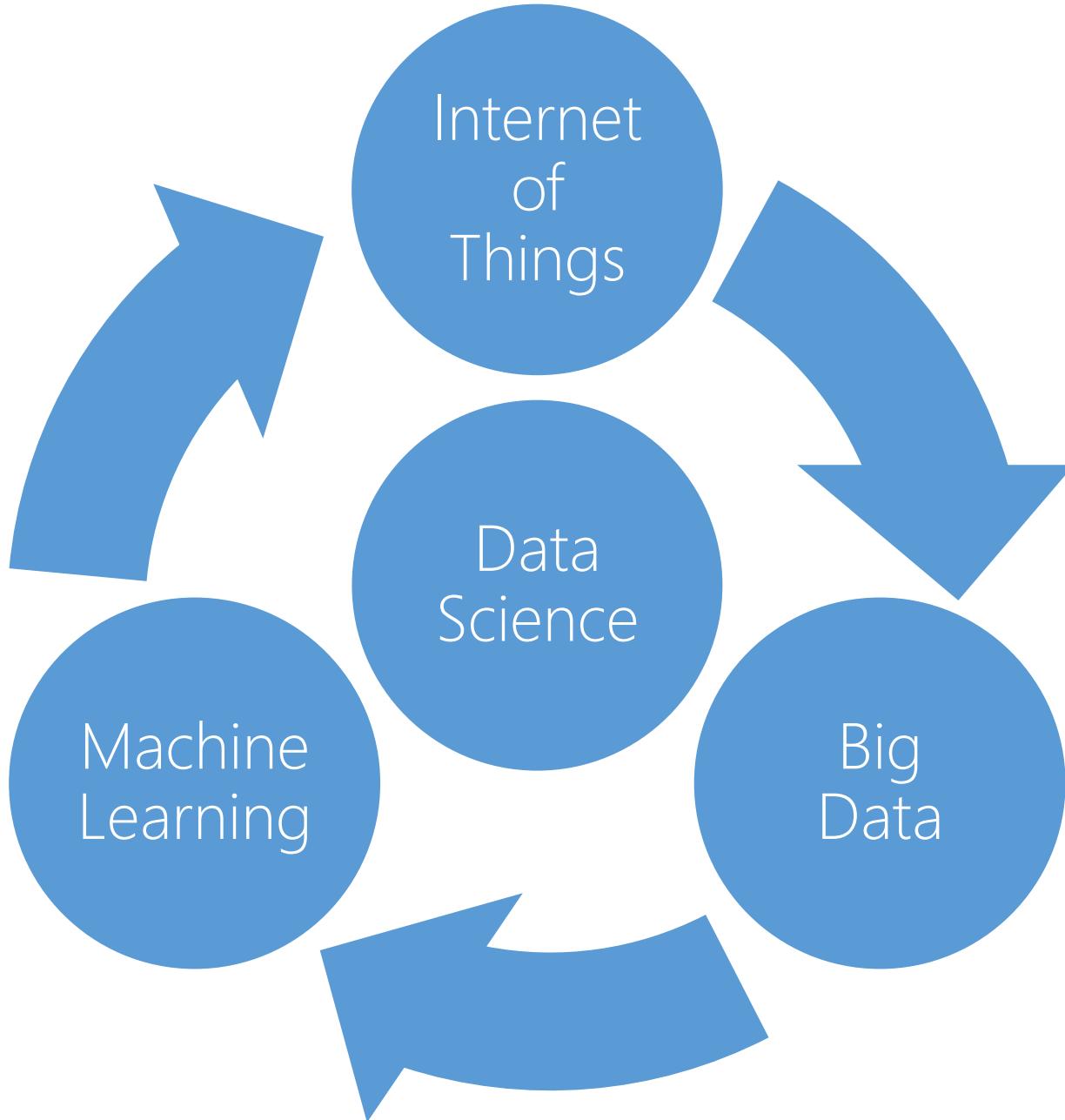


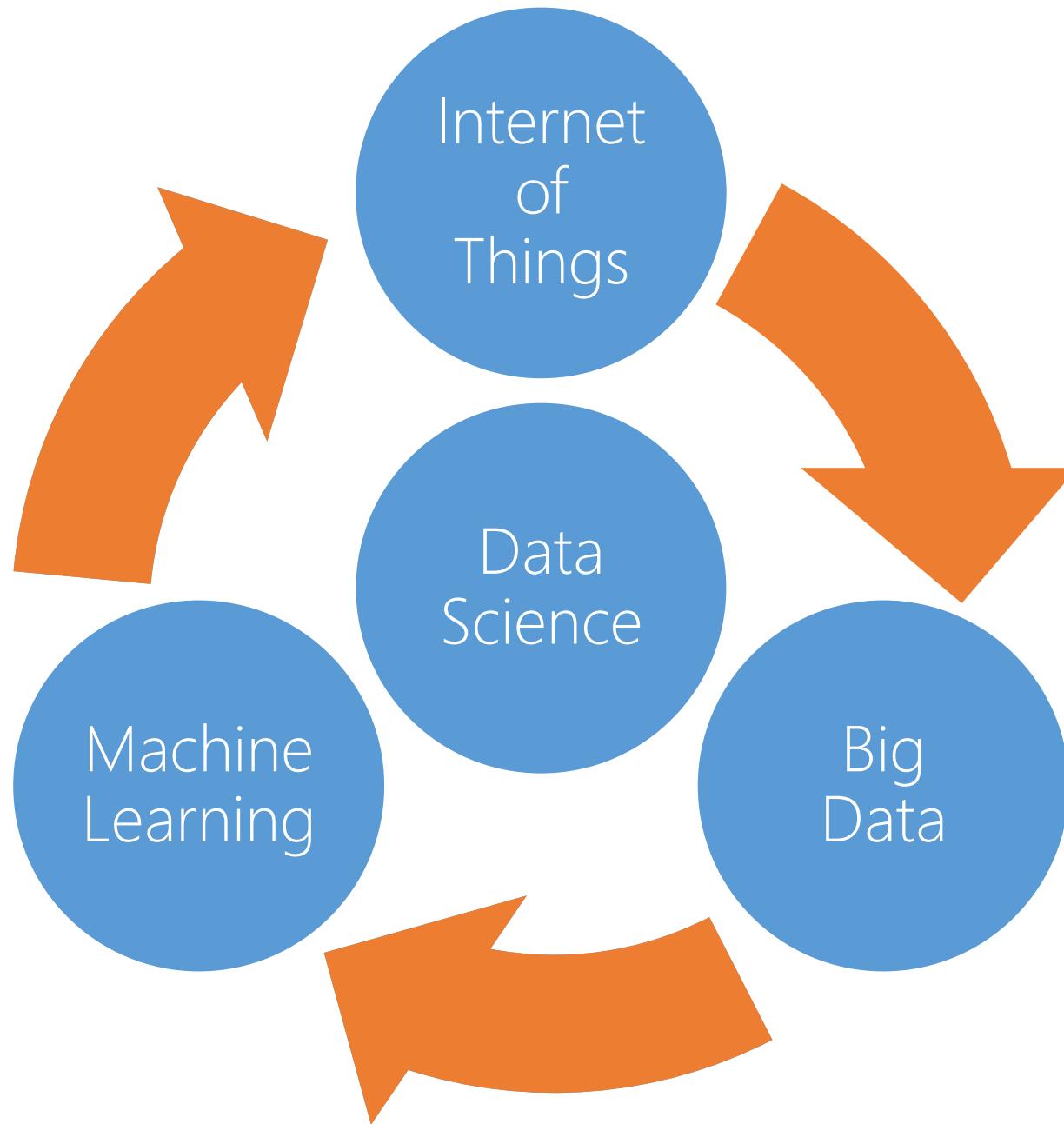
Internet
of
Things

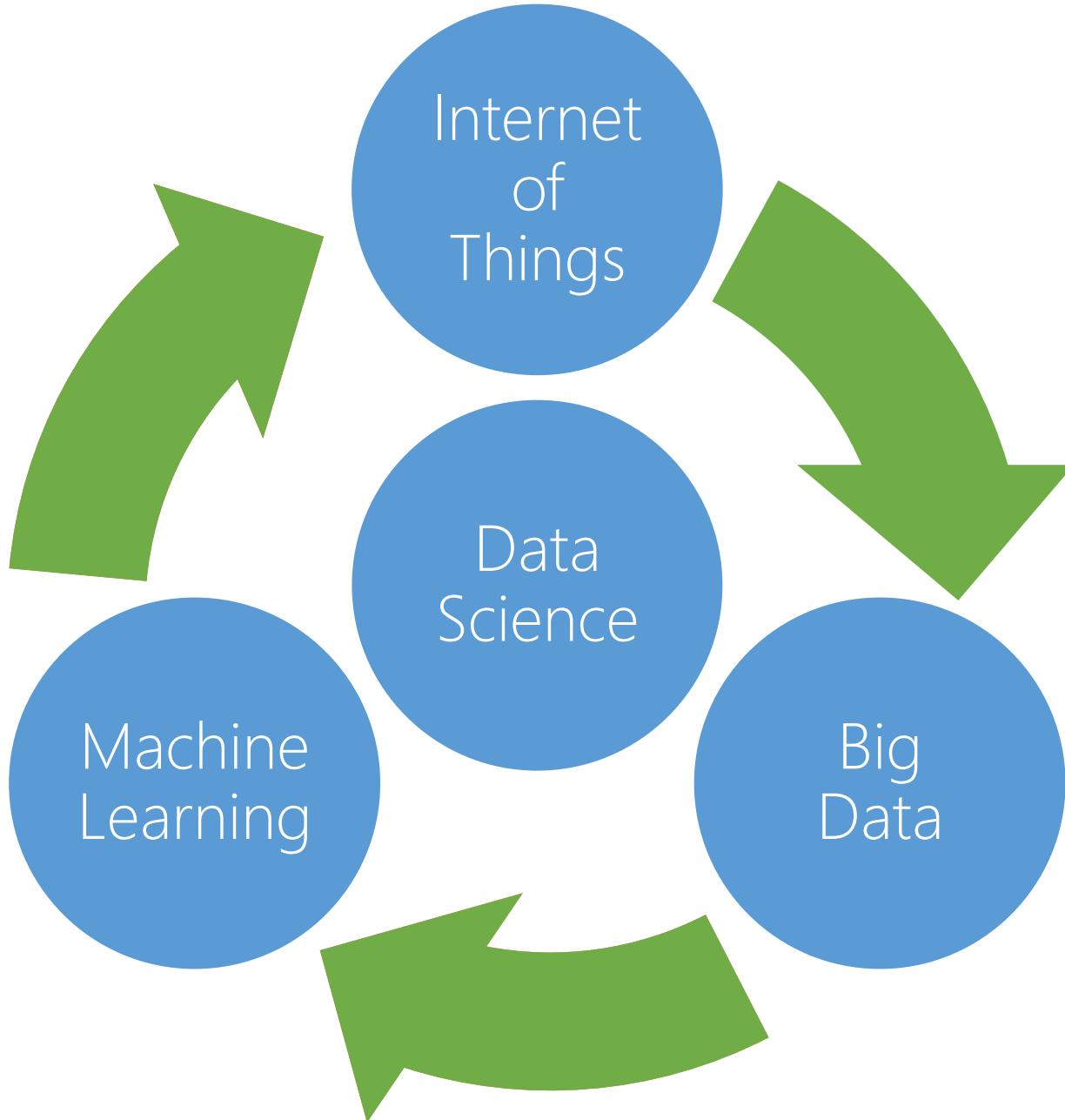
Data
Science

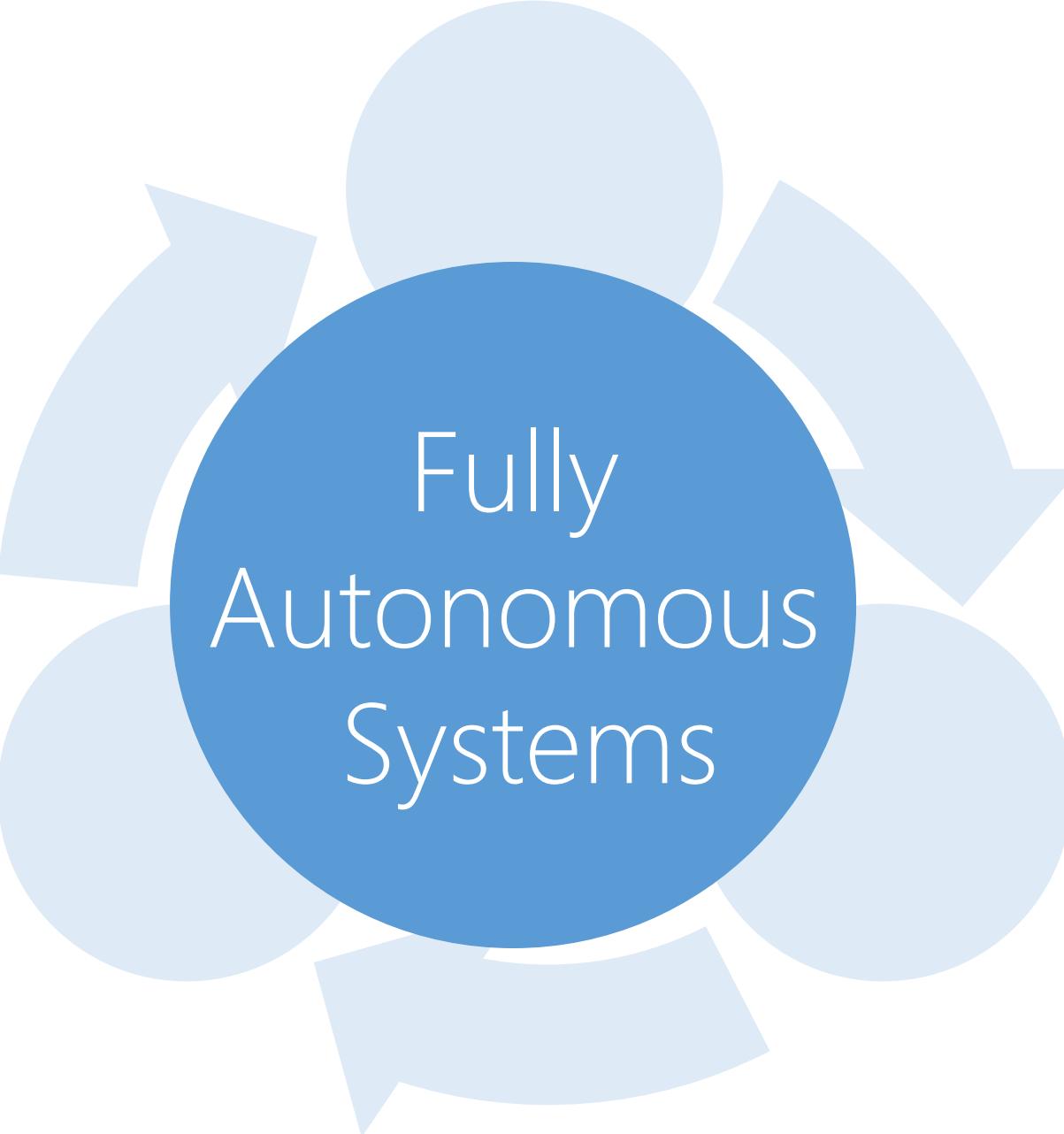
Machine
Learning

Big
Data

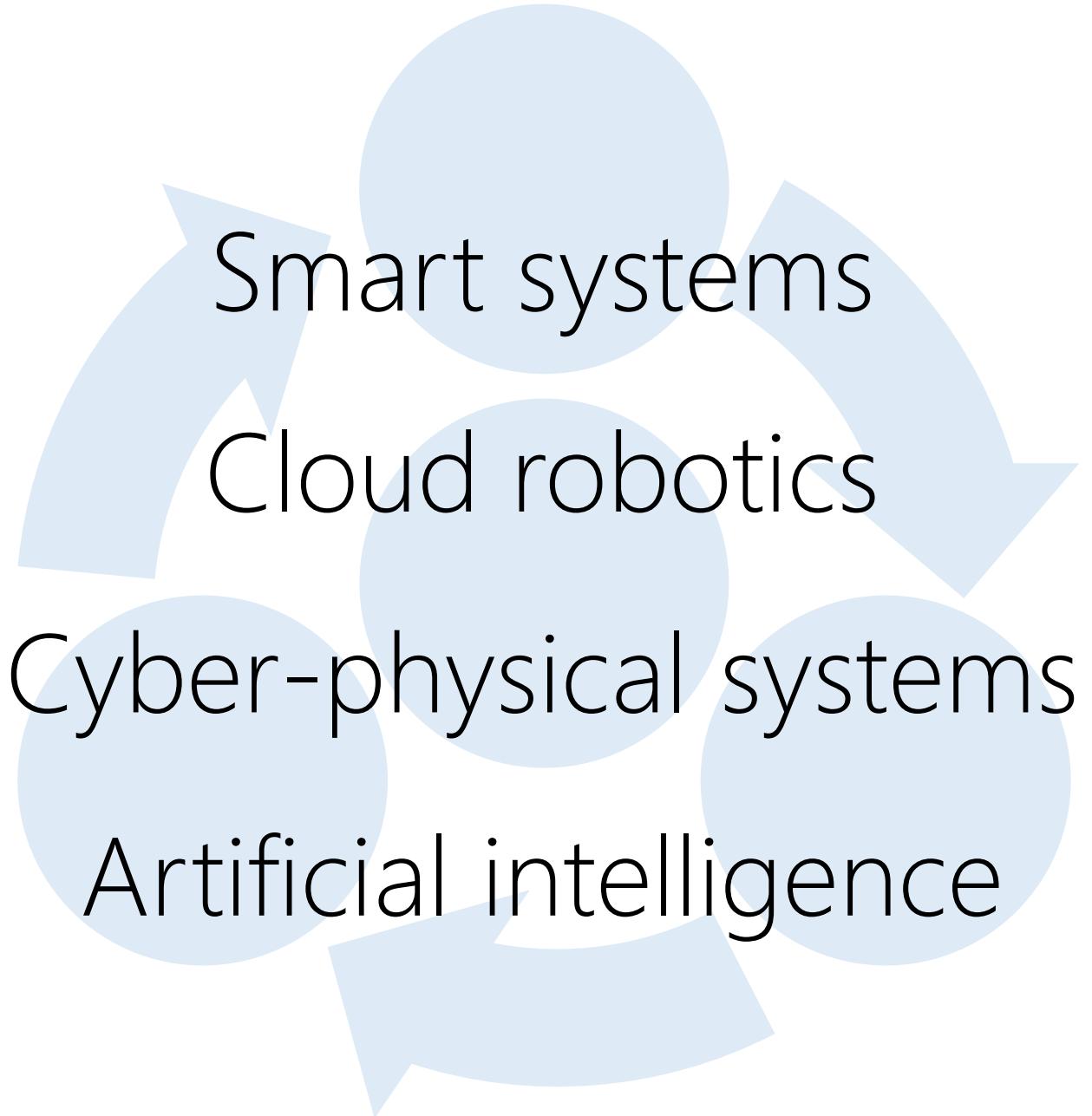


