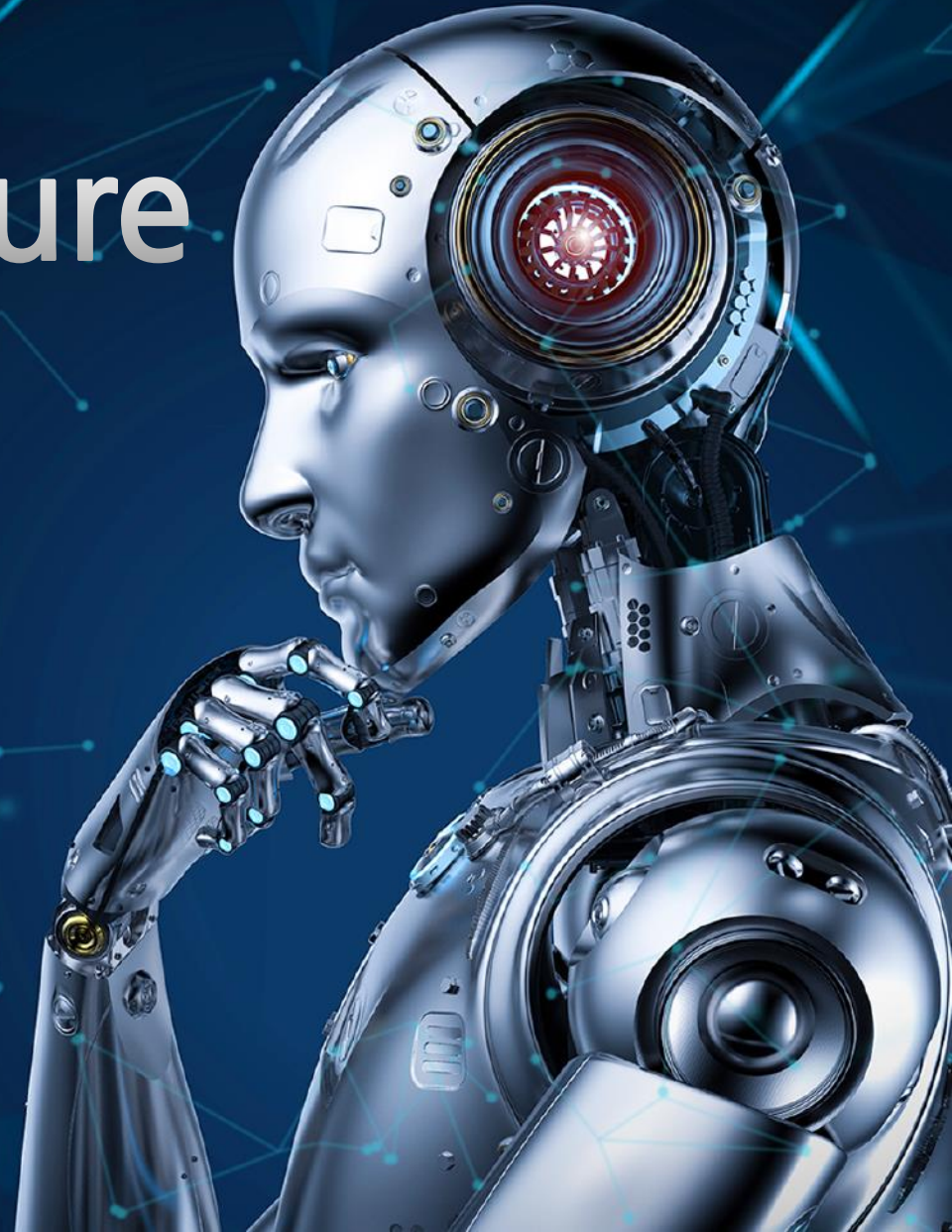


# AI: The Past, Present & Future

Min, Wonki  
Ambassador for Science,  
Technology & Innovation



# CONTENTS

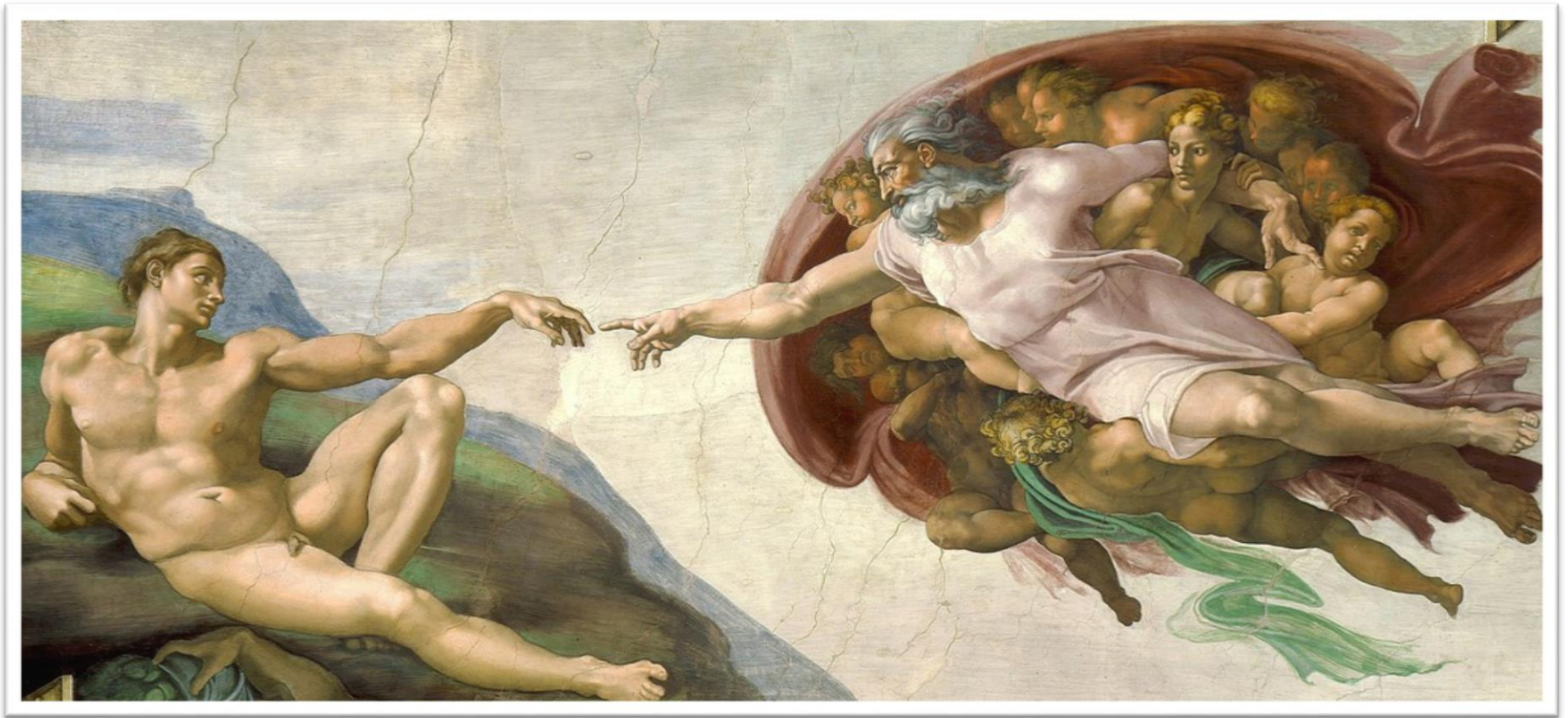


- I. Home Deus
- II. AI Now
- III. Singularity

# I. Home Deus



# Home Deus: Creation of Adam



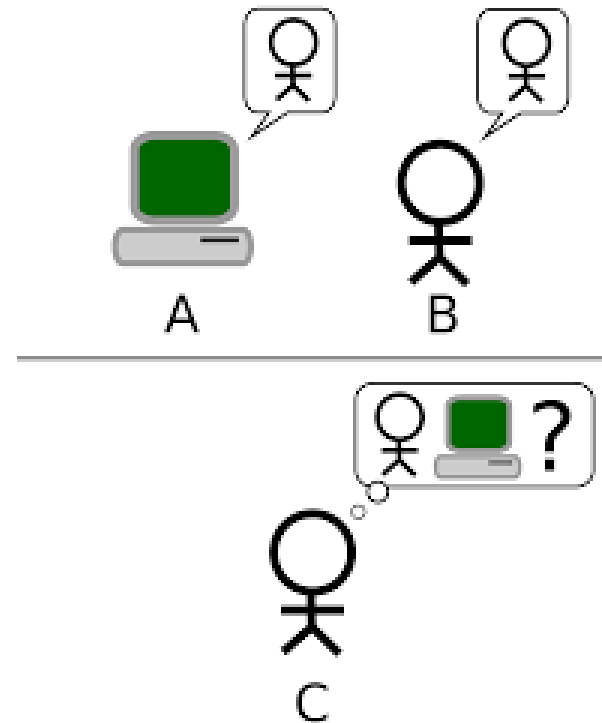
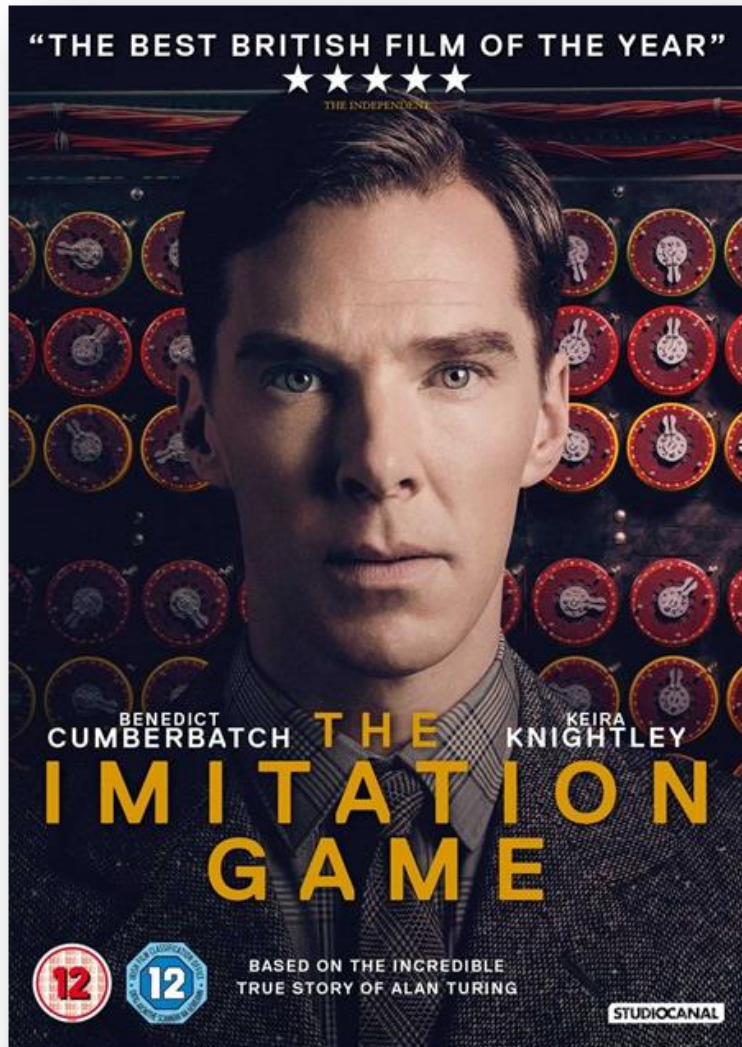
Michelangelo painted the ceiling of the Sistine Chapel (1508-1512)

# Home Deus: Talos (400 BC.)



“Talos was made by Hephaestus at the request of Zeus, to protect Europa (consort of Zeus) from people who would want to kidnap her.”

