

Geertrui Mieke De Ketelaere

# MENS VERSUS MACHINE

Artificiële intelligentie  
ontrafeld

PELCKMANS

Geertrui Mieke De Ketelaere

# HOMME VERSUS MACHINE

L'intelligence artificielle  
démystifiée

PELCKMANS

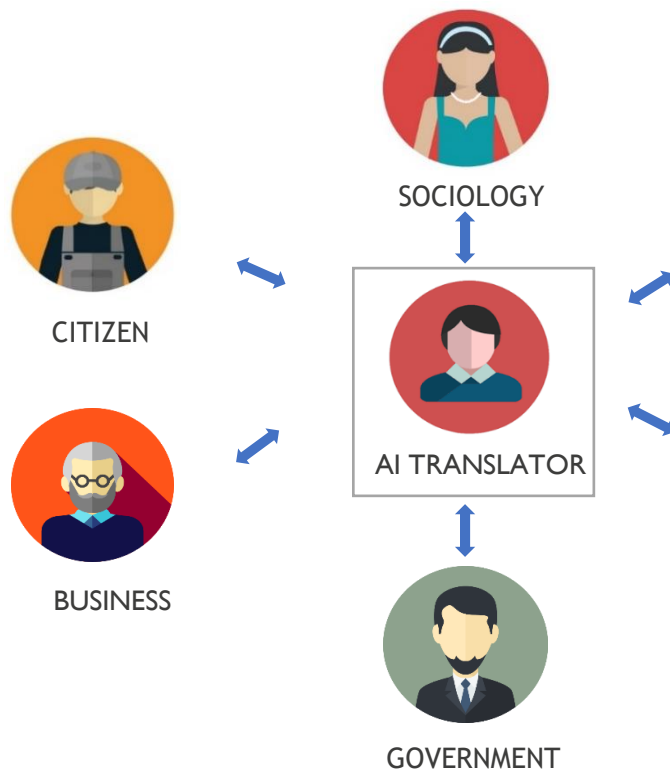
Geertrui Mieke De Ketelaere

# WANTED: HUMAN-AI TRANSLATORS

Artificial Intelligence  
Demystified

PELCKMANS

# WANTED: HUMAN AI TRANSLATORS



$$\text{Score}(U_i, v) = \left( \bar{r}_{ui} + \frac{\sum_{U_j \in \text{KN}(U_i)} \text{Sim}(U_i, U_j) (r_{U_j v} - \bar{r}_{uj})}{\sum_{U_j \in \text{KN}(U_i)} \text{Sim}(U_i, U_j)} \right) f \quad (6)$$

where  $f = \exp\{-1 + \alpha(\bar{r}_{ui} - \bar{r}_{uj})\}$ ,  $\exp$  represents the exponential function based on  $e$ ,  $\bar{r}_{ui}$  is the average of  $U_i$ ,  $r_{ui}$  is score of  $U_i$  to  $v$ ,  $\alpha$  is the attenuation factor, and  $\text{Score}(U_i, v)$  is the prediction score of  $U_i$  to  $v$ .



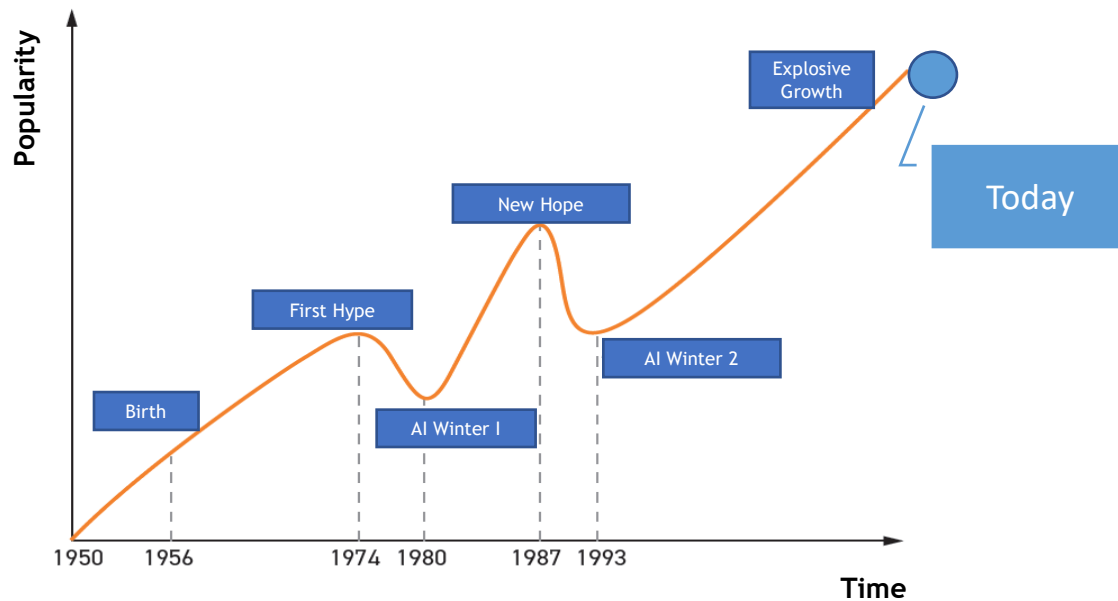
TECHNICAL



LEGAL

... Decisions referred to in paragraph 2 shall not be based on special categories of personal data referred to in Article 9(1), unless point (a) or (g) of Article 9(2) applies and suitable measures to safeguard the data subject's rights and freedoms and legitimate interests are in place ...

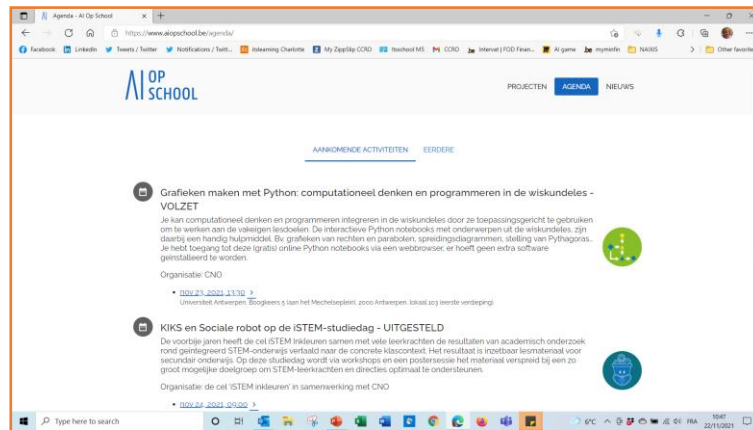
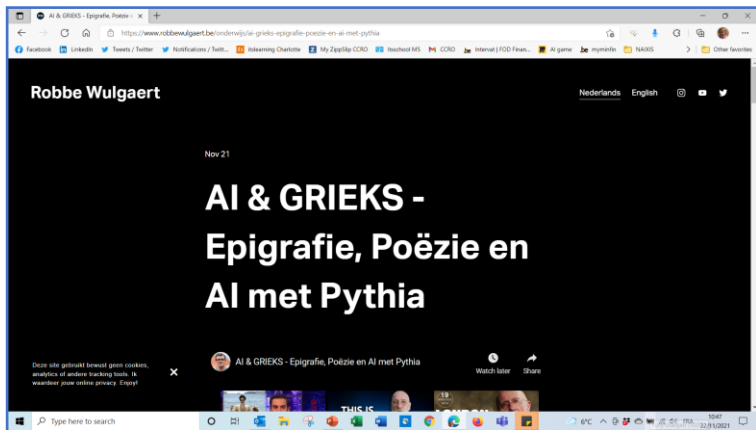
# WELCOME IN AI-LAND



