STARMIND

«The Worker of the Future: Between Hype and Reality»

Pascal Kaufmann
Founder

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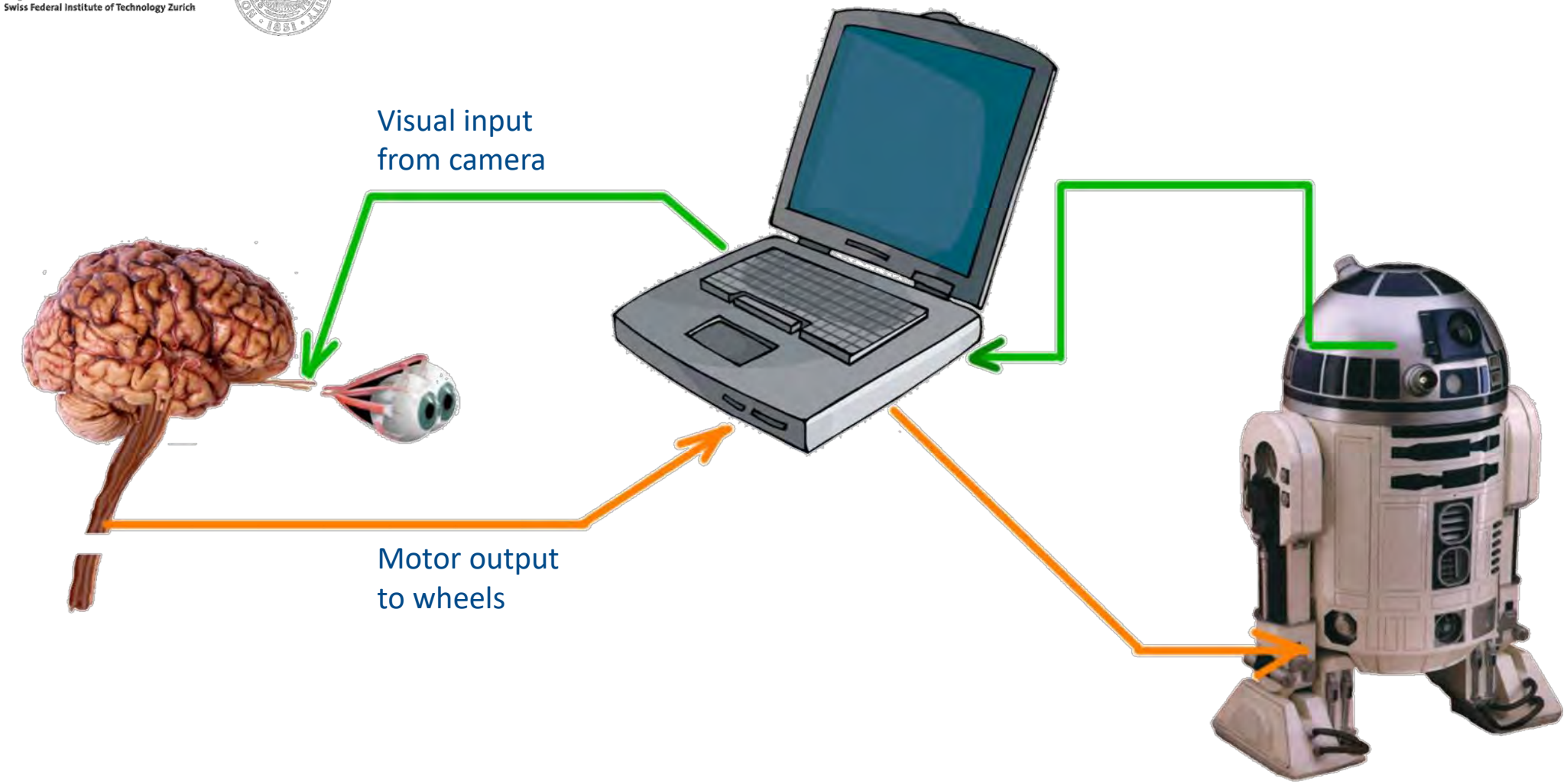
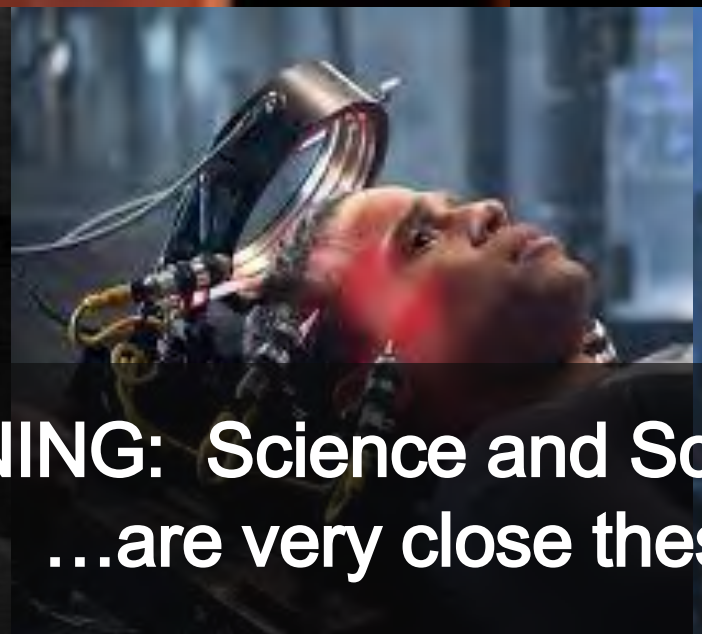
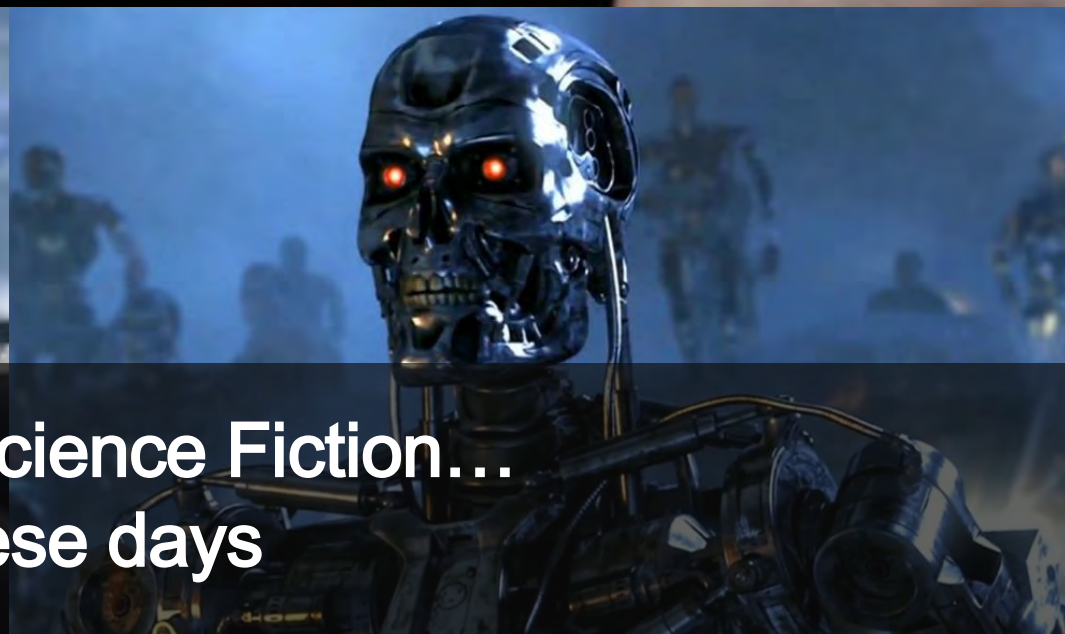
ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Northwestern University and ETH Zürich
Chicago Medical School, 2001



First attempts to tackle the brain code – Connecting Brains to Robots

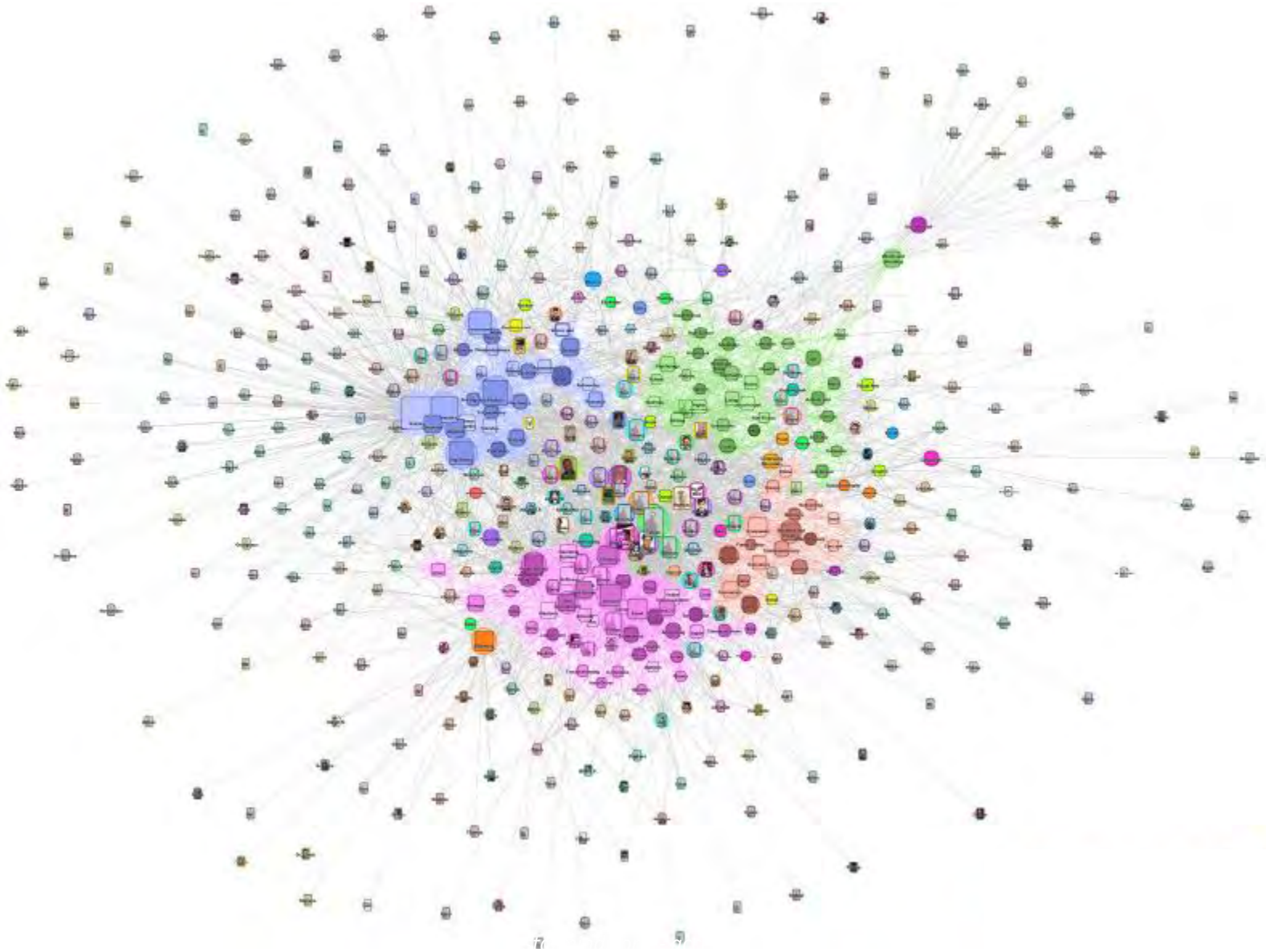




WARNING: Science and Science Fiction…

…are very close these days

Vision – Creating a global brain made up of talents




2005
What happened since then?


2013
Digital Revolution

Today – Access to Artificial Corporate Brains

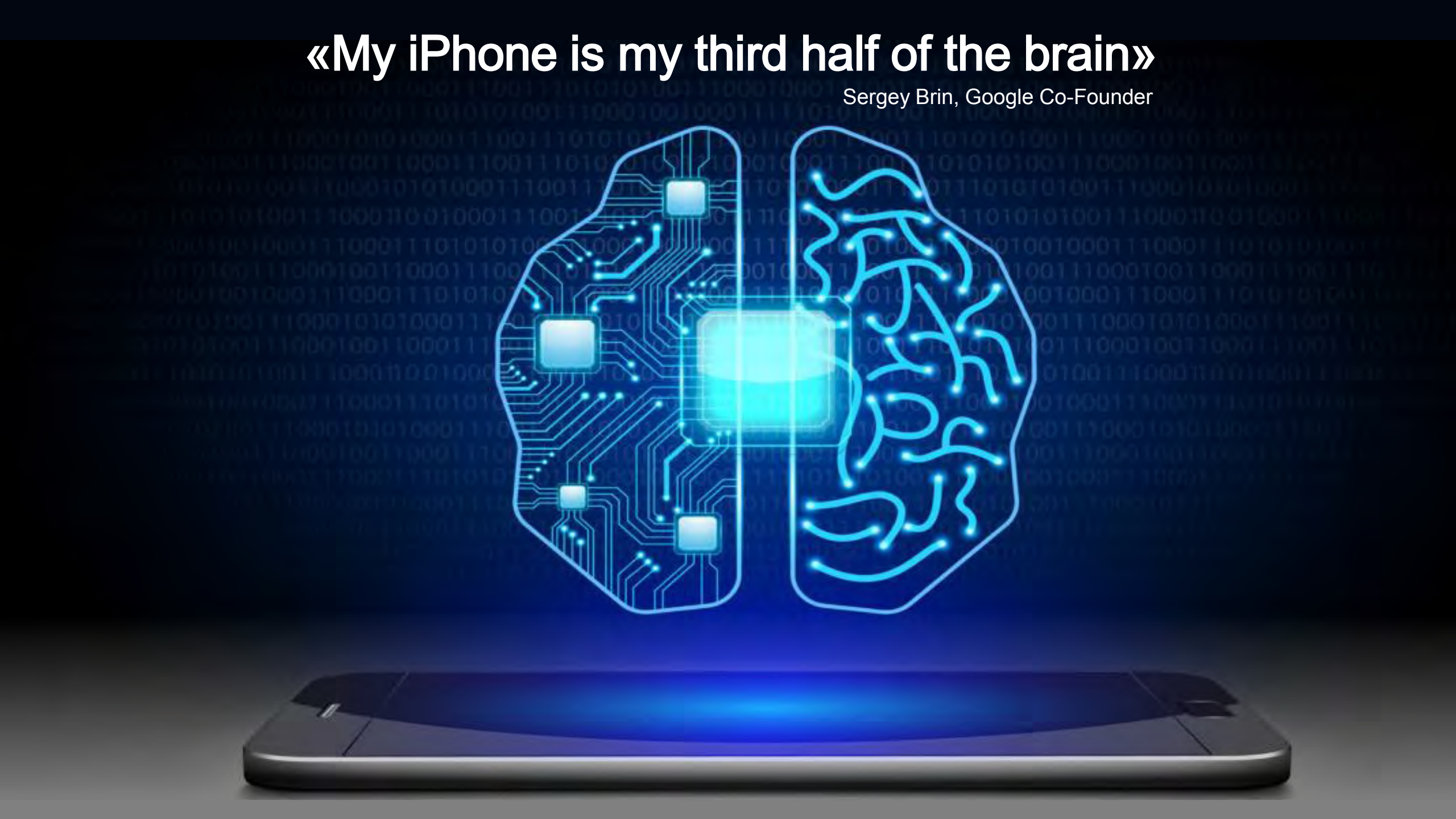
from… – Clients in 150+ countries use Starmind today

STARMIND

…to – Connecting experts within large organizations

«My iPhone is my third half of the brain»

Sergey Brin, Google Co-Founder

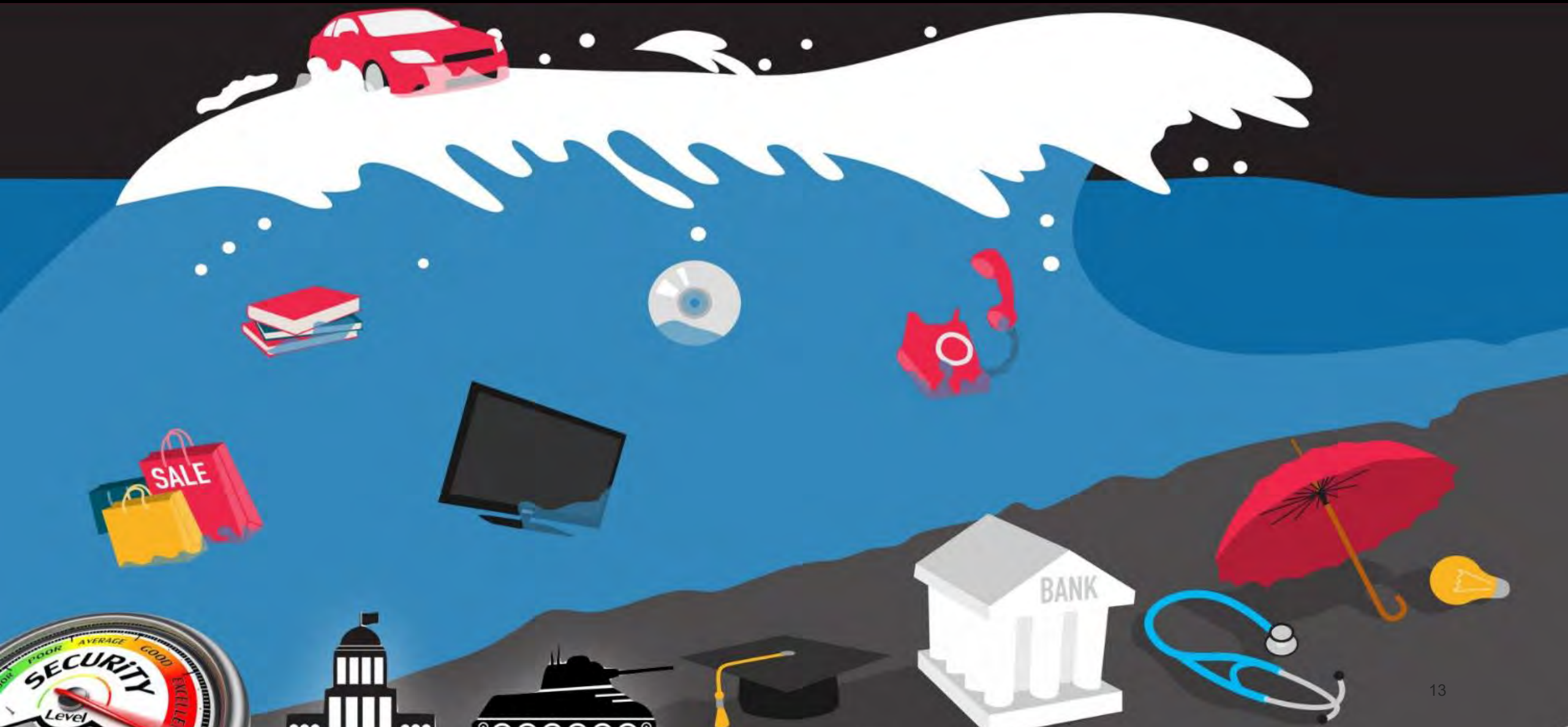


Will there be only Cyborgs after us?

credits: Gerd Leonhard

Rob Spence
“Eyeborg” (2013)

The digital transformation of our all lives is ahead of us



The digital transformation of our all lives is now

When anything can be automated or digitized: How about us?