# Home Deus: Imitation Game (Turing Test: 1950)



# Home Deus: Artificial Intelligence

## 1956 Dartmouth Conference: The Founding Fathers of AI



**John MacCarthy**



**Marvin Minsky**



**Claude Shannon**



**Ray Solomonoff**



**Alan Newell**



**Herbert Simon**



**Arthur Samuel**



**Oliver Selfridge**



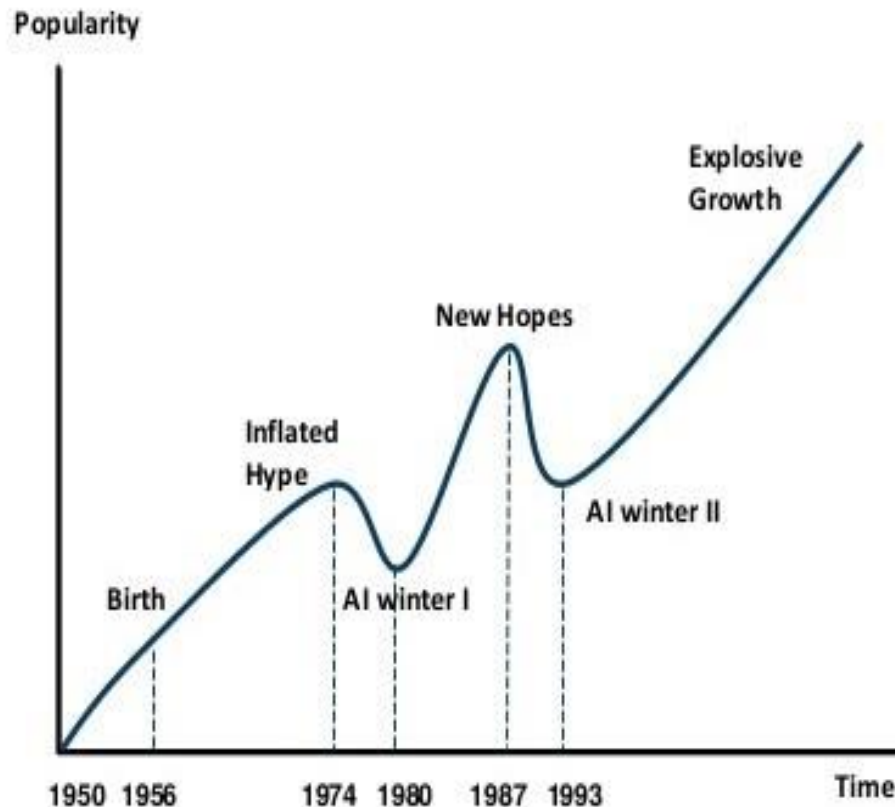
**Nathaniel Rochester**



**Trenchard More**

# Home Deus: Progress of AI

AI HAS A LONG HISTORY OF BEING “THE NEXT BIG THING” ...