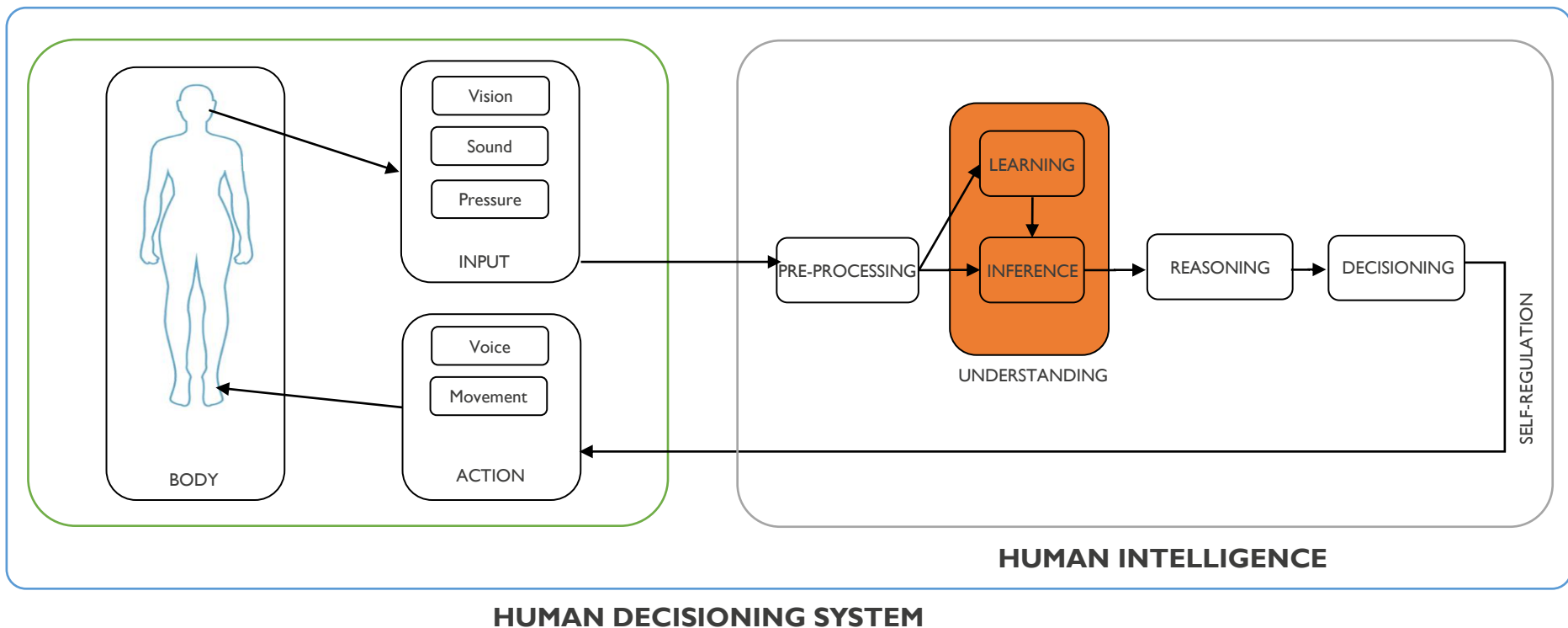
# WELCOME TO AI-LAND



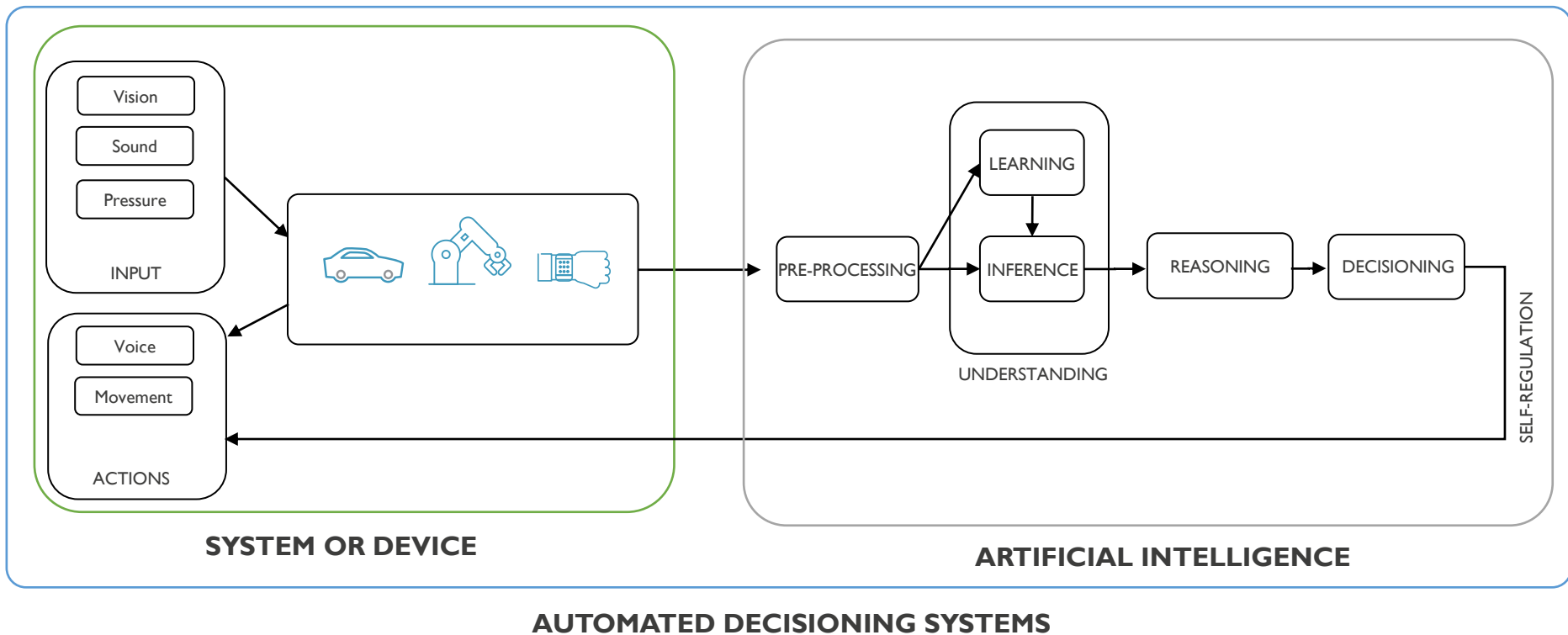
# WELCOME TO AI-LAND



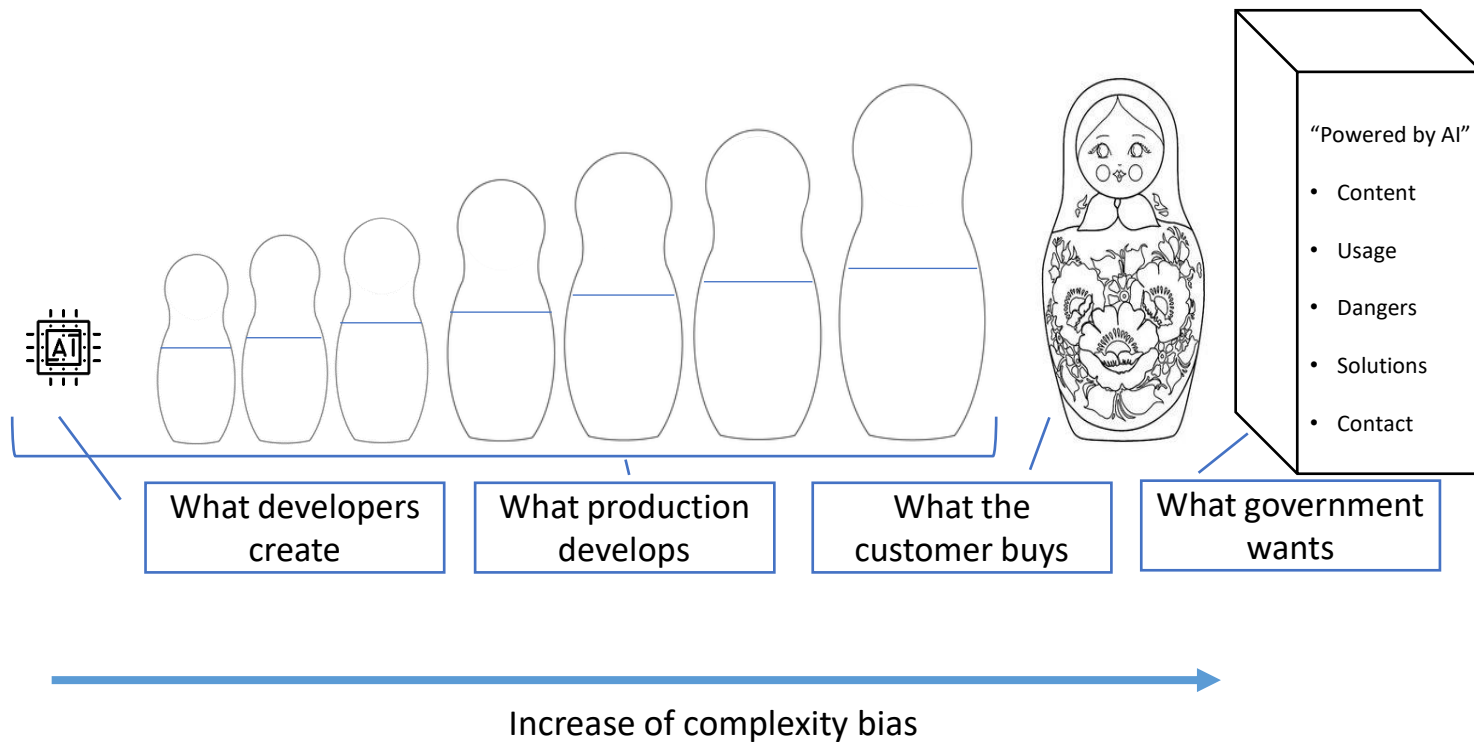
# HUMAN INTELLIGENCE TODAY



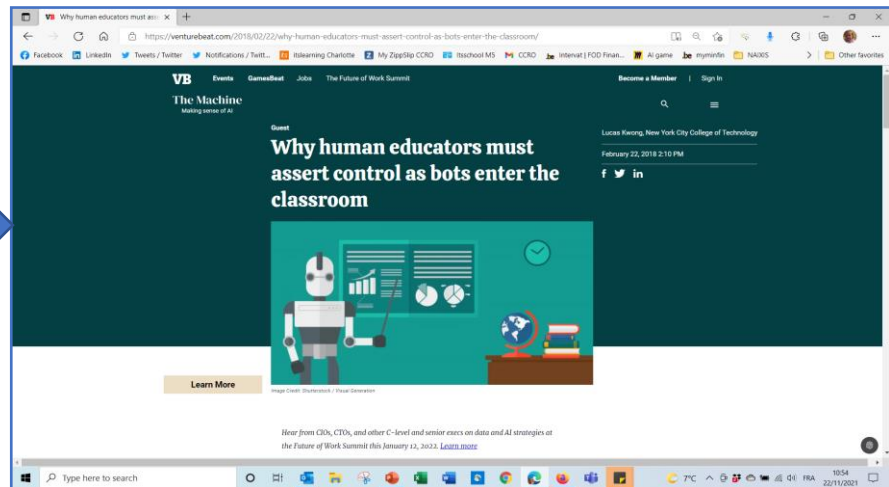
# ARTIFICIAL INTELLIGENCE TODAY




# IMPORTANCE OF TRANSPARENCY



# WELCOME TO AI-LAND



# WELCOME TO AI-LAND

 Telegraph.co.uk

## Uber stops developing driverless cars as it sells off technology

Uber has dropped plans to build its own driverless car and has sold the division developing the technology to a US start-up, after repeated ...

1 day ago



POLICY \ BUSINESS \ TECH \

## IBM will no longer offer, develop, or research facial recognition technology

*IBM's CEO says we should reevaluate selling the technology to law enforcement*

By Jay Peters | @jaypeters | Jun 8, 2020, 8:49am EDT

**BI** Business Insider

## Google tried to ease employee tension in meeting over ousted AI ethicist

Google held a meeting Tuesday with employees to discuss the ousting of Timnit Gebru, a prominent AI ethicist who said she was fired last ...