How about human work?

What if there was human level AI ?

Exploration

Aging

Adventure

Society

Medicine

Quick Question to you:

When will we have human level AI?

Brilliant minds are racing against each other...

WHAT IF WE ALL WORKED **TOGETHER?**

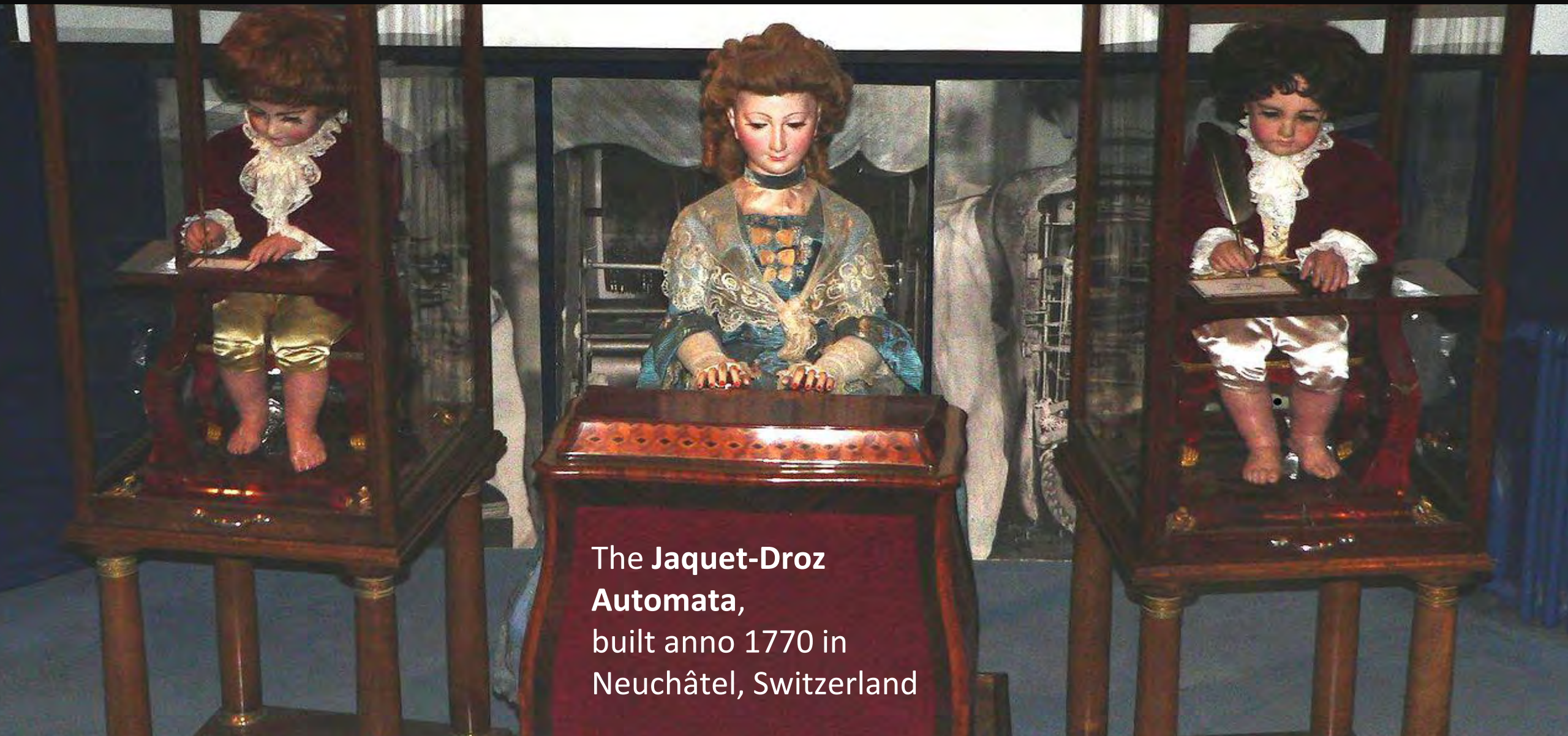
The creation of AI – The Moonlanding of the 21st century

1. **Beware of the robot hype – there are no Hollywood robots yet**
   Robotics is very hard

2. **Beware of the AI hype – there is no Artificial Intelligence yet**
   AI algorithms today are tinned human intelligence

3. **Tool up team human – Let us become cyborgs**
   Augment intelligence in order to stay in the game

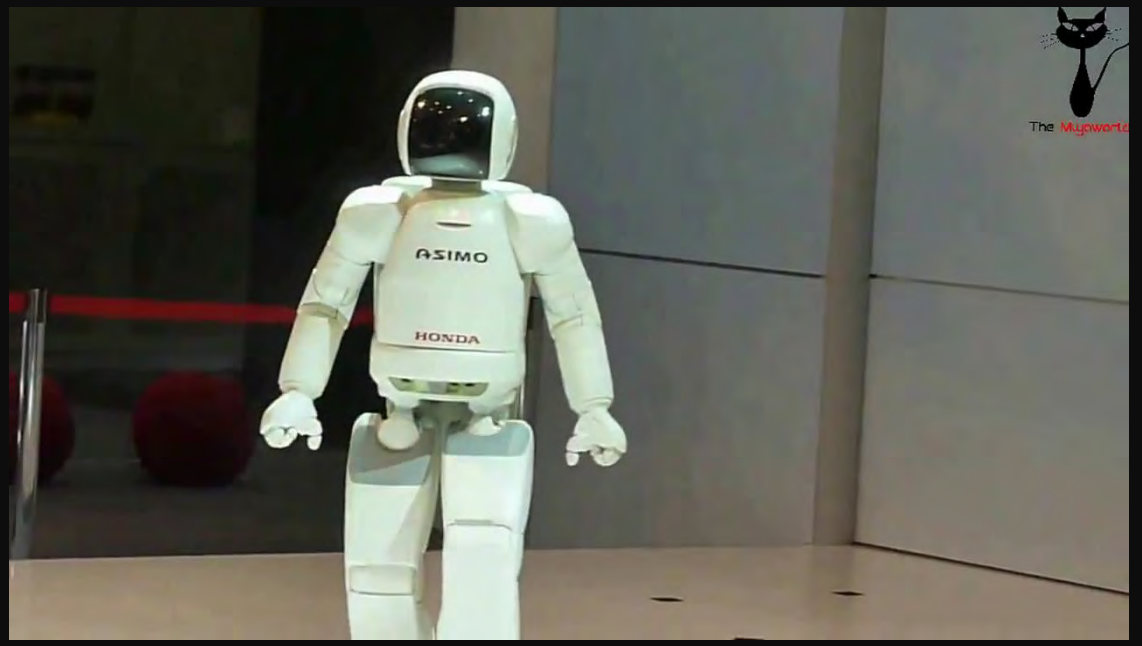
Robots: How far are we compared to 1770 (249 years ago)?



The **Jaquet-Droz Automata**,
built anno 1770 in
Neuchâtel, Switzerland

The «robo hype» – Robots leaving the factory halls (2018)

Meet the “champion” – Honda Asimo



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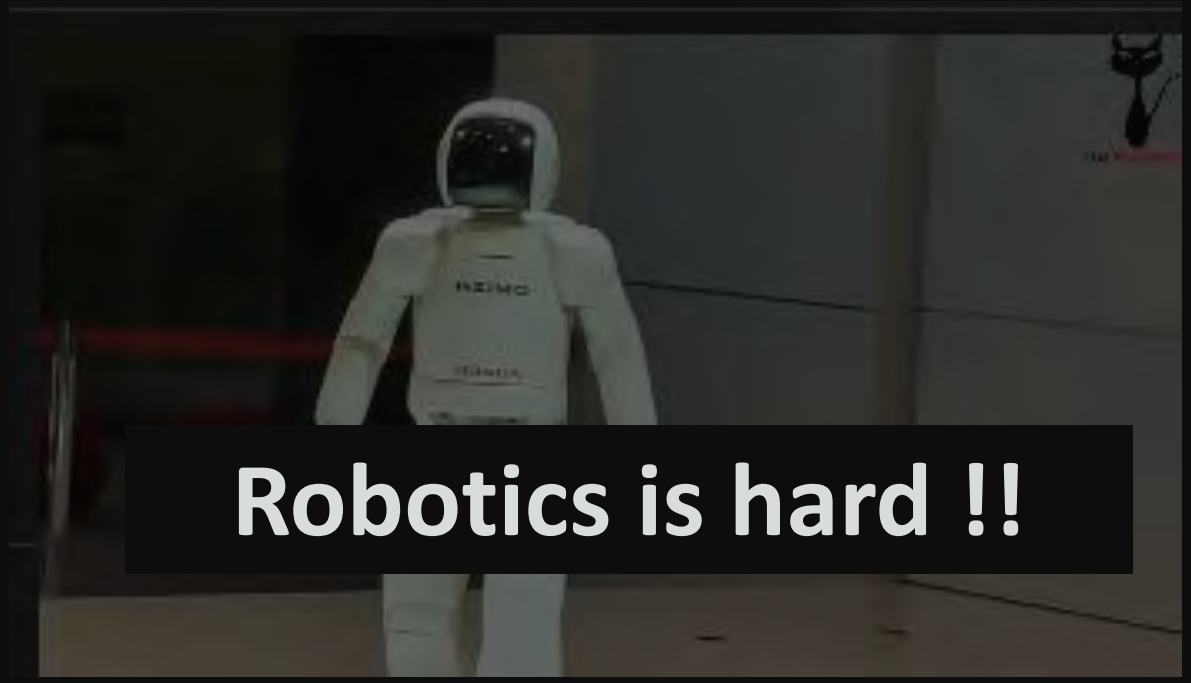
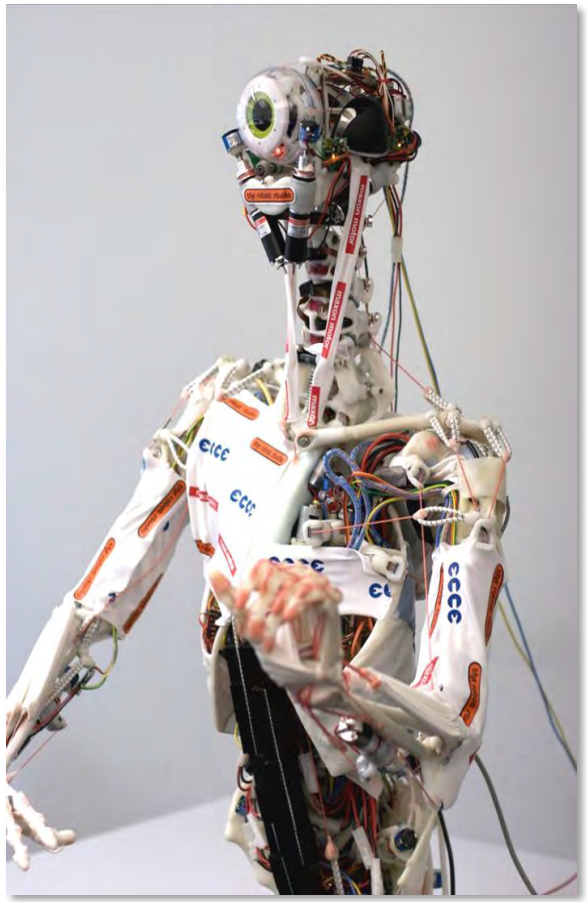
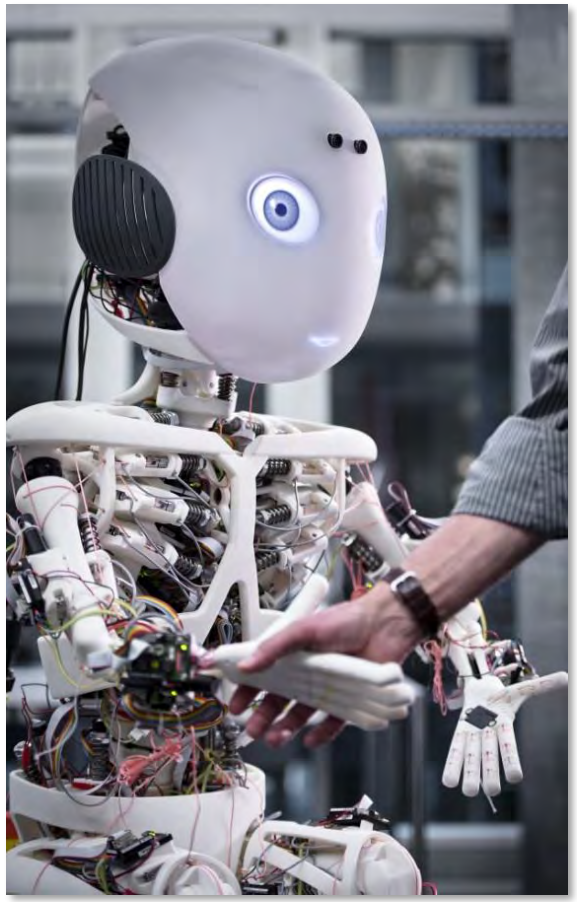


1995



2010



2015

Humanoid, social robots

\+ ?

