

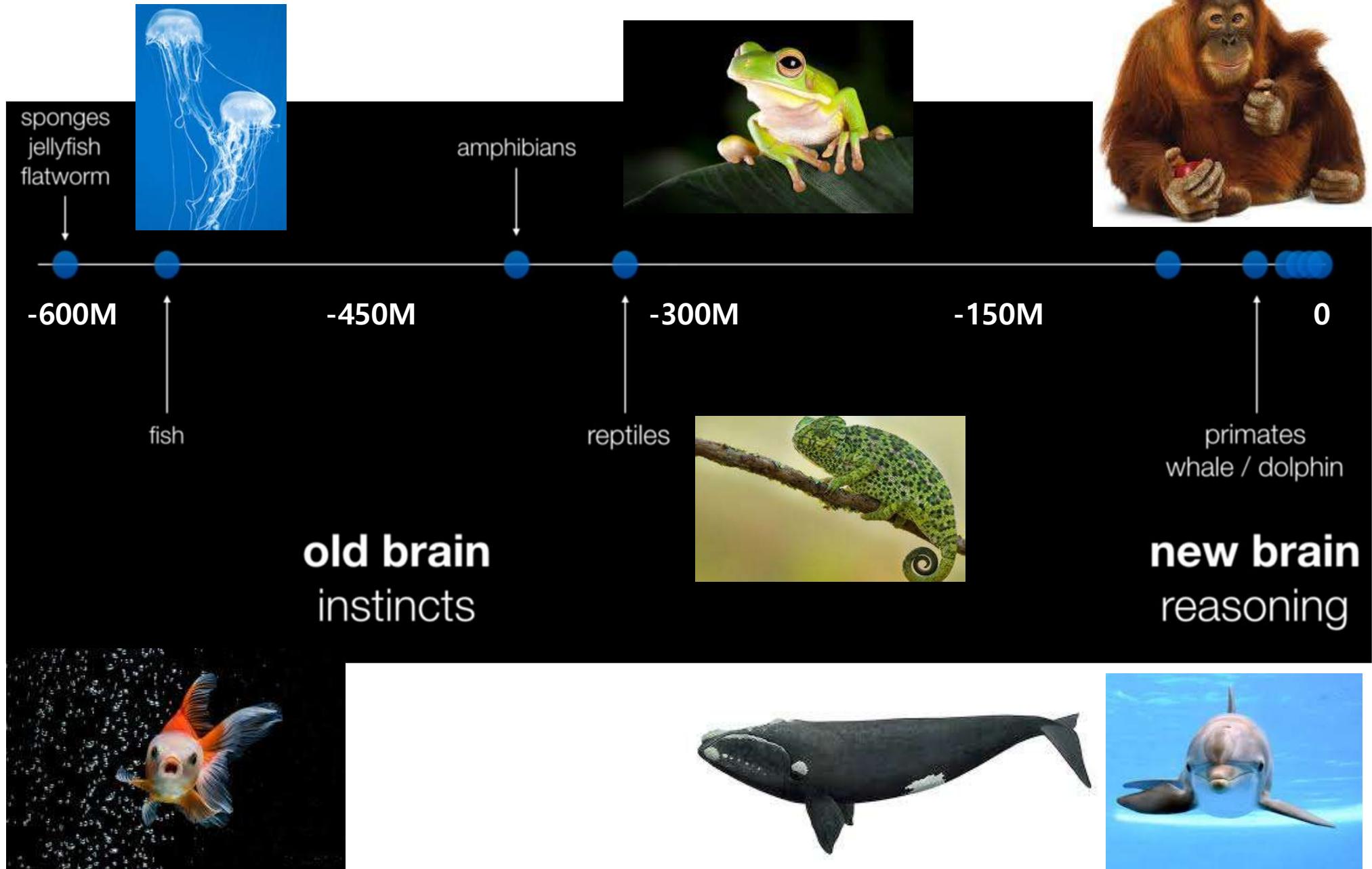
# **AI: Past, Present, and Future**

**Jae Yun JUN KIM**

**ECE Paris**

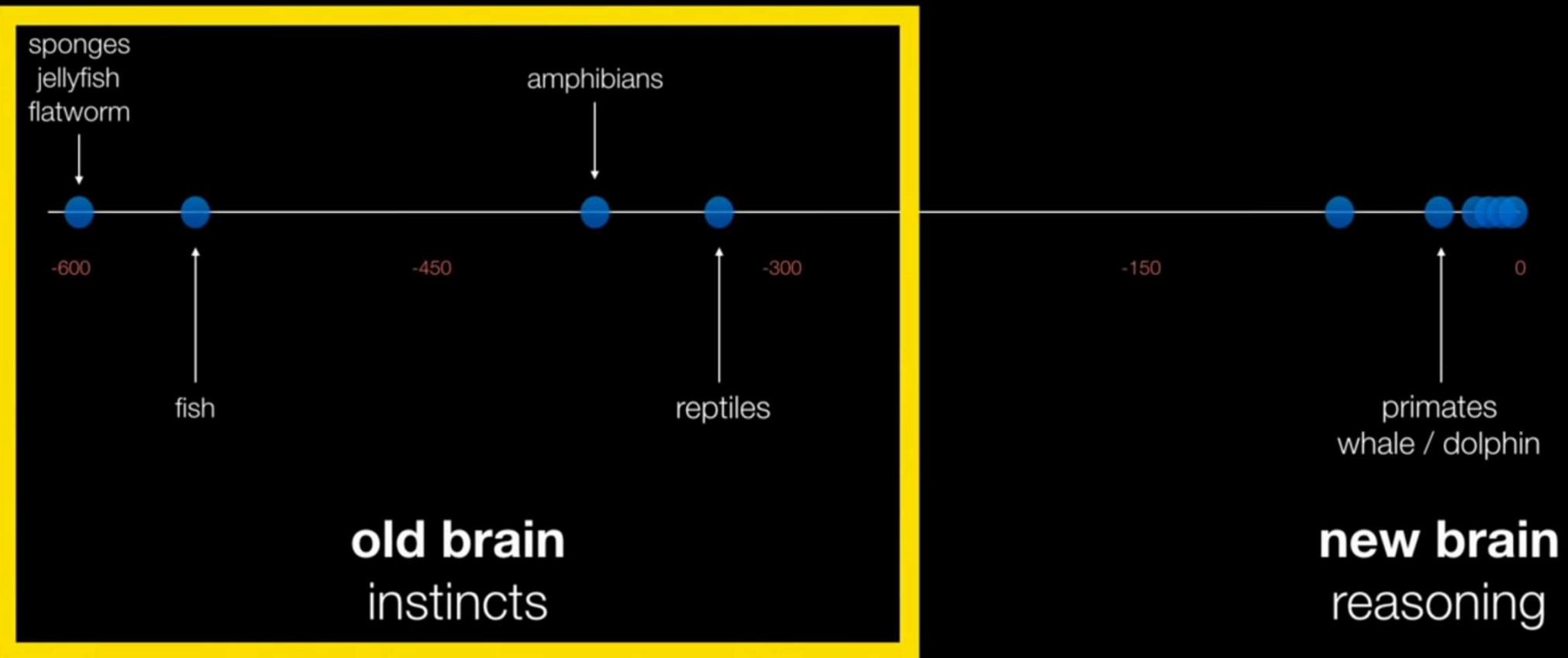
**March 26, 2019**

# Motivation: old brains vs. new brains



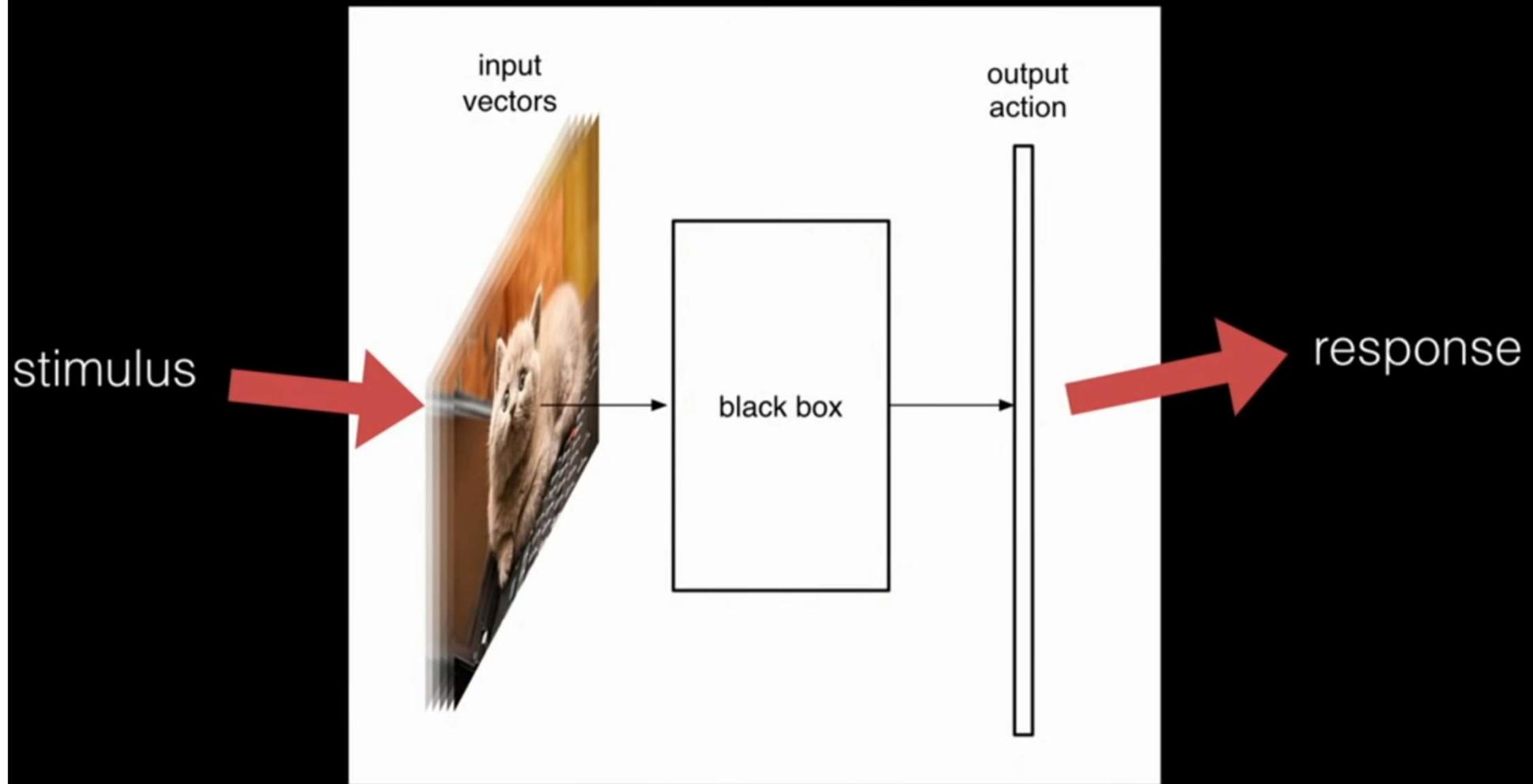