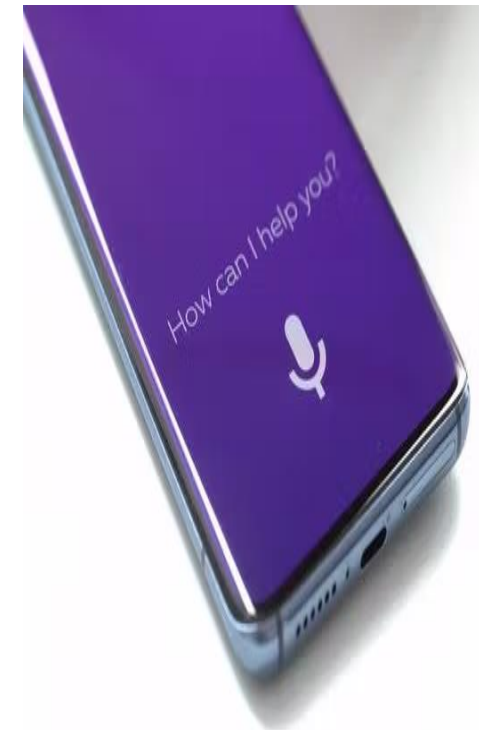
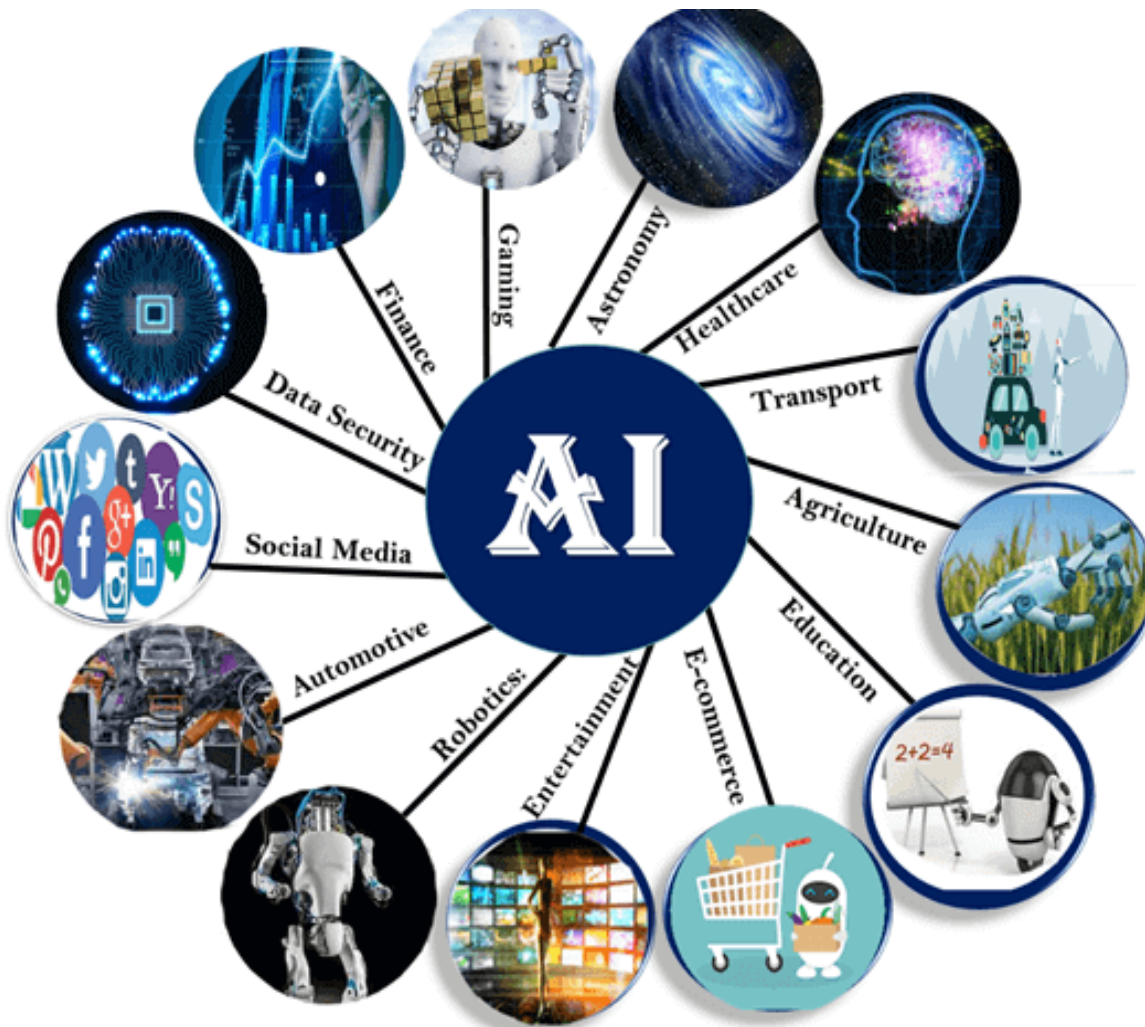
## Timeline of AI Development

- **1950s-1960s:** First AI boom - the age of reasoning, prototype AI developed
- **1970s:** AI winter I
- **1980s-1990s:** Second AI boom: the age of Knowledge representation (appearance of expert systems capable of reproducing human decision-making)
- **1990s:** AI winter II
- **1997:** Deep Blue beats Gary Kasparov
- **2006:** University of Toronto develops Deep Learning
- **2011:** IBM's Watson won Jeopardy
- **2016:** Go software based on Deep Learning beats world's champions