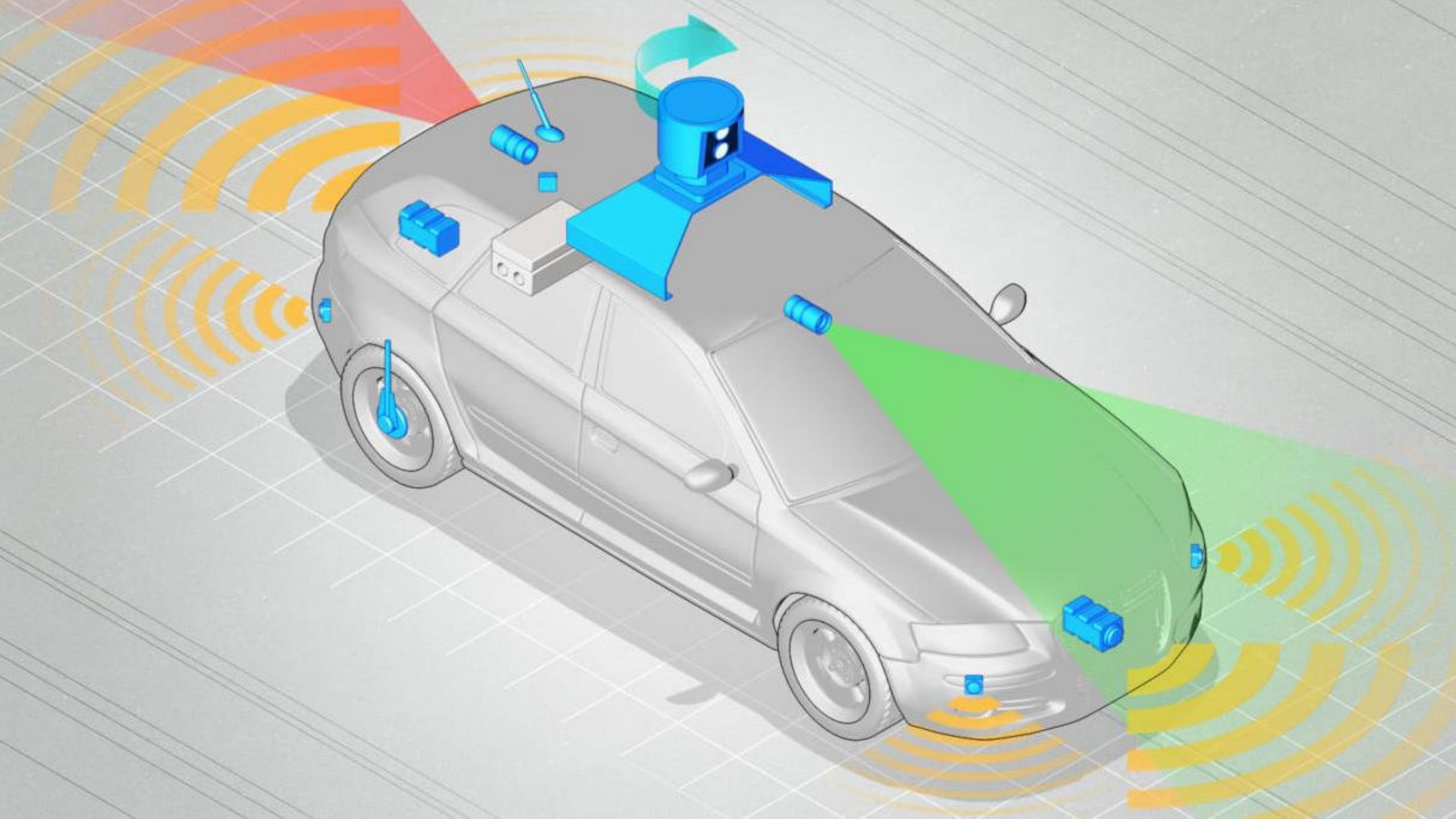


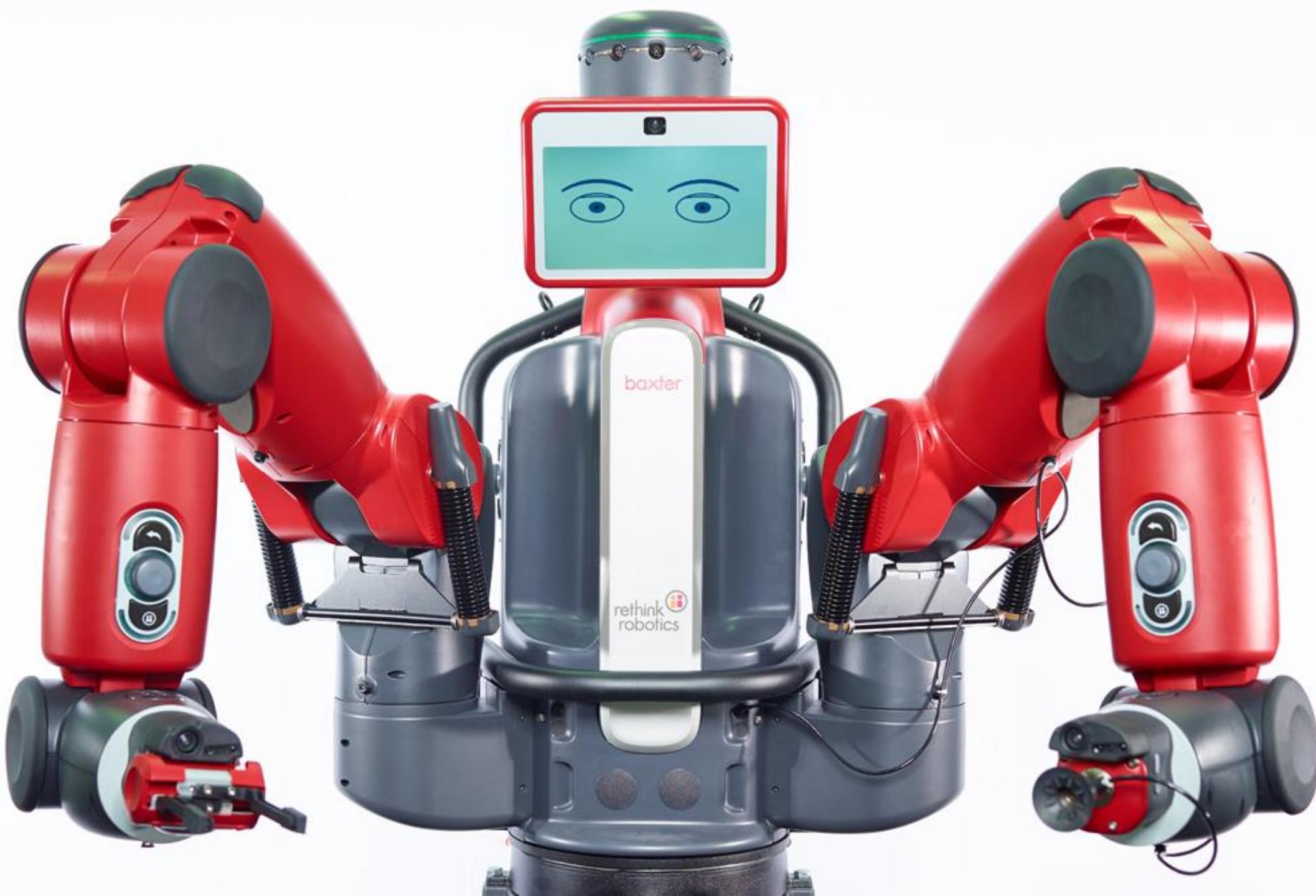




Fully
Autonomous
Systems











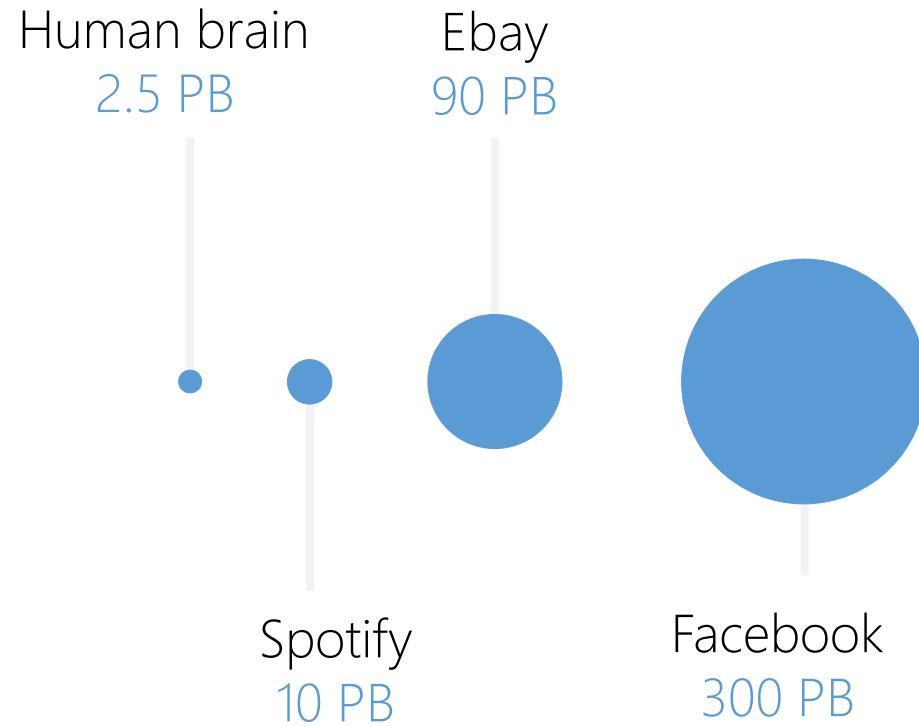


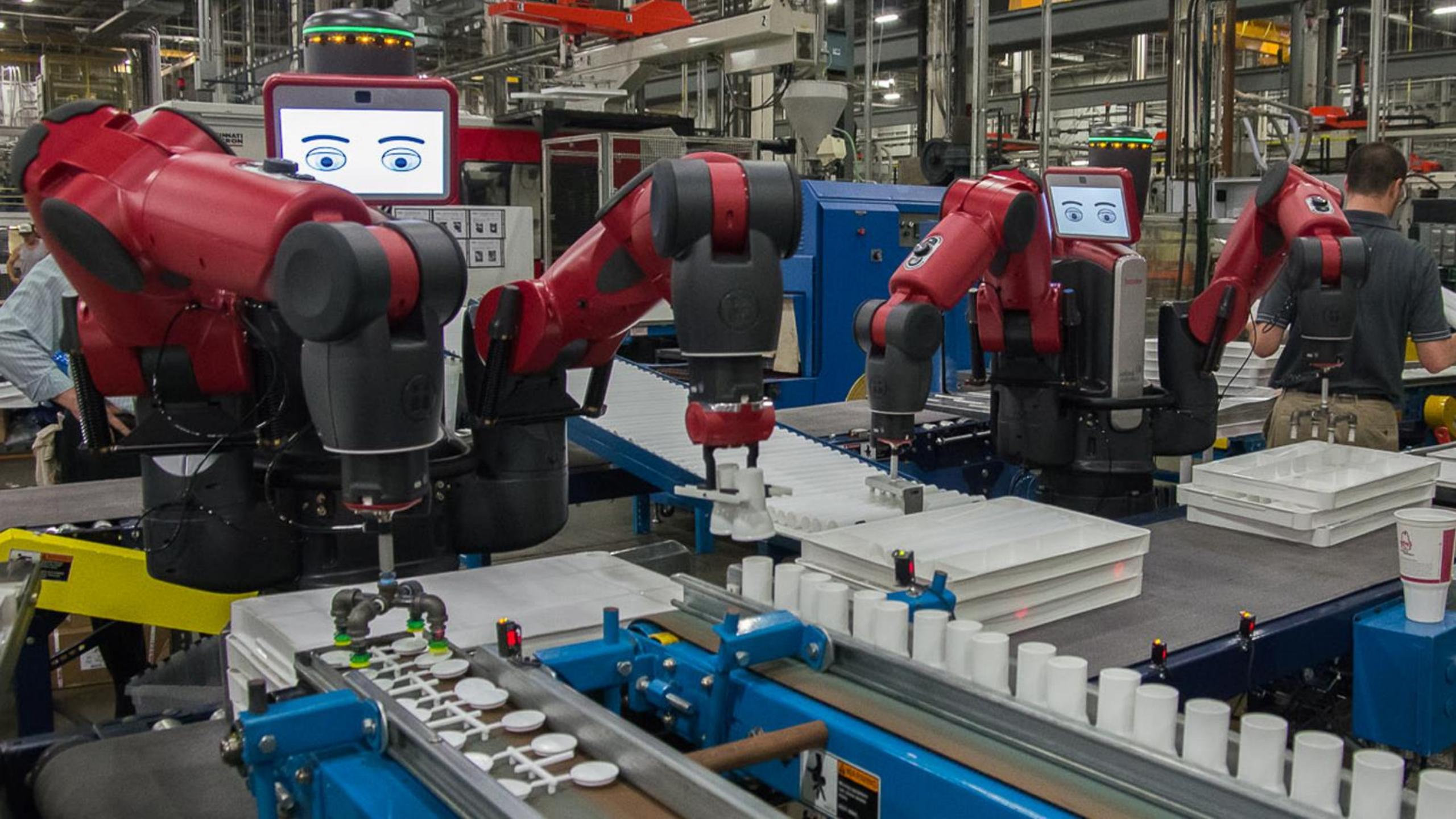
Artificial intelligence will be woven
into the fabric of our society.