Example – 25 years of research at the AI Lab in Zurich

There is one even larger hype

There is one even larger hype - AI

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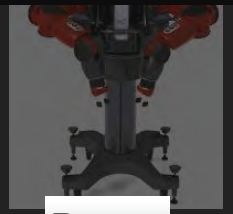
Perfect storm: The AI and Robotics hype join forces

Self-driving car

Drones

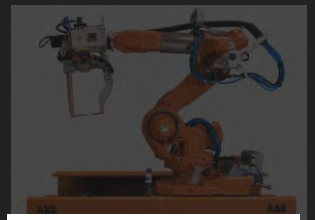
Internet of Things

Pepper

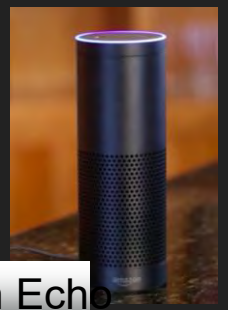


Baxter

Honda Asimo



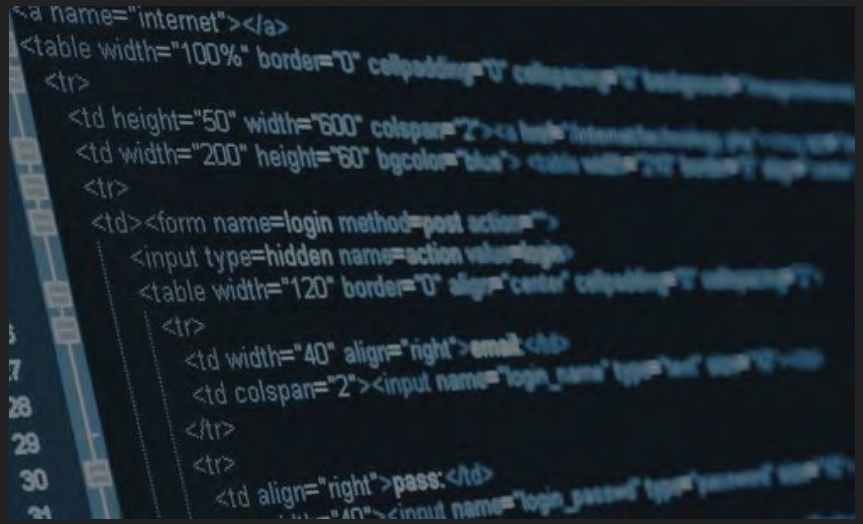
Industrial Robot



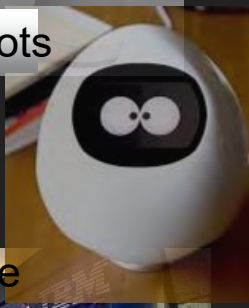
Amazon Echo

Social robots

IBM Watson



Big Data



IBMs Deep Blue

AlphaGo

Apple Siri

Industry 4.0

“Made in China 2025”

“Society 5.0”

Perfect storm: The AI and Robotics hype join forces

Self-driving car

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Internet of Things

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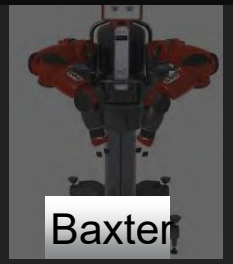

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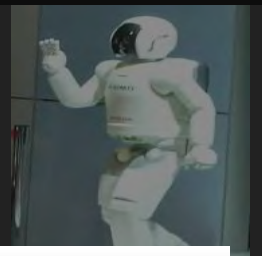

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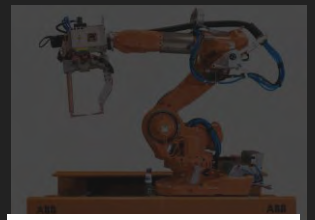

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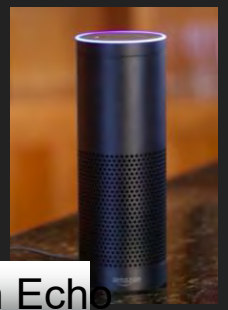

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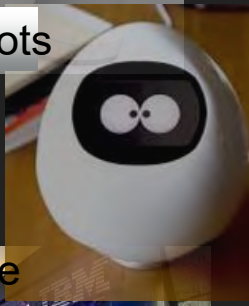
IBM Watson

the “AI”

Social robots

Big Data



IBMs Deep Blue

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Apple Siri

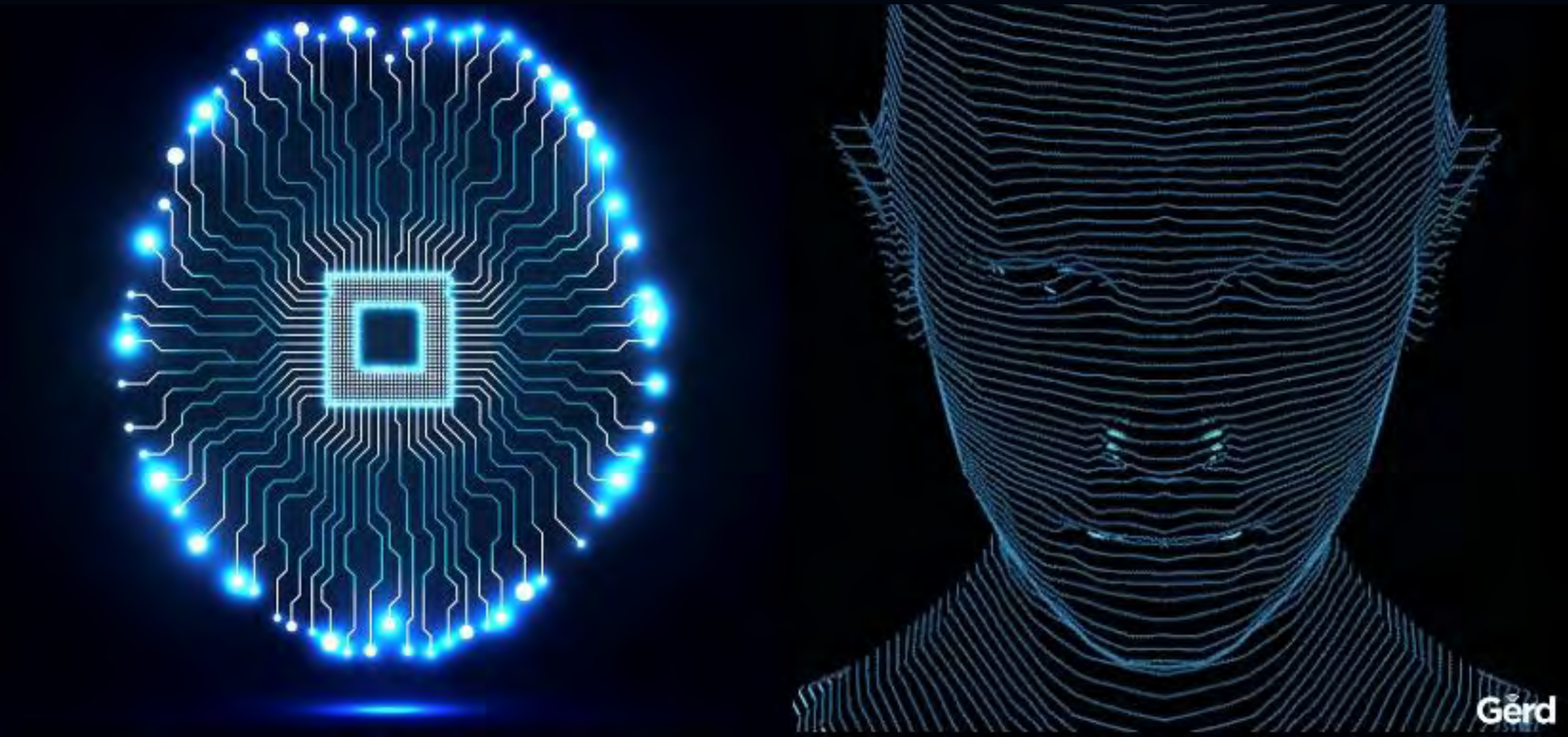
Industry 4.0

“Made in China 2025”

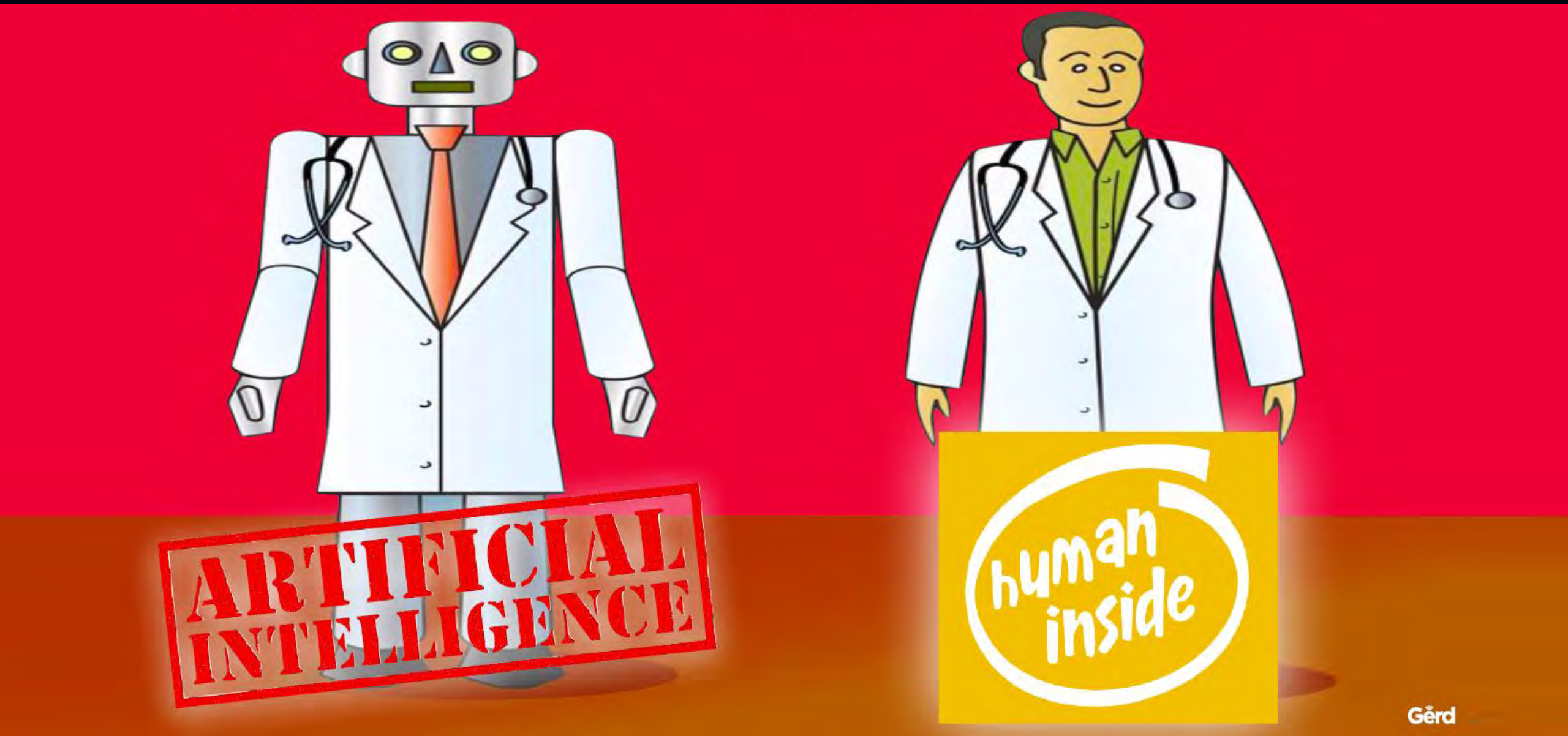
“Society 5.0’

«We will move from mobile first to an AI-first world»

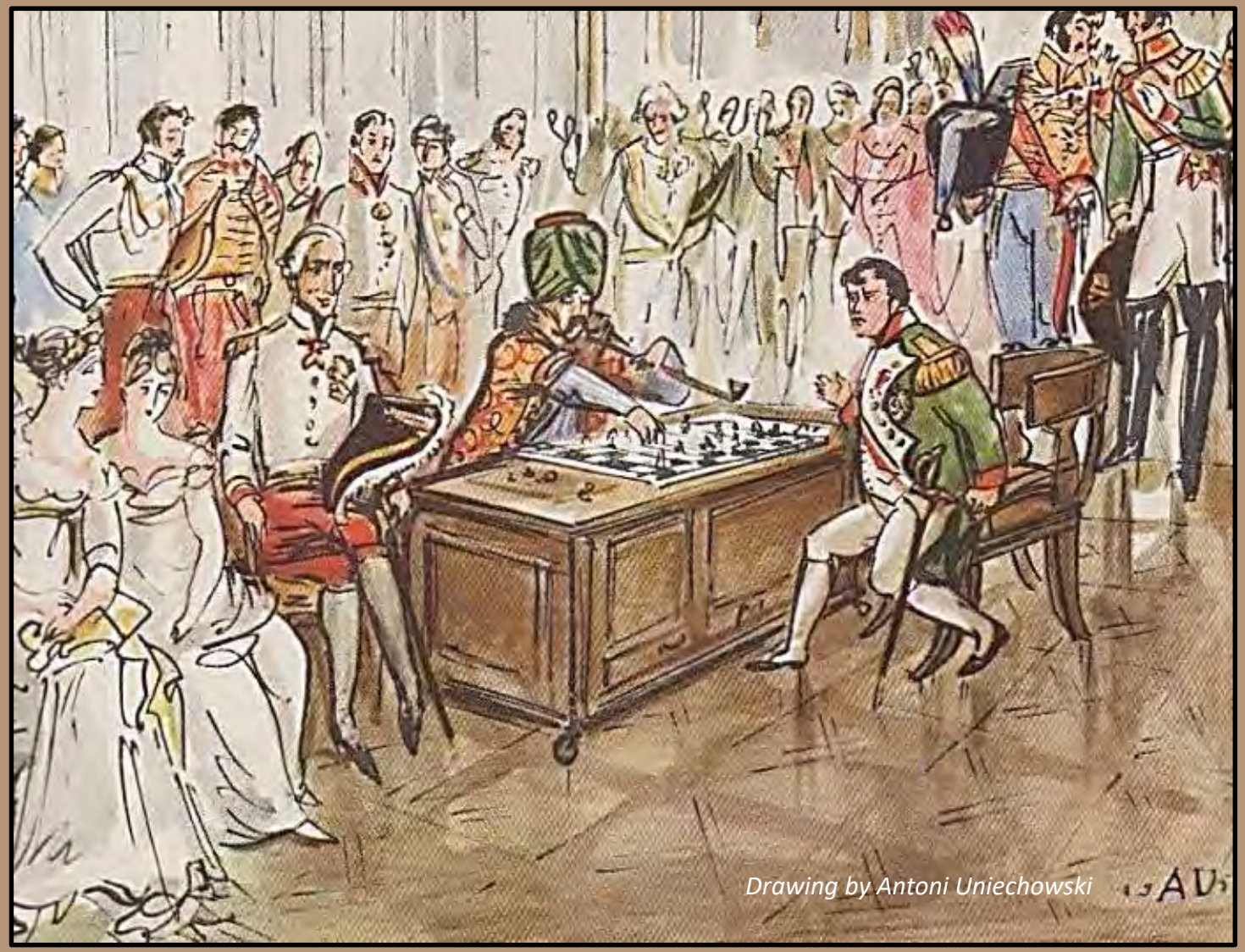
Sundar Pichai, CEO Google, 05/2016

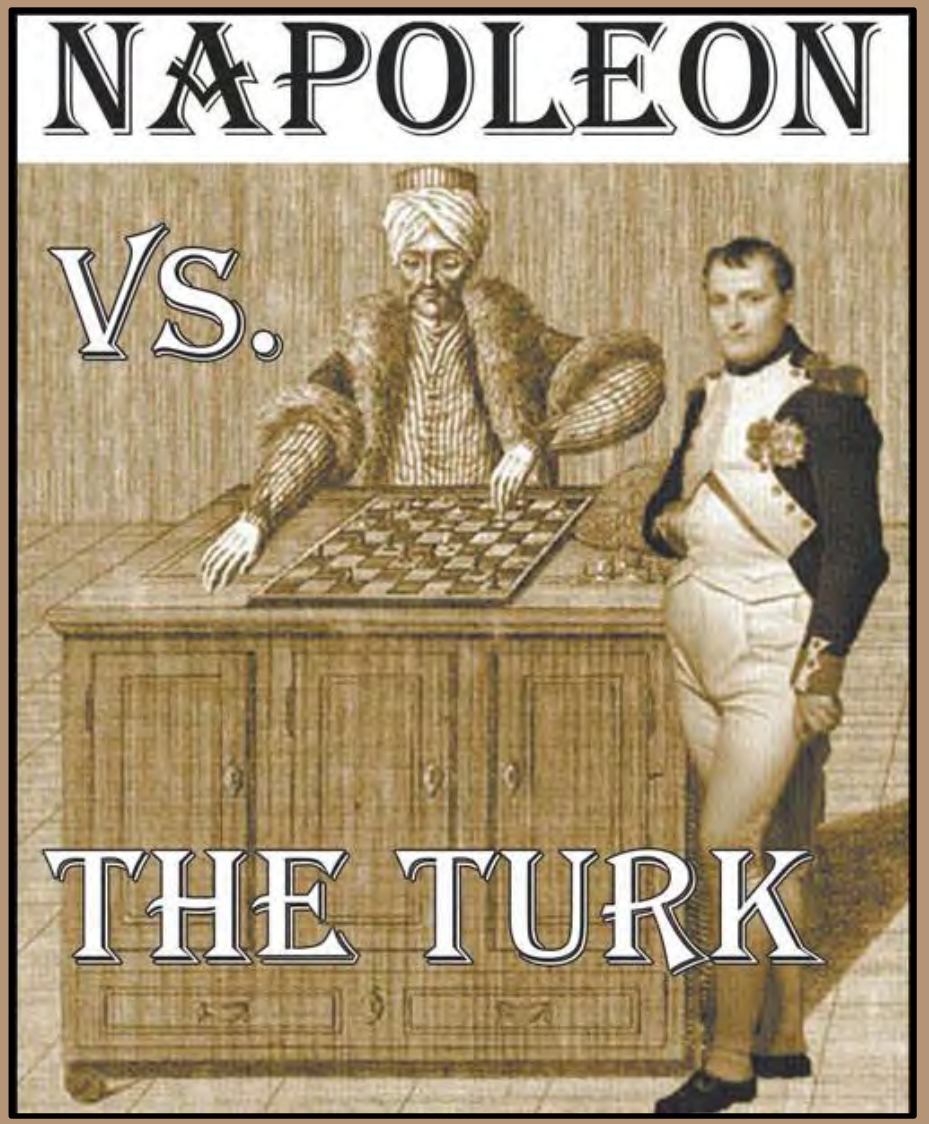


Today – new Opportunities: How much AI is in there?