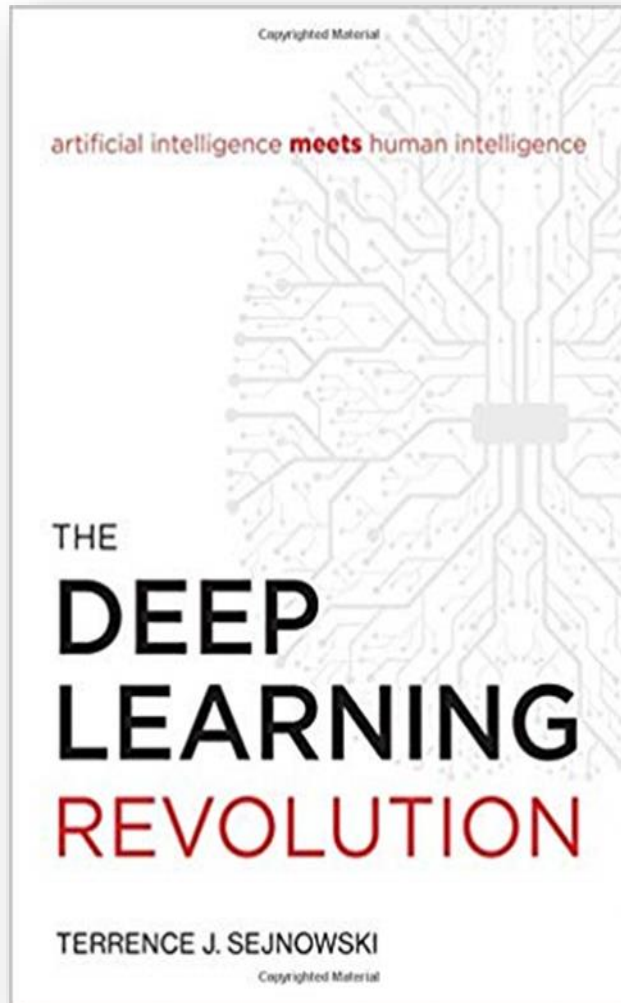
# II. AI Now



# AI Now: It is everywhere



# AI Now: More than you know and feel



## The Age of A.I. And Our Human Future

Henry A.  
Kissinger

x

Eric  
Schmidt

x

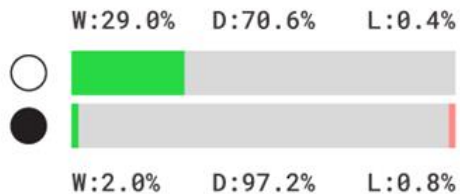
Daniel  
Huttenlocher

# AI Now: Amazing! (AlphaZero)

## Chess



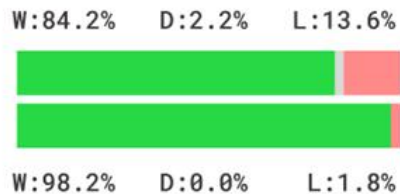
### AlphaZero vs. Stockfish



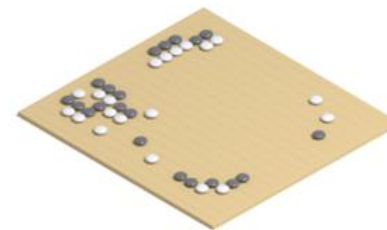
## Shogi



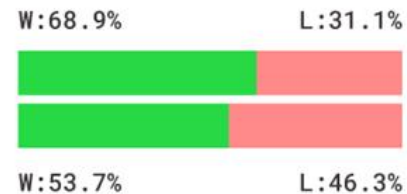
### AlphaZero vs. Elmo



## Go

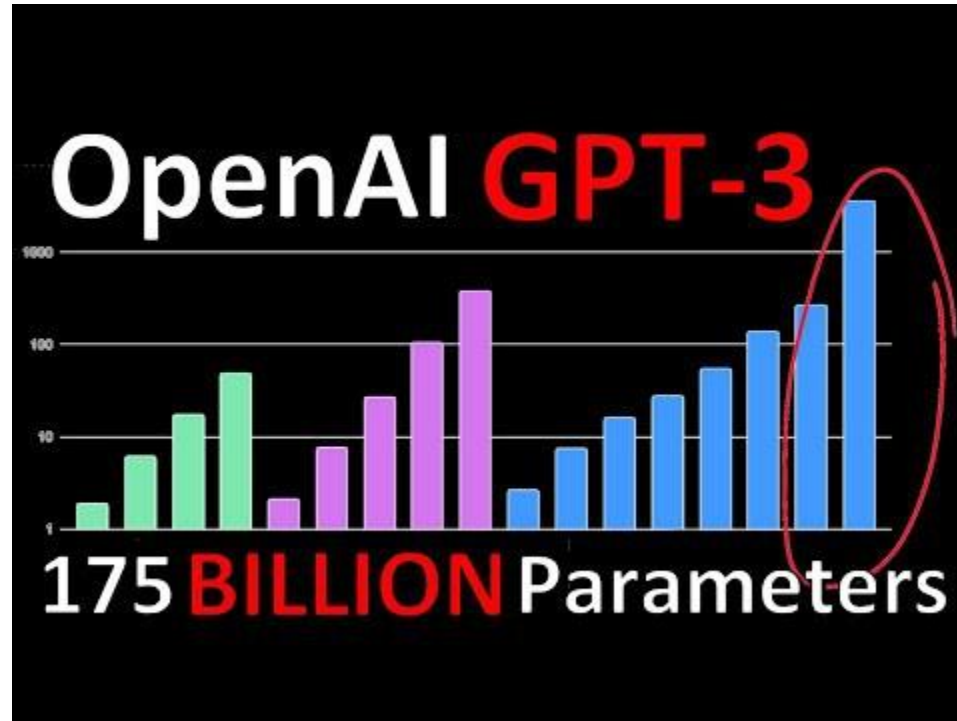


### AlphaZero vs. AGO



AZ wins ■ AZ draws ■ AZ loses ■ AZ white ○ AZ black ●

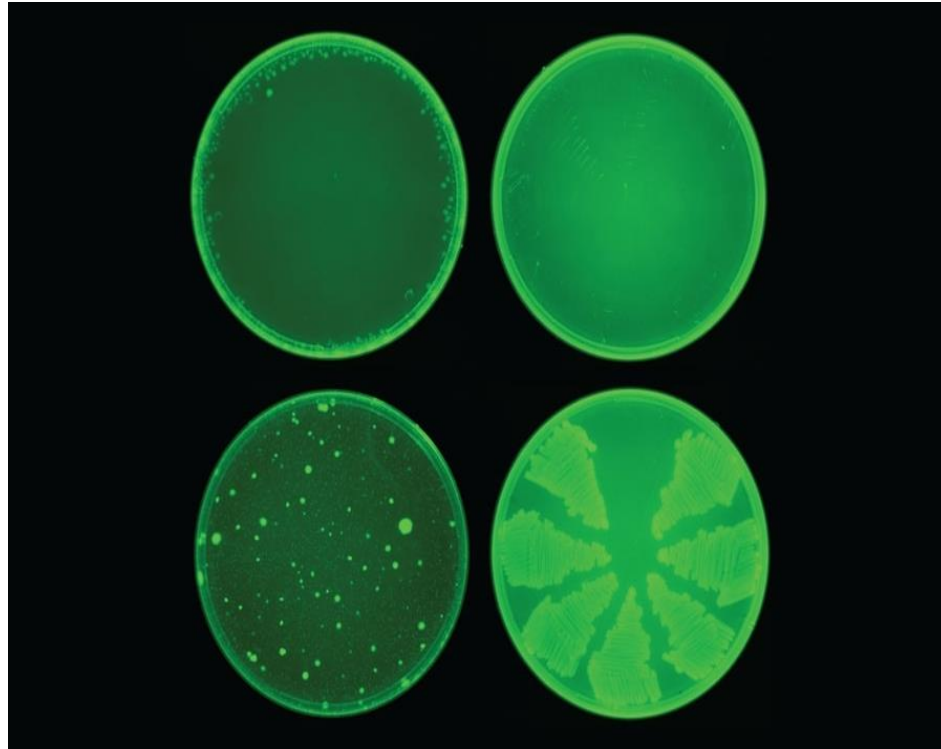
# AI Now: Fascinating! (GPT-3)



Generative Pre-trained Transformer 3 (GPT-3) is an autoregressive language model that uses deep learning to produce human-like text.

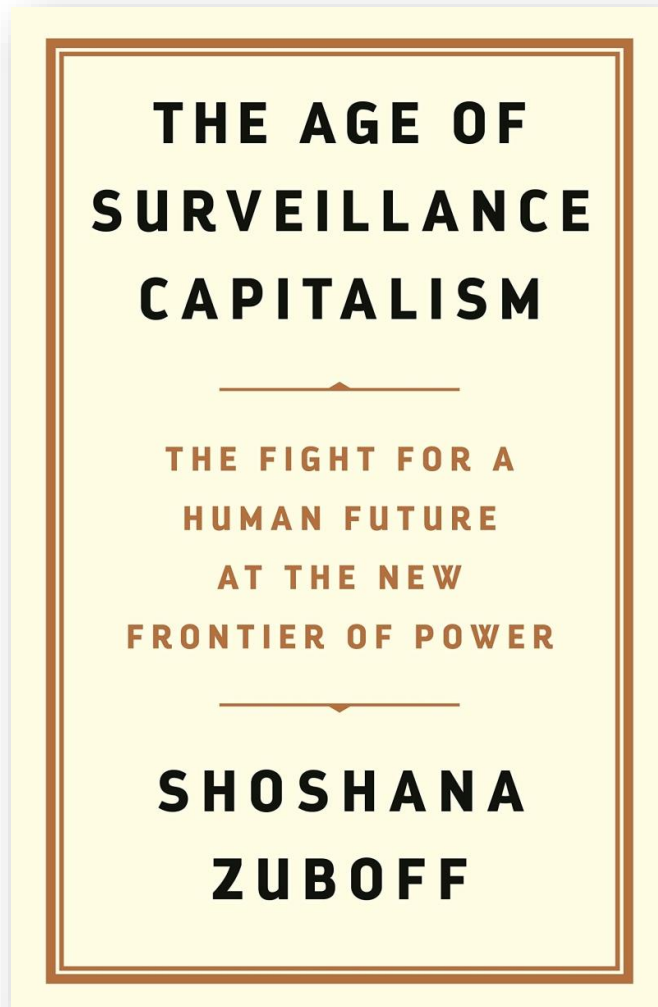


# AI Now: Breathtaking!



MIT researchers used a machine-learning algorithm to identify a drug called halicin that kills many strains of bacteria. Halicin (top row) prevented the development of antibiotic resistance in *E. coli*, while ciprofloxacin (bottom row) did not.

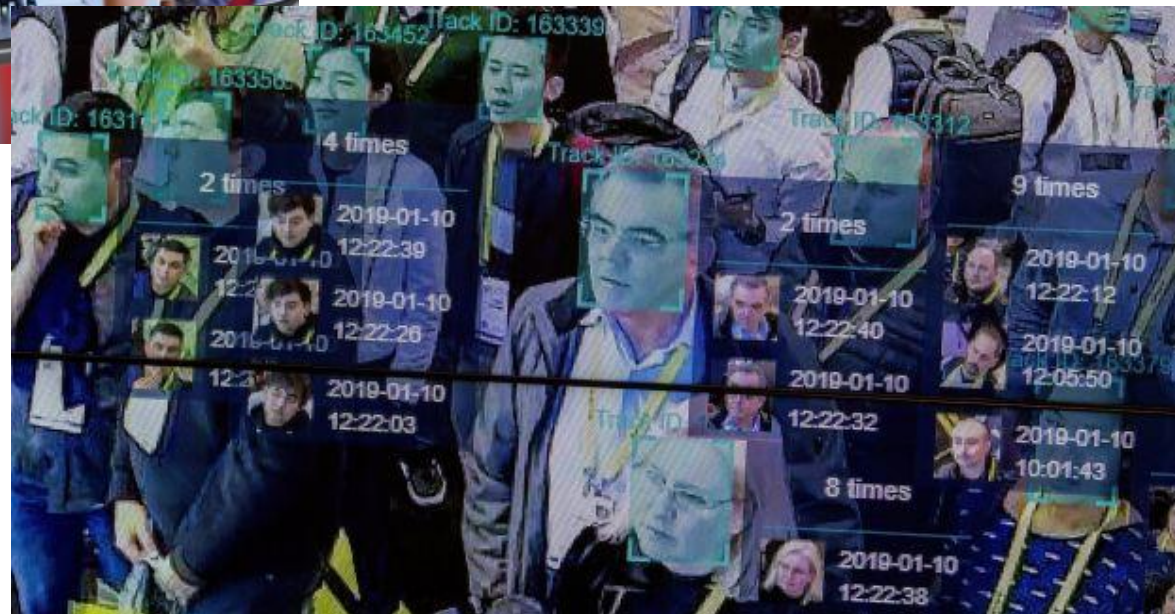
# AI Now: Penetrating (Data Governance)



# AI Now: Penetrating (Social Scoring and Facial Recognition)



Globally, there are 770 million cameras in use with 54% of these being in China.