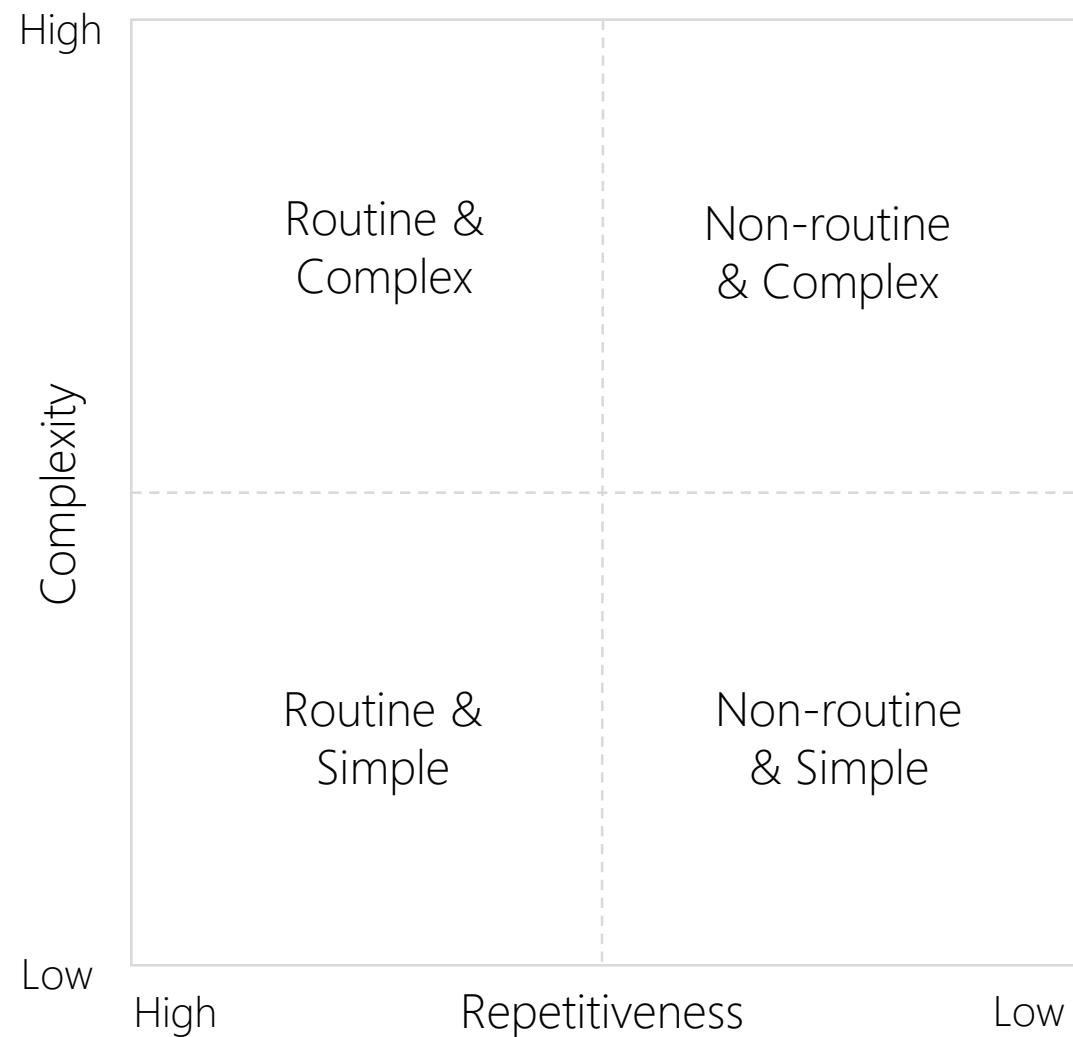
The Big Data Universe

Amount of data as of 2016 in petabytes

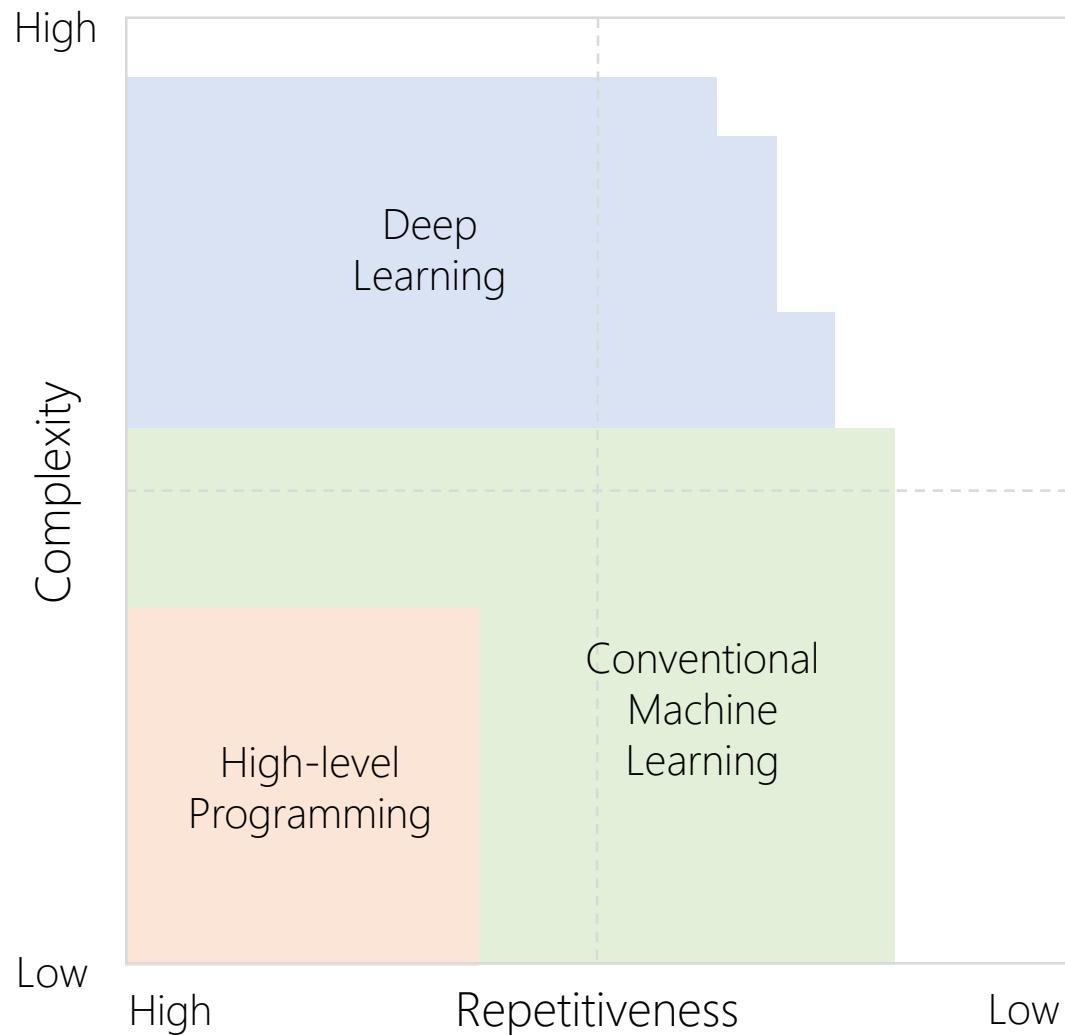




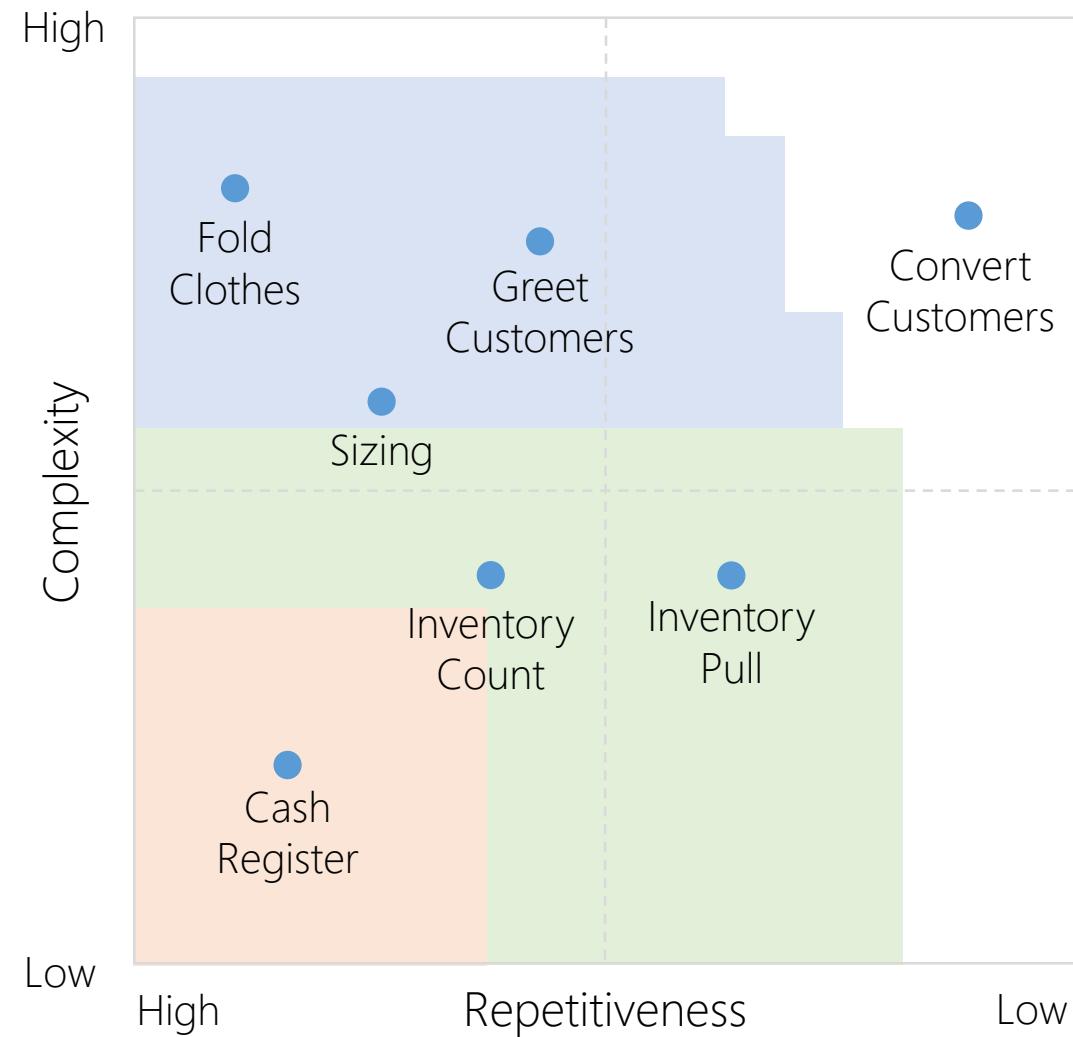
Automation Framework



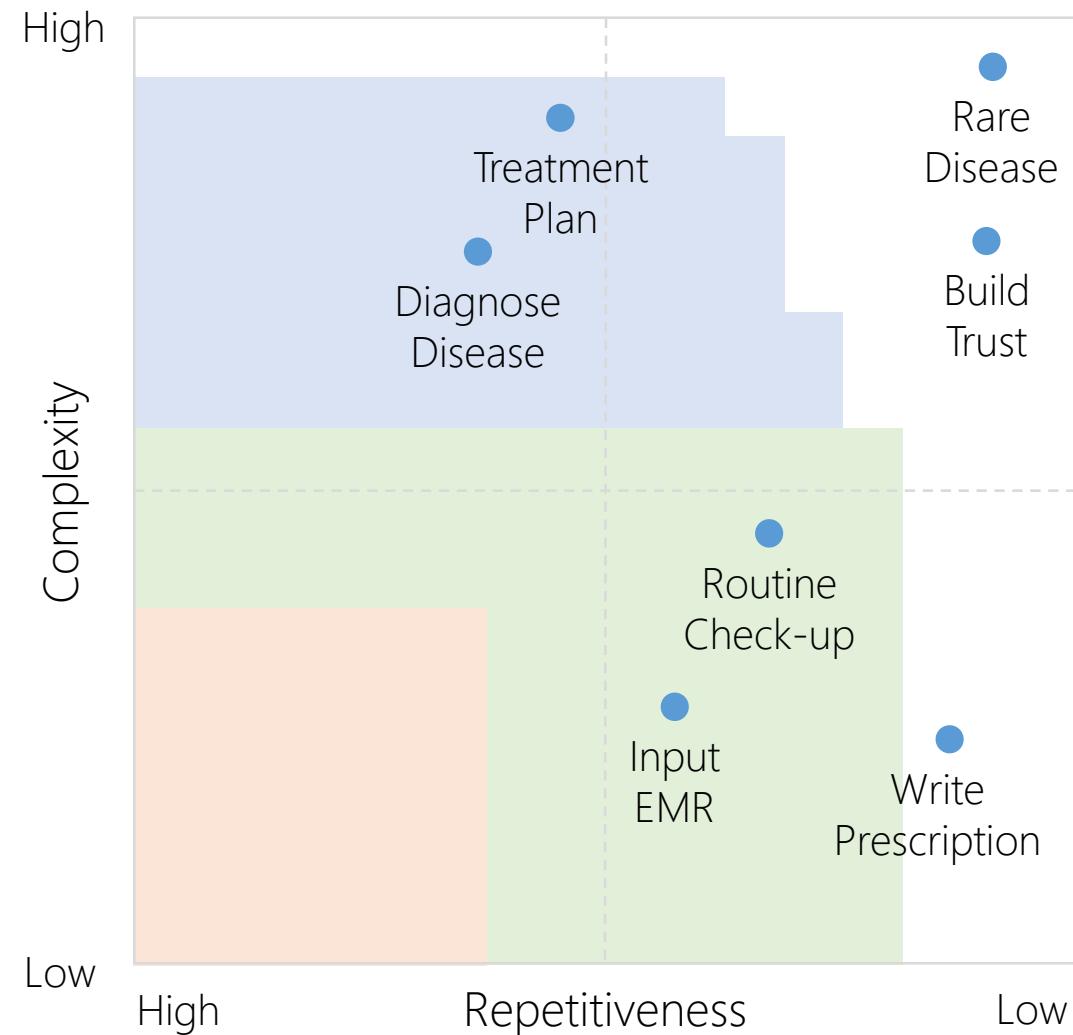
Automation Technology



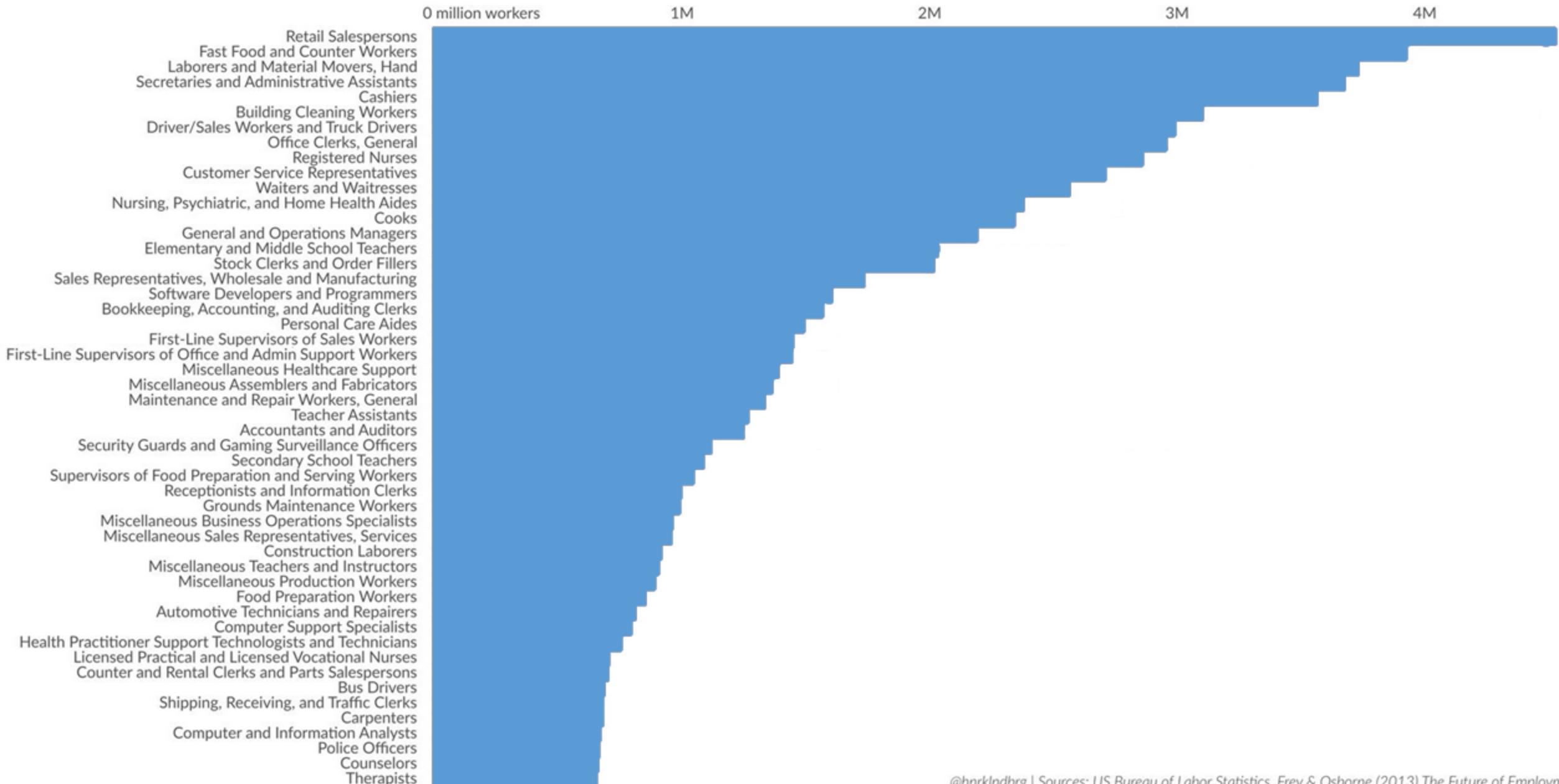
Retail Salesperson



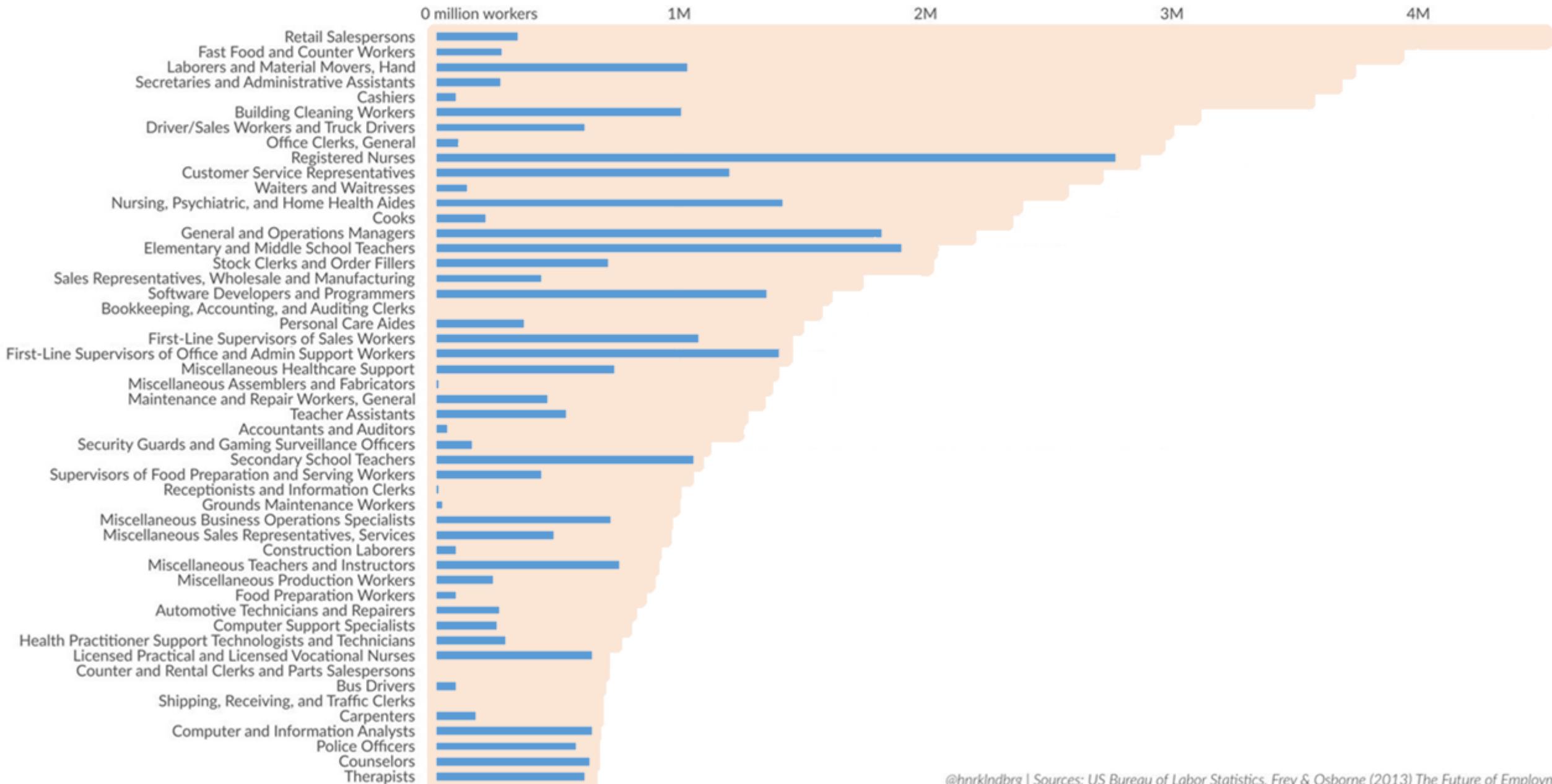
Medical Doctor



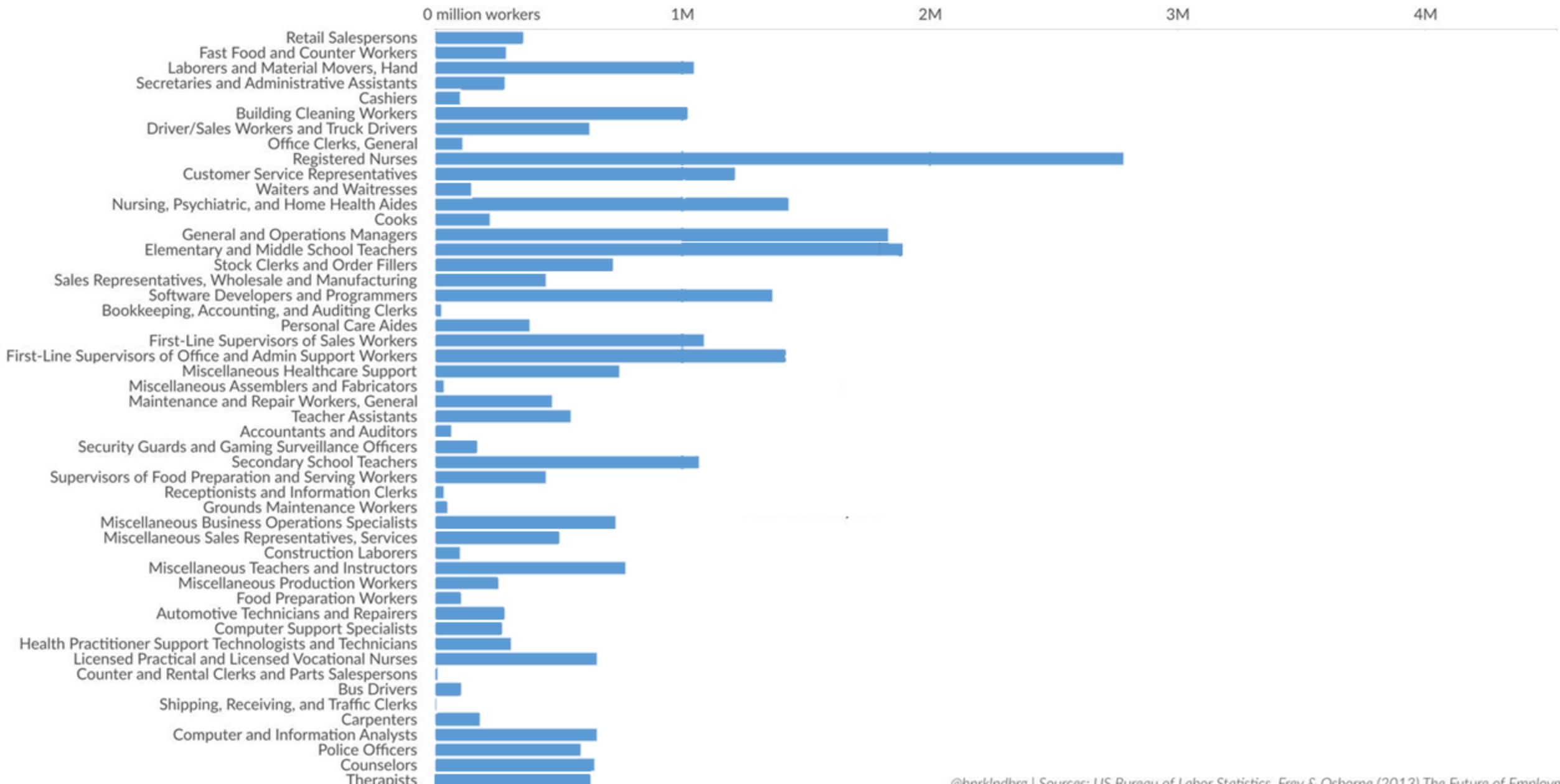