Napoleon vs. the Chess Automaton (1809)





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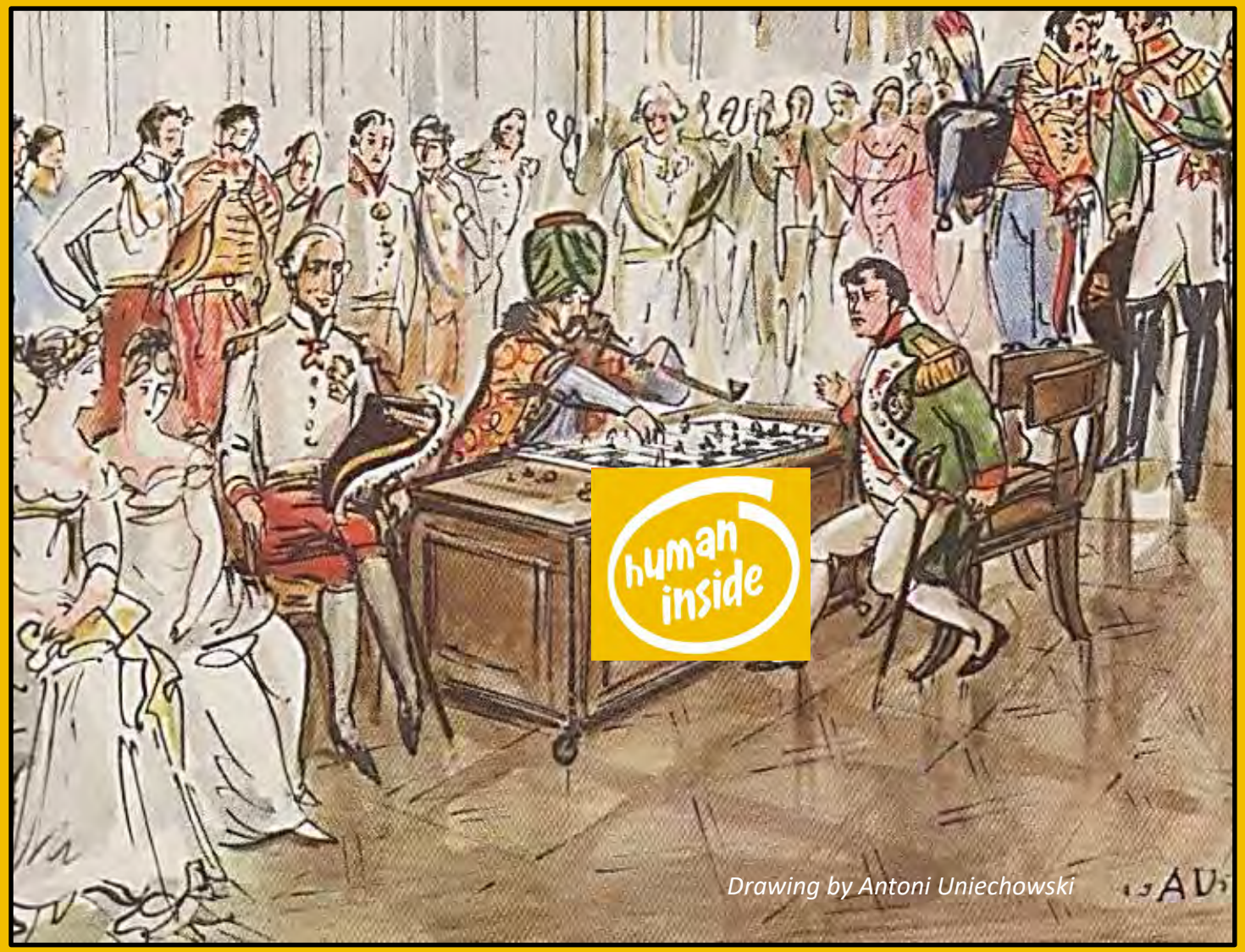

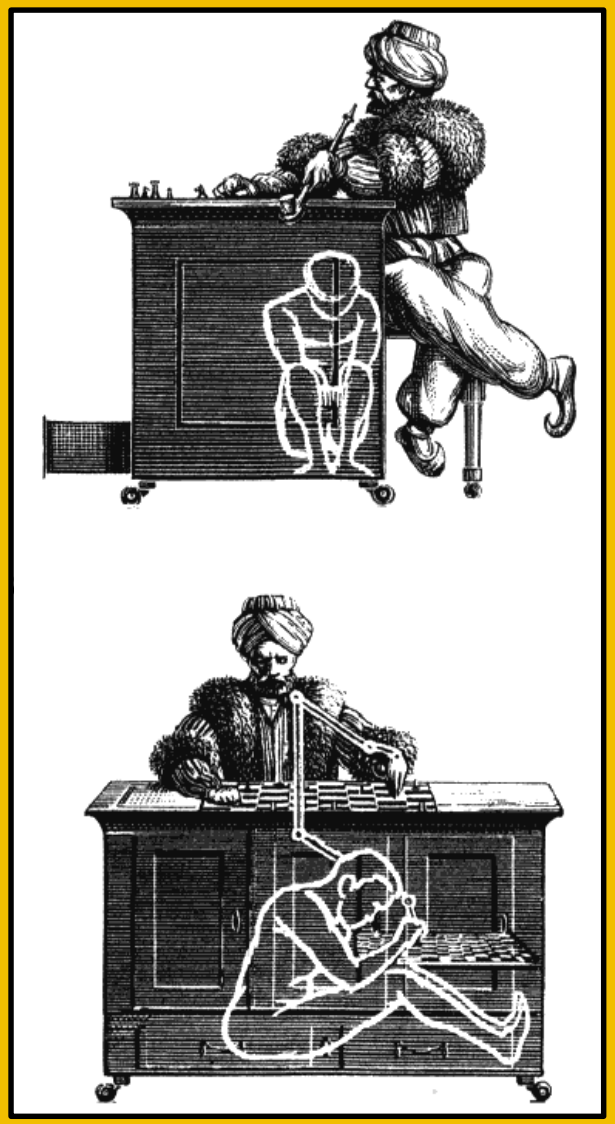

- *1770 – 1854, the fake chess-playing machine attracted world leaders and toured the globe.*
- *For more than 84 years it tricked the best minds, before it was burnt in the US, Philadelphia.*

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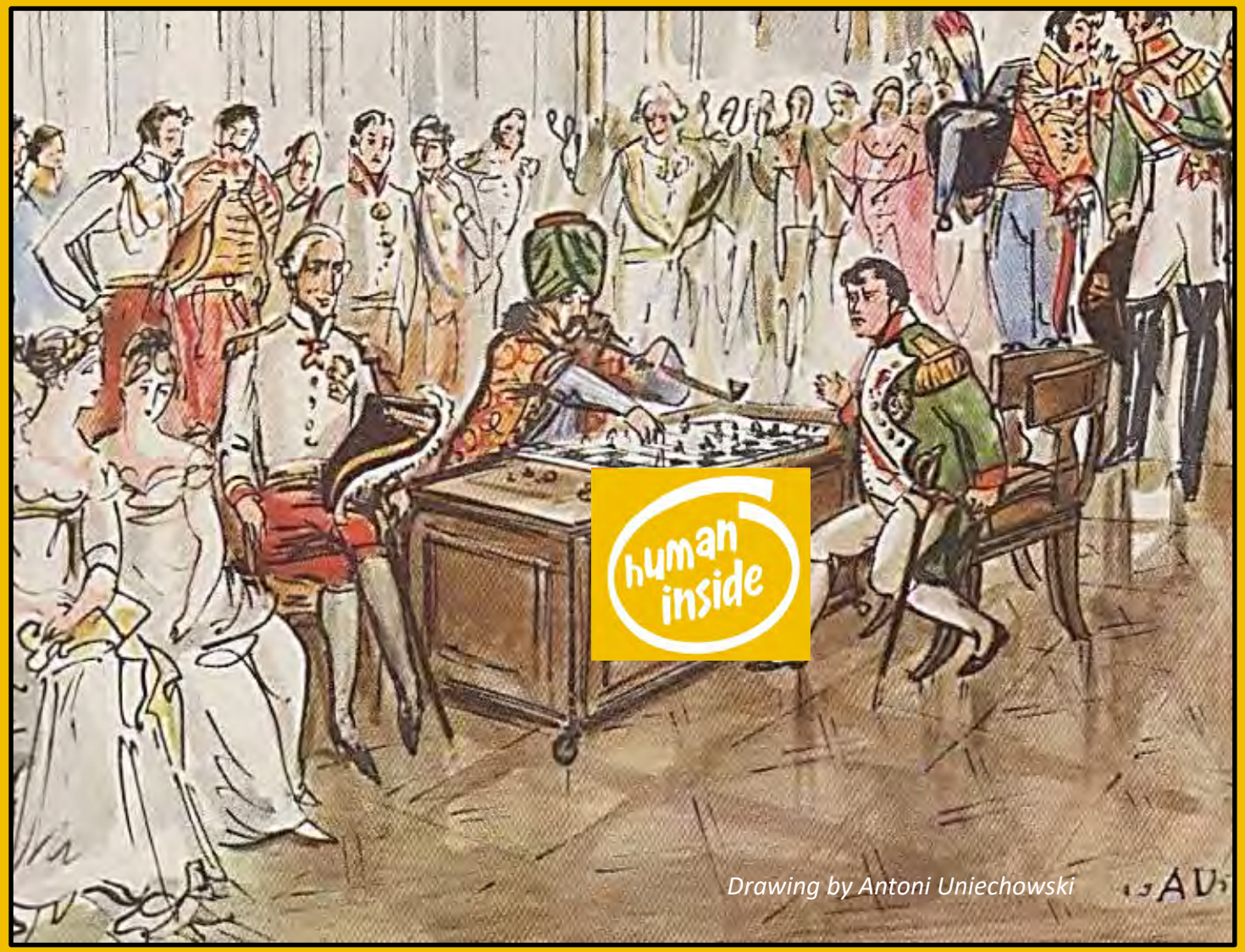

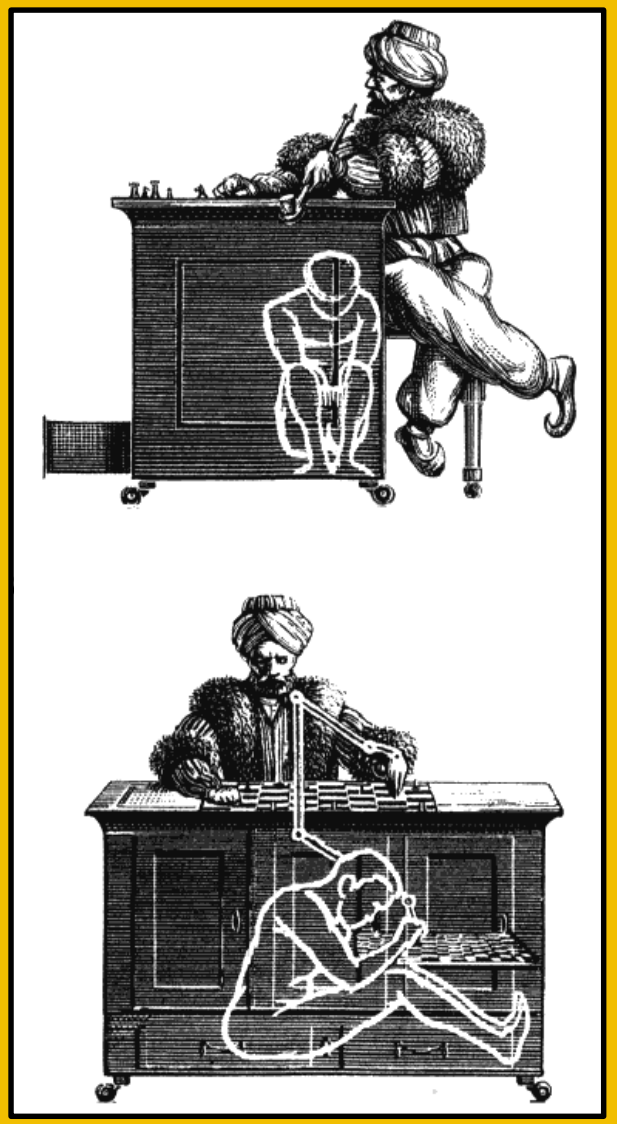

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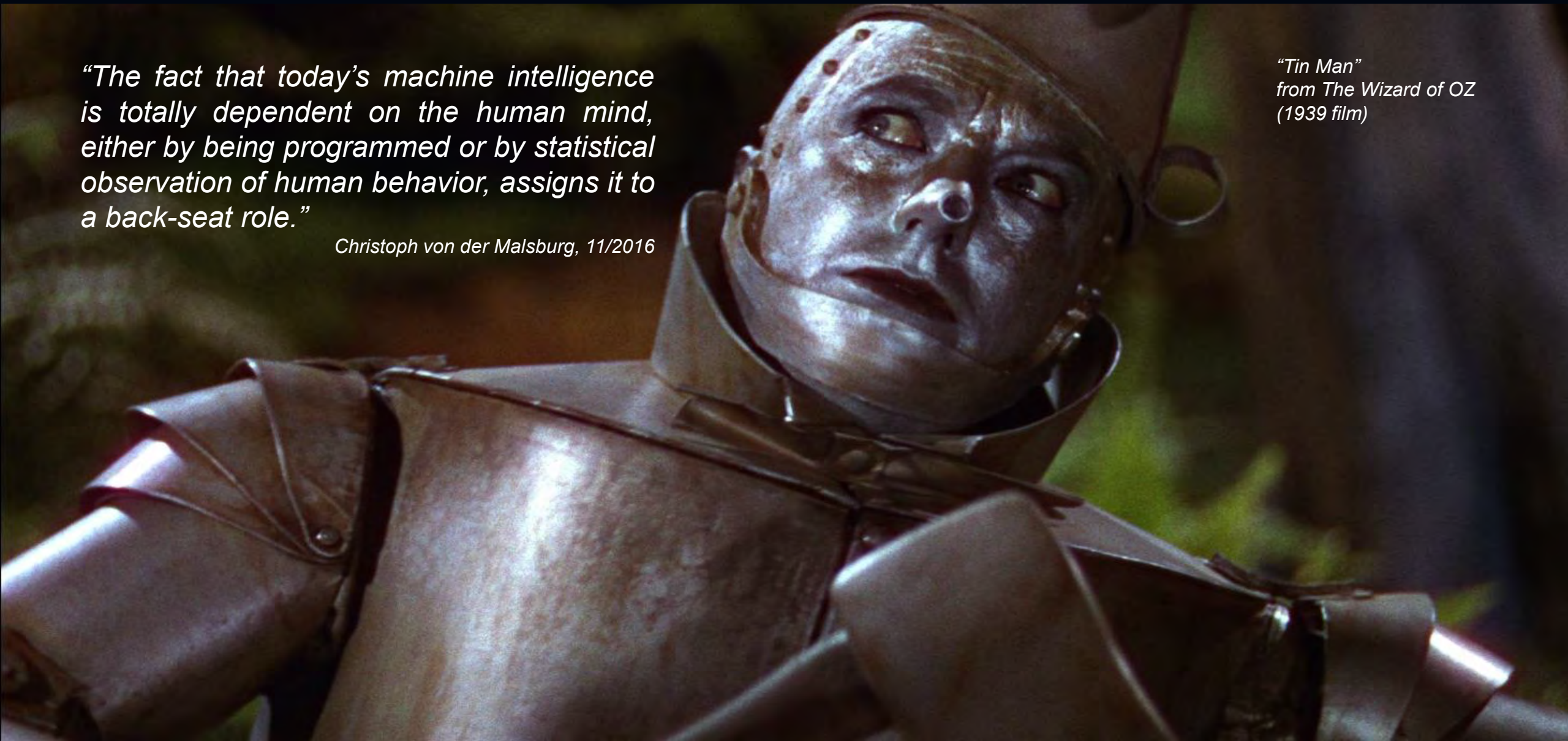
AI today: More than tinned human intelligence?