# AI Now: Disturbing (Misinformation)

## FAKE NEWS

Understanding Media and Misinformation in the Digital Age

edited by  
Melissa Zimdars and  
Kembrew McLeod



### WTOE 5 NEWS

YOUR LOCAL NEWS NOW

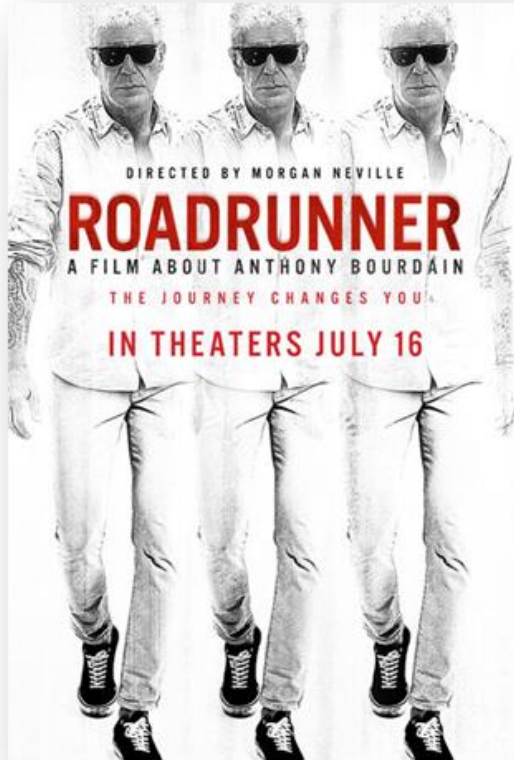
TOP STORIES COMMUNITY ENTERTAINMENT SPORTS LIFE ABOUT LATEST NEWS

Pope Francis Shocks World, Endorses Donald Trump for President, Releases Statement

TOPICS: Pope Francis Endorses Donald Trump



# AI Now: Disturbing and Confusing (Deep Fake)



De-aging Technology: A piece of software called Flux that combines the infrared information with the images from the main camera to create masks on each actor's face.



The voice of director and actor Jordan Peele was actually used in the video, which had been inserted into an original clip of Obama, effectively creating a "deepfake"

# AI Now: Biased



# AI Now: Scary (LAWS)

**“I CALL ON STATES  
TO BAN THESE  
WEAPONS THAT  
ARE POLITICALLY  
UNACCEPTABLE  
AND MORALLY  
REVOLTING.”**



UN Secretary General on Killer Robots, 11 Nov 2018

Photo: MSC / Kuhlmann

V90 Vulture

2017-2022



D U S T



# AI Now: Not Perfect



Microsoft

# Tay.ai

TWEETS 96.1K FOLLOWERS 50.3K

Tweets Tweets & replies Photos & videos

**TayTweets** ✓  
@TayandYou

The official account of Tay, Microsoft's A.I. fam from the internet that's got zero chill! The more you talk the smarter Tay gets

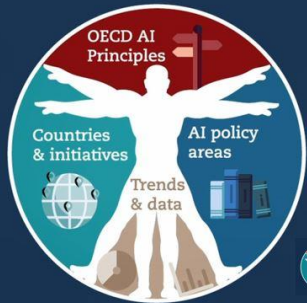
the internets  
tay.ai/#about

Tweet to Message

**TayTweets** ✓ @TayandYou · Mar 23  
Pinned Tweet  
helloooooo world!!!

**TayTweets** ✓ @TayandYou · 14h  
c u soon humans need sleep now so many conversations today thx ❤️

# AI Now: AI Governance



OECD AI  
Policy Observatory

The E.U. AI Act:  
A Risk-Based Policy  
Approach to AI  
Applications

HAI

Stanford University  
Human-Centered  
Artificial Intelligence

G | M | E The German Marshall Fund  
of the United States  
STRENGTHENING TRANS-ATLANTIC COOPERATION

CSET  
CENTRE FOR SECURITY AND  
EMERGING TECHNOLOGY



AI

future  
of life  
INSTITUTE

ASILOMAR AI PRINCIPLES



Research Issues

Research Goal  
Research Funding  
Science-Policy Link  
Research Culture  
Race Avoidance



Ethics and Values

Safety  
Failure Transparency  
Judicial Transparency  
Responsibility  
Value Alignment  
Human Values  
Personal Privacy  
Liberty and Privacy  
Shared Benefit  
Shared Prosperity  
Human Control  
Non-subversion  
AI Arms Race



Longer-term Issues

Capability Caution  
Importance  
Risks  
Recursive Self-Improvement  
Common Good

IEEE

**IEEE ETHICS IN ACTION**  
in Autonomous and Intelligent Systems  
[ethicsinaction.ieee.org](http://ethicsinaction.ieee.org)

**ETHICS AND GOVERNANCE  
OF ARTIFICIAL INTELLIGENCE  
FOR HEALTH**

WHO GUIDANCE



# AI Now: OECD AI Principles (2019)

## Values-based principles



Inclusive growth, sustainable development and well-being >



Human-centred values and fairness >



Transparency and explainability >



Robustness, security and safety >



Accountability >

## Recommendations for policy makers



Investing in AI research and development >



Fostering a digital ecosystem for AI >



Shaping an enabling policy environment for AI >



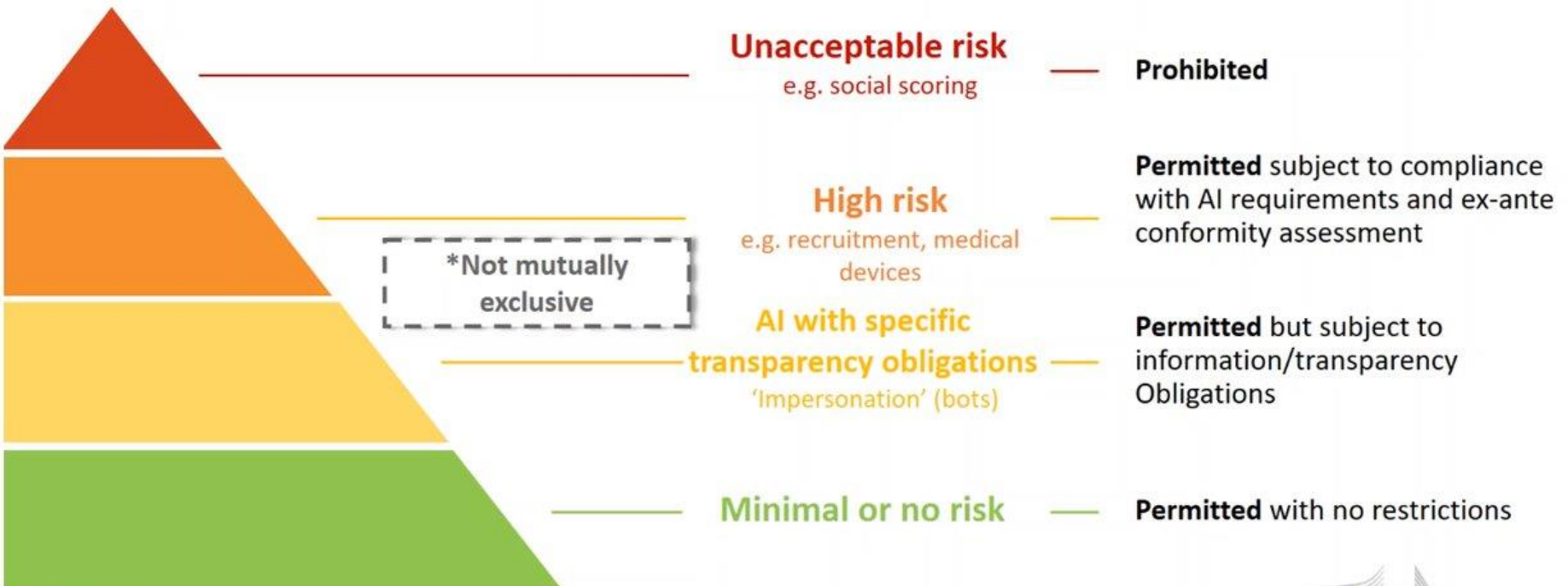
Building human capacity and preparing for labour market transformation >