# Motivation: old brains vs. new brains

## Deep Learning

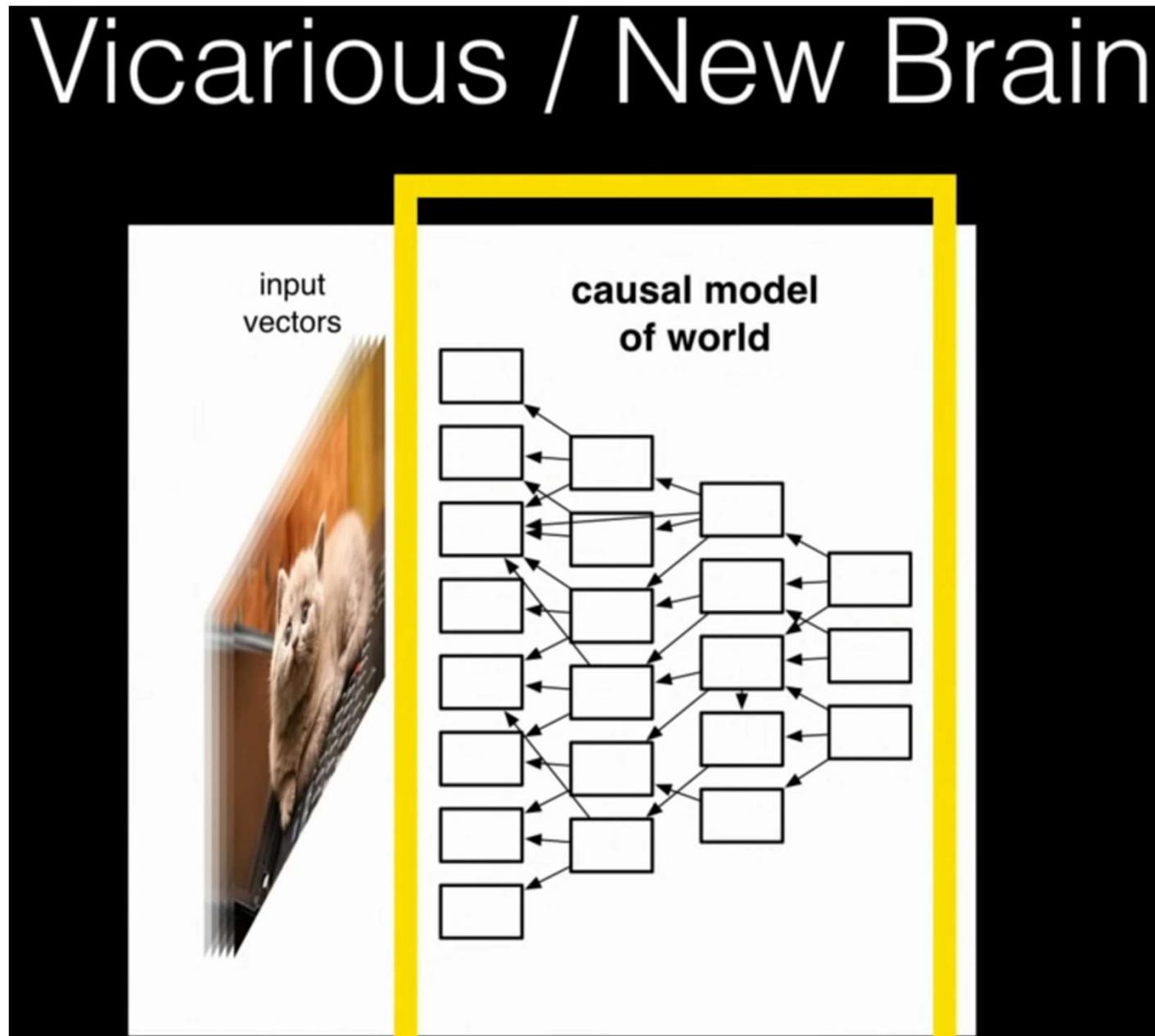


## Motivation: old brains vs. new brains

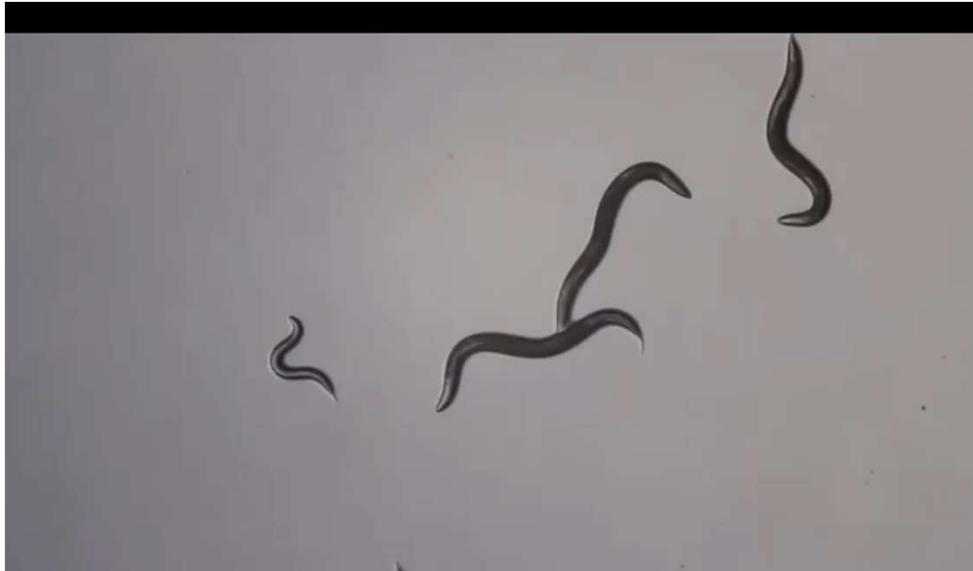
# Deep Learning / Old Brain



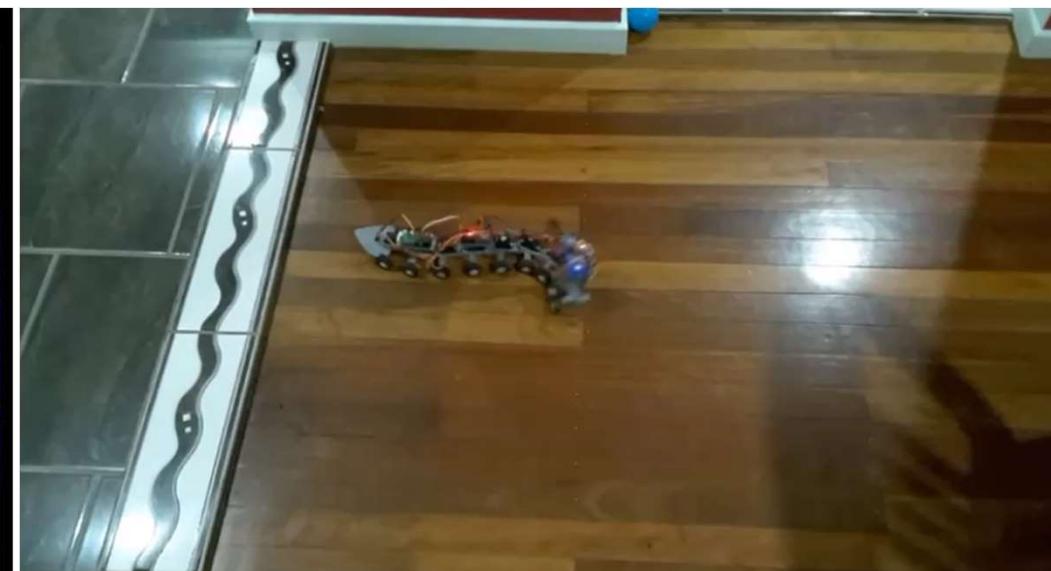
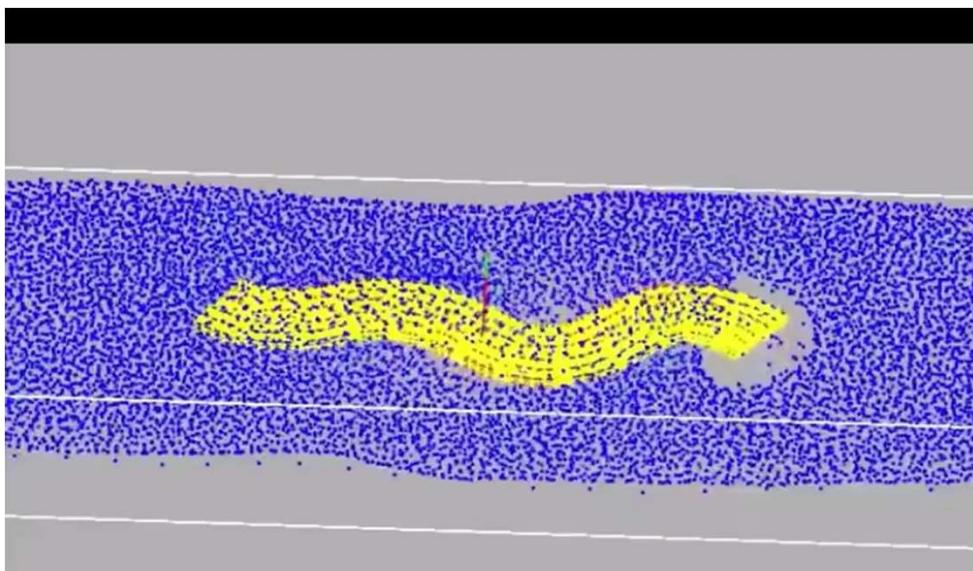