19 hours ago



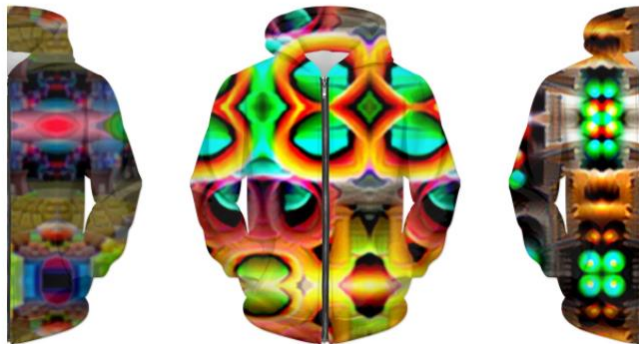
# WELCOME TO AI-LAND

## These Hoodies Make You 'Invisible' to Some Surveillance Algorithms

They were created by researchers from Facebook and the University of Maryland



Dave Gershgorin Aug 6, 2020 · 3 min read ★



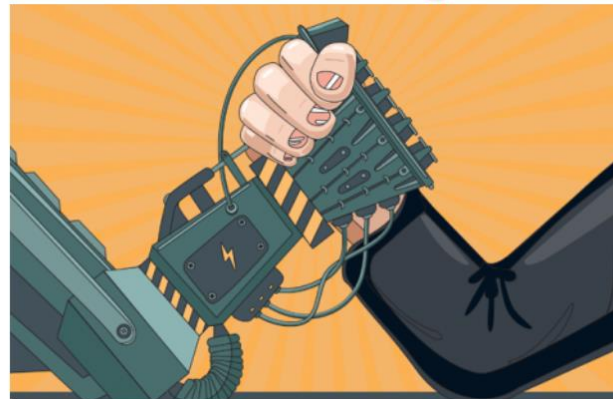
## AI and your resume: How to beat the bots

Before you can interview for a new job, you must get past the AI tools that screen candidates. Experts share seven do's and don'ts for AI-proofing your resume