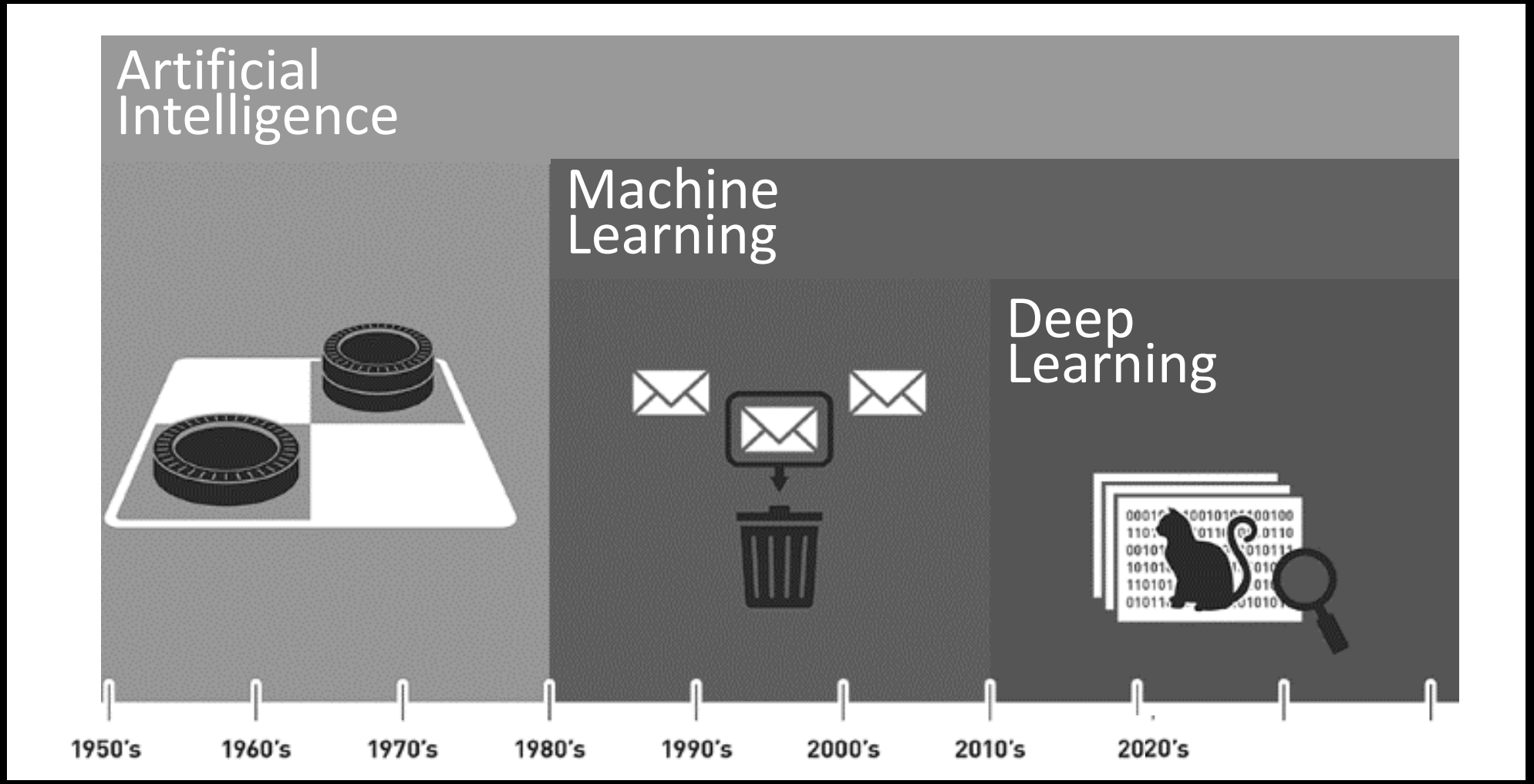


"The fact that today's machine intelligence is totally dependent on the human mind, either by being programmed or by statistical observation of human behavior, assigns it to a back-seat role."

Christoph von der Malsburg, 11/2016

"Tin Man"
from The Wizard of OZ
(1939 film)

What is Artificial Intelligence – What is state of the art?



Lee Sedol vs. AlphaGo, 03/2016

Silver, David, et al. "Mastering the game of Go with deep neural networks and tree search" *Nature*, (2016)

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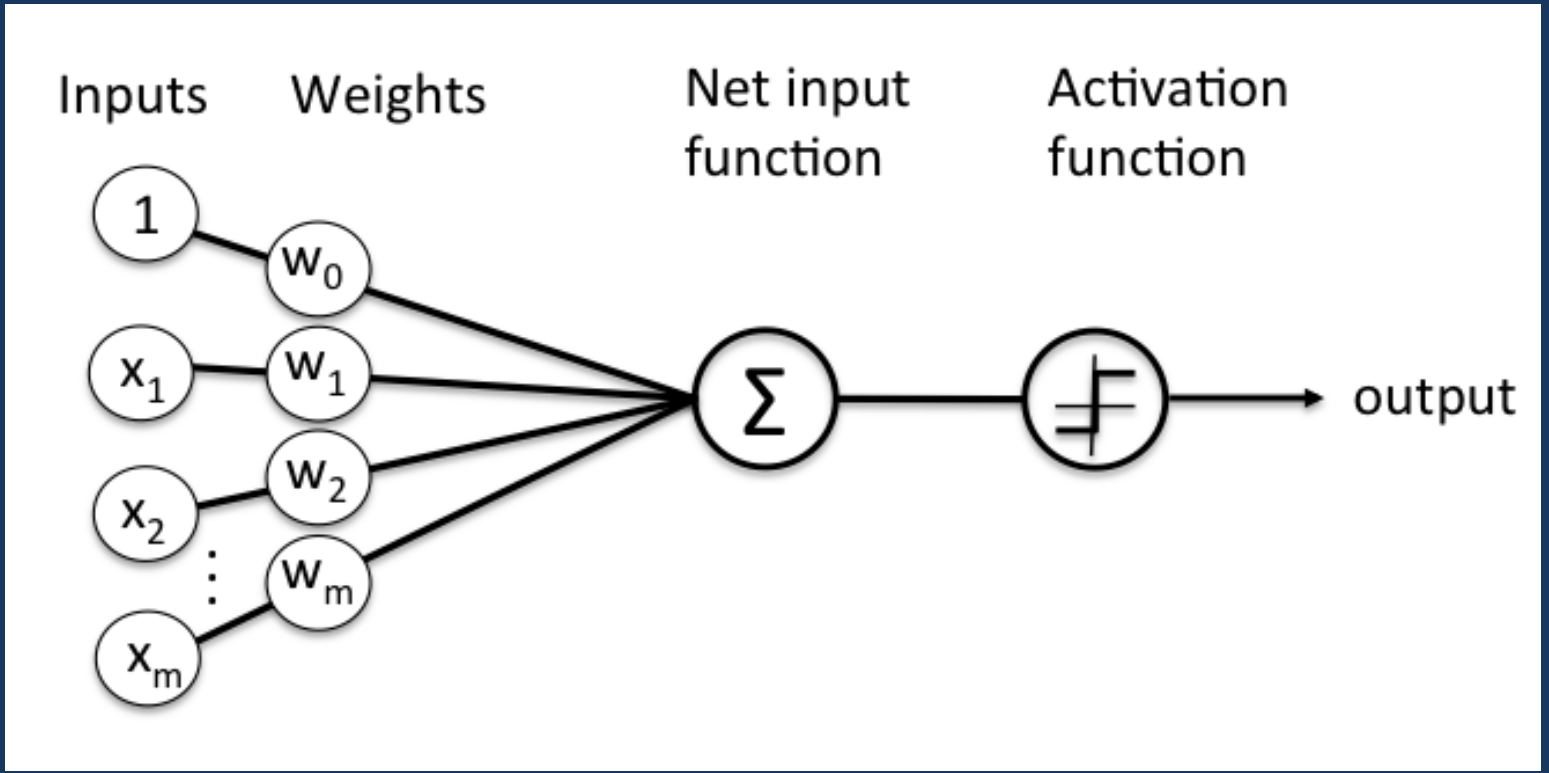
“The Navy revealed the embryo of an electronic computer today that it expects will be able to walk, talk, see, write, reproduce itself and be conscious of its existence.”

Reaction upon the first Artificial Neural Network

“The Navy revealed the embryo of an electronic computer today that it expects will be able to walk, talk, see, write, reproduce itself and be conscious of its existence.”

New York Times, July 7, 1958

First Artificial Neural Network – Frank Rosenblatt's Perceptron (1957)



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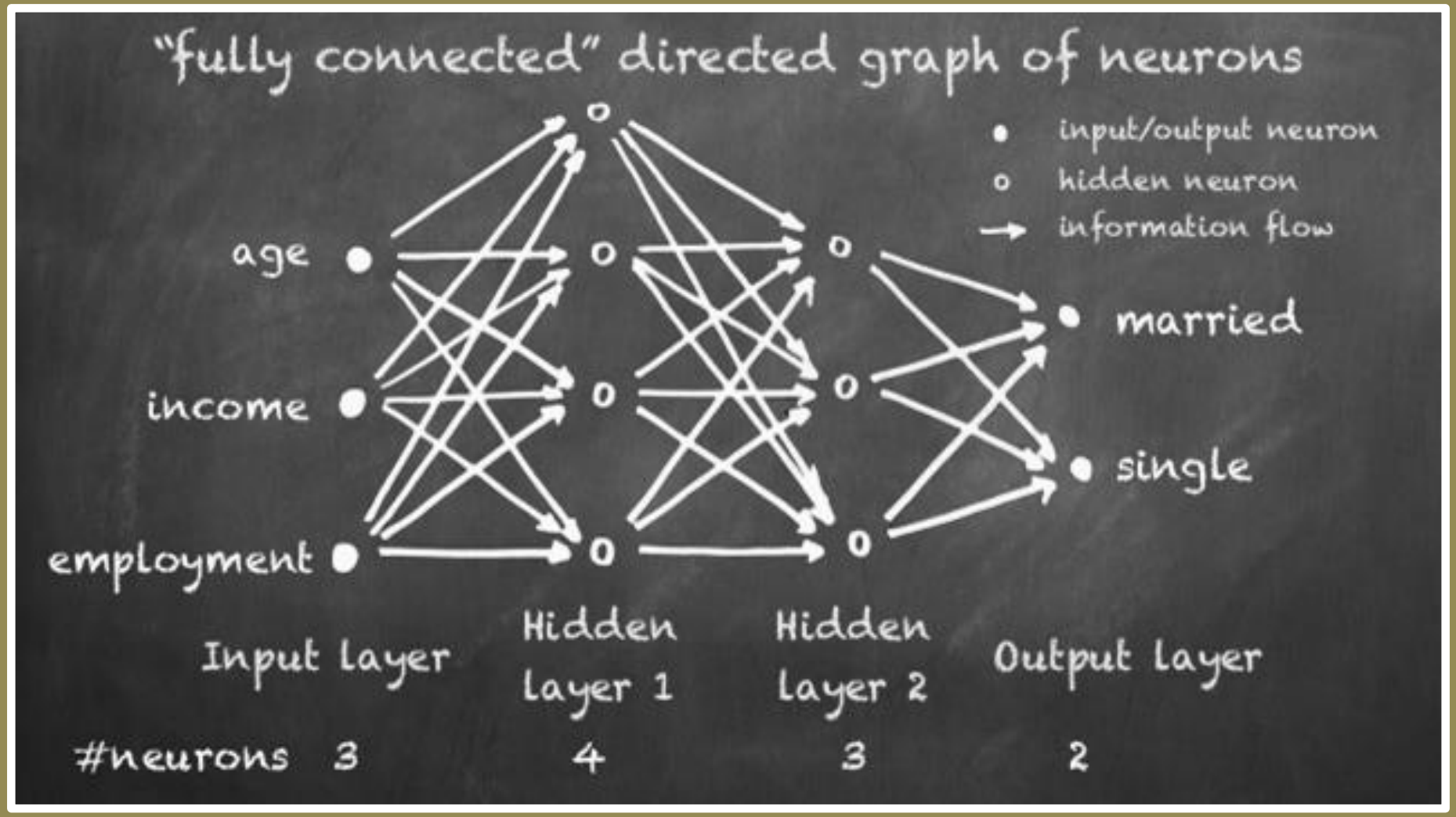
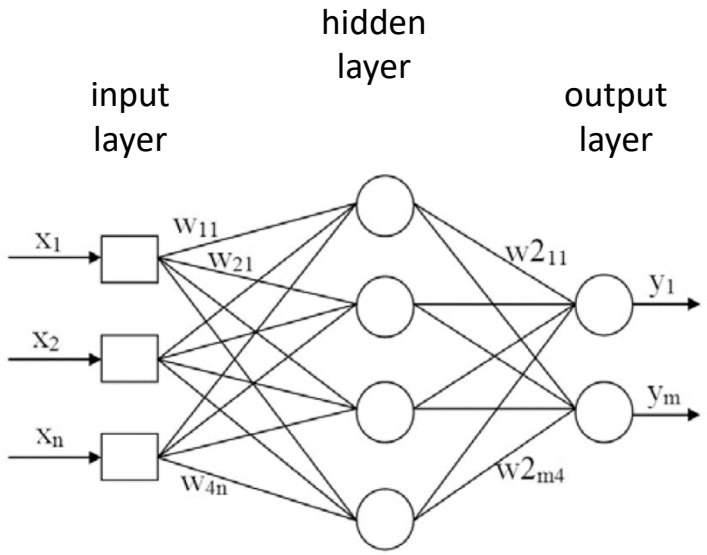
Today's Artificial Neural Networks – Example



From Perceptron to Deep Learning: Progress



Artificial Neural Network

1957

“The Perceptron”

110 tons

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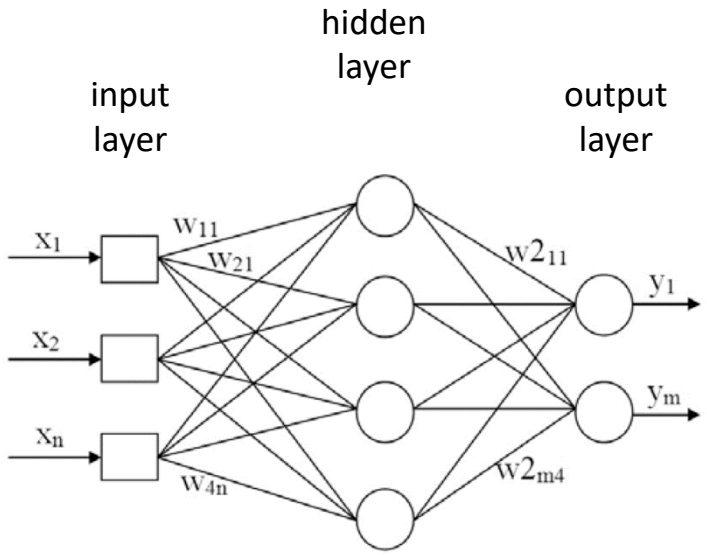

Artificial Neural Network

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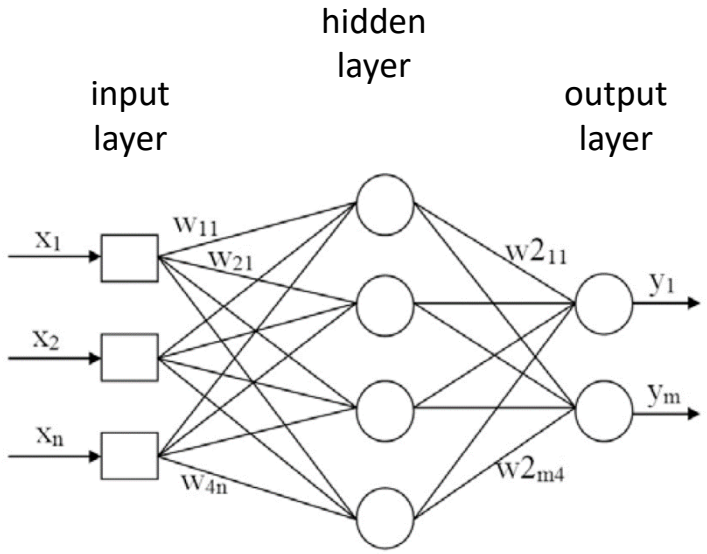
110 tons

60+ years of research

\+ Trillions $ of cash = ?

10^{12} x more computing power

From Perceptron to Deep Learning: Progress (?)



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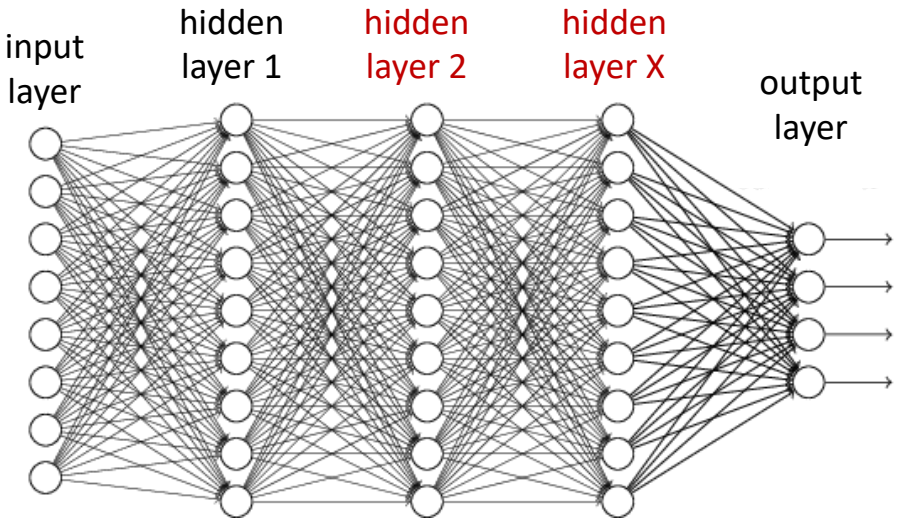
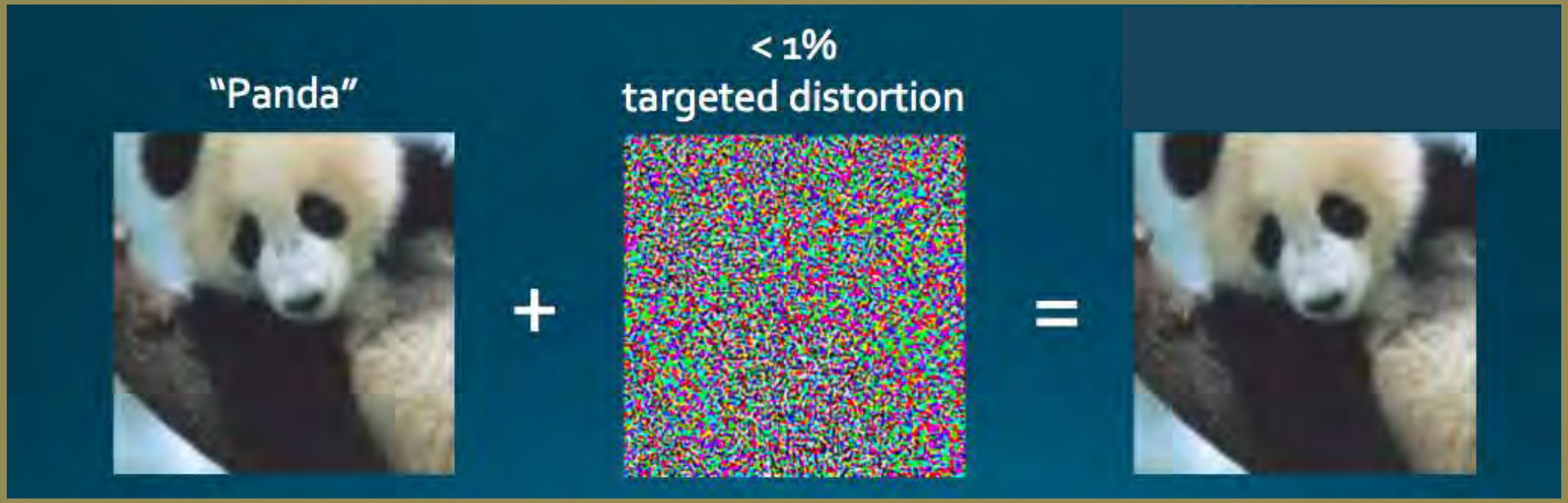