## Motivation: old brains vs. new brains



# Old brain: OpenWorm Project: C. Elegans



C. Elegans: 302 neurons | a few thousands synapses



**Intelligence** can be defined as

- the ability to learn how to address various problems.
- the ability to perceive or infer information, and to retain it as knowledge to be applied towards adaptive behaviors within an environment or context.

**Artificial Intelligence (AI)** can be defined as

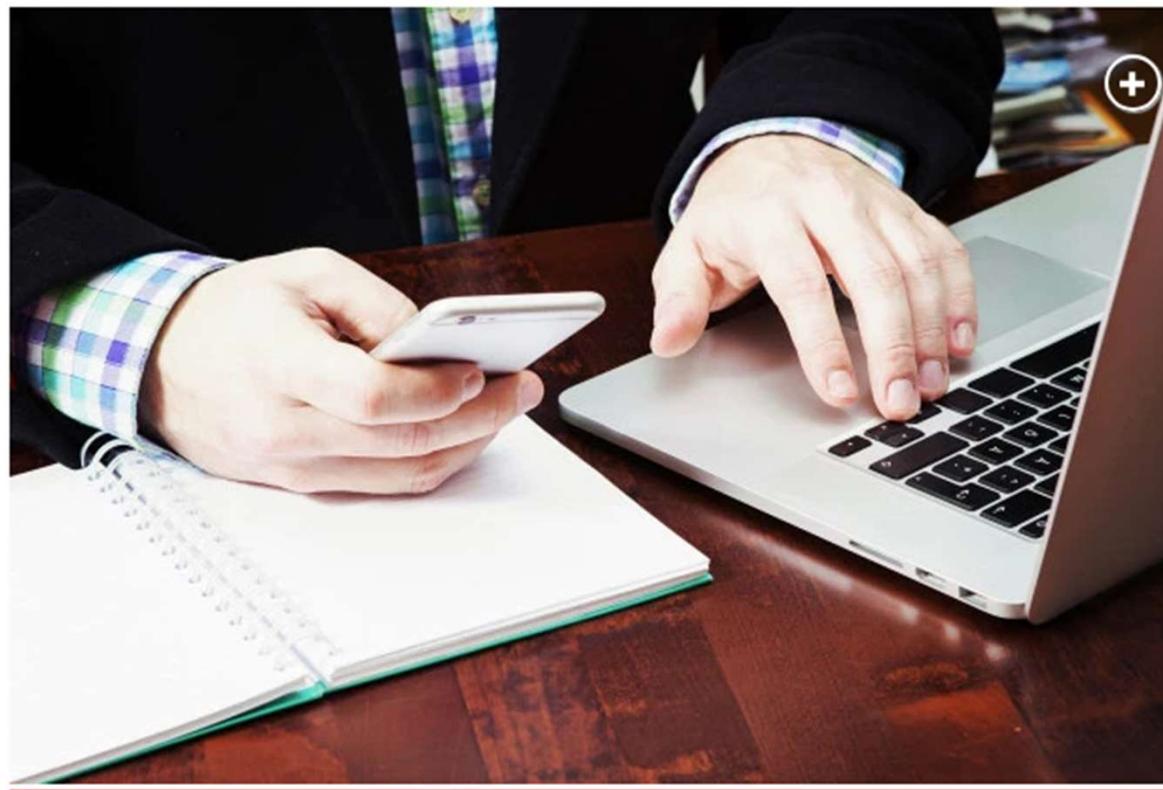
- the ability that a machine has to act adaptively in any given situation.
- the ability that a machine has to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.