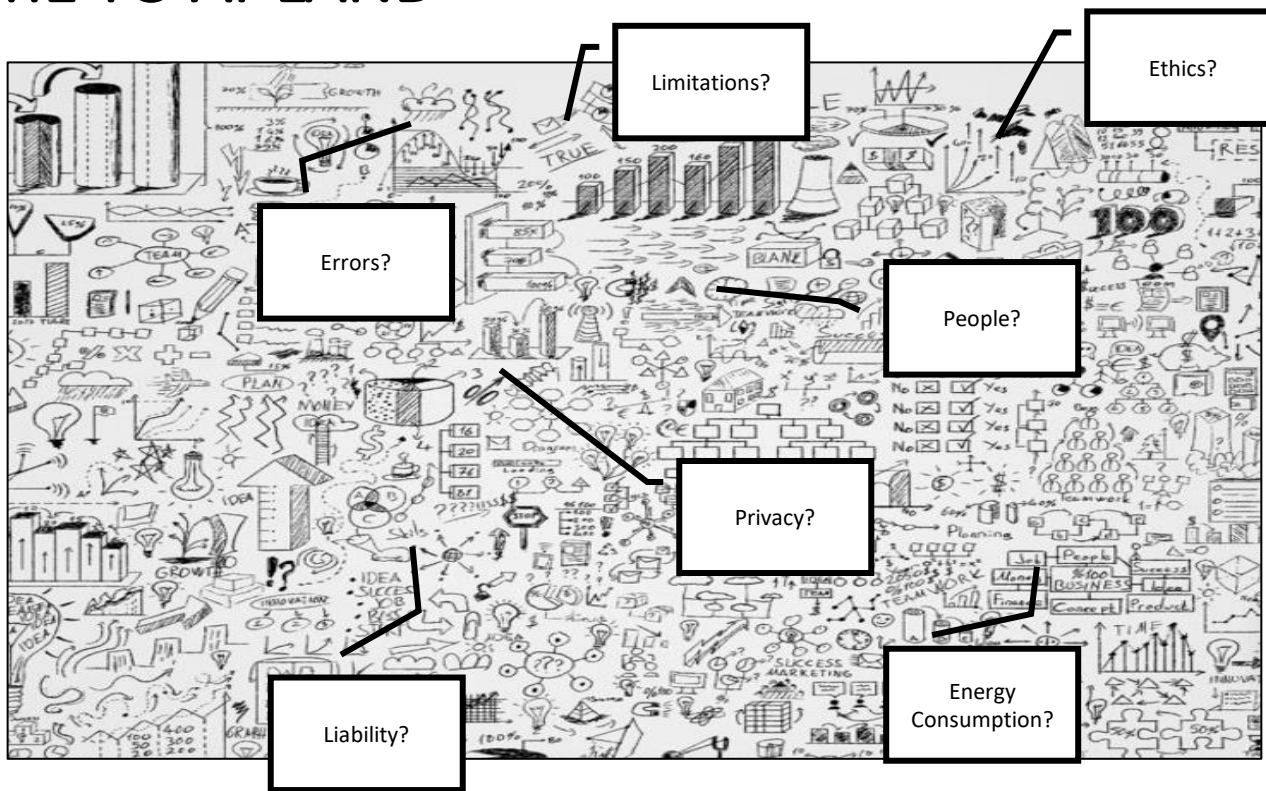
By **Stephanie Overby**

July 16, 2019

195 readers like this



# WELCOME TO AI-LAND



# AI TODAY

2%

CO2 emission by  
AI/IOT systems

21%

Adoption of AI

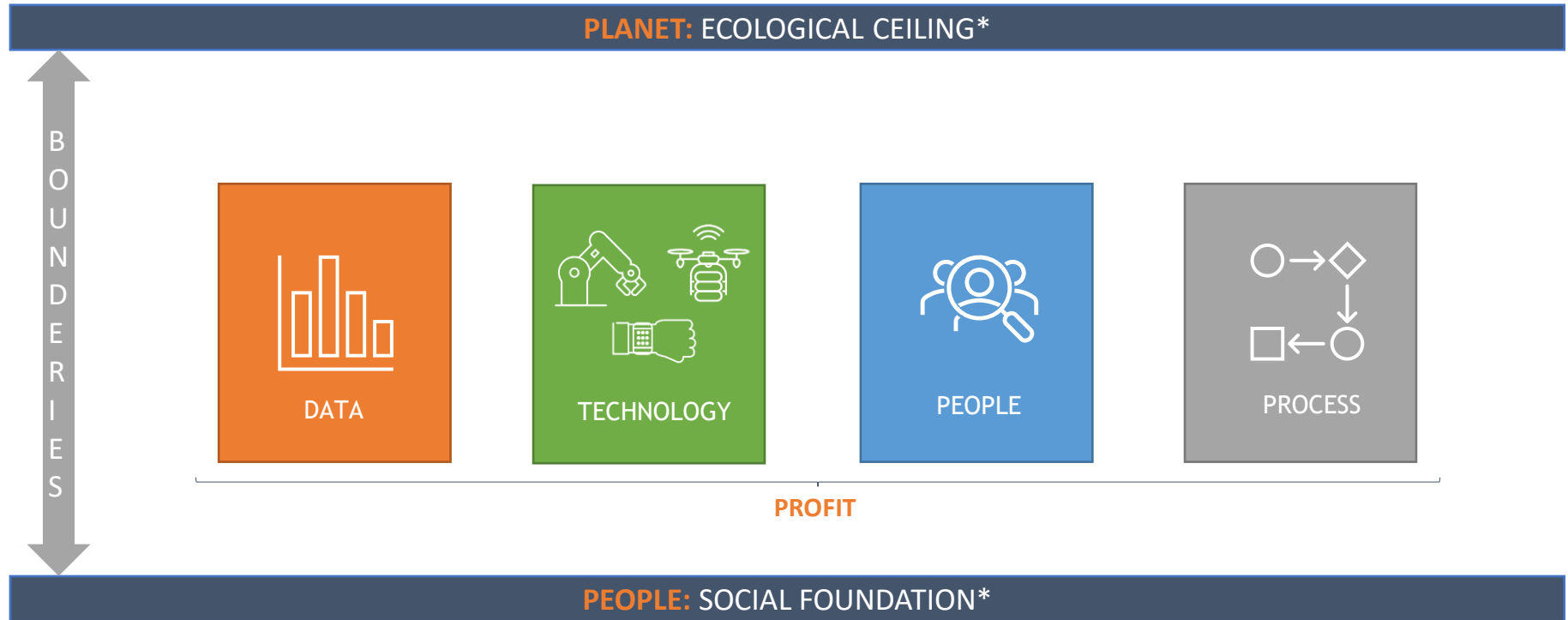
35%

Models misbehaving

\* AI for business: What's going wrong, and how to get it right | ZDNet

\* Global survey: The state of AI in 2020 | McKinsey

# CURRENT ADOPTION ISSUES AND HOW TO FIX THEM



\* Donut Economics, Kate Raworth

# CURRENT ADOPTION ISSUES AND HOW TO FIX THEM



THE GOOD

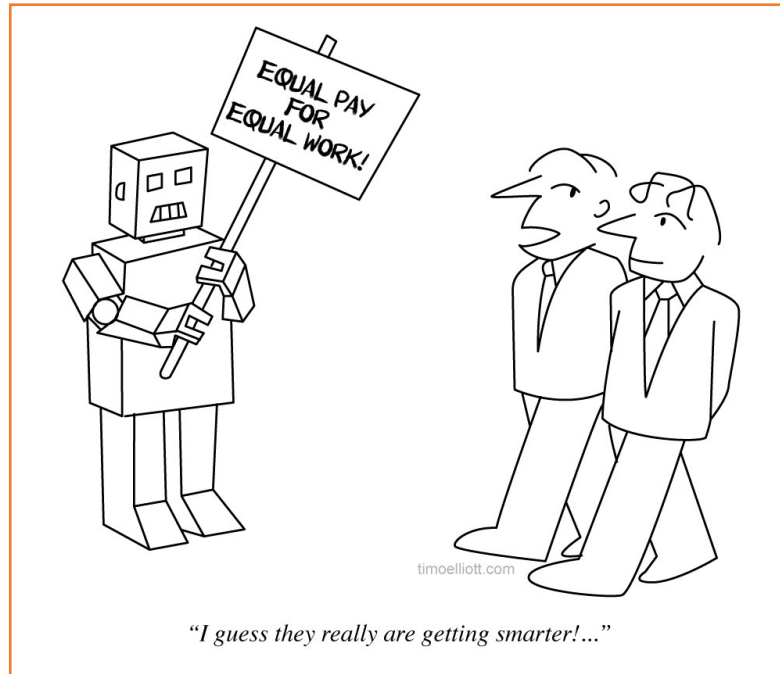


THE BAD

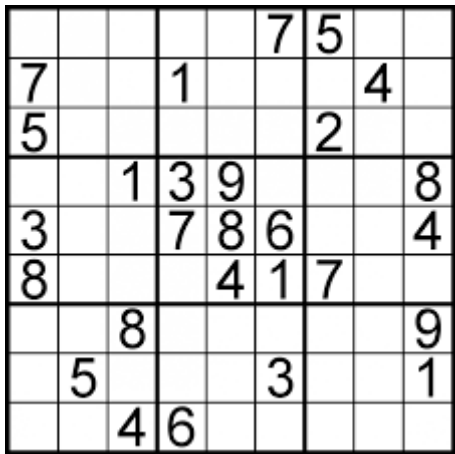


THE UGLY

# THE GOOD



# DEFINITION



We learn by rules

**WEAK**



We learn by experience

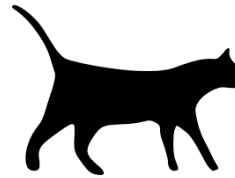
**STRONG**

# PATTERN RECOGNITION

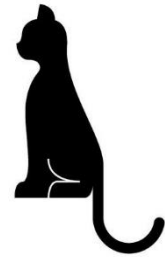
- 3 – 9
- 4 – 16
- 8 – 64
- 9 – ?



Cat



Cat



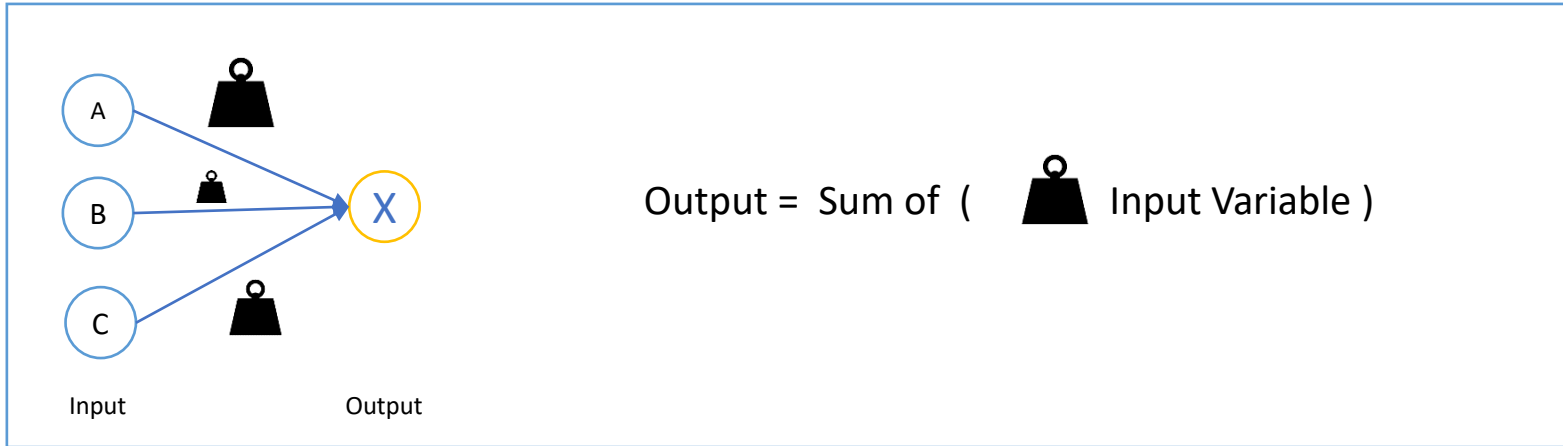
?

# PATTERN RECOGNITION

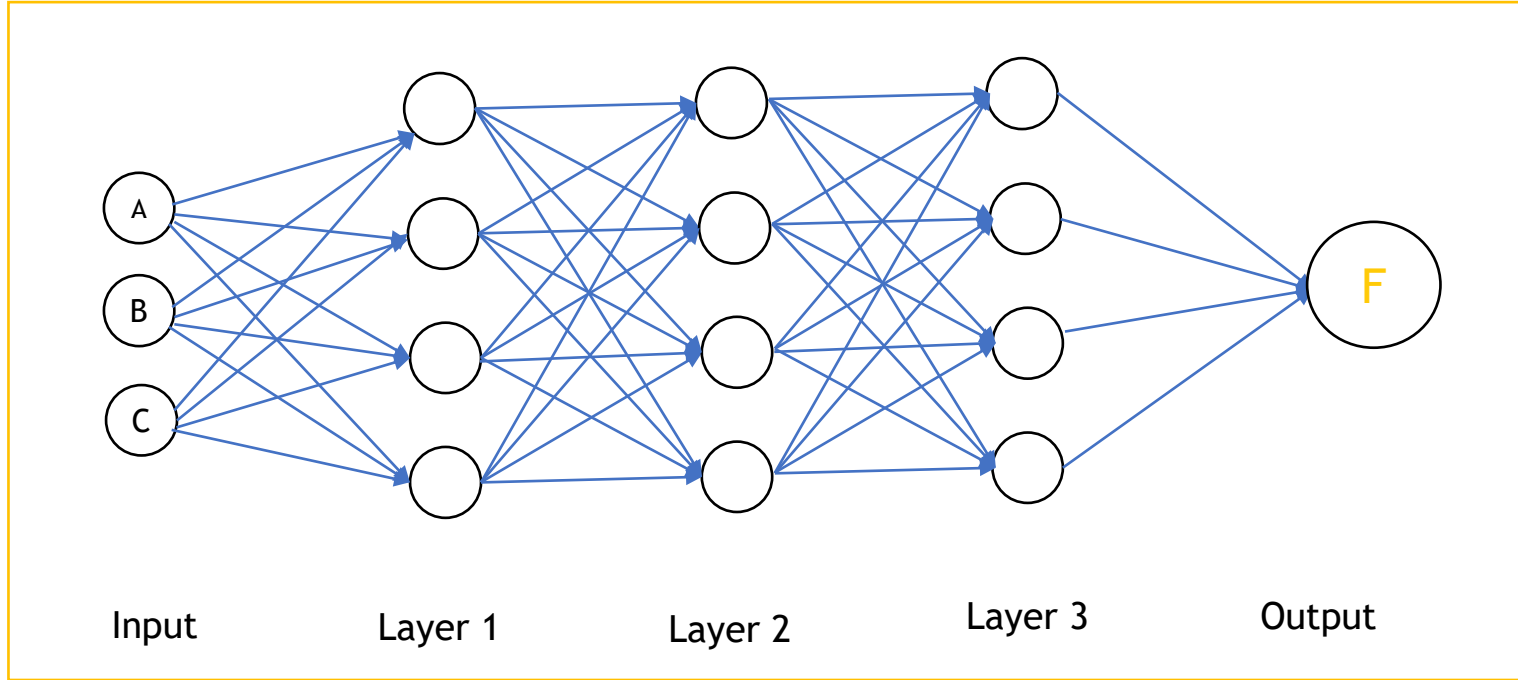
Input 1	Input 2	Input 3	Output
2	4	5	3
5	2	8	2
2	2	1	3
3	3	5	?

# ALGORITHM

The equation is called an algorithm. It allows us to calculate automatically/to predict the output.



# NEURAL NETWORKS



# AI ANNO 2021

	HUMAN INTELLIGENCE	ARTIFICIAL INTELLIGENCE
1. Speed of processing		X
2. Knowledge Transfer		X
3. Decision Accuracy		X
4. Operational Modus		X
5. Size of storage	X	
6. Energy Usage	X	
7. Parallel Processing	X	

# AI ANNO 2021

	HUMAN INTELLIGENCE	ARTIFICIAL INTELLIGENCE
8.Adapt to Change	X	
9.Type of Input Data	X	
10. Physical Collaboration	X	
11. Human Dialogues	X	
12. Creativity	X	
13. Emotions	X	
14. Consciousness	X	
15. Ethics (Bias)	X	X
16. Ethics (Noise)	X	X