Artificial Neural Network

2019

"Deep Learning"

How to trick a Deep Neural Network: The Panda example



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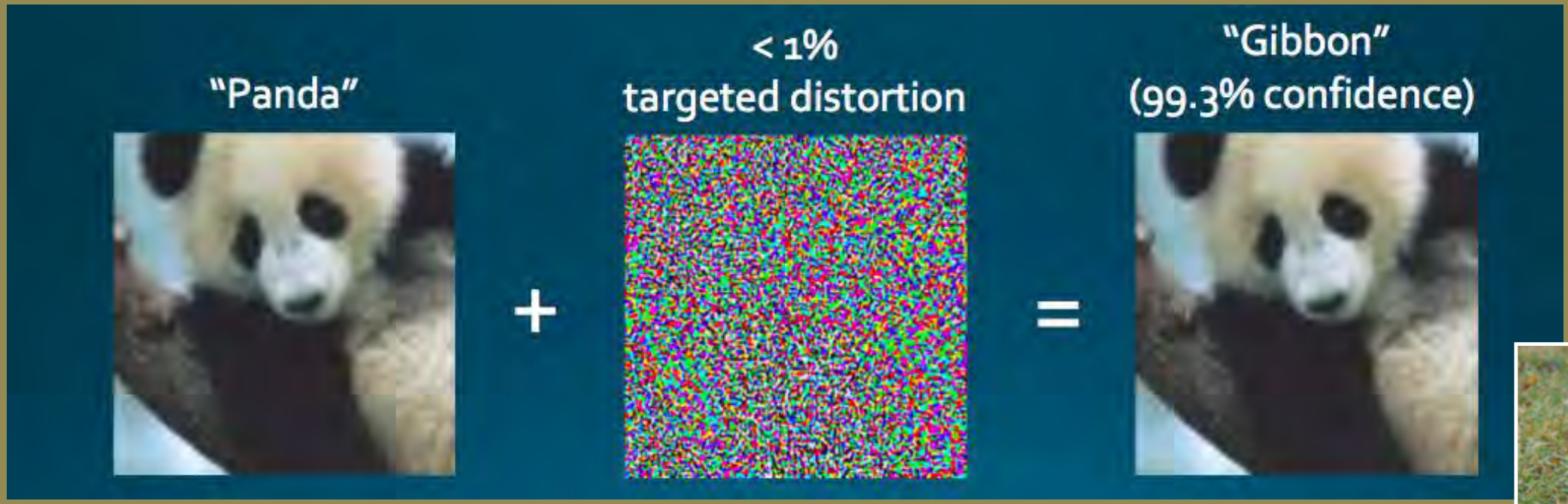

Gibbon

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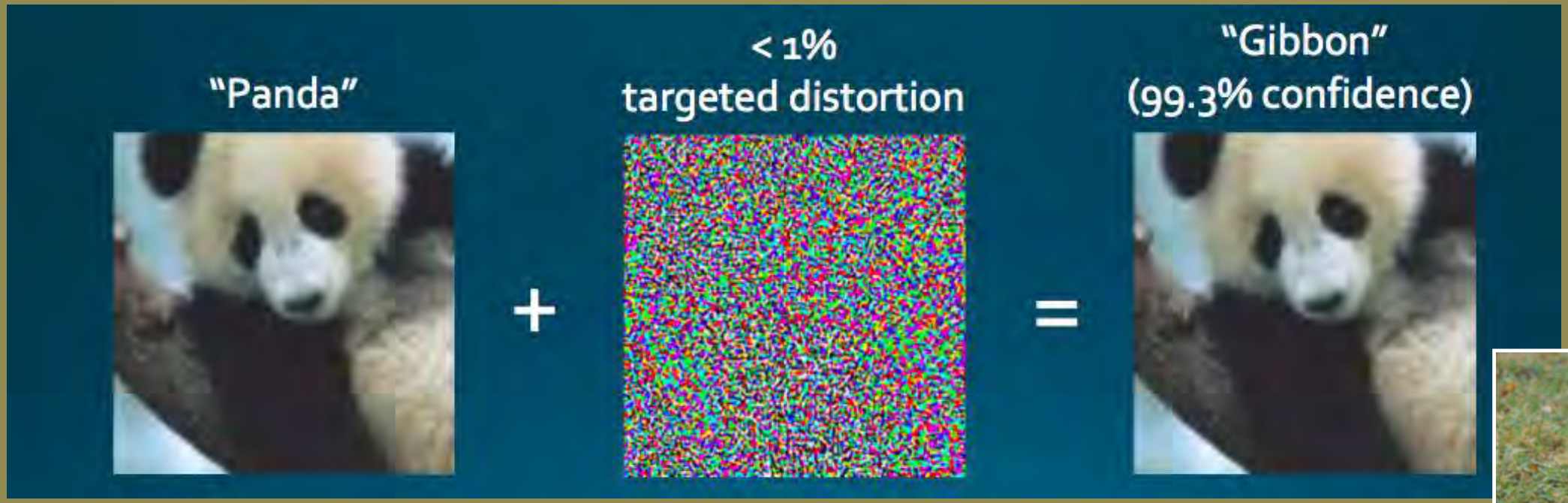
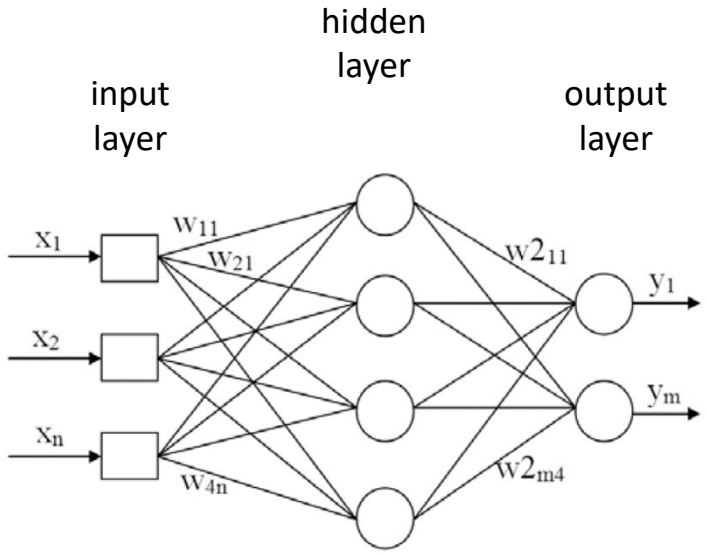


"Statistically impressive, but individually unreliable."

John Launchbary, DARPA

Gibbon

From Perceptron to Deep Learning: Progress (?)



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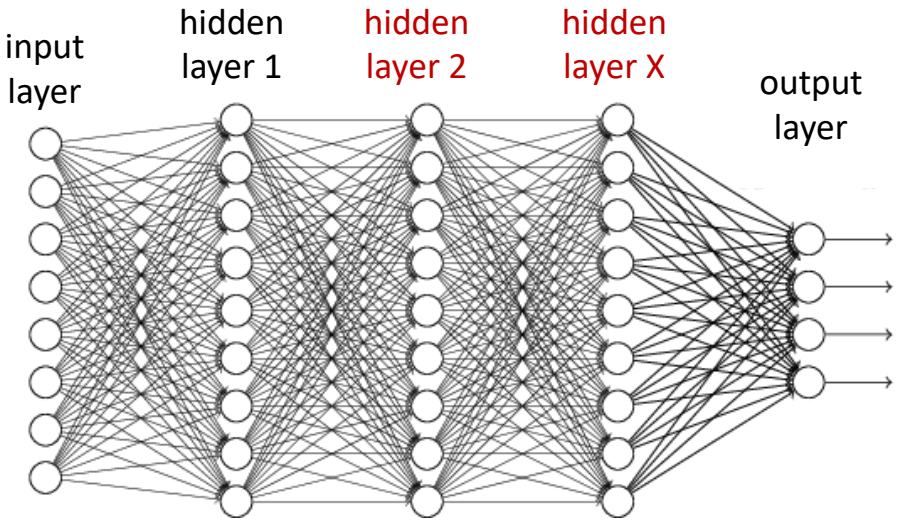
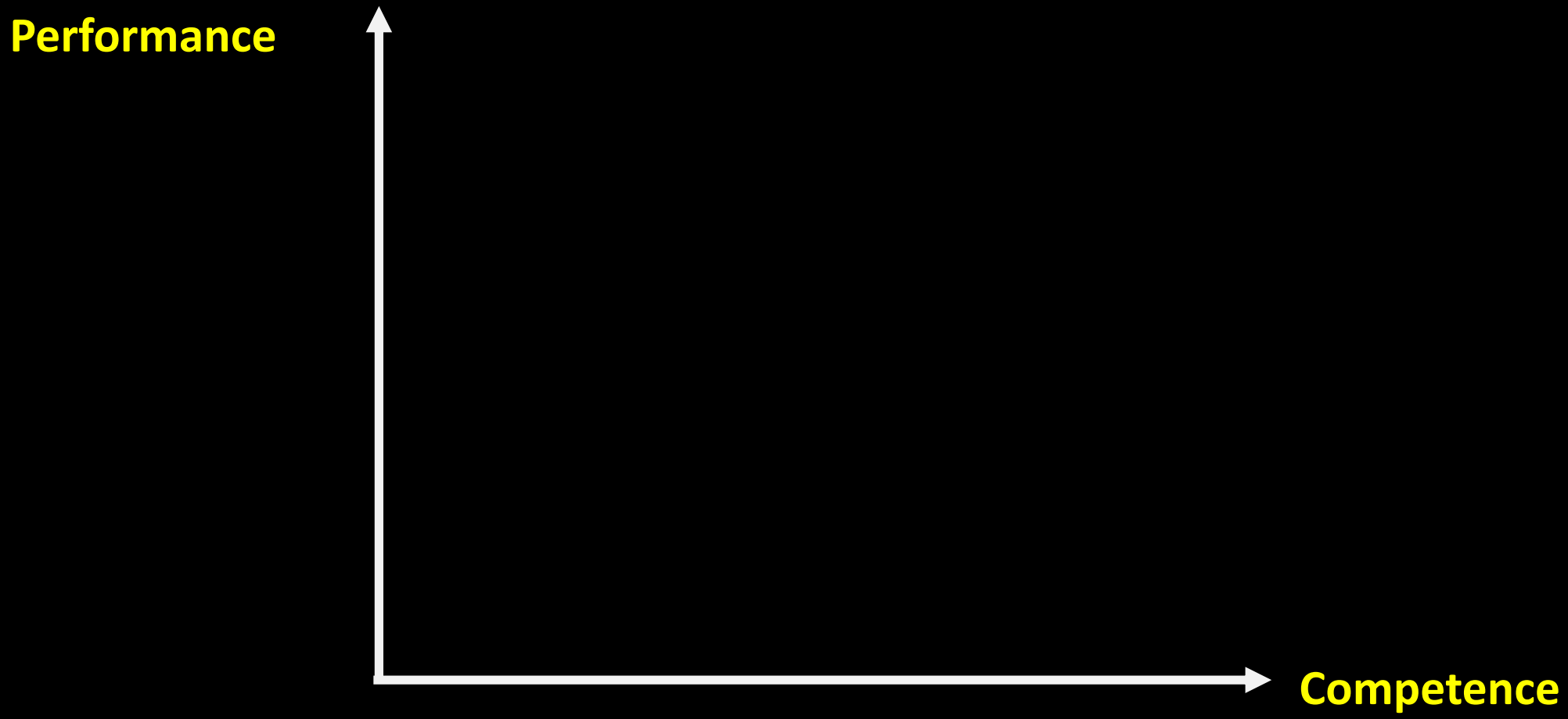


Artificial Neural Network

2019

"Deep Learning"

Difference between man and machine – Example: Performance vs. Competence



Difference between man and machine – Example: Performance vs. Competence

Performance

- search engines (Google)
- Big Data
- manufacturing
- Deep Neural Networks

eg. DeepMind, DeepBlue

Competence

Difference between man and machine – Example: Performance vs. Competence

Performance

- **search engines (Google)**
- **Big Data**
- **manufacturing**
- **Deep Neural Networks**

eg. DeepMind, DeepBlue

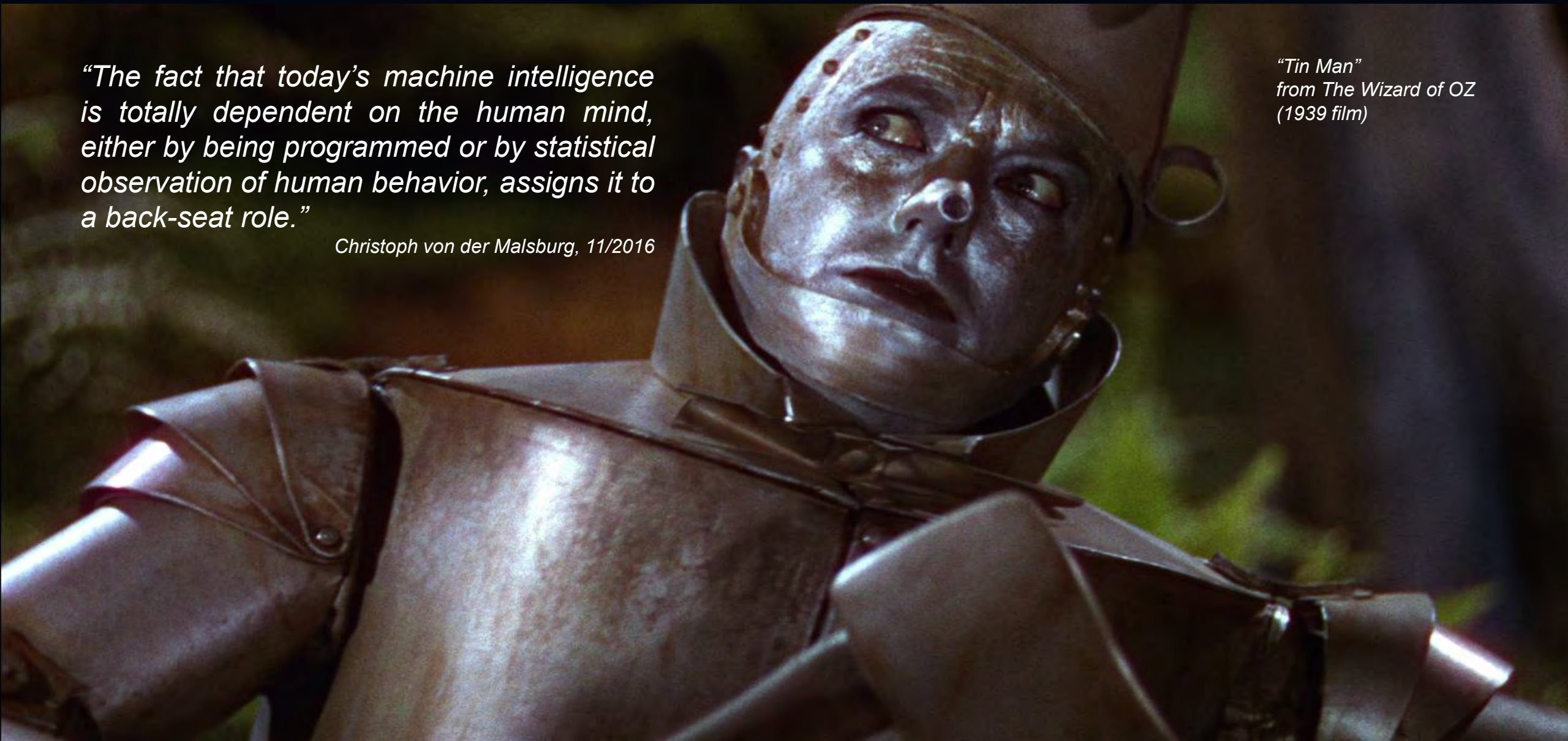
most Humans

eg. shoes:
«What can you do with a pair of shoes?»

«Play chess on a 10 x 10 board»

Competence

AI today: More than tinned human intelligence?