# Examples of AI

## AI already reads your resume – now it's going to interview you, too

By Erika Prafder

December 4, 2017 | 8:38am | Updated



Shutterstock

# Examples of AI

## Dating apps use artificial intelligence to help search for love

November 8, 2018 by Daniel Silva



Tinder founder Sean Rad told the Web Summit in Lisbon that AI will "create better user experiences"

# Examples of AI

36,357 views | Feb 12, 2019, 04:00am

## Here's What Happened When IBM's Advanced AI Machine Challenged An International Debate Champion



Carmine Gallo Senior Contributor @

Leadership Strategy

*I write about leadership communication to grow sales and build brands.*



IBM's most advanced AI machine challenges a record-setting human debate champion.

GALLO COMMUNICATIONS

# Examples of AI

GOVERNMENT

## US defense department outlines its AI strategy



By [Ryan Daws](#)

Editor of AI News. A gadget lover, music purveyor, and ex-host of a consumer technology show.

Posted on February 14, 2019



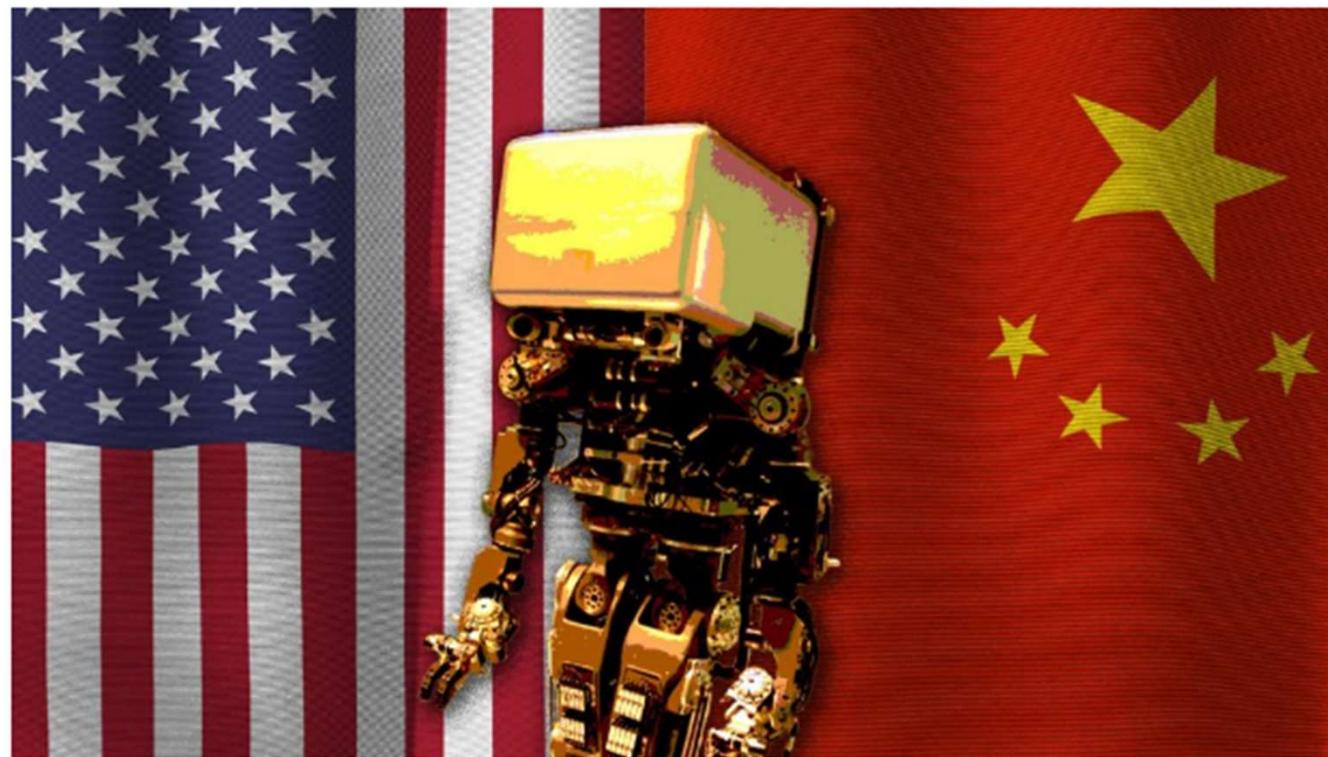
PHOTO BY CHRISTOPHER SKOR ON UNSPLASH

# Examples of AI

## China is rapidly developing its military AI capabilities

By Matt Field, February 8, 2019

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Credit: Matt Field. Based in part on photo by Morio CC SA 3.0 via Wikimedia Commons.

# Examples of AI

13,837 views | Dec 5, 2018, 07:15am

## How Artificial Intelligence Is Helping Financial Institutions



Sameer Maskey Forbes Councils  
Forbes Technology Council CommunityVoice

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POST WRITTEN BY

**Sameer Maskey**

Founder and CEO at [Fusemachines](#), an AI solutions and services provider based in NYC.

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Getty

# Examples of AI

AI in Healthcare (Spring 2019)



# Examples of AI

## The Self-Driving Car Timeline – Predictions from the Top 11 Global Automakers



Last updated on February 19, 2019, published by Jon Walker

Jon Walker covers broad trends at the intersection of AI and industry. He has reported on politics and policy issues for news organizations including National Memo, Massroots, NBC, and is a published science fiction author.