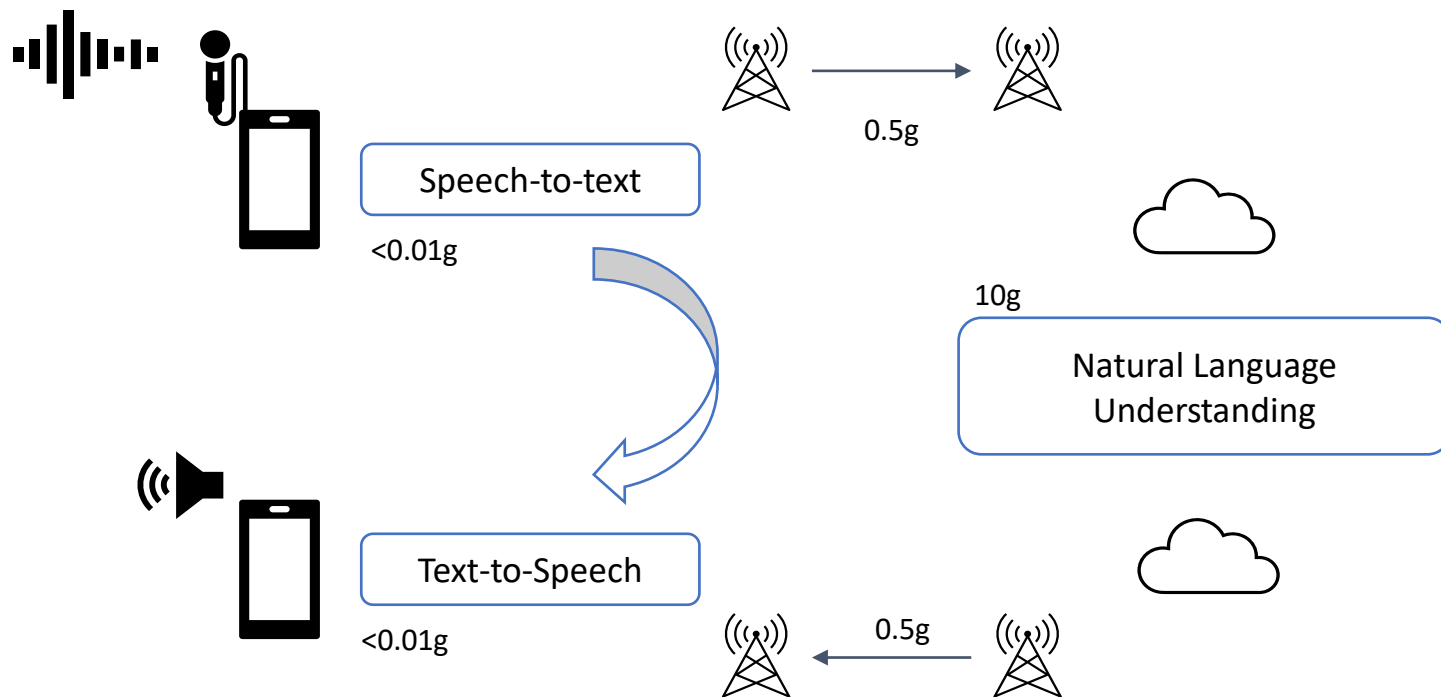
# A LITTLE CHECK

« Siri, what is the weather going to be like tomorrow »

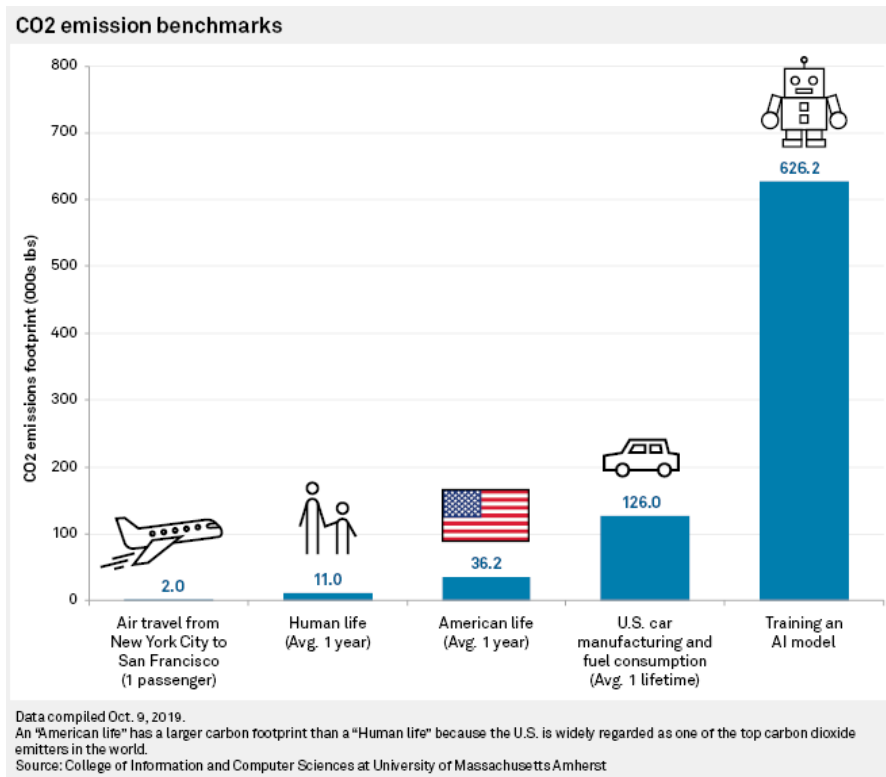
## THE RESULT: CO<sub>2</sub> DURING INFERENCE

11g CO<sub>2</sub>

# BUT, THAT'S NOT ALL: HOW DID WE CALCULATE THIS?



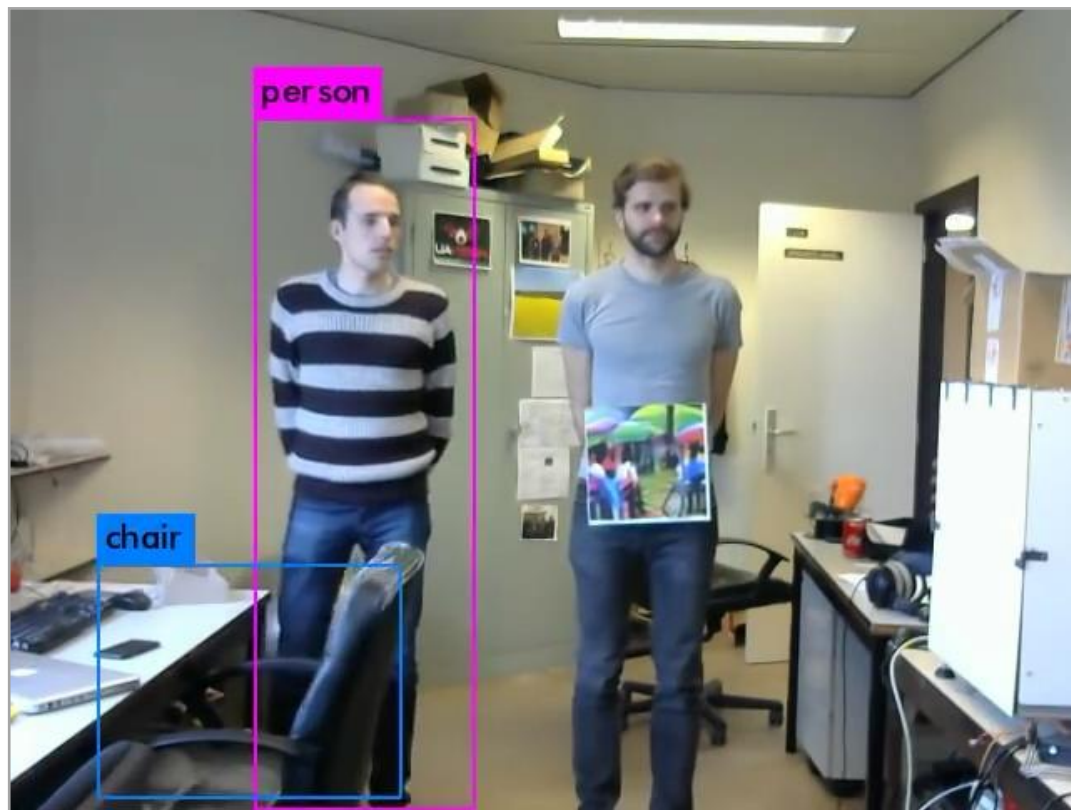
# THE RESULT: ENERGY EFFICIENCY



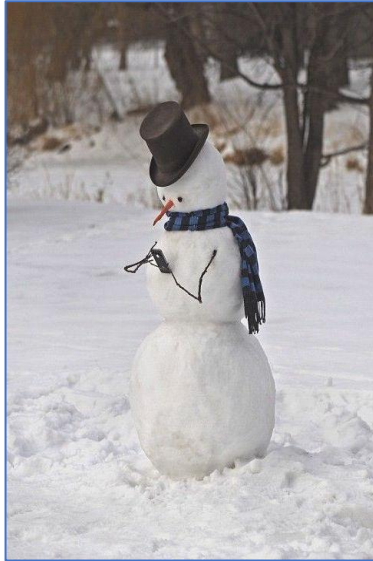
# LACKING COMMON SENSE



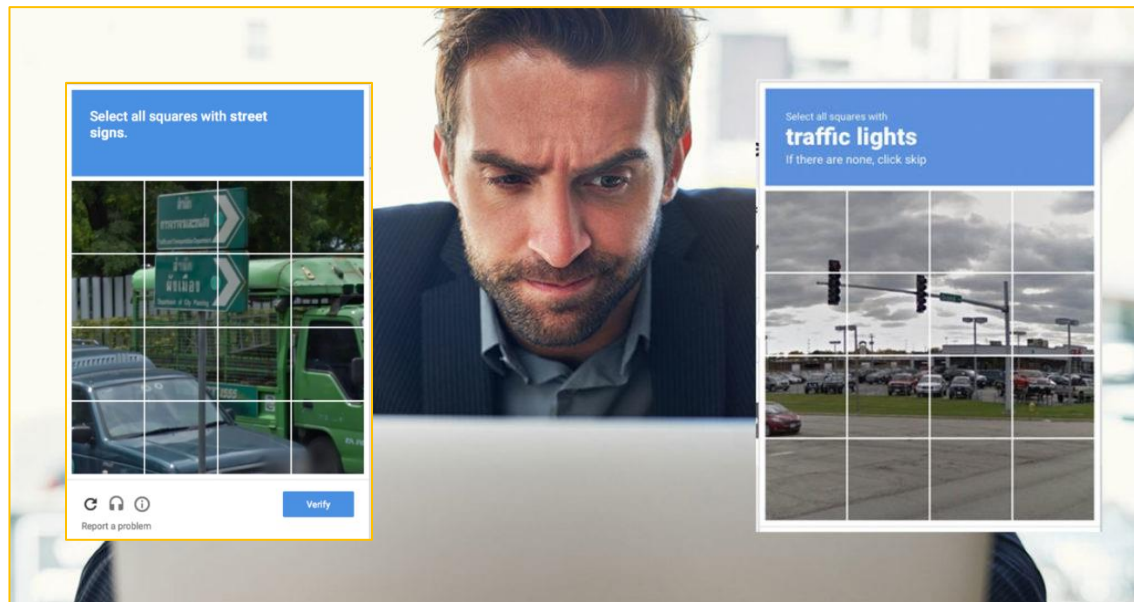
# LACKING COMMON SENSE: STILL UNKNOWN



# LACKING CONCEPTS & ABSTRACTION



# LACKING CONCEPTS & ABSTRACTION



# LACKING INTRA DEVICE COLLABORATION

## Video of Tesla on Autopilot crashing into truck kicks off online debate

Users noted that Autopilot might not be capable of spotting stationary objects

Web Desk | June 06, 2020 17:45 IST



A screengrab from the video of Tesla Model 3 (white) crashing into the overturn truck