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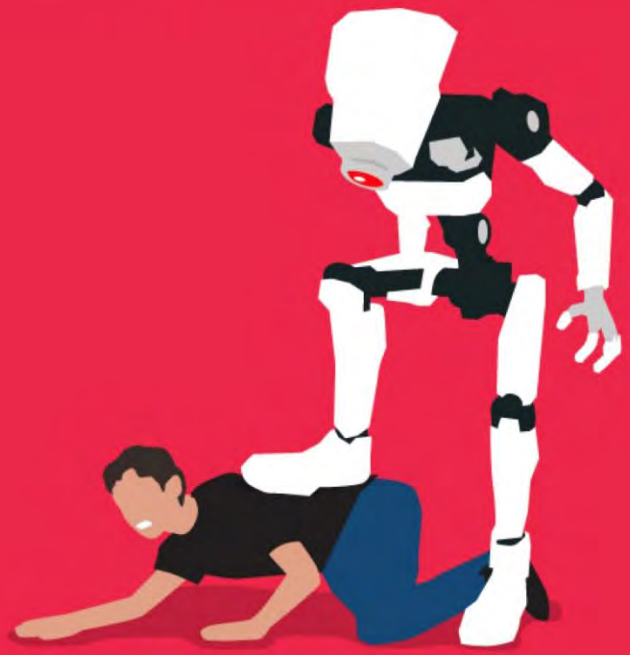
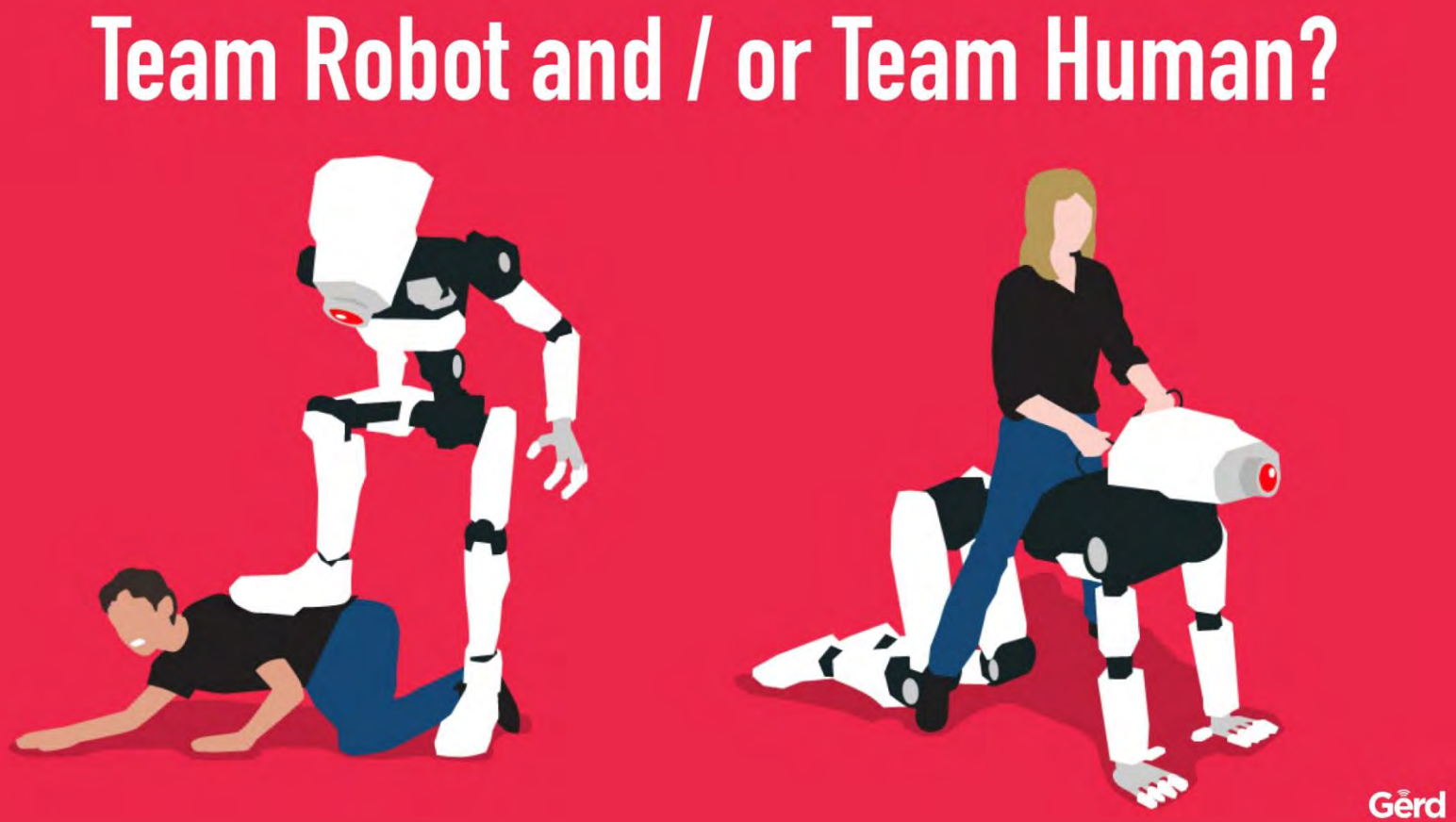
Team Robot and / or Team Human?



Gerd

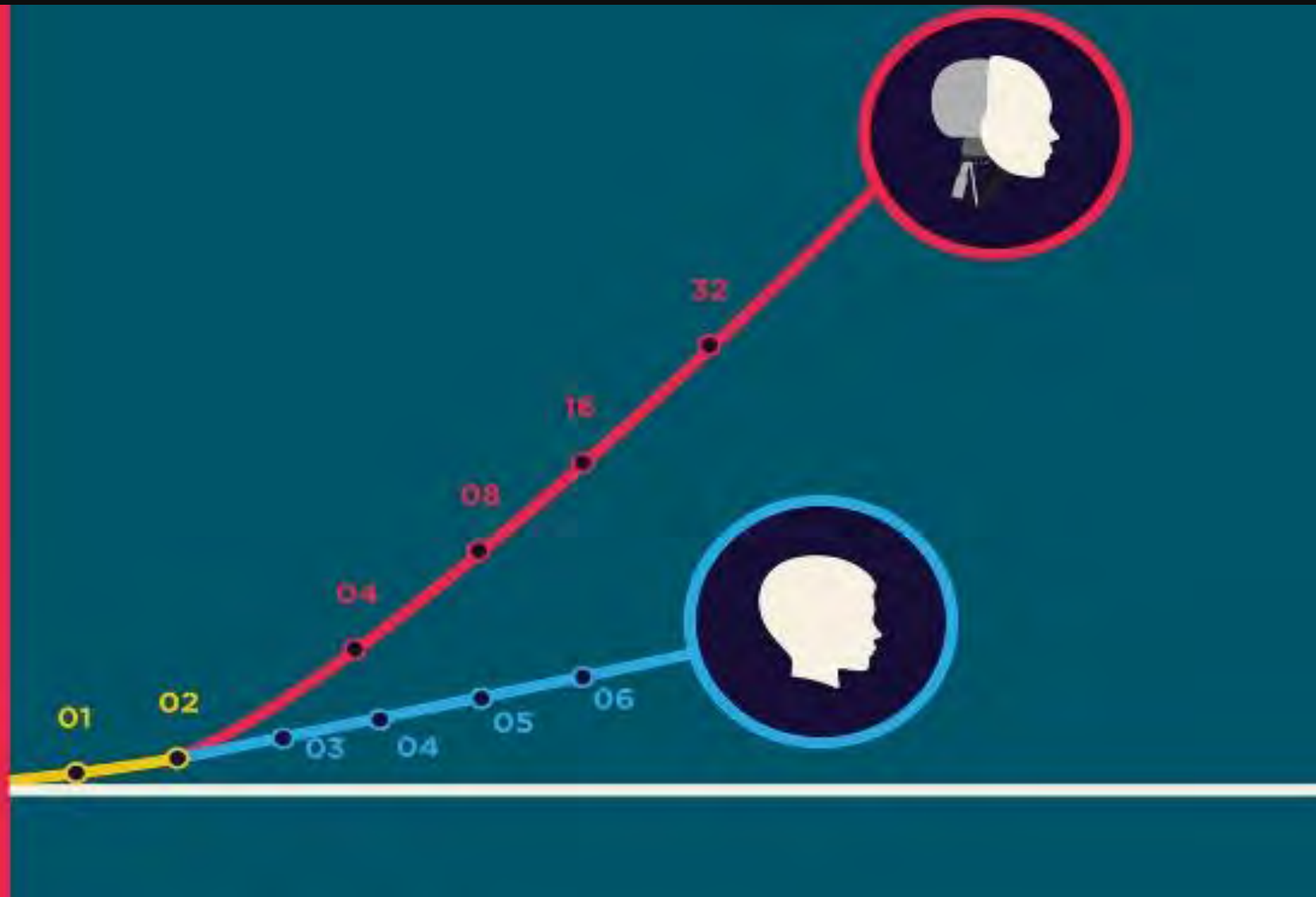
Let us embrace latest technology and tool up team human



Can humans keep up with the digital revolution?

Keep in mind: Technology is exponential

but Humans are linear

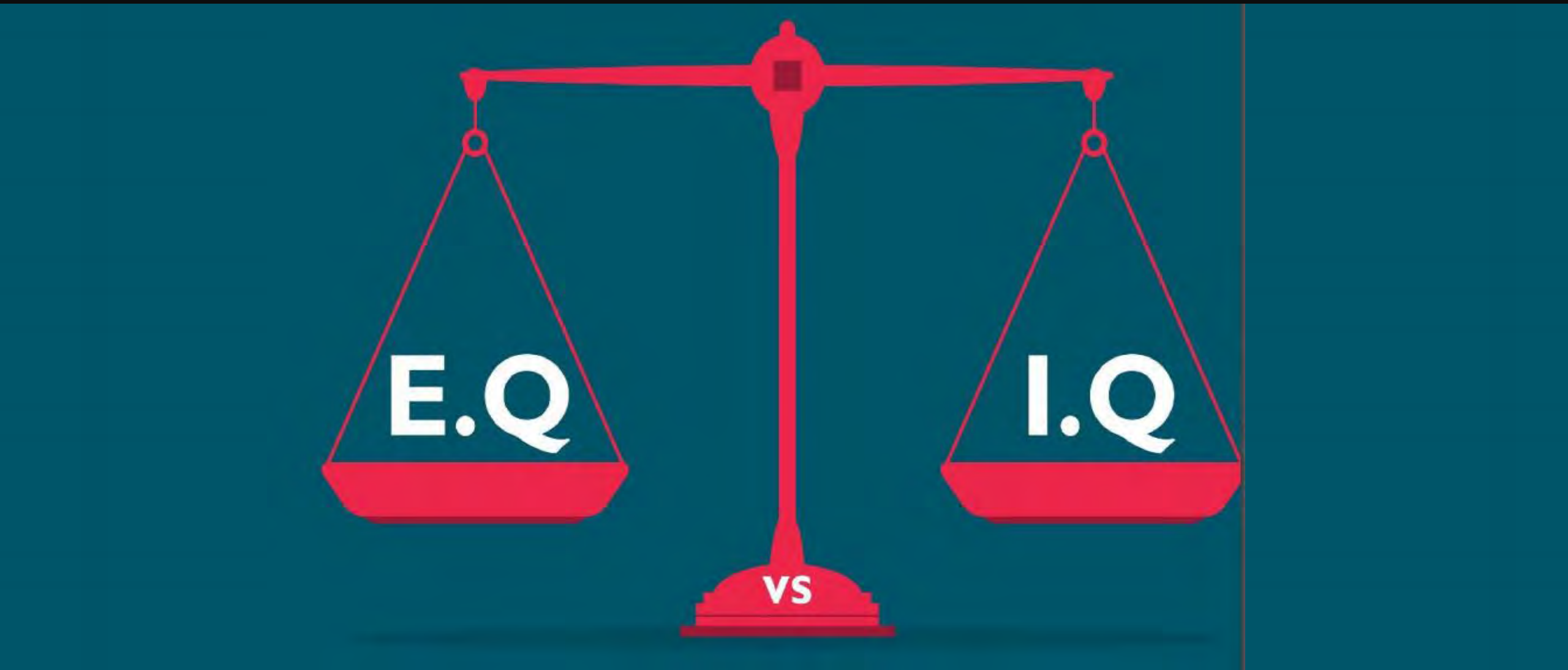


Combining Intelligence AND Human values are critical for the future

"Purely intelligent creatures, whether people or machines, are bad for humanity" (S. Sarukkai)

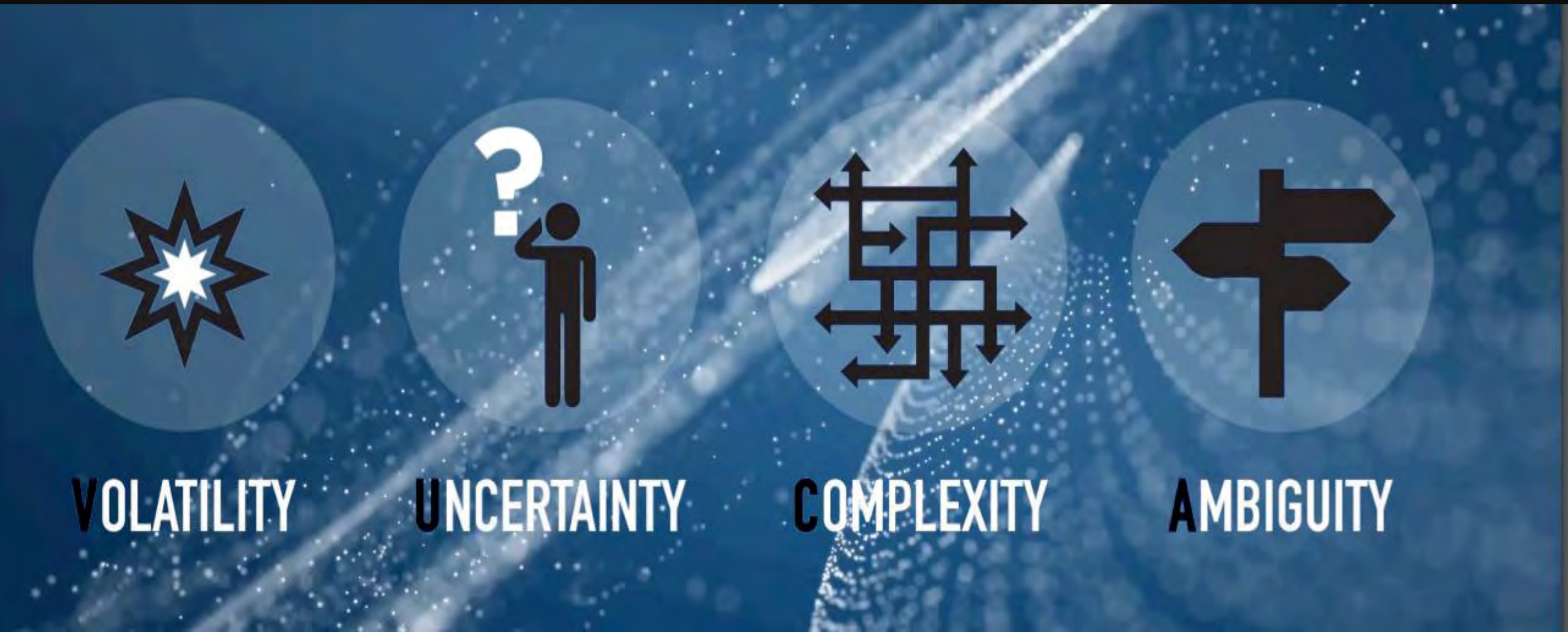

Regenerative medicine
Ubiquitous computing
Synthetic biology
Robotics
Brain sciences
Intelligence augmentation
Cognitive Computi
Genetic engineering
Nanotech
Artificial Intelligence
Morals
Values
Ethics
Humanity
Gerd