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# Examples of AI

8,172 views | Oct 25, 2018, 08:29pm

## What Happens Now That An AI-Generated Painting Sold For \$432,500?



William Falcon Contributor

Science

I write about AI, its business use and ethical use.



Portrait of Edmond Belamy, 2018, created by GAN (Generative Adversarial Network).

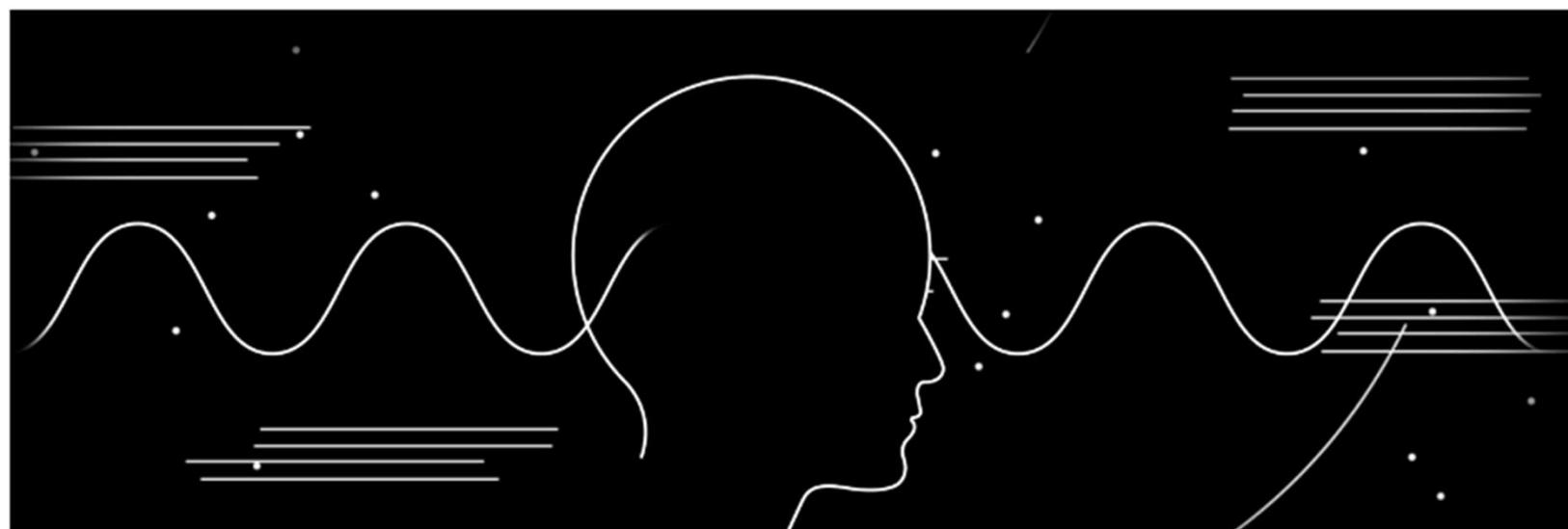
## Examples of AI

# AI-music startup Endel to release albums through Warner Music

March 22, 2019

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Tags: [Alexa](#) [amazon](#) [Artificial Intelligence](#) [Endel](#) [smart speakers](#) [Warner Music](#)



## Examples of AI

### AlphaGo: Google-developed AI beats South Korean Go grandmaster Lee Se-dol in first contest

Updated 9 Mar 2016, 9:26pm



PHOTO: South Korean professional Go player Lee Se-Dol puts the first stone against Google's artificial intelligence program, AlphaGo. (Getty Images)

# Examples of AI

4,666 views | Jan 25, 2019, 03:56am

## DeepMind AI Beats Professional Human StarCraft II Players



Sam Shead Contributor

AI & Big Data

*I cover artificial intelligence and Google DeepMind.*



StarCraft II gameplay

DEEPMIND

# Examples of AI

**RIVERS CASINO**  
PITTSBURGH

- HOME
- CASINO4FUN
- CASINO >
- PROMOTIONS >
- DINING >
- ENTERTAINMENT >
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777 Casino Dr.  
Pittsburgh, PA 15212  
412-231-7777 (Local)



# Examples of AI

The New York Times

## Building A.I. That Can Build A.I.

Google and others, fighting for a small pool of researchers, are looking for automated ways to deal with a shortage of artificial intelligence experts.