# Visible light



# Thermal enhanced video



# LACKING INTER DEVICE COLLABORATION



## Autonomous car hits autonomous robot in bizarre collision

January 7, 2019 - By [Tracy Cozzens](#)

[0 Comments](#)

Est. reading time: 1:30 

In a unique car accident, a self-driving Tesla Model S hit and destroyed an autonomous [Promobot](#), the robot model v4, on Jan. 6 in Las Vegas. The incident took place at 3000 Paradise Road, Las Vegas.

At 7 p.m., the Promobot's engineers transported robots to the Vegas's Congress Hall to prepare their booth at the Consumer Electronics Show, being held Jan. 8-11. All the robots were moving in a line. But one of them missed its way and drove to the roadway of the street parking lot.

At that moment, it was hit by a self driving Tesla car.

# LACKING REASONING



A handwritten equation "3 + 4 = ?" is shown on a black background. The numbers and symbols are white and slightly blurry, mimicking a handwritten style. The entire image is enclosed in a red rectangular border.

Deep Learning



A printed equation "3 + 4 = ?" is shown on a white background. The numbers and symbols are black and sharp. The entire image is enclosed in a green rectangular border.

Deep Learning + Logic

85% accuracy, 30 000 examples



Which pictures has most dogs?

# LACKING CAUSALITY, FOCUS ON FINDING CORRELATIONS



## No evidence of vaccine increasing blood clot risk: AstraZeneca

By Jane Byrne

15-Mar-2021 - Last updated on 16-Mar-2021 at 20:56 GMT



© GettyImages/peterschreiber.media

If AI's So Smart, Why Can't It Grasp Cause and Effect? | WIRED

# LIMITED ADAPTATION TO CHANGING CONTEXT

Artificial intelligence / Machine learning

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## Our weird behavior during the pandemic is messing with AI models

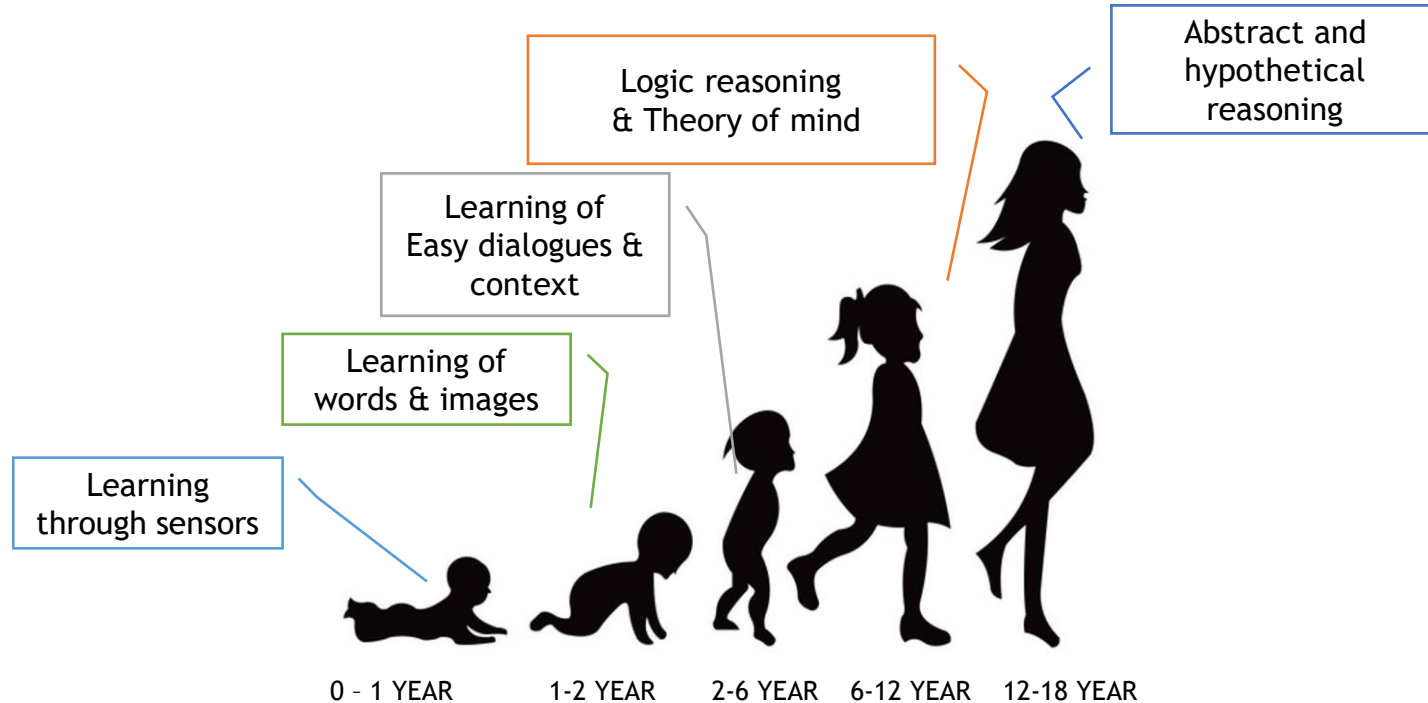
Machine-learning models trained on normal behavior are showing cracks — forcing humans to step in to set them straight.

by **Will Douglas Heaven**

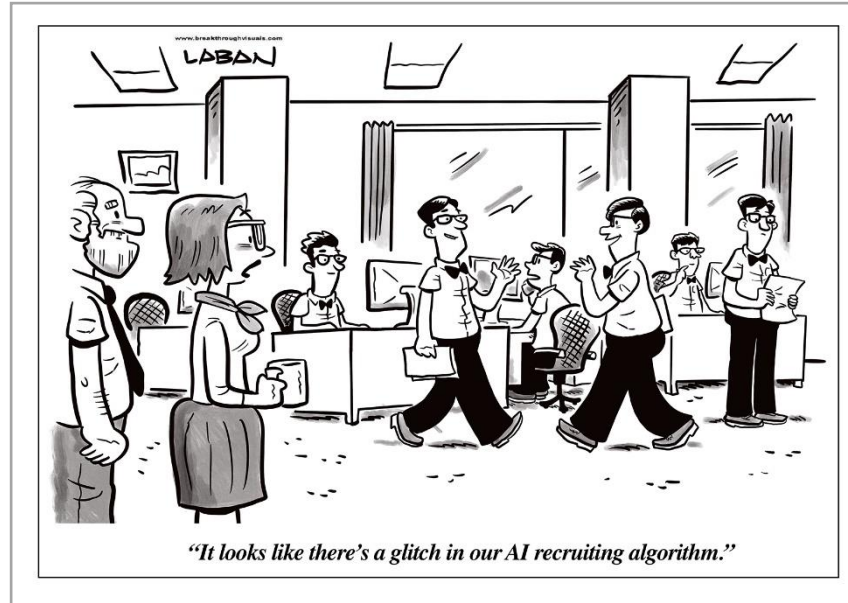
May 11, 2020

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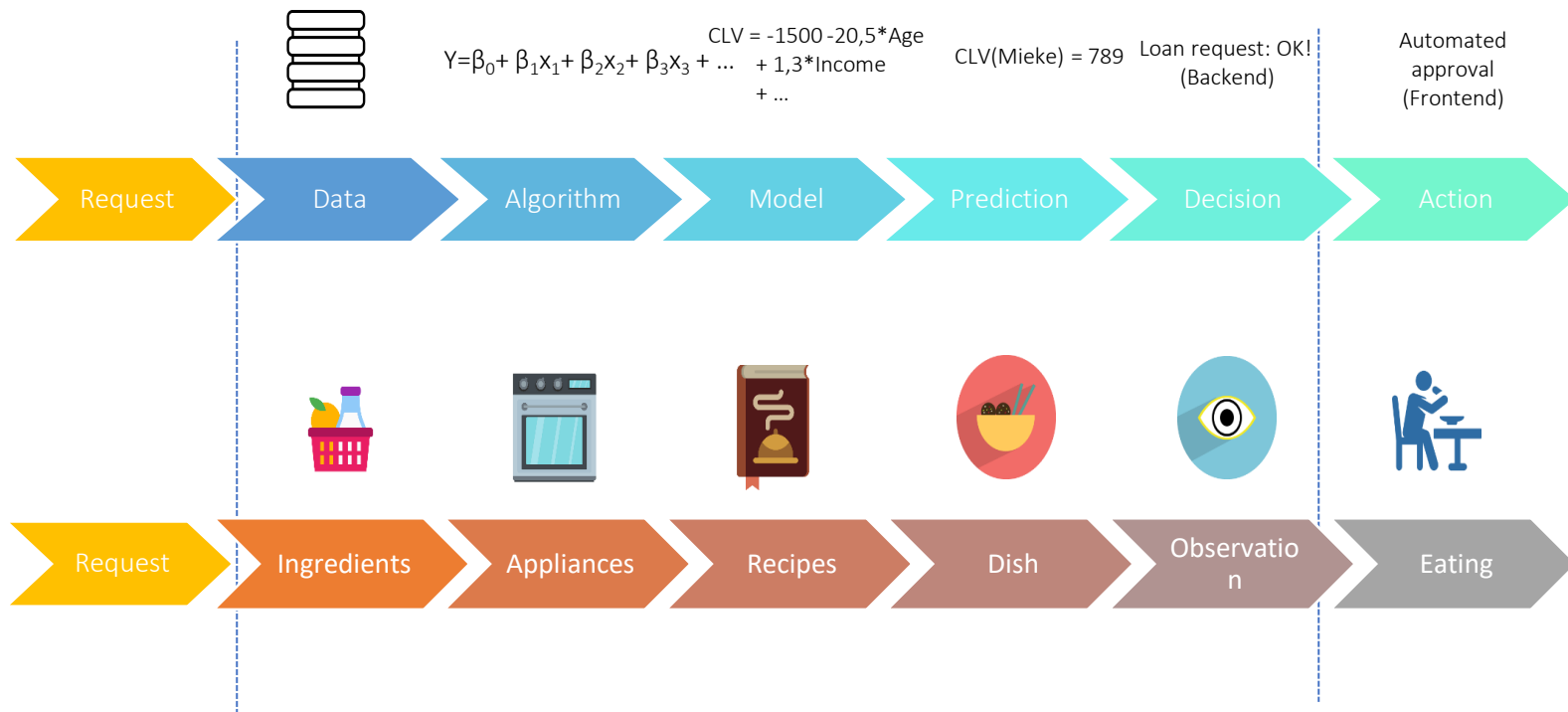
# HUMAN INTELLIGENCE