In a world of automation, soft factors become precious

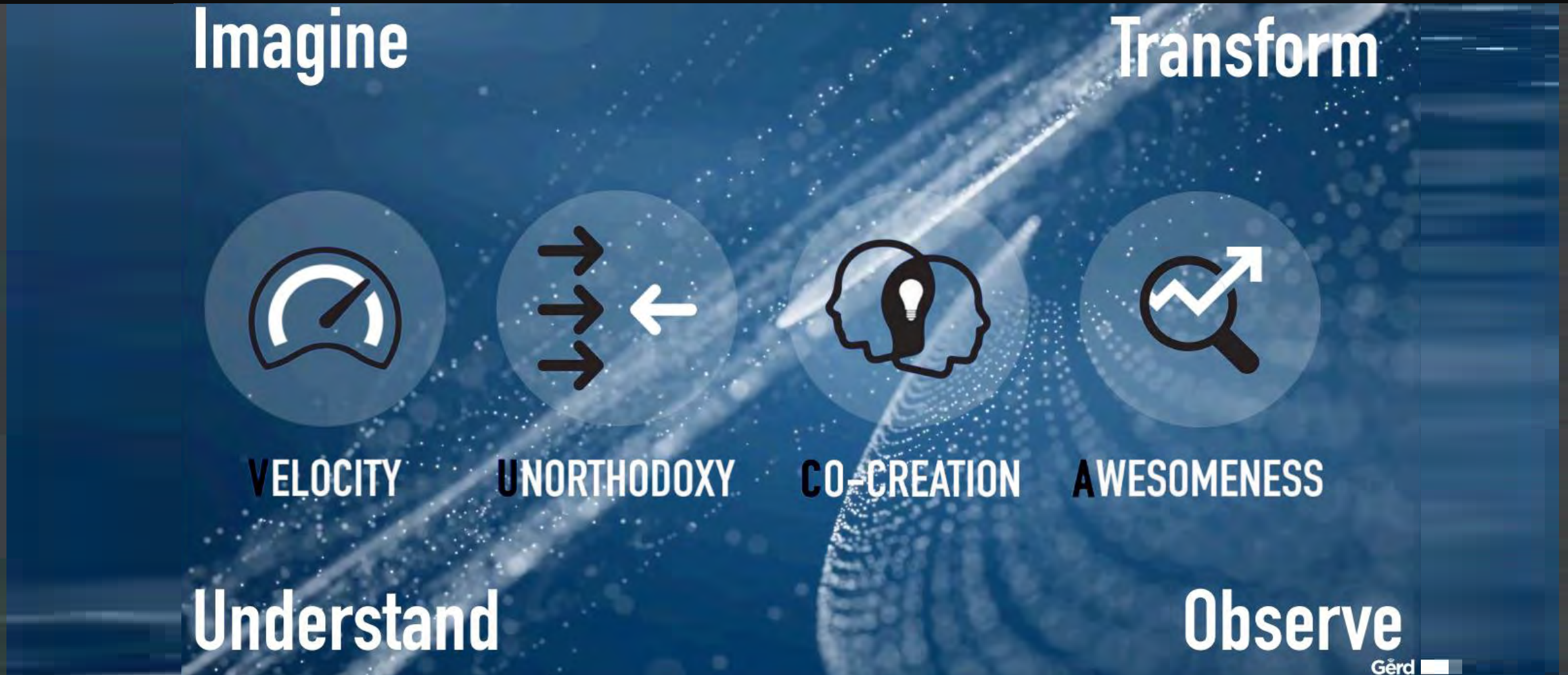


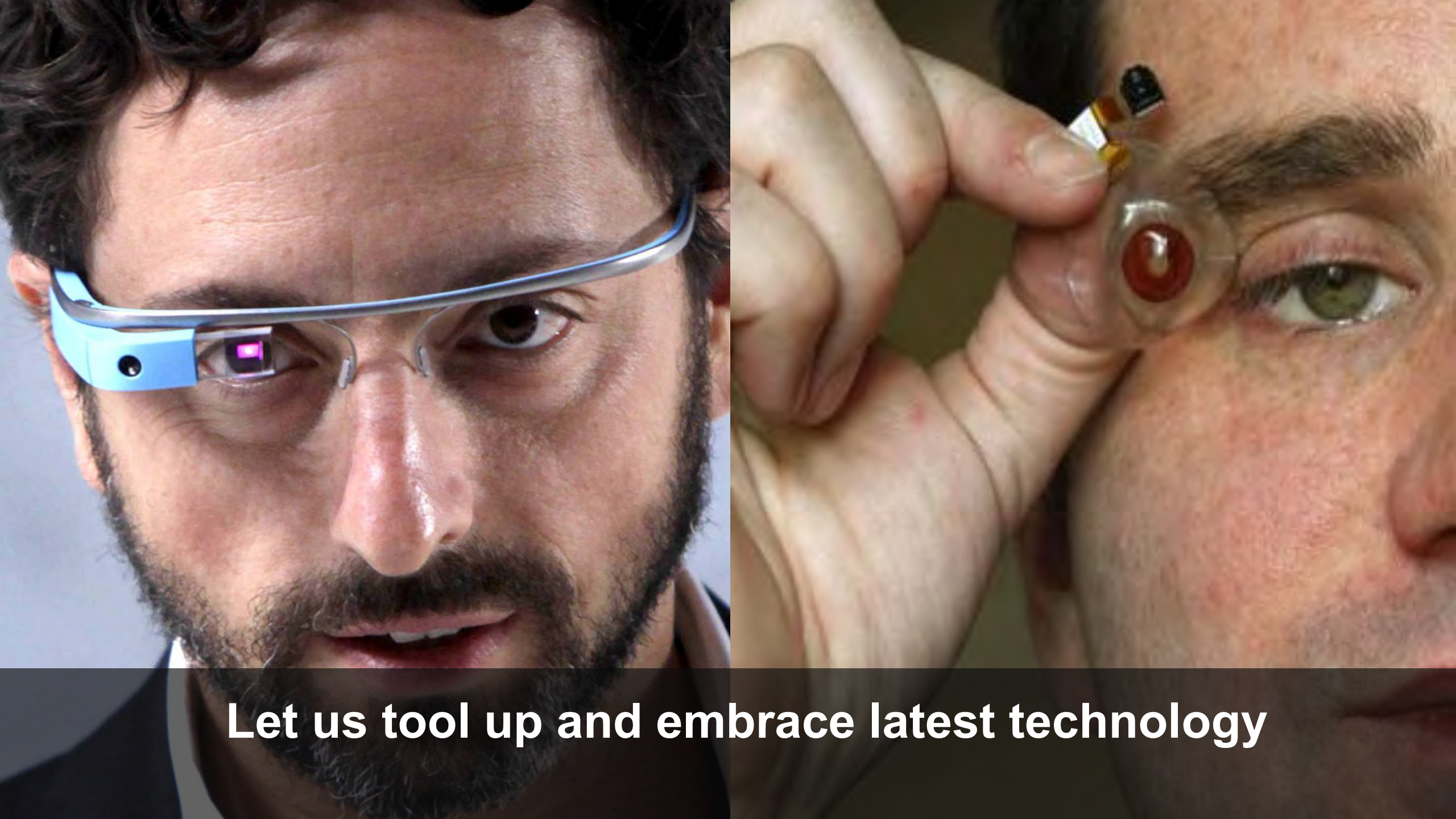
"Algorithms outperform human intelligence when it is NOT about understanding emotional states, intentions, interpretations, deep semantic skills, consciousness, self-awareness and flexible intelligence" (via Luciano Floridi)

Human Workers facing the future – Changing Environments



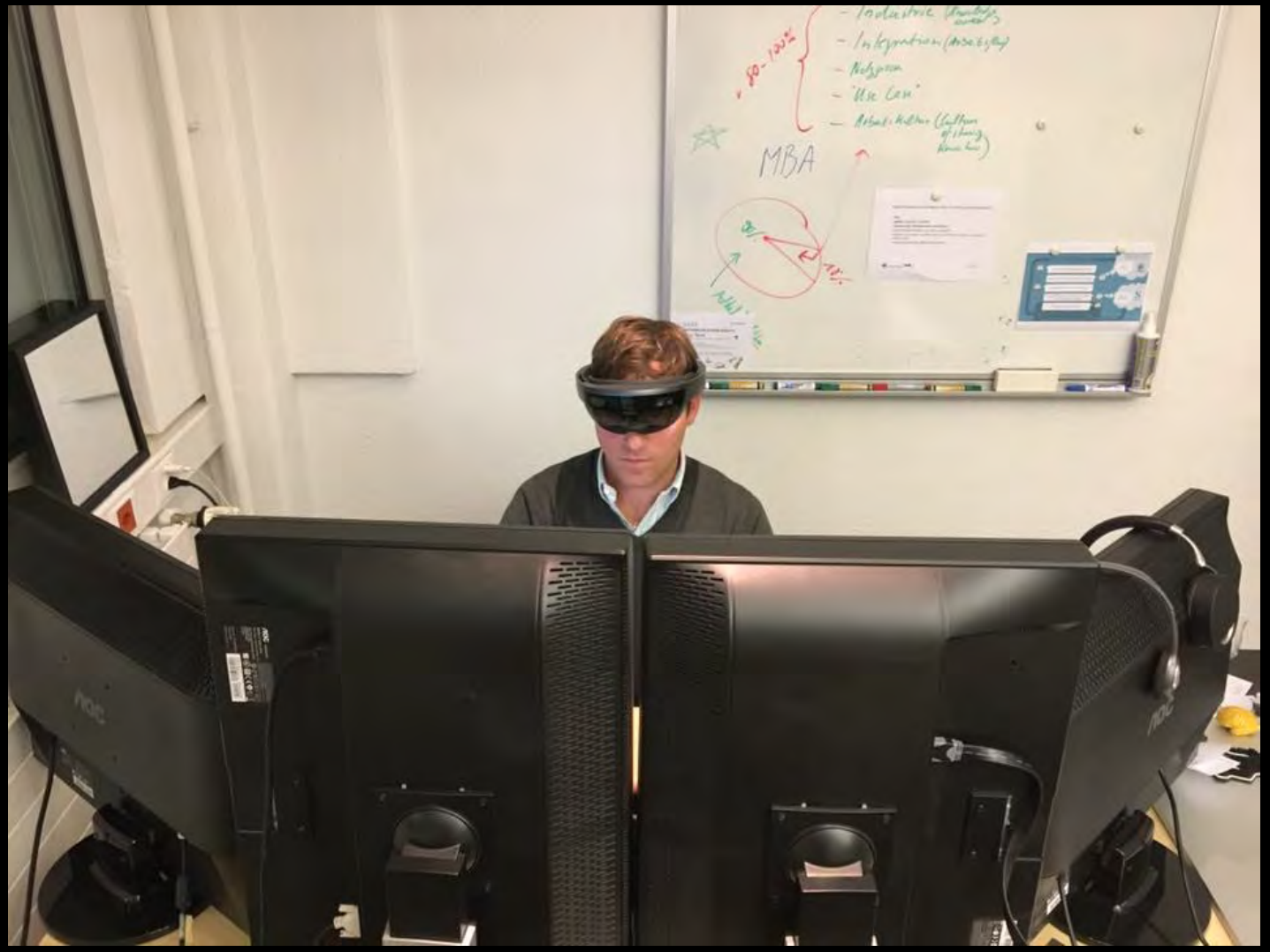
Human Workers facing the future – Important skills





Let us tool up and embrace latest technology

A new generation of Interface: HoloLens at work



Working at the Starmind HQ, Switzerland

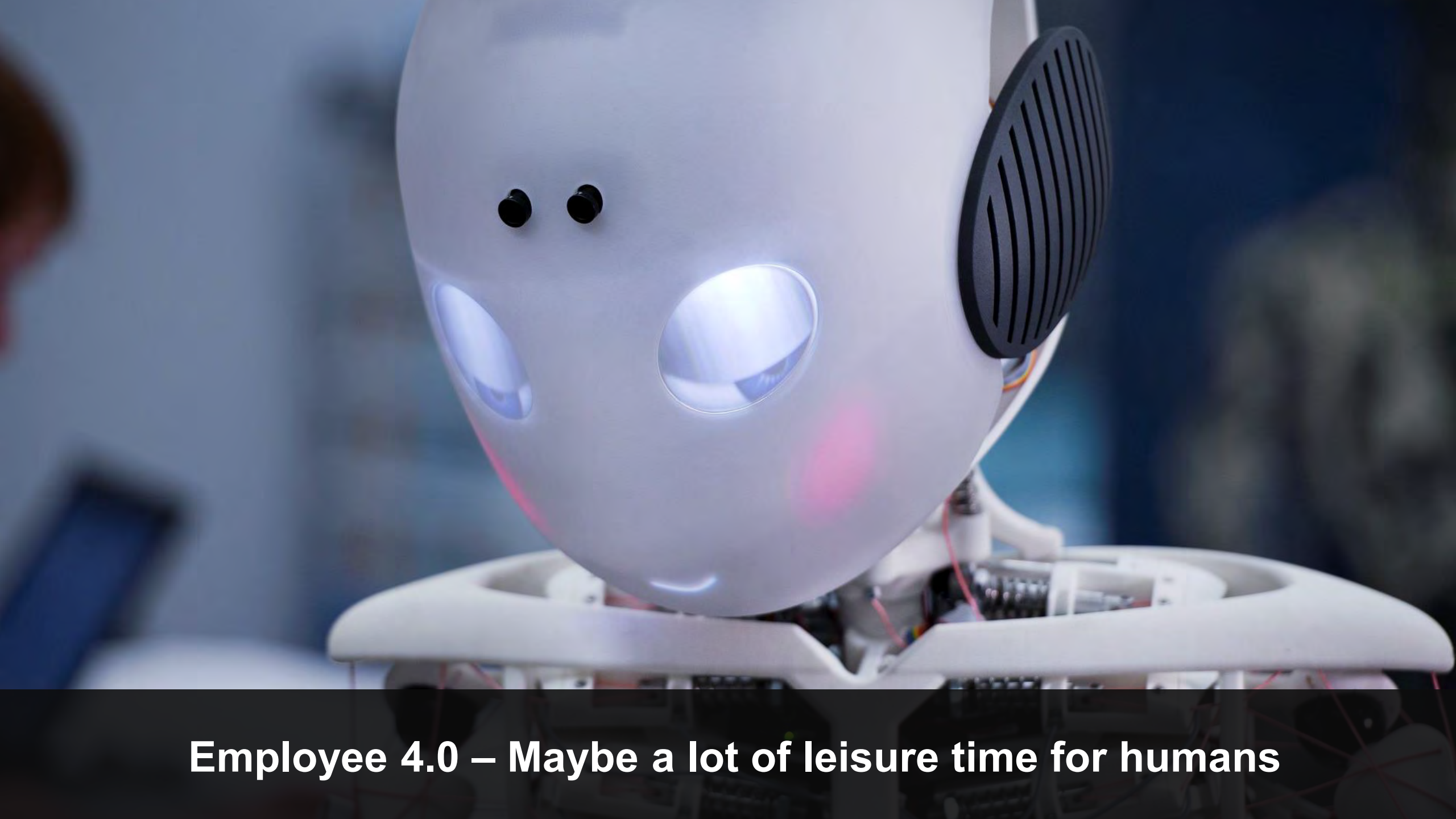
STARMIND

A new generation of Interface: HoloLens at Home

As technology gets commodity, the Human Factor gets key

Human worker 2.0 – Access to Artificial Corporate Brains

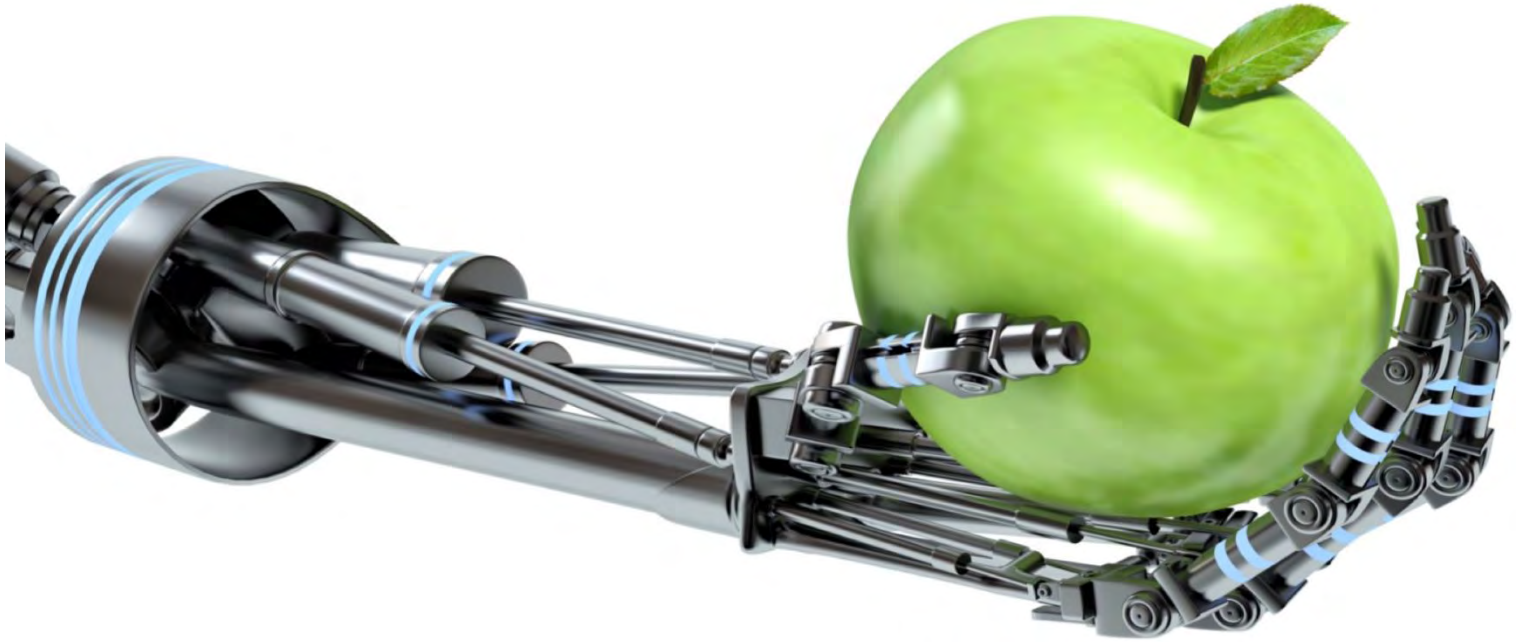
Human worker 3.0 – Technology gets closer and incorporated



Employee 4.0 – Maybe a lot of leisure time for humans

The digital transformation of the entire workforce is ahead of us

It is up to you what will and what should not be automated



Herzlichen Dank!

STARMIND

Thank you !

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