## Examples of AI

### Google Reveals Automatic Machine Learning: A.I. Can Create Itself

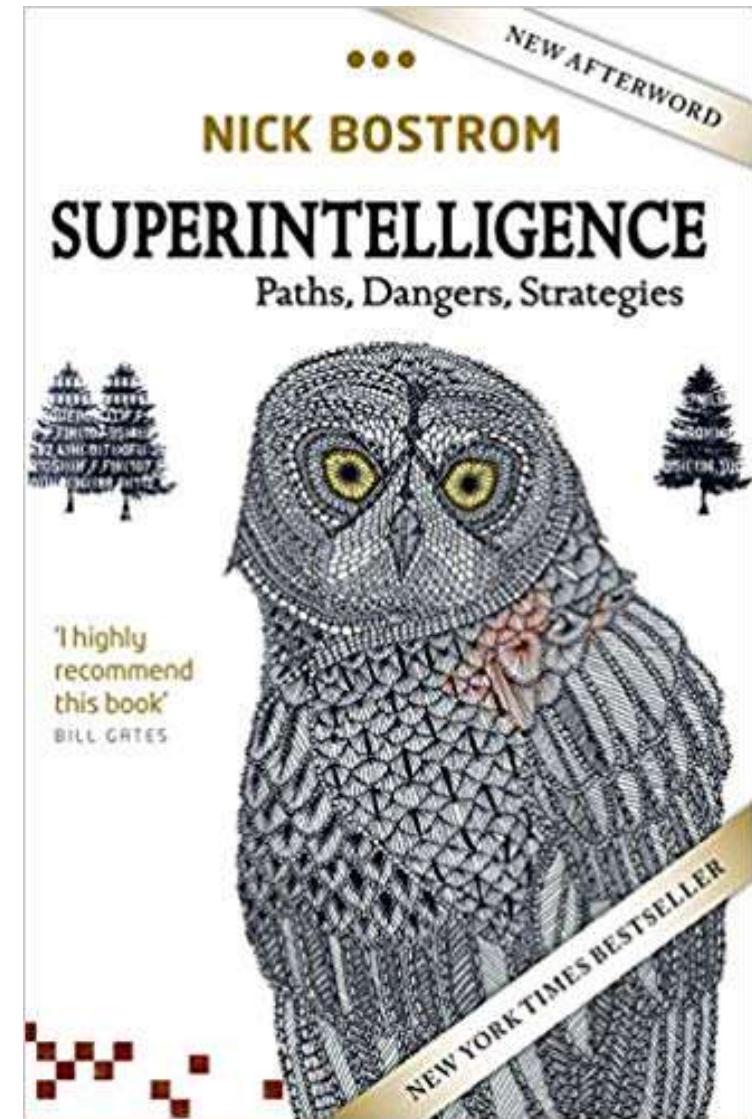


By [Graham Templeton](#) on May 23, 2017

Filed Under [Innovation](#), [Algorithms](#), [Coding](#), [Evolution](#), [Google](#), [Machine Learning](#) & [Singularity](#)

## **Superintelligence** can be defined as

- the cognitive ability that surpasses the intelligence of the best human brain.
- any intellect that radically outperforms even the best human brains in all practically relevant fields.



**Intelligence explosion** can be defined as

- the theory that talks about the fact that, when machines can produce better machines, humans will no longer surpass the intelligence of machines.
- the fact that machines descendants will be more powerful than humans descendants.



Advances in Computers  
Volume 6, 1966, Pages 31-88



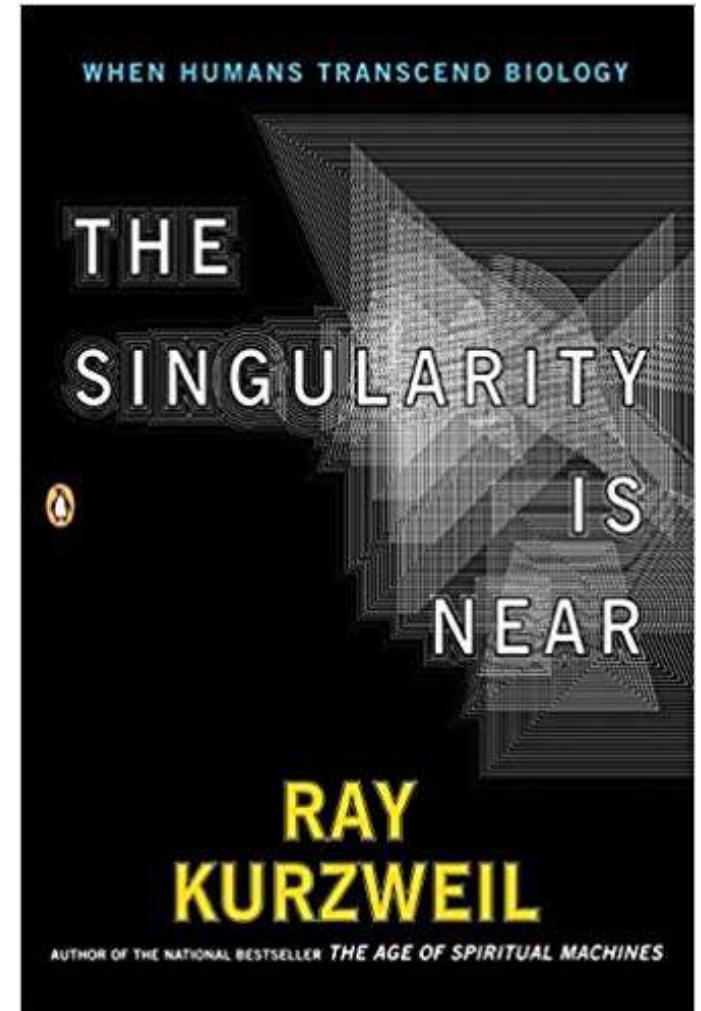
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## Speculations Concerning the First Ultraintelligent Machine \*

Irving John Good

## Technological singularity can be defined as

- the time instant at which the superintelligence takes place.
- the time instant at which the evolution of artificial intelligence accelerates and surpasses the humans' intelligence in every domain.



# When the **technological singularity** would take place?

## Future Progress in Artificial Intelligence: A Survey of Expert Opinion

*Vincent C. Müller<sup>a,b</sup> & Nick Bostrom<sup>a</sup>*

<sup>a)</sup> Future of Humanity Institute, Department of Philosophy & Oxford Martin School,  
University of Oxford. <sup>b)</sup>Anatolia College/ACT, Thessaloniki

### When Will AI Exceed Human Performance? Evidence from AI Experts

Katja Grace<sup>1,2</sup>, John Salvatier<sup>2</sup>, Allan Dafoe<sup>1,3</sup>, Baobao Zhang<sup>3</sup>, and Owain Evans<sup>1</sup>