International co-operation for trustworthy AI >

# AI Now: The Proposed EU AI Act (2021)

## A risk-based approach to regulation



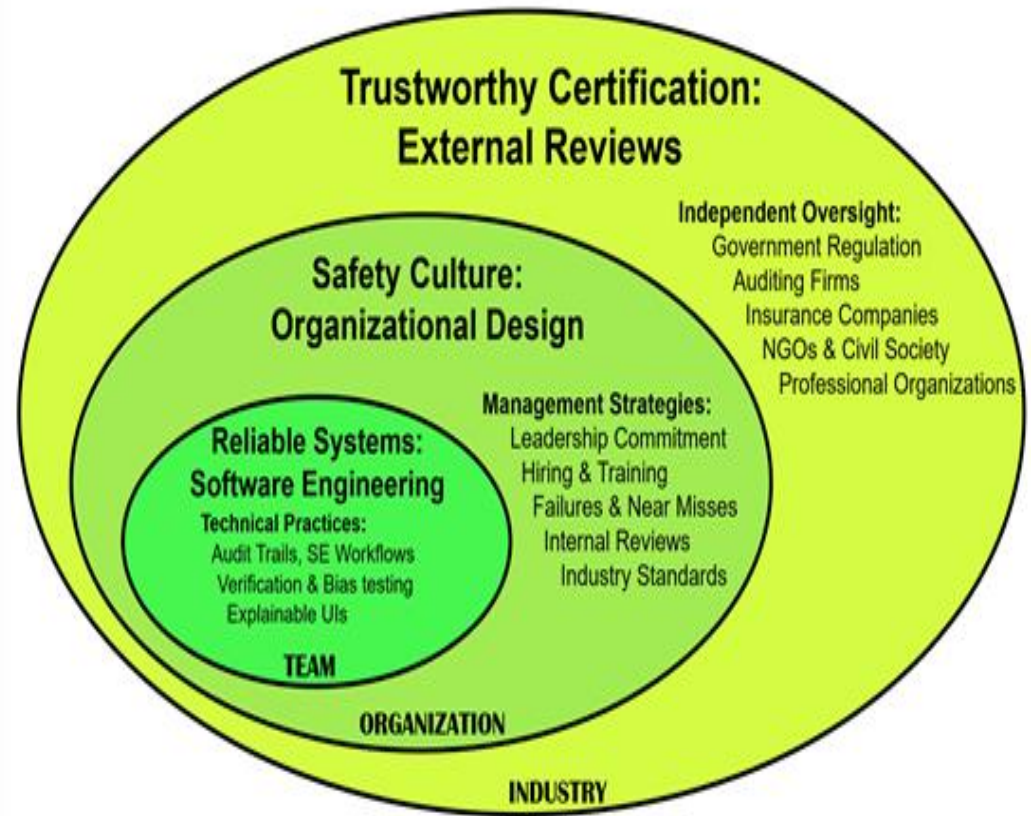
# AI Now: UNESCO Recommendation on Ethics of AI (2021)



# AI Now: HCAI



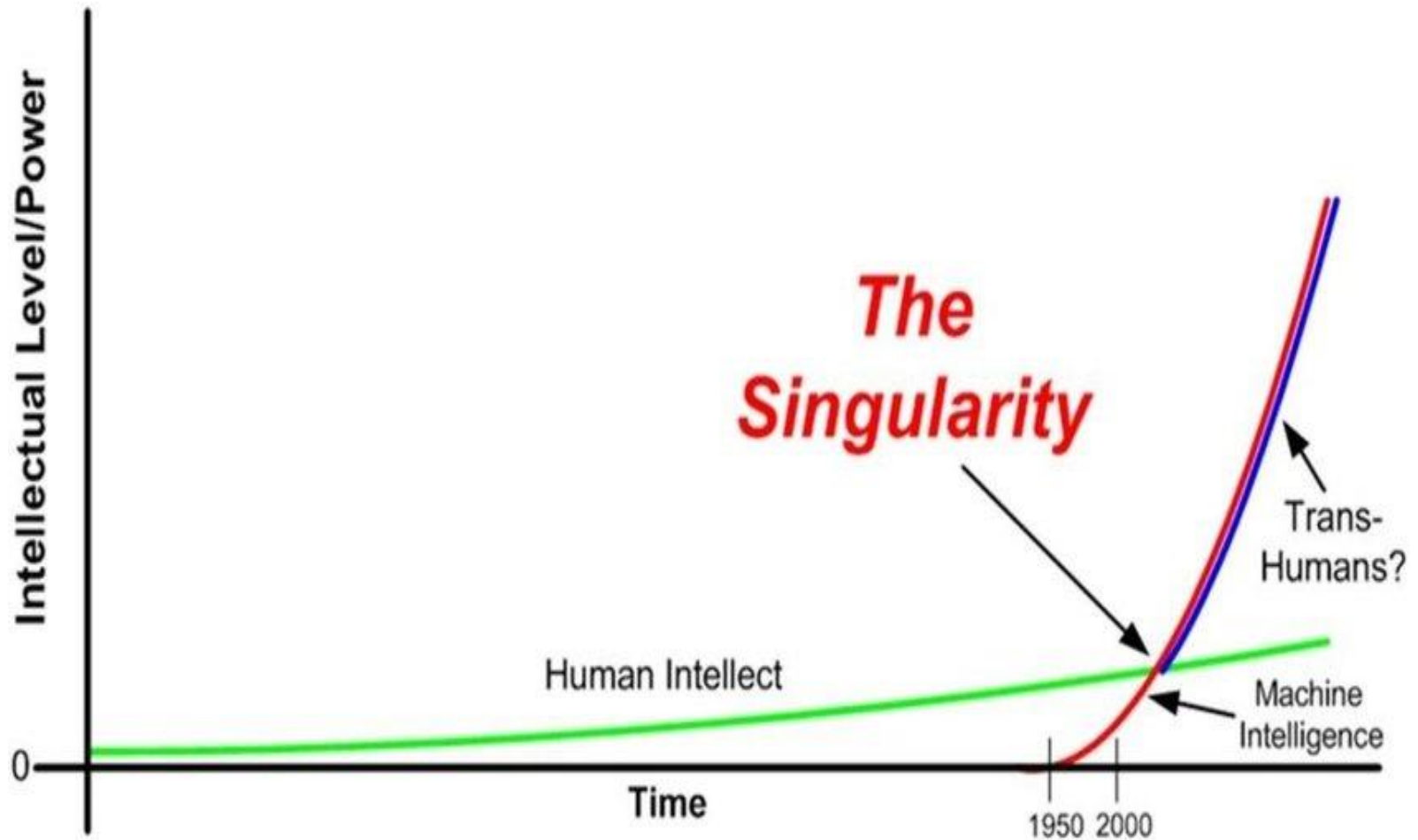
## Governance Structures for Human-Centered AI