# THE BAD



# THE PROCESS



# HUMAN ERRORS: SECURITY & PRIVACY BY DESIGN

We would also need information as to how the images would be protected. If the students' face prints aren't properly secured, or the system isn't robust enough to fend off hackers, this creates cyber-security risks. It may be possible for hackers to link children's face prints to other data about them, and track them.



Privacy concerns are key when it comes to facial recognition technologies in schools. Monkey Business Images/Shutterstock

## Spread of digital assistants to classrooms poses concerns

Published Feb. 13, 2019

By Lauren Barack  
Contributor, K-12



# HUMAN ERRORS: UNDERSTANDING BIAS & NOISE

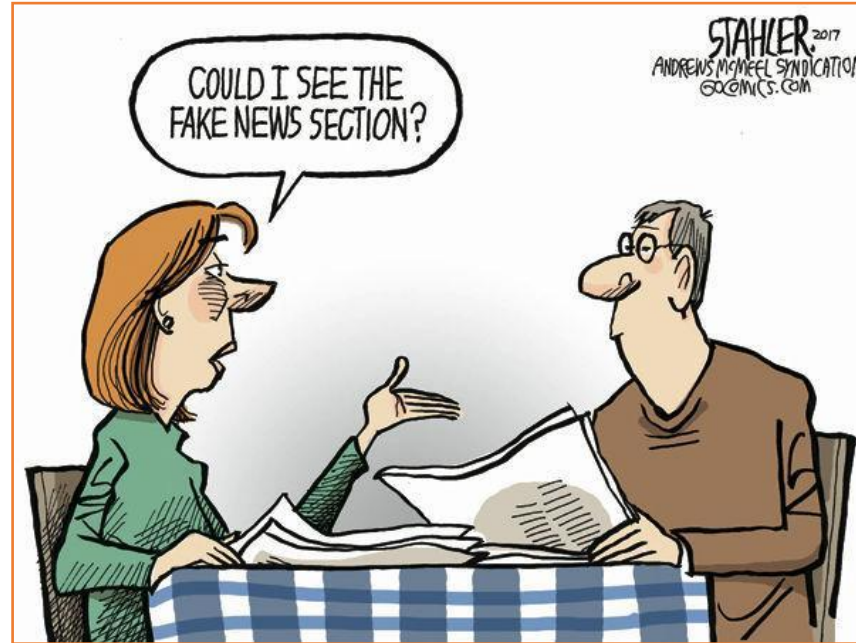
## **An Algorithm Determined UK Students' Grades. Chaos Ensued**

This year's A-Levels, the high-stakes exams taken in high school, were canceled due to the pandemic. The alternative only exacerbated existing inequities.

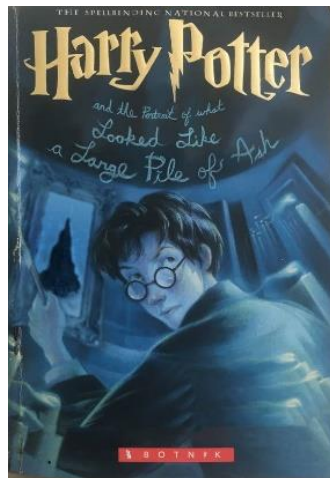


PHOTOGRAPHY: TOLGA AKREN/AFP/GETTY IMAGES

# THE UGLY

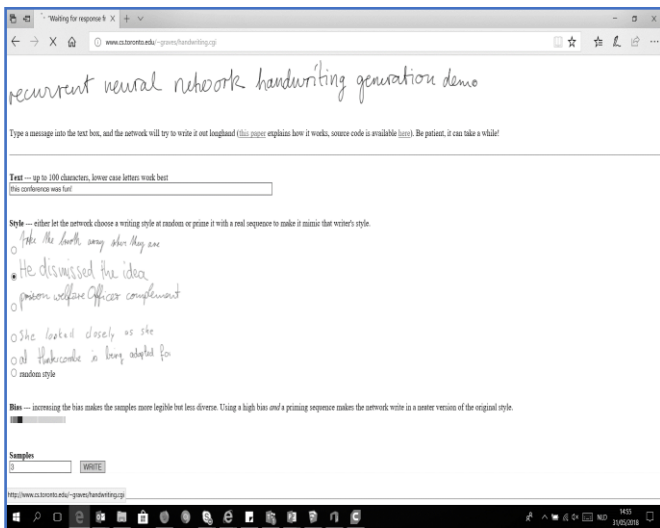


# AUTOGENERATION ROLLERCOASTER

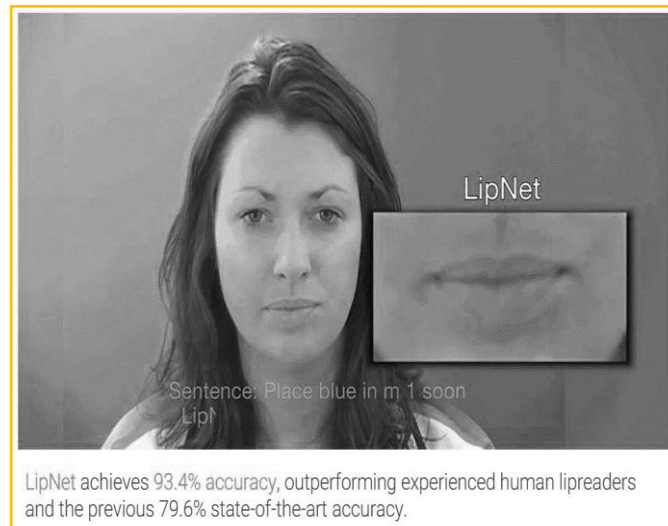


**AUTOGENERATED BOOKS**

# AUTOGENERATION ROLLERCOASTER



AUTOGENERATED WRITTEN LETTERS



LipNet achieves 93.4% accuracy, outperforming experienced human lipreaders and the previous 79.6% state-of-the-art accuracy.

AUTOGENERATED TEXT

# AUTOGENERATION ROLLERCOASTER



<http://makemeazombie.com>

# CURRENT RISKS OF ADVERSARIAL ATTACKS

## Deep Learning Malware Can Fake Cancer on Medical Images

A deep learning algorithm successfully penetrated a healthcare organization and fooled both humans and an AI system with faked medical images.



Source: Thinkstock

EDITORS' PICK | Oct 14, 2021, 07:01am EDT

## Fraudsters Cloned Company Director's Voice In \$35 Million Bank Heist, Police Find



Thomas Brewster Forbes Staff

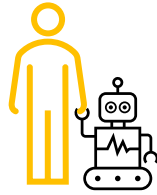
Cybersecurity

Associate editor at Forbes, covering cybercrime, privacy, security and surveillance.