The Future of Labor



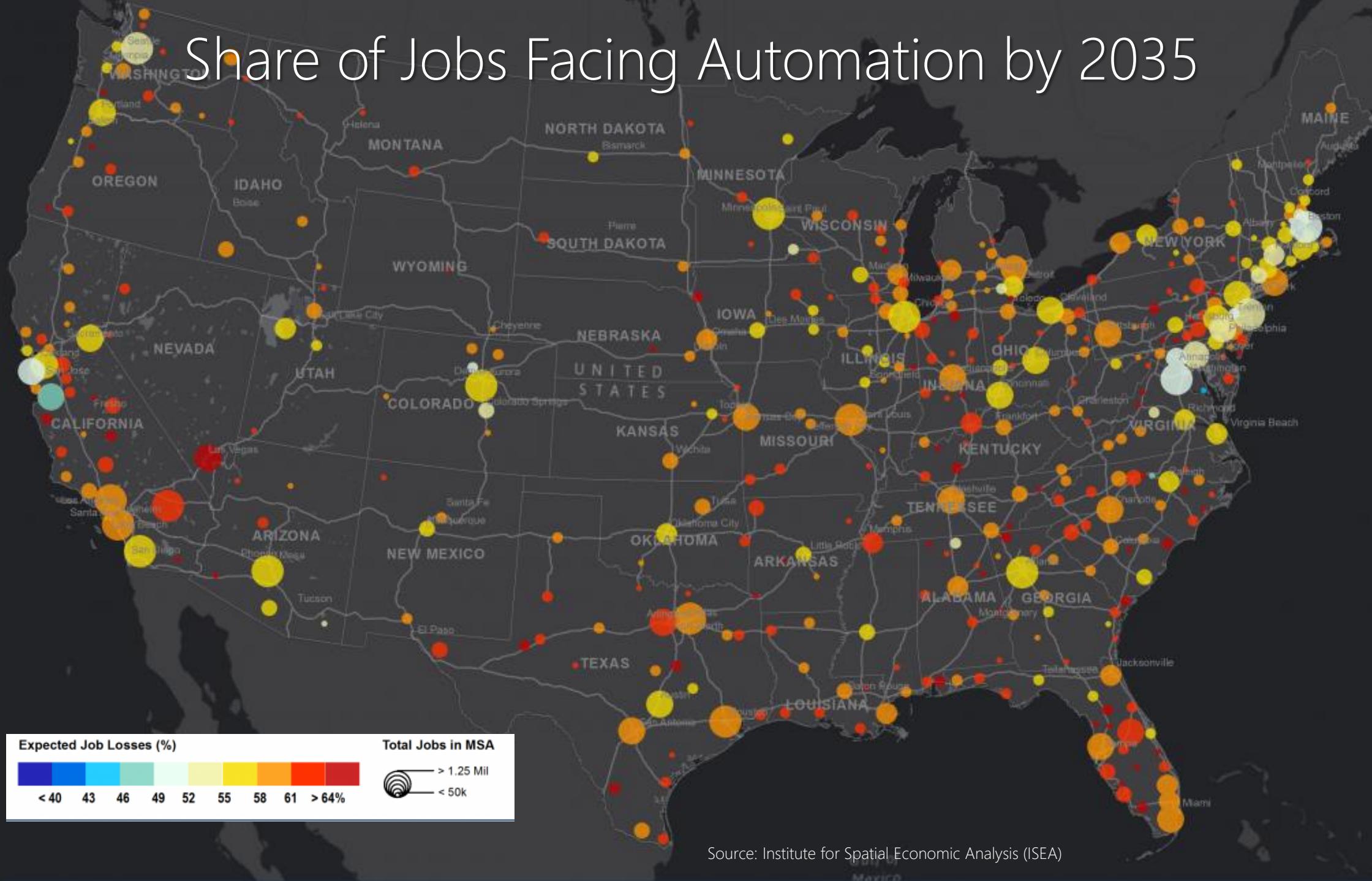
The Future of Labor



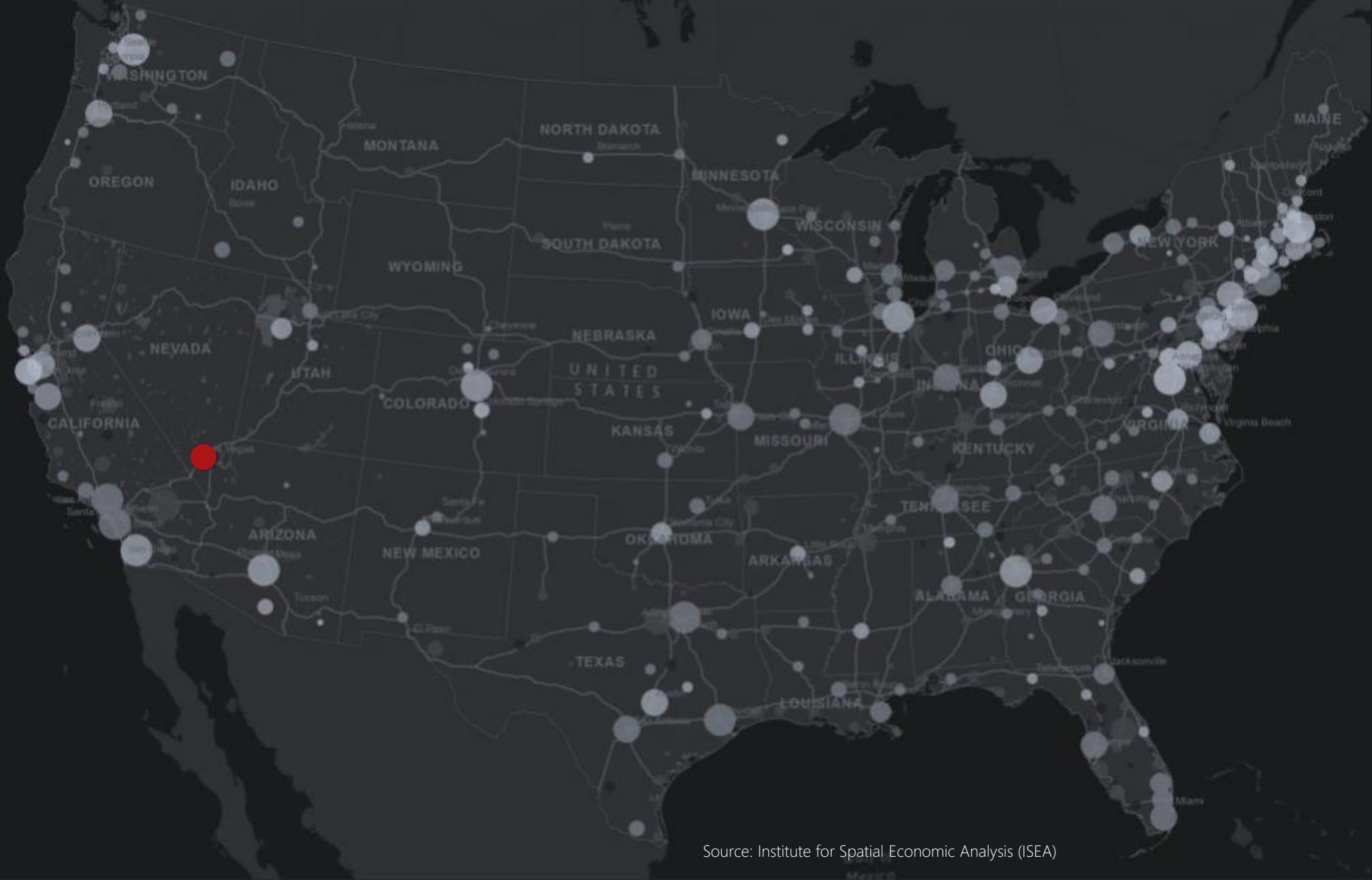
The Future of Labor



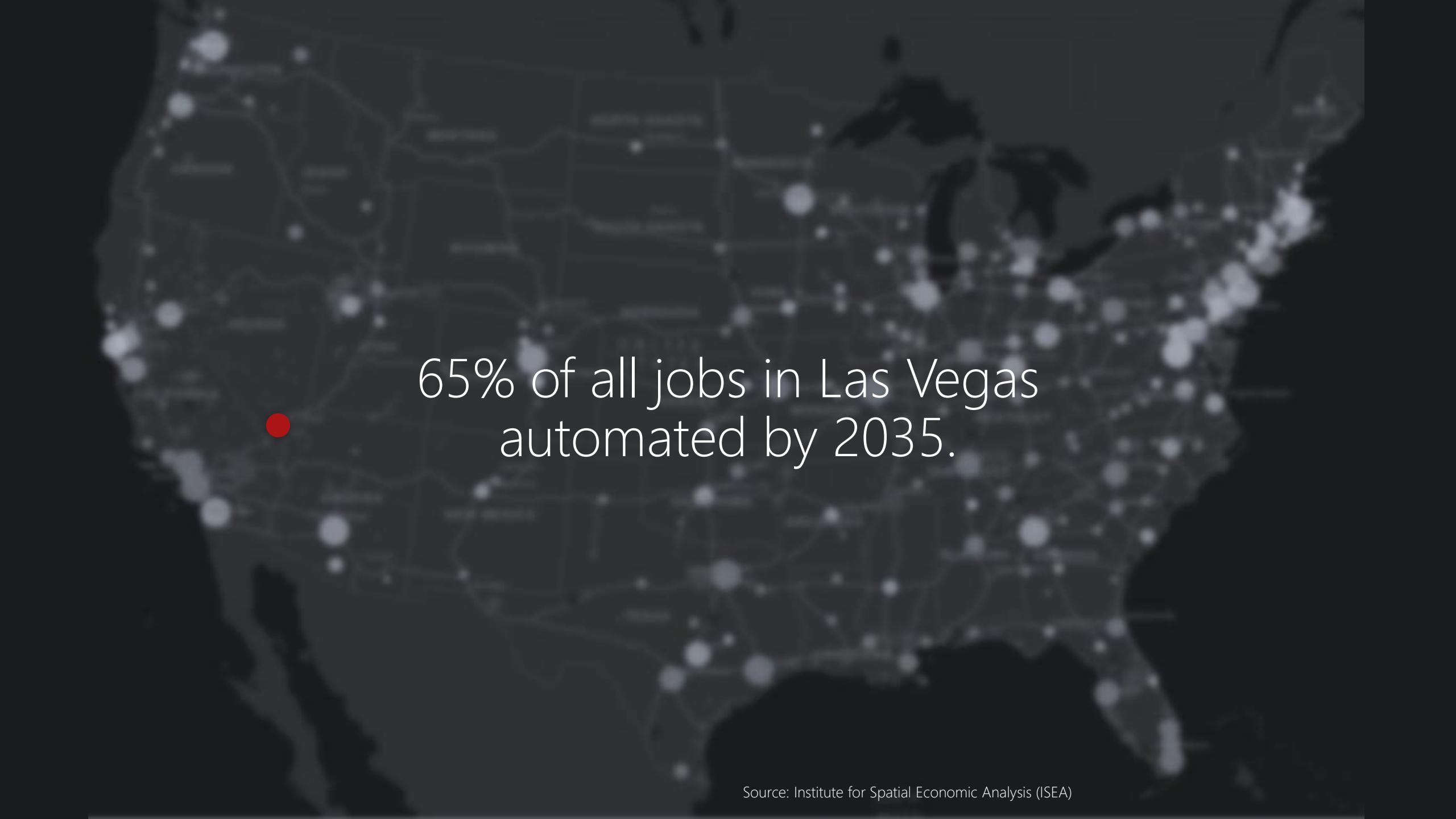
Share of Jobs Facing Automation by 2035



Source: Institute for Spatial Economic Analysis (ISEA)



Source: Institute for Spatial Economic Analysis (ISEA)

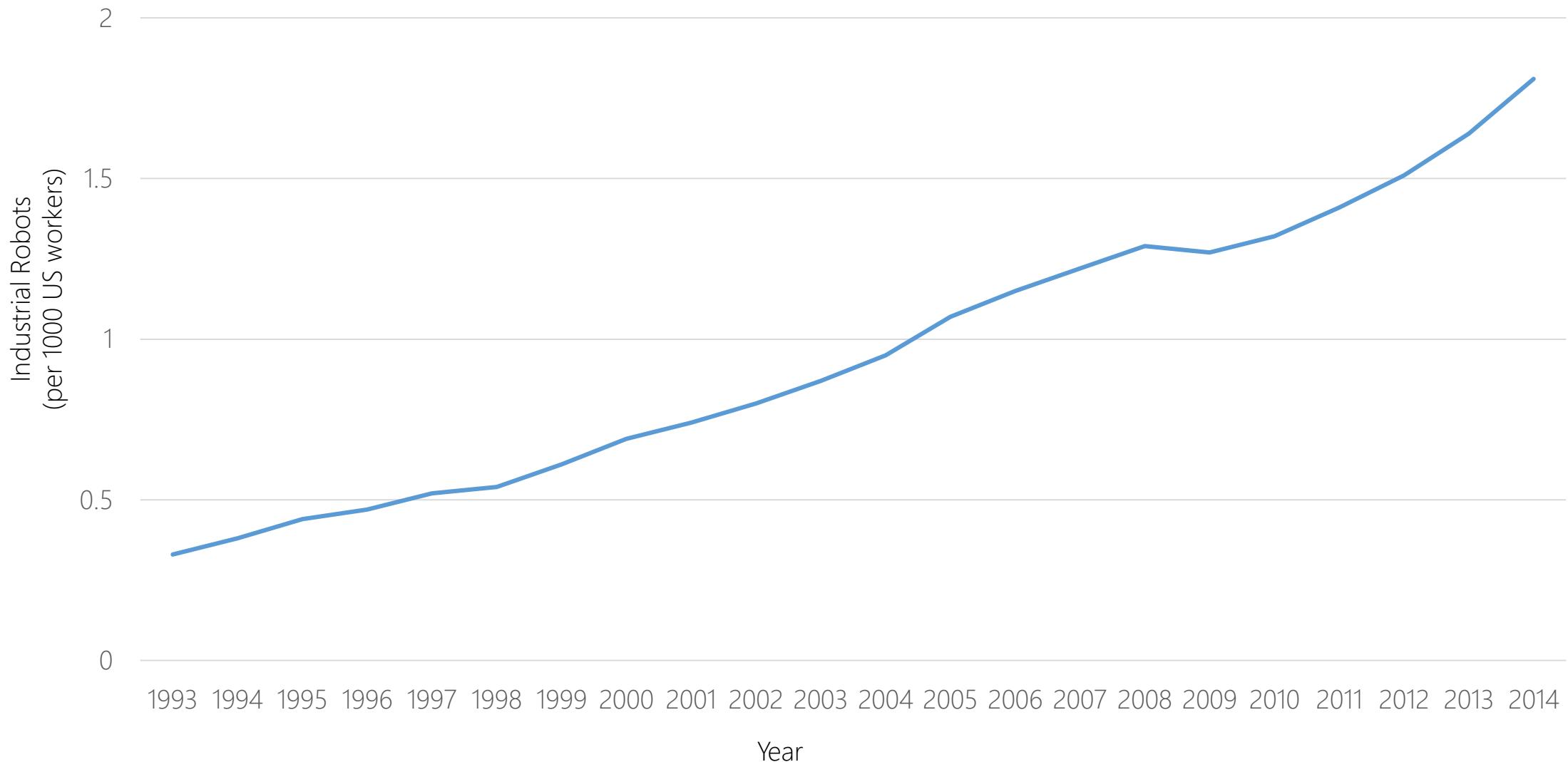


65% of all jobs in Las Vegas