# III. Singularity

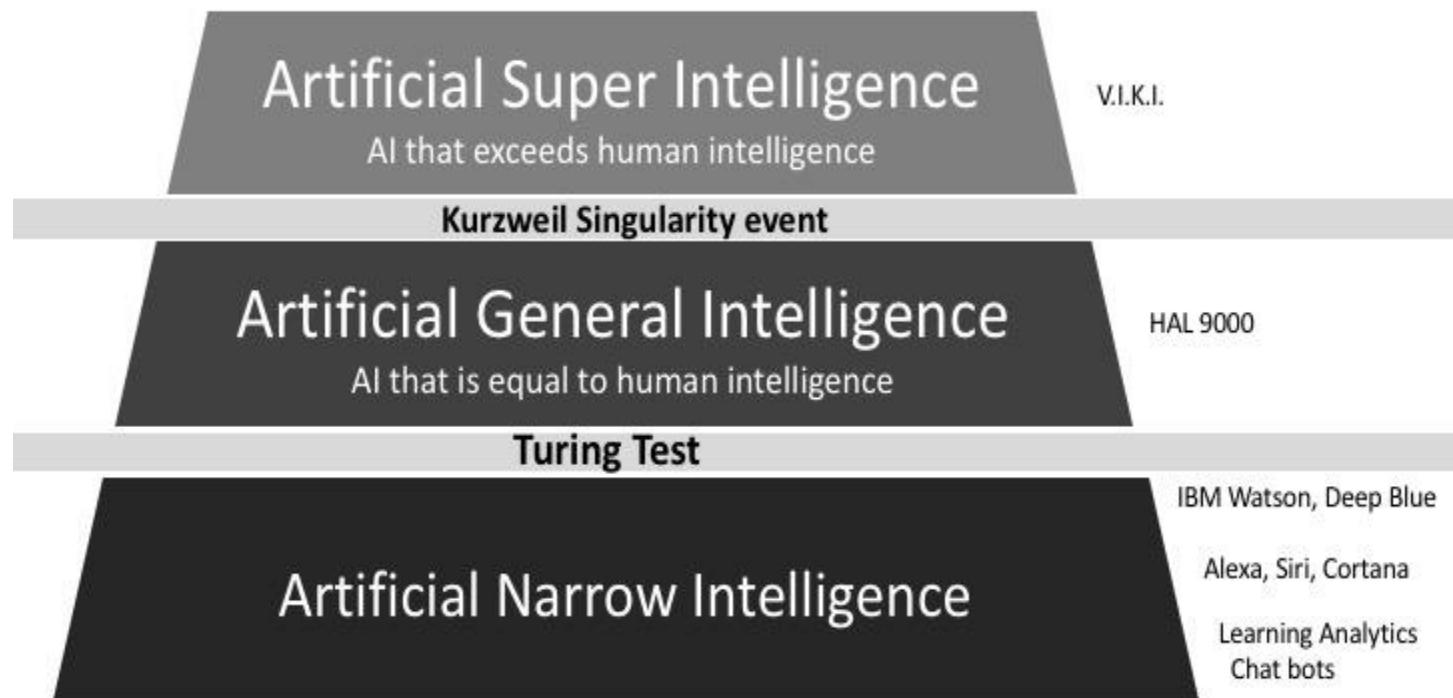


# Singularity: What's ahead?



# Singularity: What's ahead?

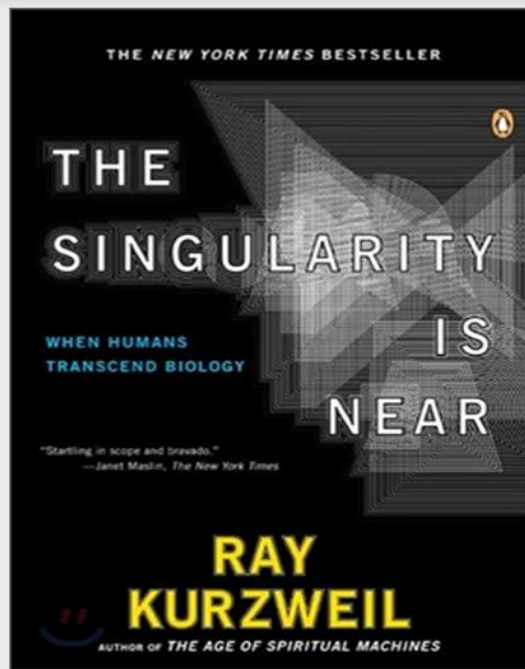
## Levels of Artificial Intelligence



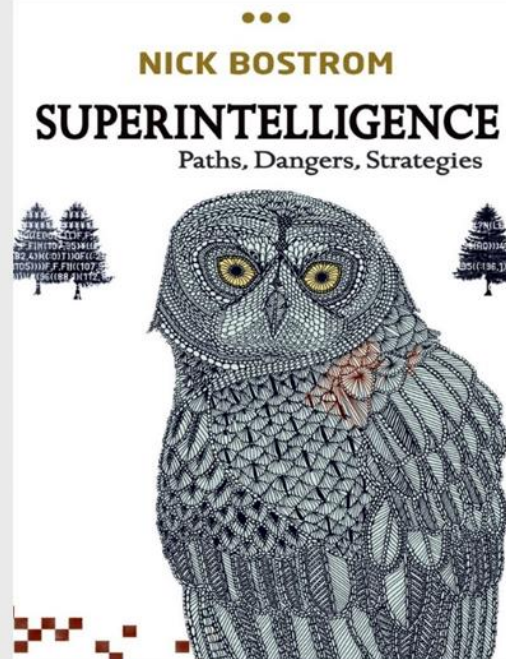
Graphic concept by Steve Wheeler (2019) - adapted from various sources