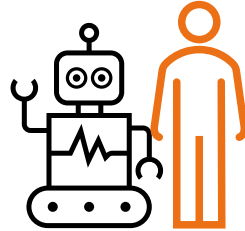


<https://healthitanalytics.com/news/deep-learning-malware-can-fake-cancer-on-medical-images>

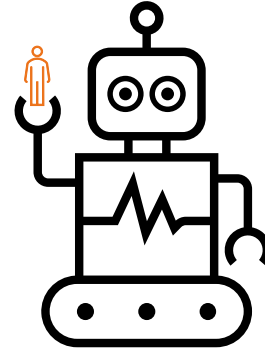
# WANTED: HUMAN-AI TRANSLATORS



NARROW AI



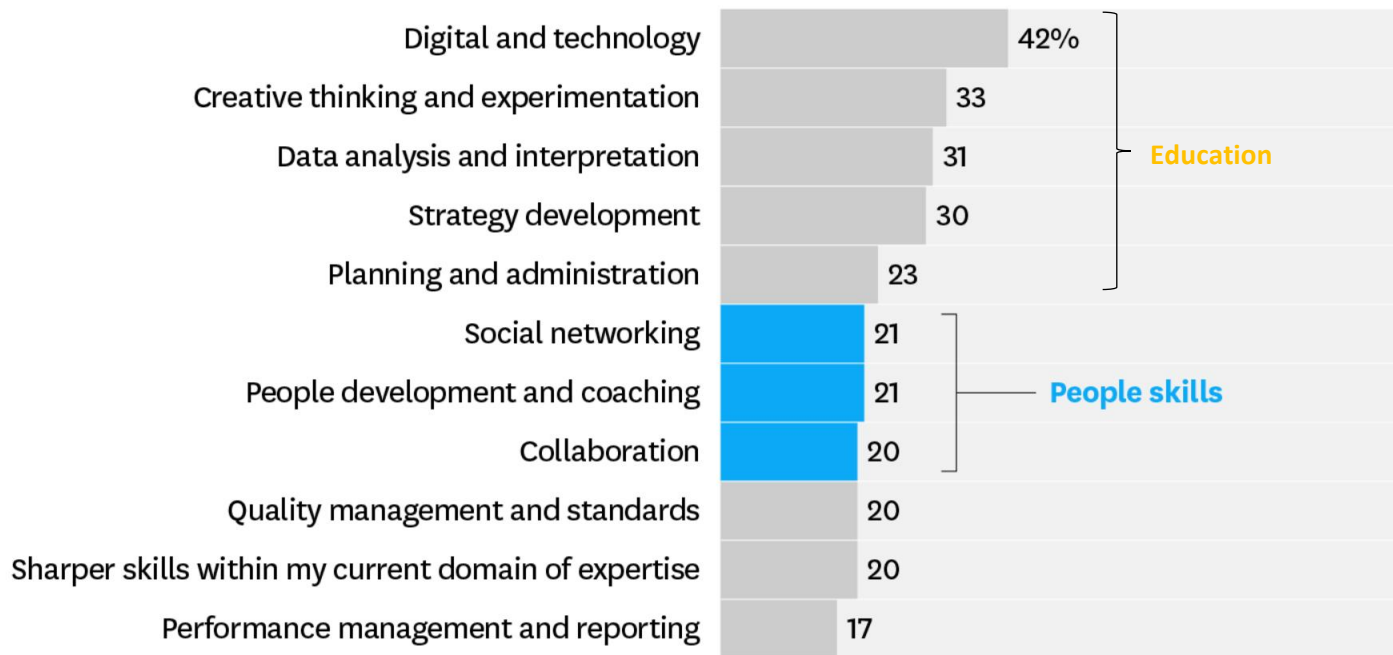
BROAD AI



GENERAL AI

# PEOPLE SKILLS

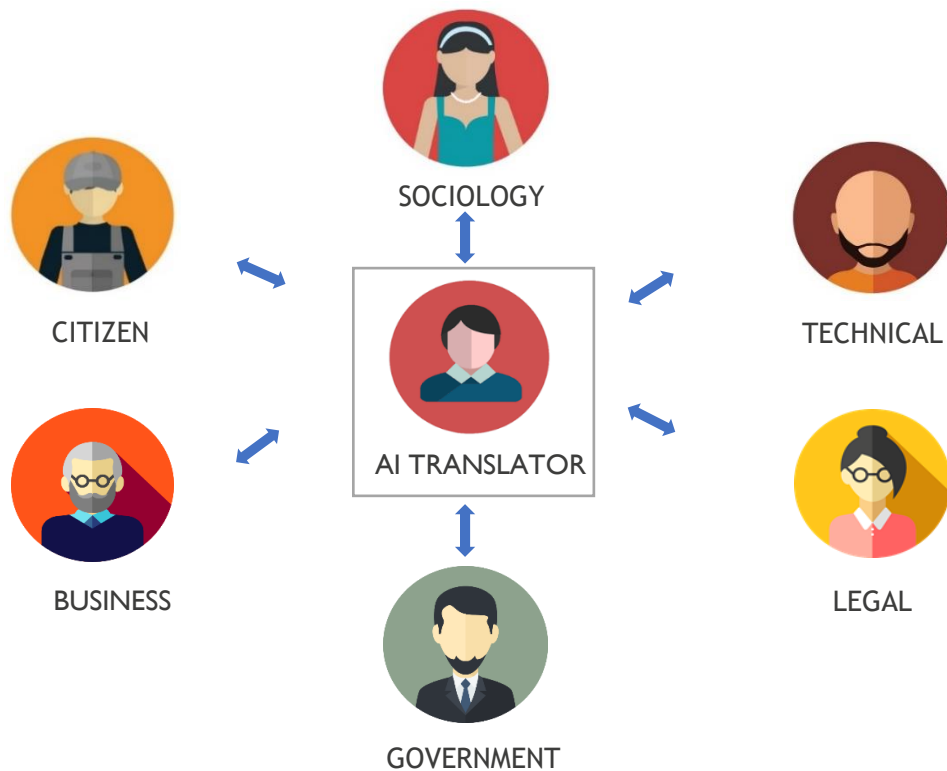
PERCENTAGE OF RESPONDENTS WHO SELECTED THE GIVEN SKILL AMONG THEIR TOP THREE



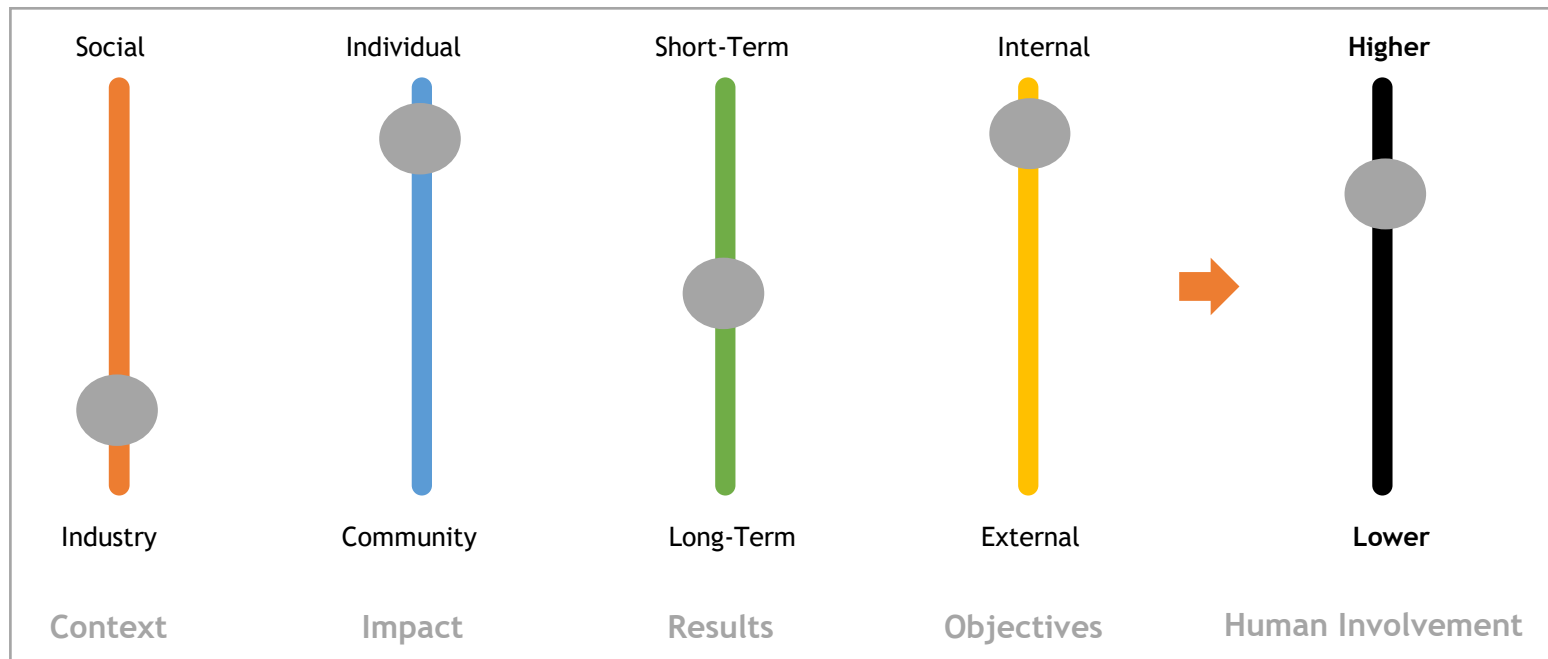
**SOURCE** ACCENTURE SURVEY OF 1,770 FRONTLINE, MID-LEVEL, AND EXECUTIVE-LEVEL MANAGERS FROM 14 COUNTRIES

© HBR.ORG

# WANTED: HUMAN AI TRANSLATORS



# WANTED: HUMAN AI TRANSLATORS



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L'intelligence artificielle  
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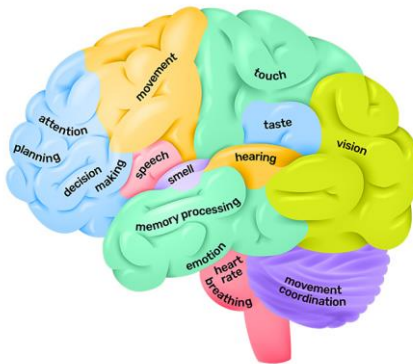
Artificial Intelligence  
Demystified

PELCKMANS

# CURRENT LIMITATIONS: INDIVIDUAL INTELLIGENCE

## LOW-LEVEL FUNCTIONS

- Almost fully understood
- Localised
  - Sensory functions (sight, hearing, smell, taste, touch)
  - Motor functions (object grasping)
  - Sensorimotor functions (obstacle avoidance)



## HIGH-LEVEL FUNCTIONS

- Partially understood
- Not fully localised
  - Perception
  - Situation awareness
  - Decision making under uncertainty
  - Reasoning
  - Adaptation
  - etc

# CURRENT LIMITATIONS: GROUP INTELLIGENCE

## LOW-LEVEL FUNCTIONS

- Cooperative data gathering
- Information exchange
- Cooperative object detection
- Cooperative manipulation
- Etc



## HIGH-LEVEL FUNCTIONS

- Shared individual awareness
- Consensus finding
- Cooperative decision making
- Group formation
- Etc