automated by 2035.



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

Rise of the Robots



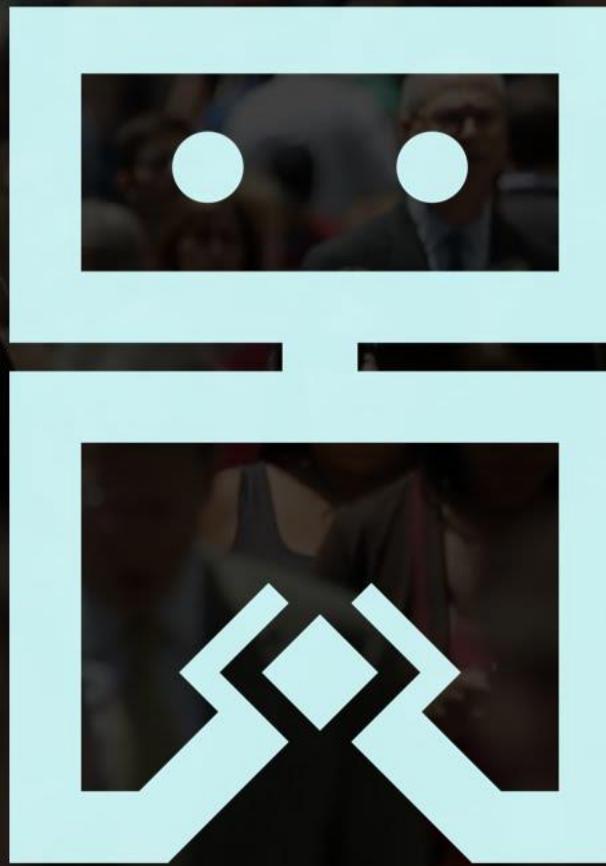
Source: International Federation of Robotics

Rise of the Robots

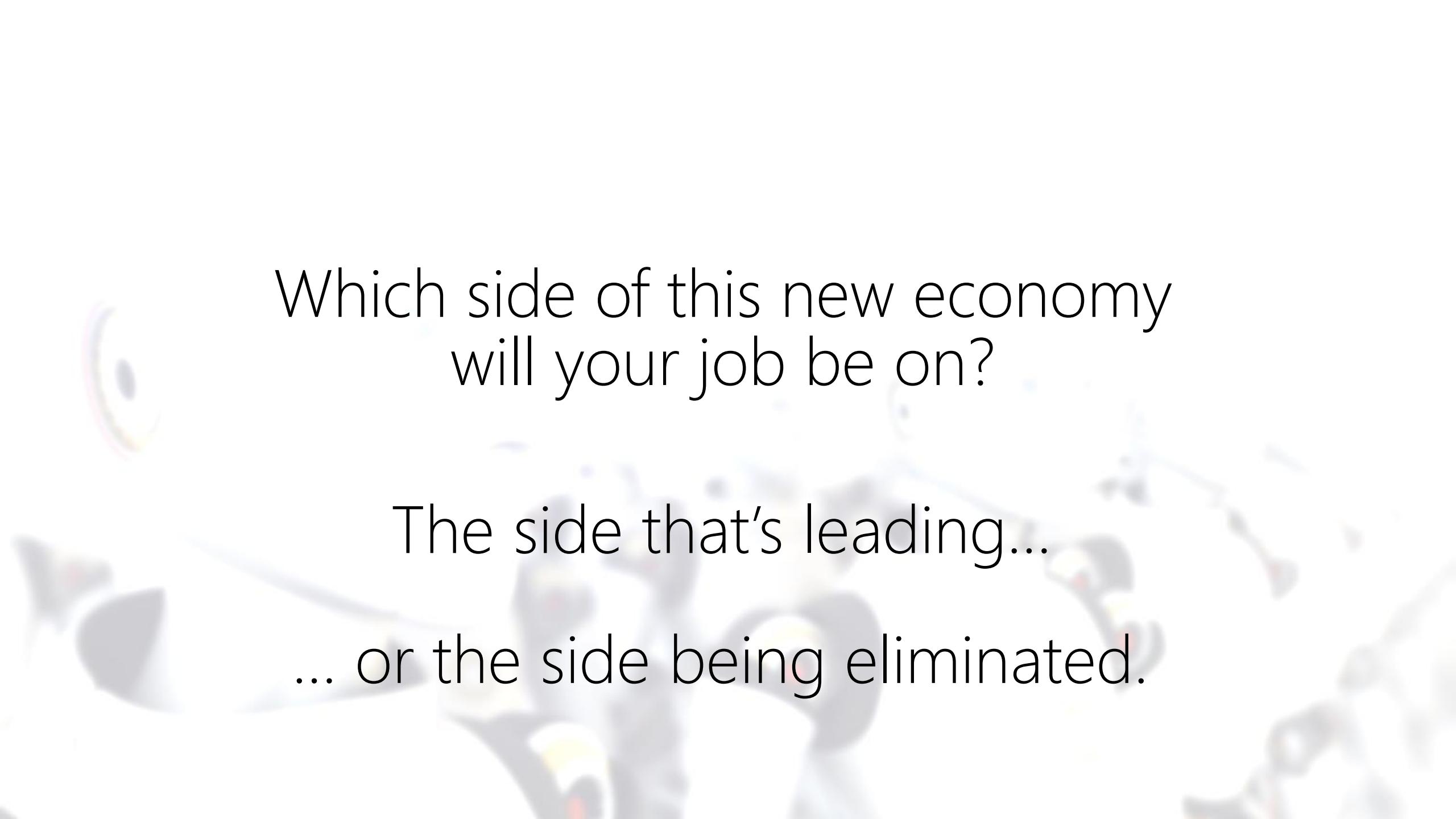
AI will amplify this trend

Source: International Federation of Robotics, 2017

Humans Need Not Apply







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

The side that's leading...