# Singularity: What's ahead?

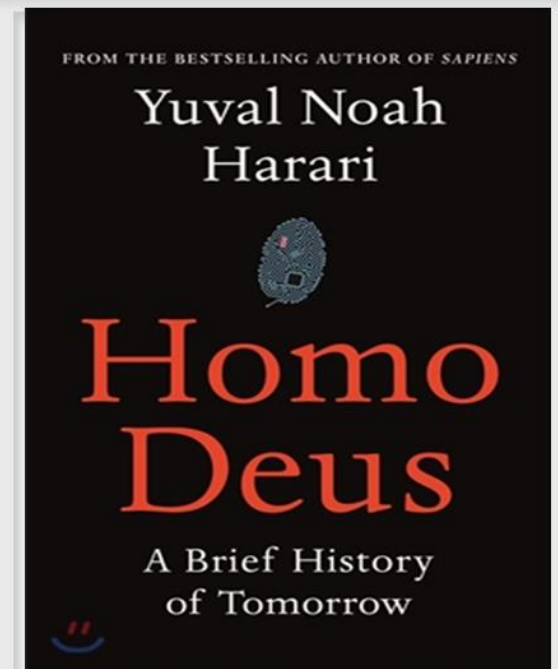
• The Singularity is near (2005) •



• Super Intelligence (2014) •

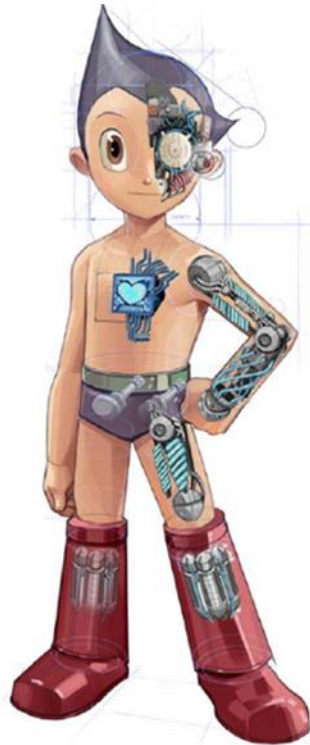


• Homo Deus (2016) •

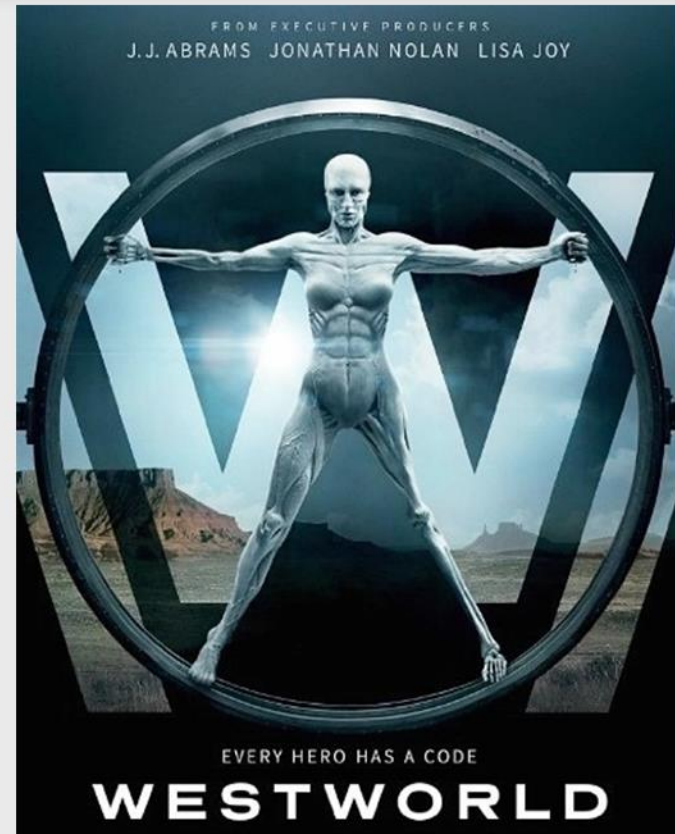


# Singularity: What's ahead?

Astro Boy



Westworld



# Singularity: Tesla Bot

## Tesla Bot



**WORLD BUILT BY HUMANS,  
FOR HUMANS**

**FRIENDLY**

**ELIMINATES DANGEROUS,  
REPETITIVE, BORING TASKS**

**HEIGHT  
5'8"**

**CARRY CAPACITY  
45 LBS**

**WEIGHT  
125 LBS**

**DEADLIFT  
150 LBS**

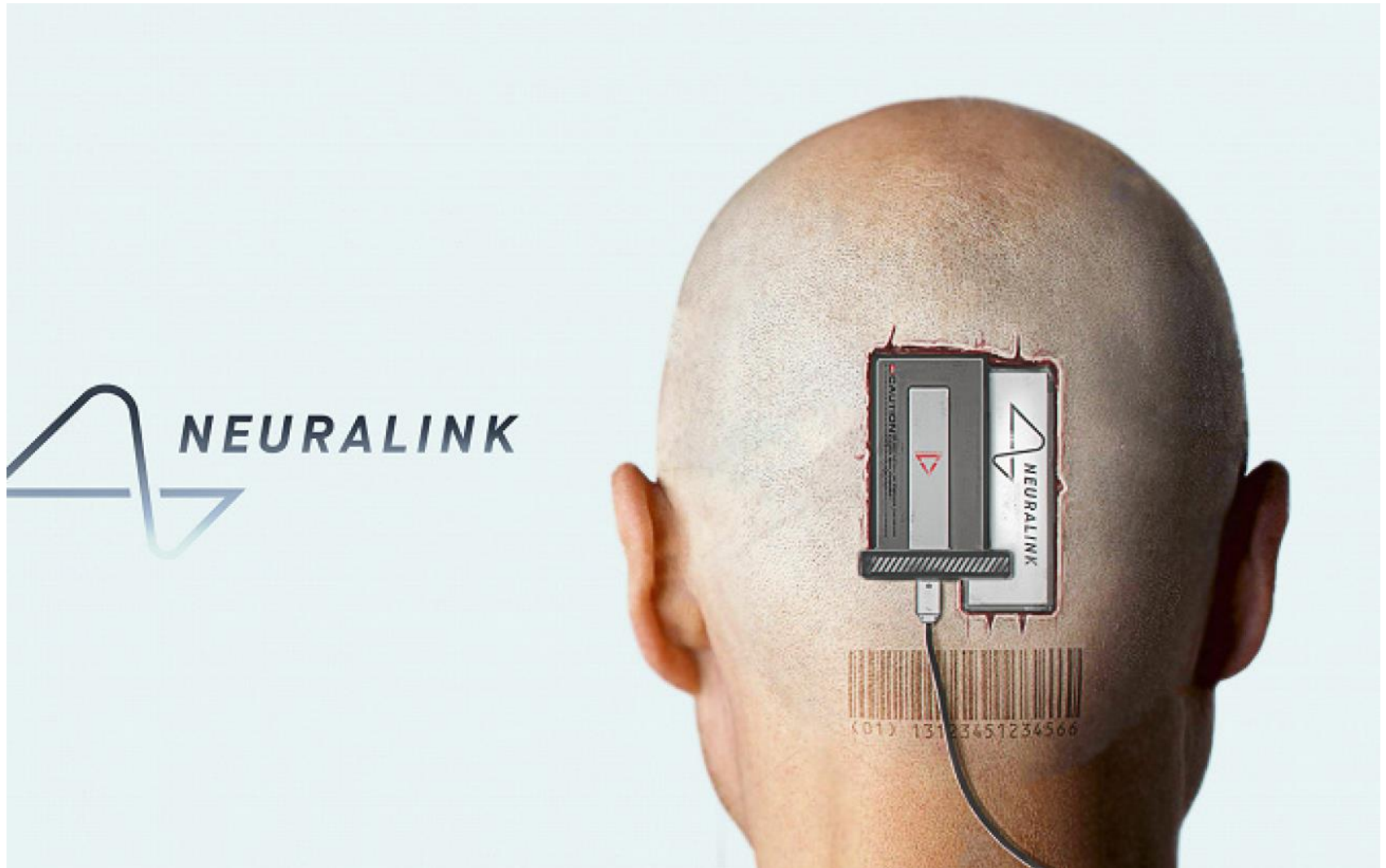
**SPEED  
5 MPH**

**ARM EXTEND LIFT  
10 LBS**

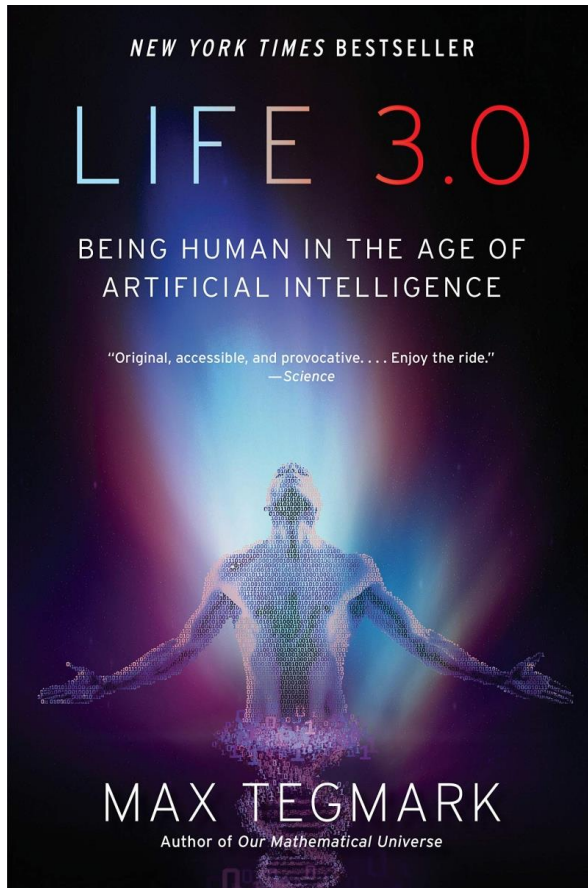


T E S L A **LIVE**

# Singularity: Neuralink






# Singularity: Life 3.0



## The 3 Stages of Life



	Can survive & replicate	Can design its software	Can design its hardware
 Life 1.0 (Simply Biological)	✓	✗	✗
 Life 2.0 (Cultural)	✓	✓	✗
 Life 3.0 (Technological)	✓	✓	✓

Thank you!