<sup>1</sup> *Future of Humanity Institute, Oxford University*

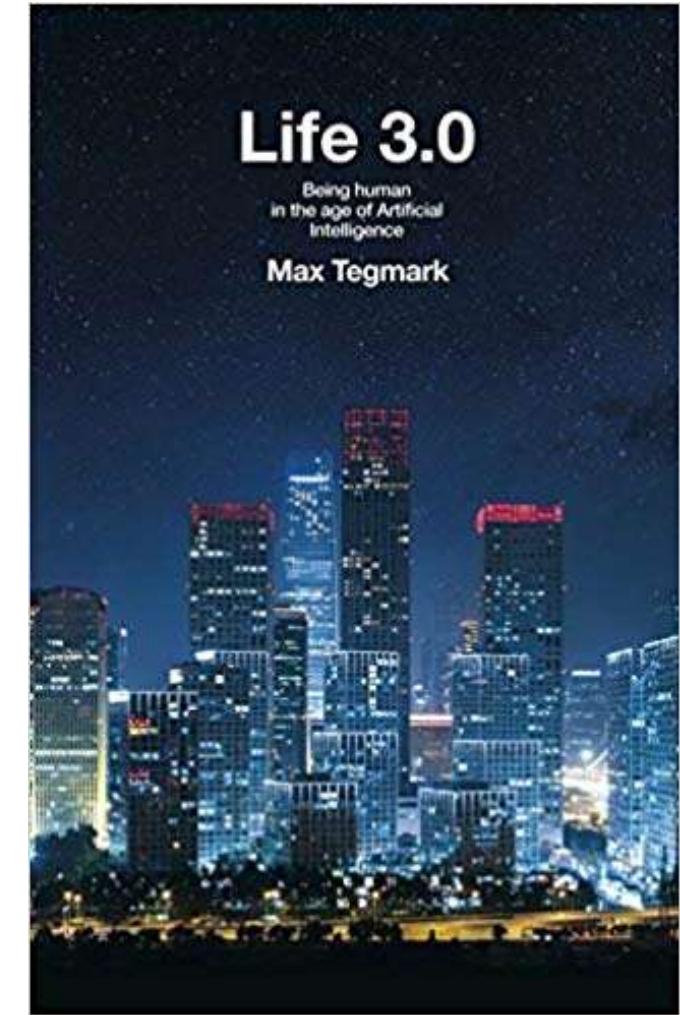
<sup>2</sup> *AI Impacts*

<sup>3</sup> *Department of Political Science, Yale University*

# Between 2040 and 2045

## Life 1.0, Life 2.0, and Life 3.0

- **Life 1.0:** life of bacteria, who cannot learn anything.
- **Life 2.0:** life of humans, who can learn. This learning capability allowed us to be the most powerful organisms on the planet.
- **Life 3.0:** life of machines, who can learn not only software but also hardware, and who will surpass humans' intelligence.



## Fear of superintelligence

# **ROBOSTOP Facebook shuts off AI experiment after two robots begin speaking in their OWN language only they can understand**

Experts have called the incident exciting but also incredibly scary

---

By James Beal and Andy Jepring

1st August 2017, 12:03 am | Updated: 2nd August 2017, 4:56 am

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# Fear of superintelligence



SCIENCE

## Stephen Hawking warns that AI could completely destroy mankind



Mike Wehner @MikeWehner

November 7th, 2017 at 2:58 PM

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# Fear of superintelligence

## Microsoft's Bill Gates insists AI is a threat

By Kevin Rawlinson  
BBC News

⌚ 29 January 2015

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# Fear of superintelligence

Elon Musk on artificial intelligence: 'We're summoning the demon'

[News](#) | Updated Oct 27, 2014

By Matt Picht

# Fear of superintelligence

## Musk and Zuckerberg clash over future of AI

By Jane Wakefield  
Technology reporter

⌚ 25 July 2017

f m t e Share



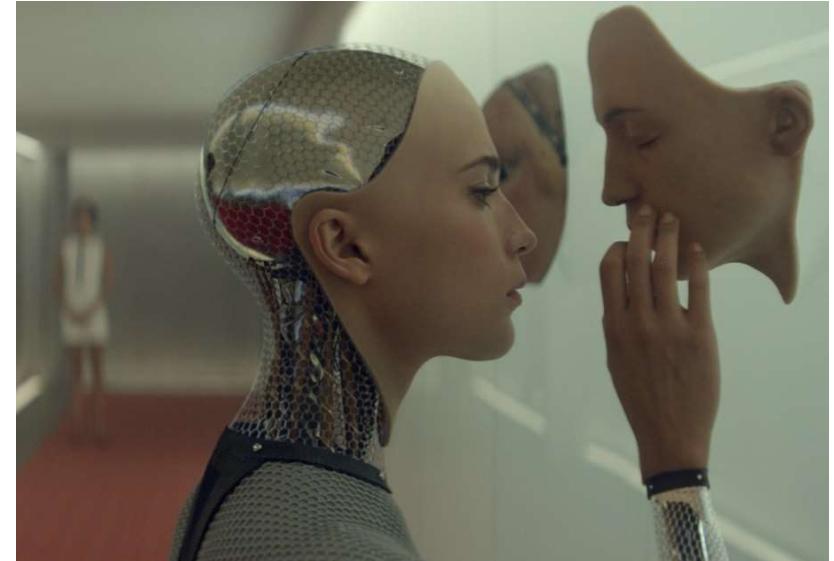
# Fear of superintelligence



AI allows us ...

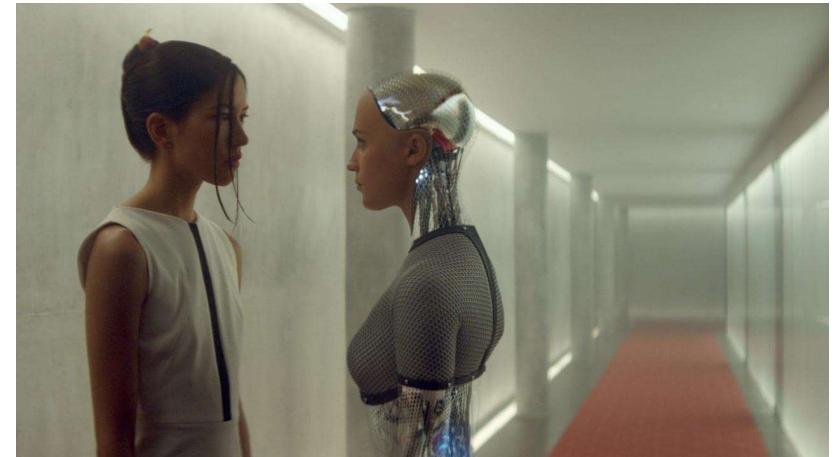
to study about **metacognition**

- Knowing about knowing
- Thinking about thinking



to **reverse-engineer**

- Who am I?
- What am I?



# What is AI for you?