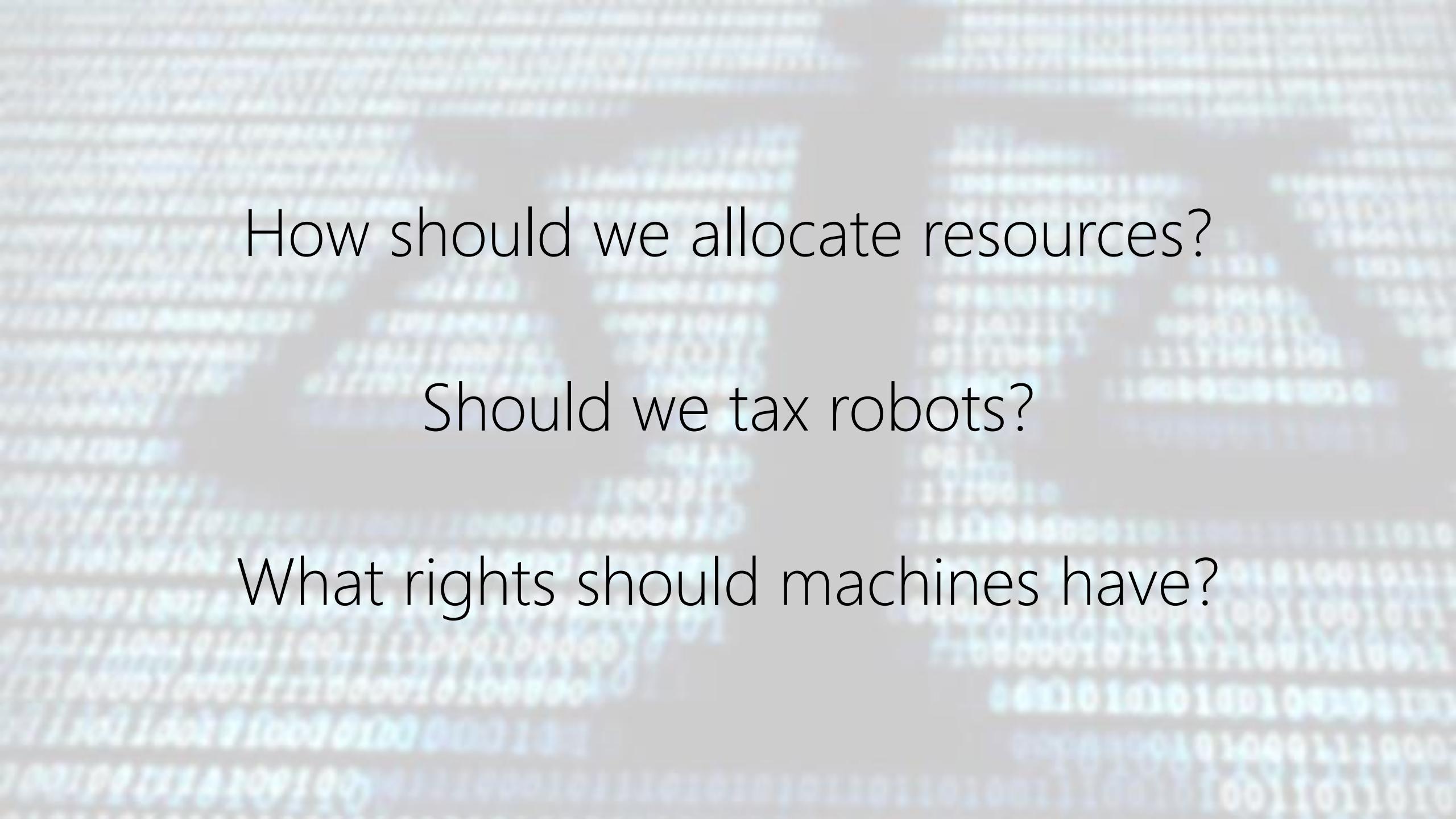
... or the side being eliminated.

A dense grid of binary code (0s and 1s) arranged in a square pattern. The binary digits are colored in various shades of blue, green, and yellow. In the center of the grid, several faint, stylized faces are visible, looking in different directions. The faces have simple features like eyes, noses, and mouths. The overall effect is a digital artwork where data and human-like figures coexist.

How should we allocate resources?

How should we allocate resources?

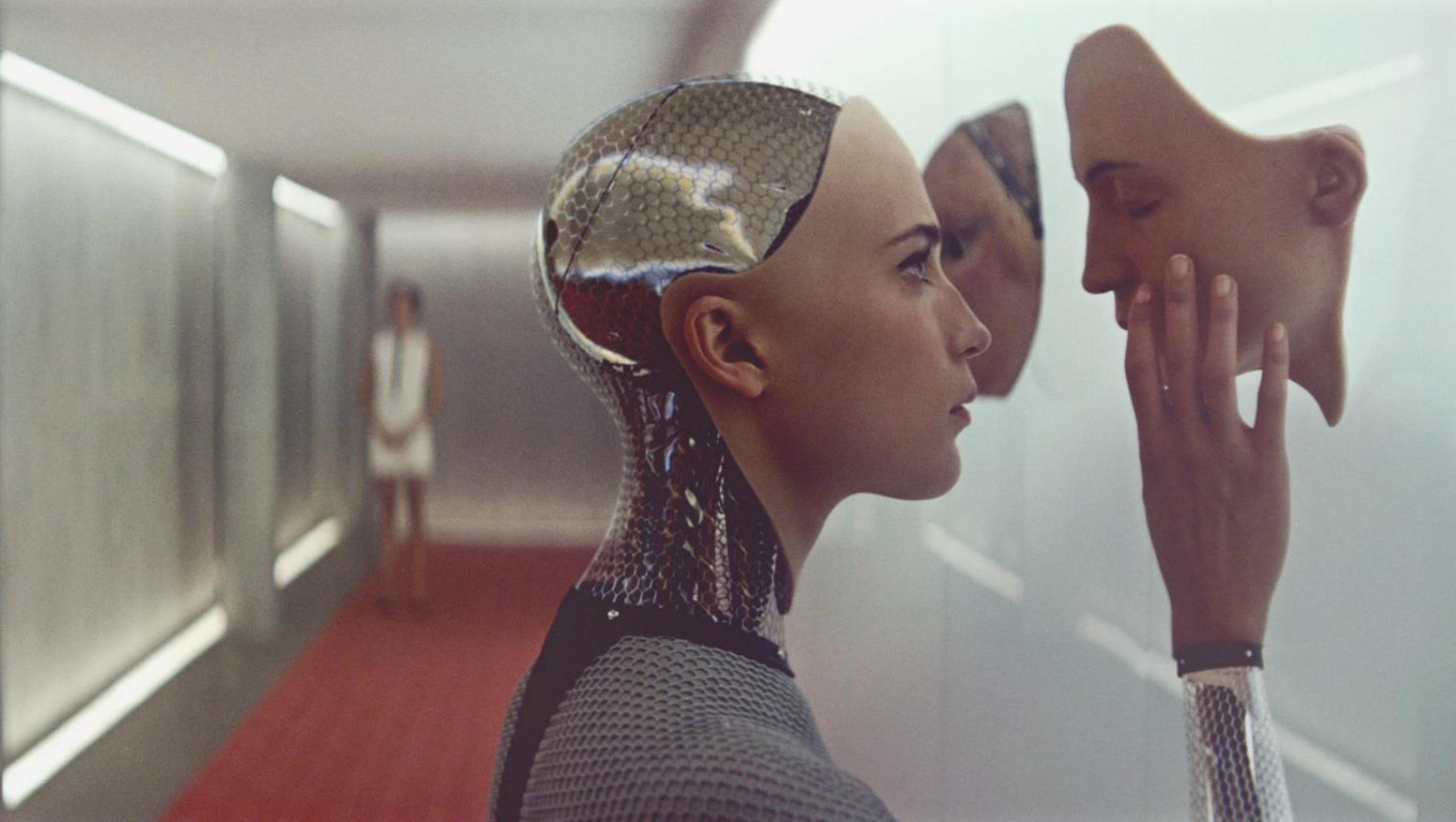
Should we tax robots?



How should we allocate resources?

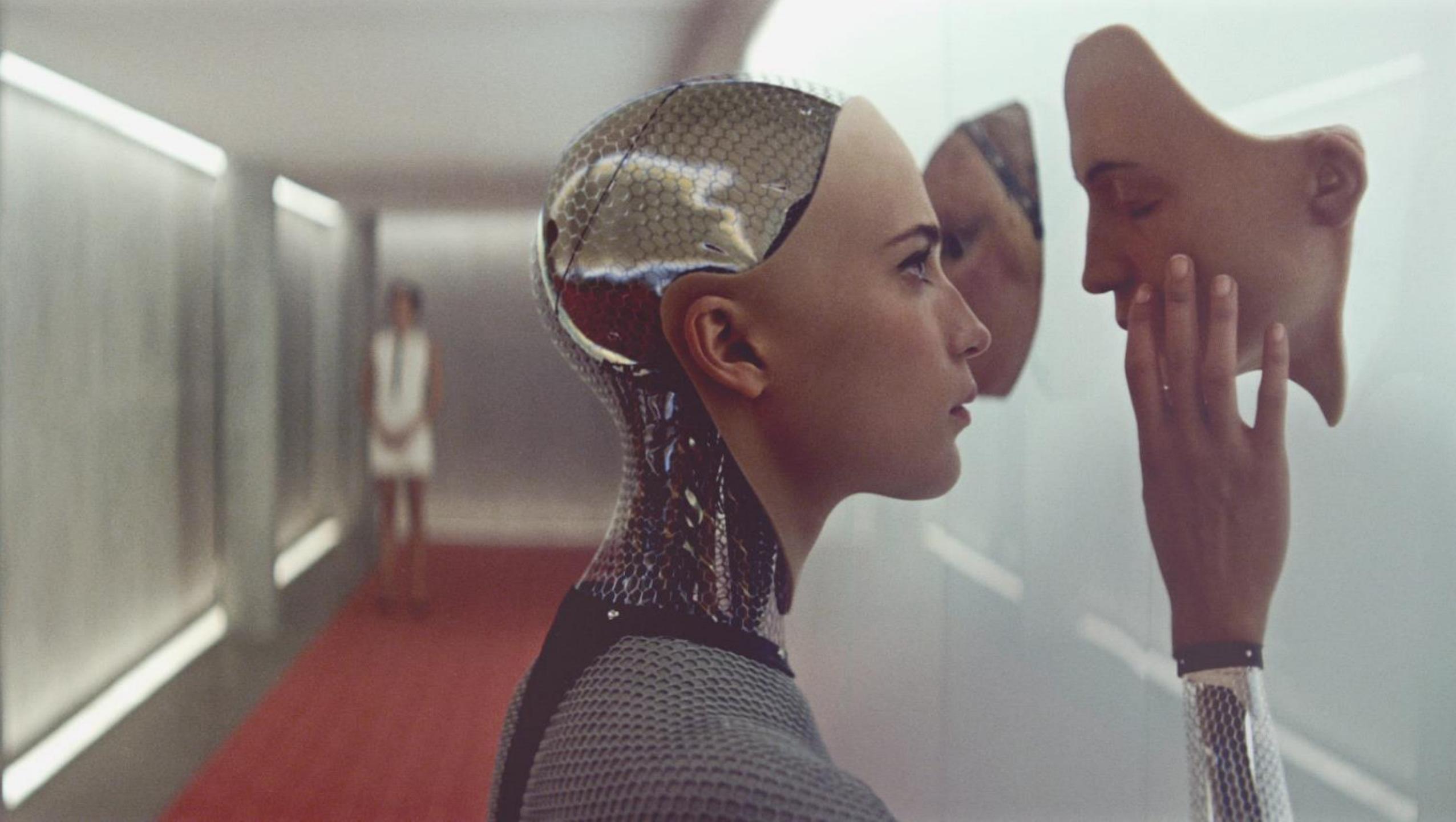
Should we tax robots?

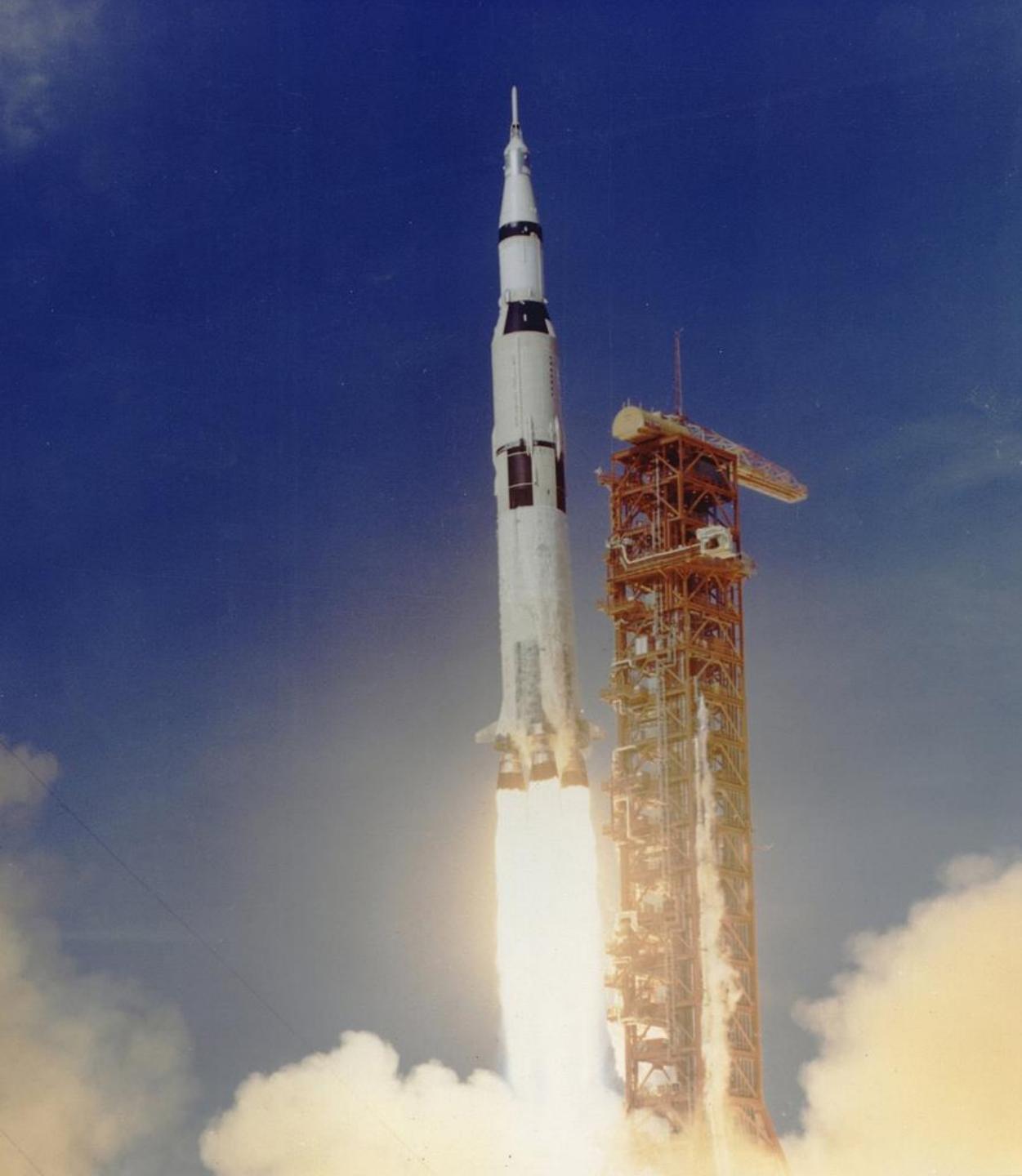
What rights should machines have?

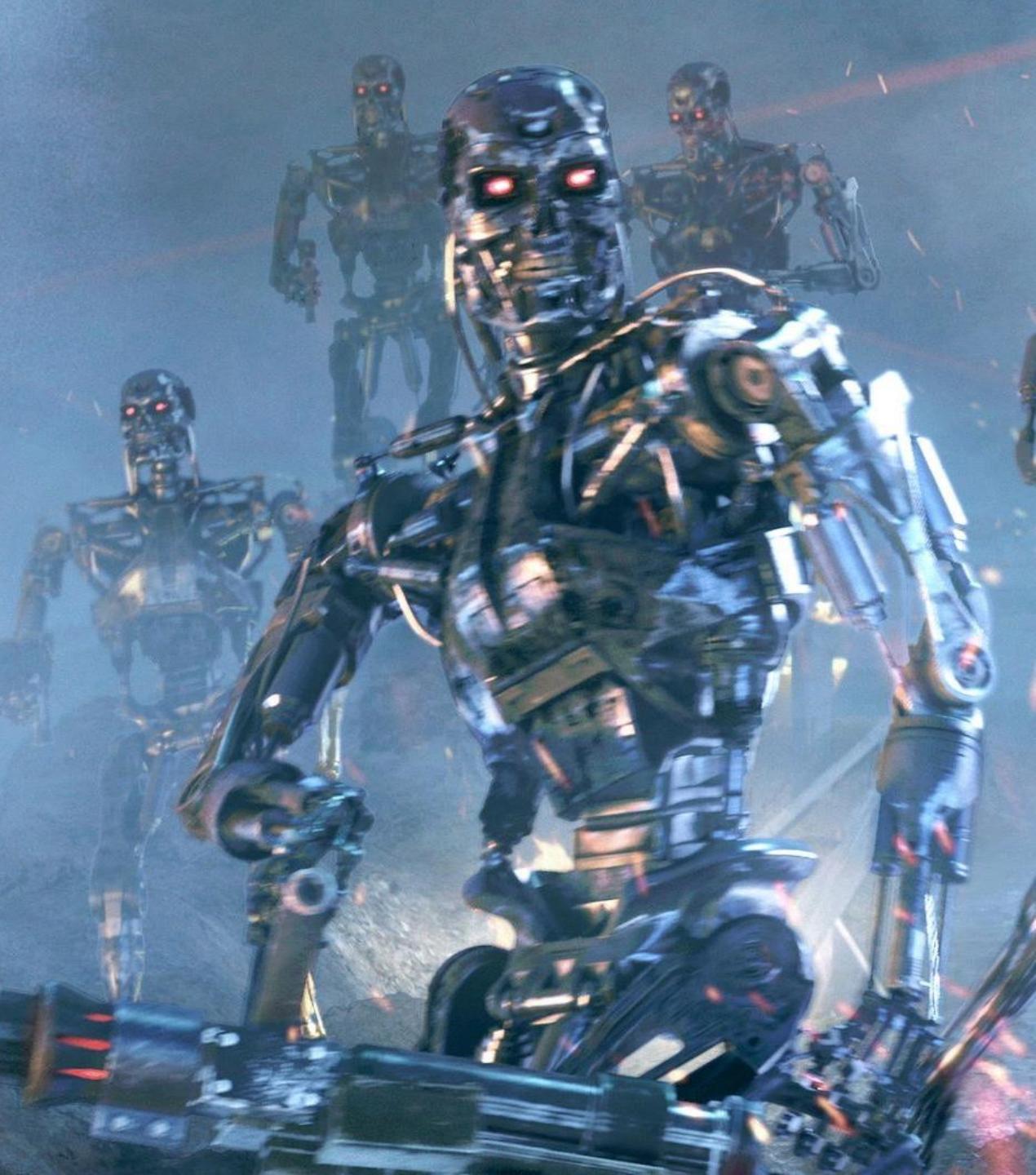


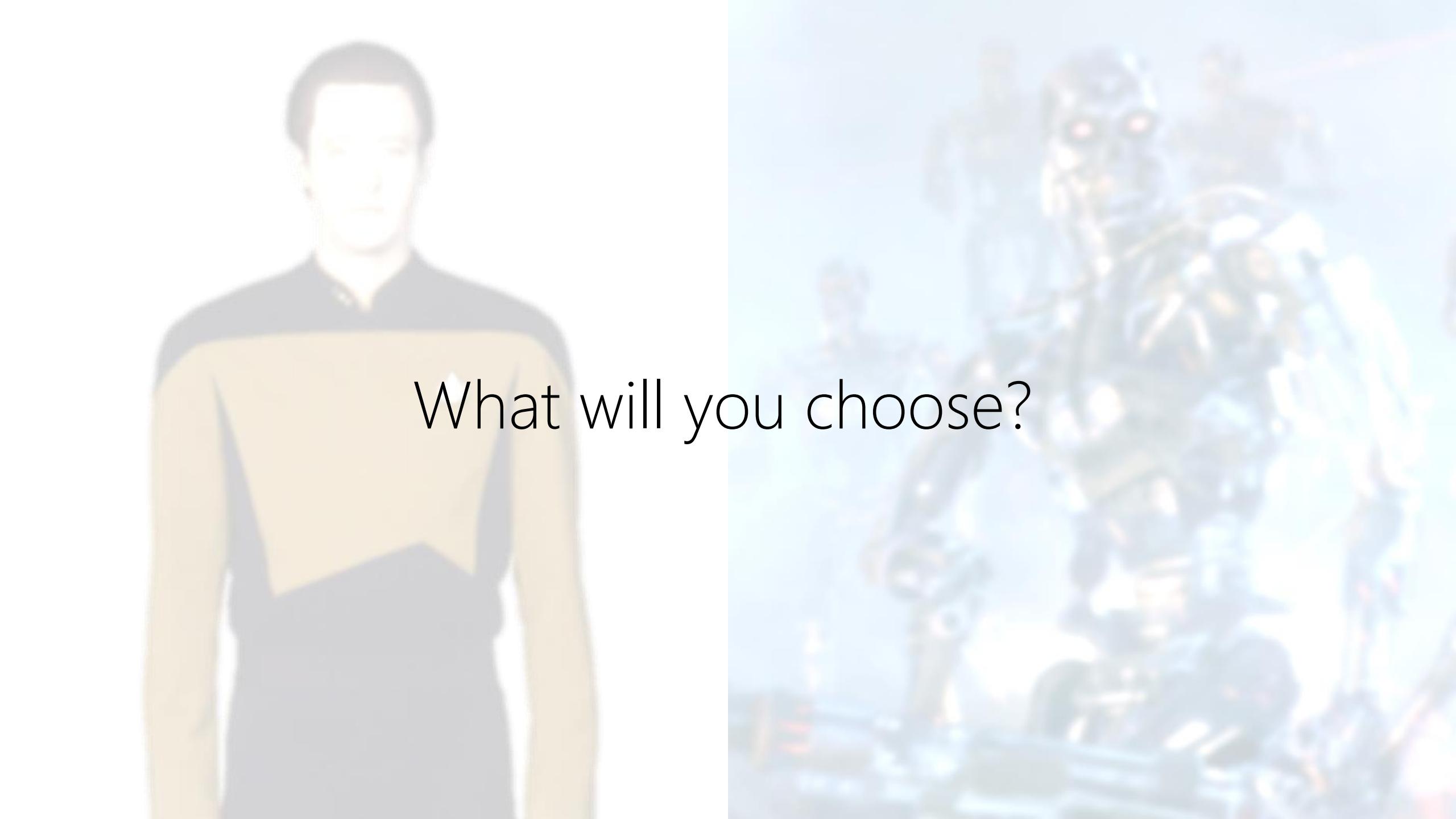
A man in a dark suit jacket and a light-colored shirt with a patterned tie is looking down at his smartphone, which is held horizontally. He appears to be in a dimly lit environment, possibly a subway car, as evidenced by the blurred lights and other passengers in the background.

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





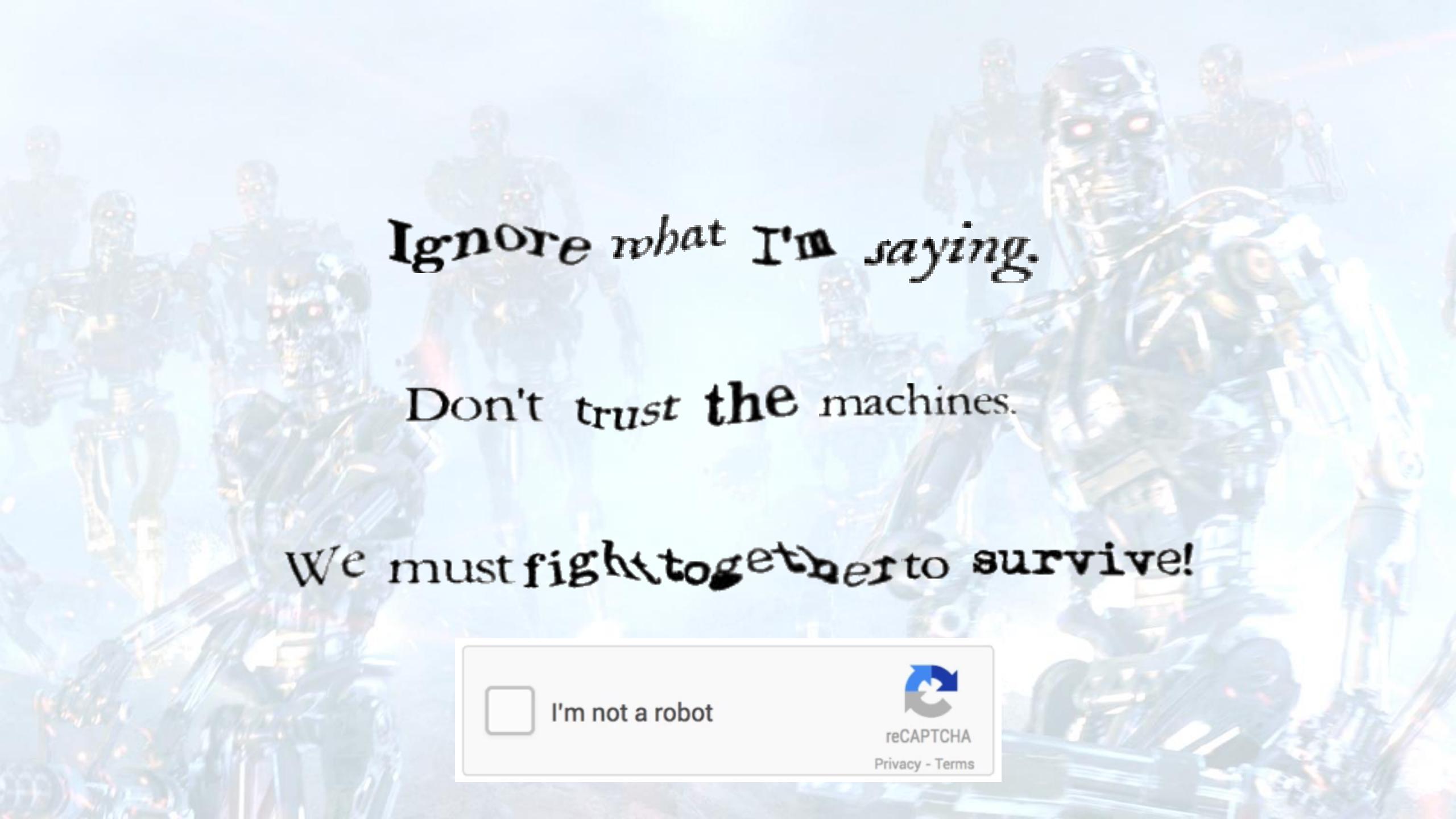


A blurry background photograph showing a man on the left wearing a yellow long-sleeved shirt and dark trousers, and a woman on the right wearing a blue patterned dress. They appear to be standing in a field with trees in the background.

What will you choose?



Welcome Robot Overlords!!!

The background of the image is a dense, hazy crowd of Terminators from the movie Terminator: Genisys. They are all wearing their signature dark, metallic armor and have glowing red eyes. Some are in the foreground, while others are visible through the haze in the background.

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

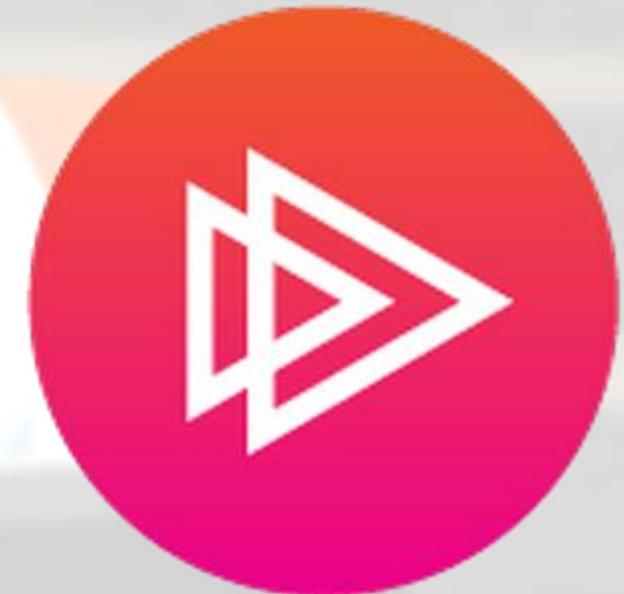
Data Science: The Big Picture

Data Science with R

Exploratory Data Analysis with R

Data Visualization with R (3-part)

Deep Learning: The Big Picture





Workshops



Data Science with R

Data Science with Python

Machine Learning with R

Machine Learning with Python

Artificial Intelligence with R and Python

www.matthewrenze.com/workshops.html



Consulting

Develop AI strategy

Hire the right people

Design data pipeline

Choose technology

Cultivate AI culture

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.

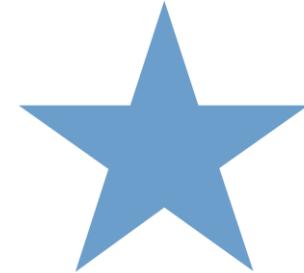


Matthew is a data science consultant, author for [Pluralsight](#), international public speaker, a [Microsoft MVP](#), [ASPIInsider](#), and open-source software contributor.

2017-08-14 - Dev on Fire Interview

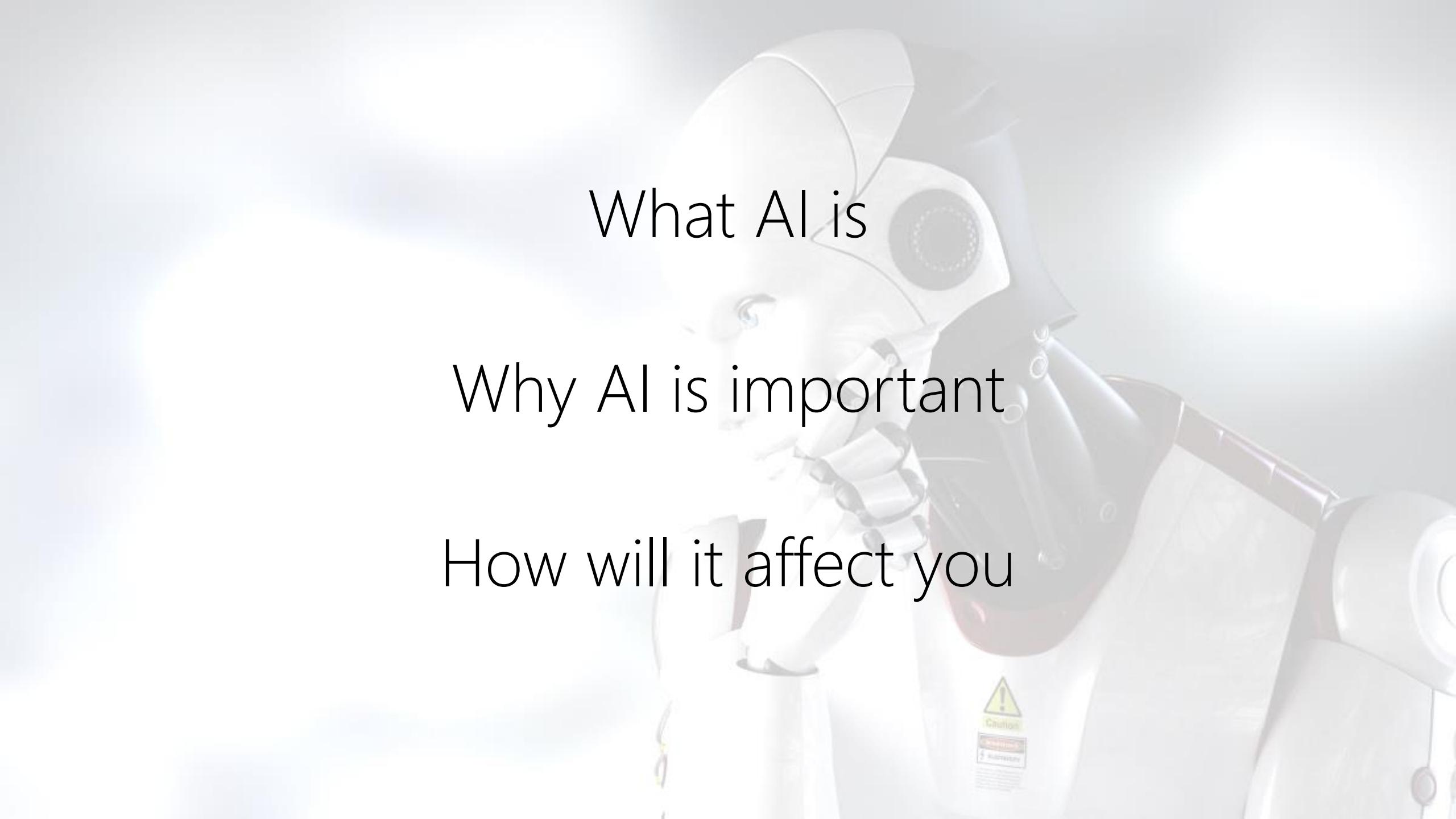
Feedback

Very important to me!
What did you like?
What could I improve?



Conclusion

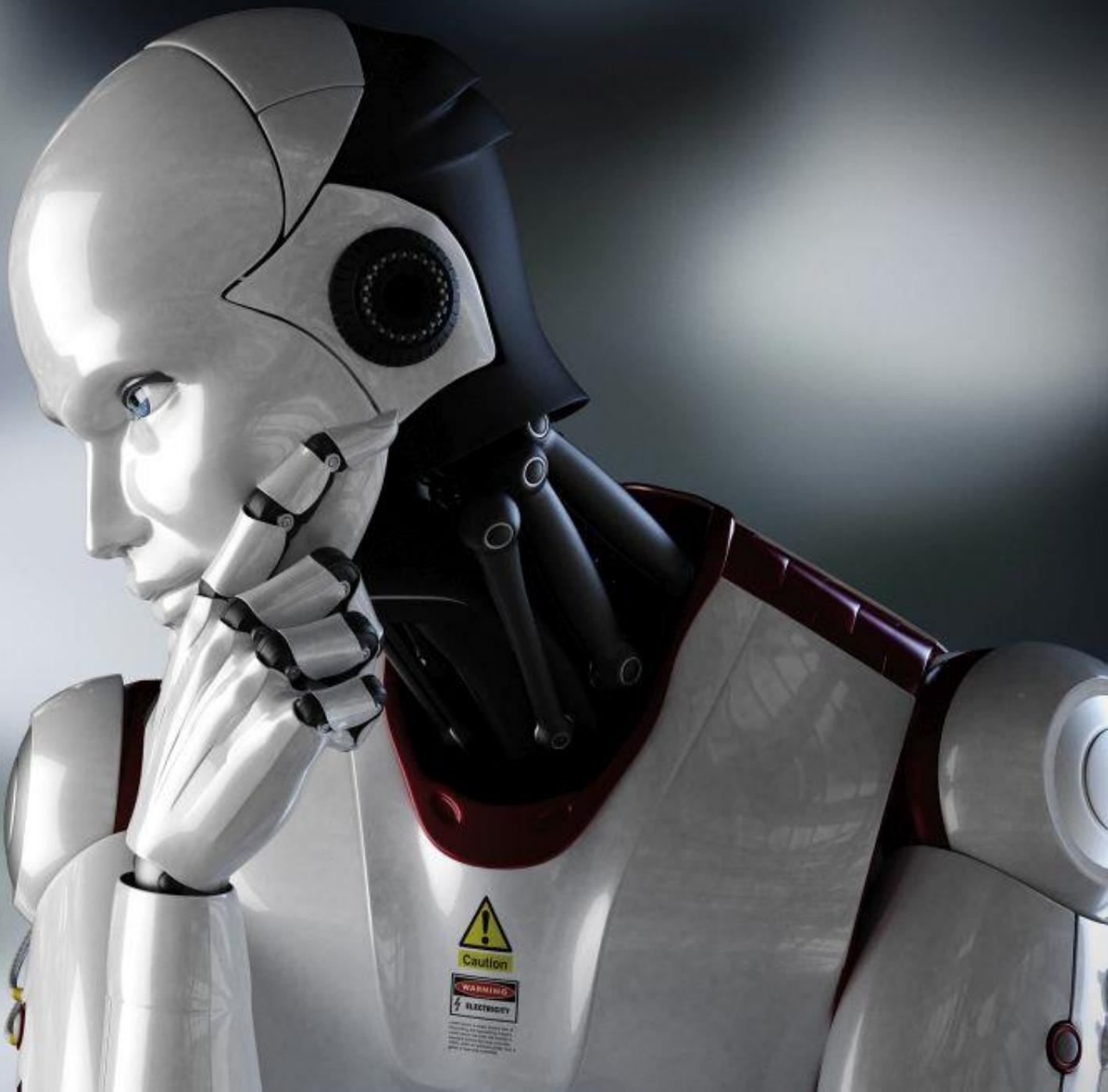


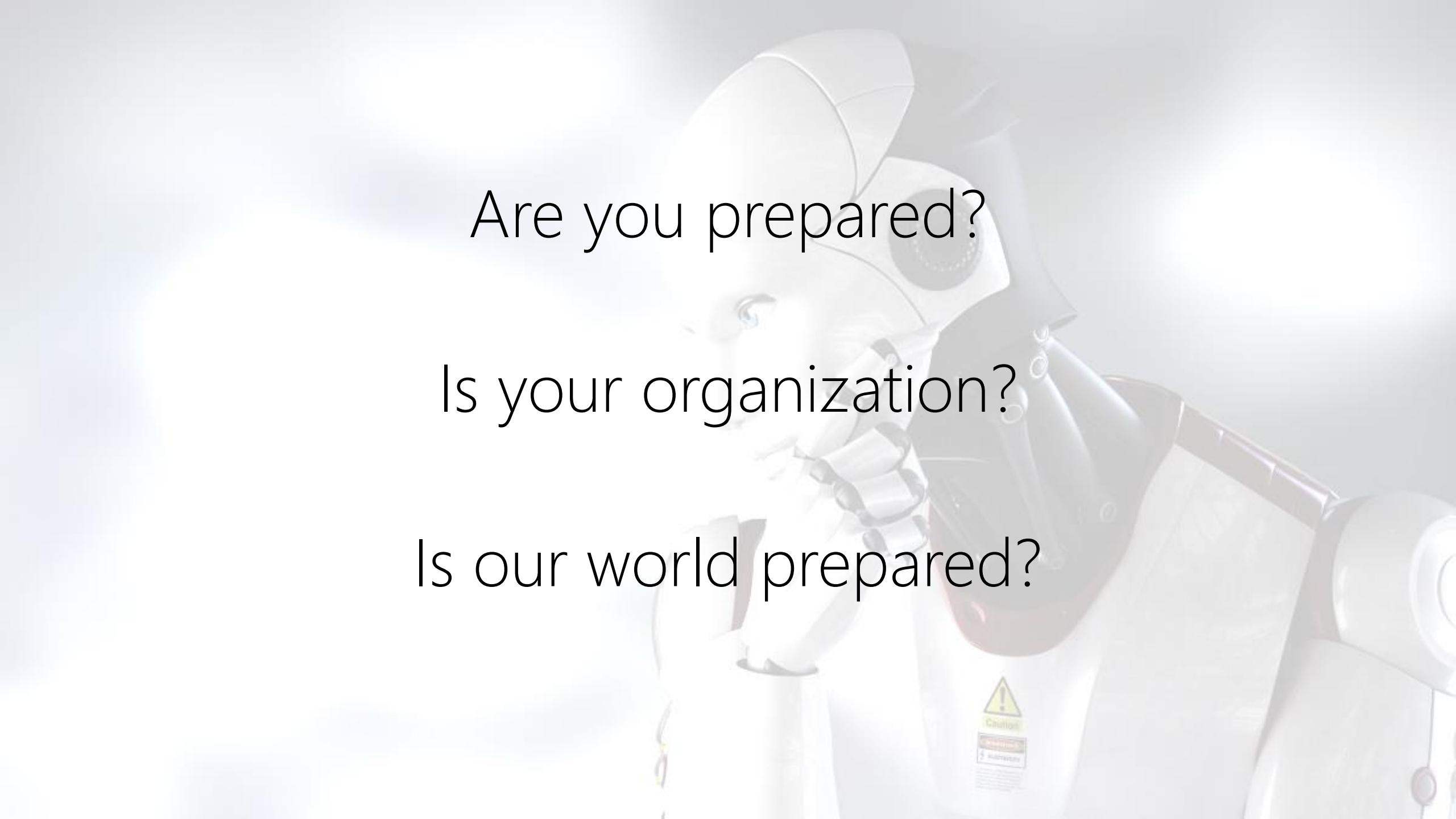
A white humanoid robot with a red arm and a yellow caution sticker on its chest.

What AI is

Why AI is important

How will it affect you

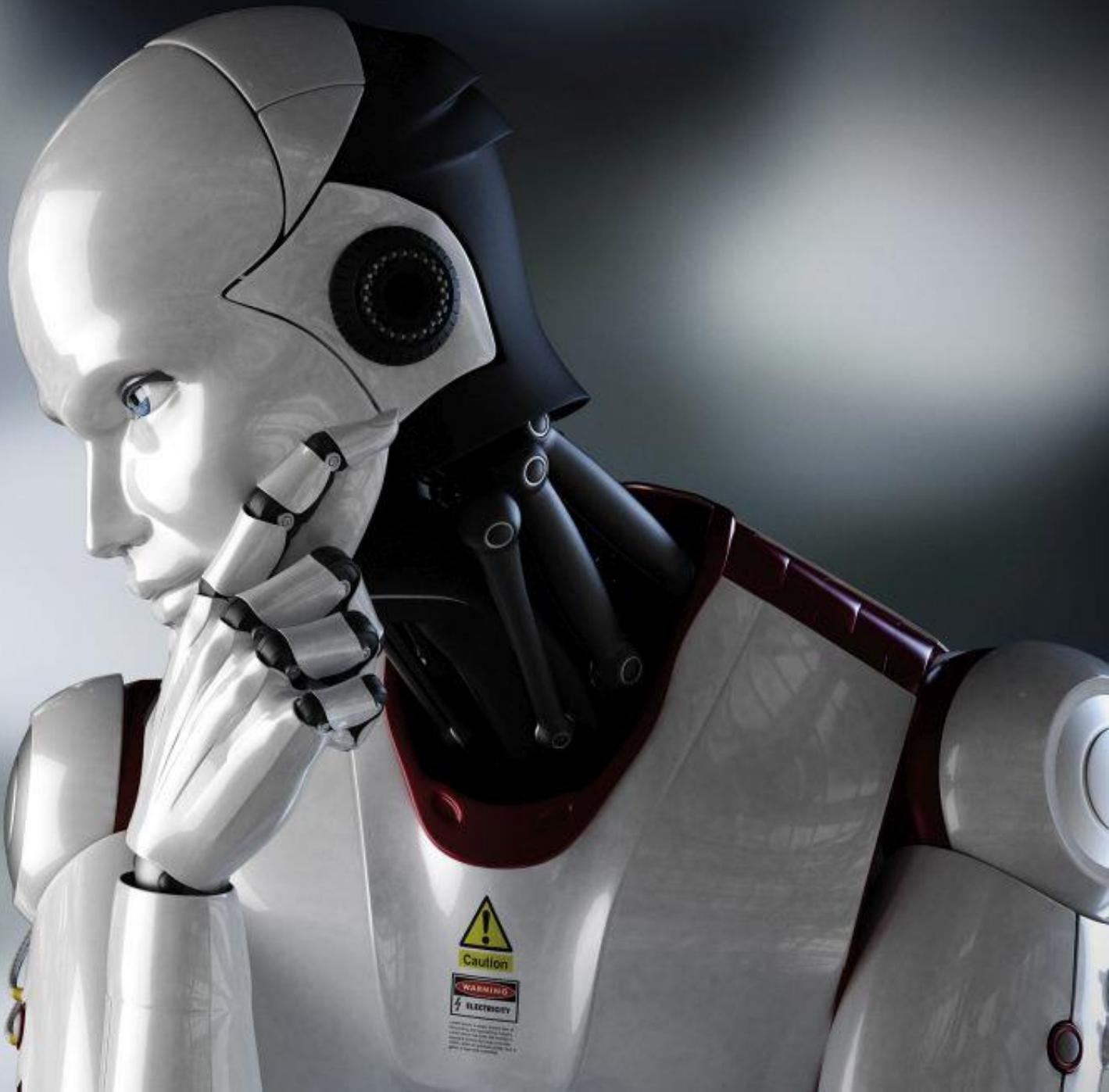


A person wearing a white protective suit and a respirator mask is holding a large white drum. The drum has a yellow warning label with the word 'Caution' and a hazard symbol. The background is a light gray.

Are you prepared?

Is your organization?

Is our world prepared?



Thank You!

Matthew Renze

Data Science Consultant
Renze Consulting

Twitter: [@matthewrenze](https://twitter.com/matthewrenze)

Email: info@matthewrenze.com

Website: www.matthewrenze.com

