What is(n't) AI?

Perspectives from AI research

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Disclaimer

- This lecture is about AI in general, not necessarily game AI

- However the issues still apply — particularly when AI is used outside the game itself (e.g. analytics, player modelling)

What is AI?

- ❌ Simulating human brains or human intelligence
- ✅ Performing tasks by machine (or by software) which would ordinarily require human intelligence
- ✅ Making decisions to achieve goals

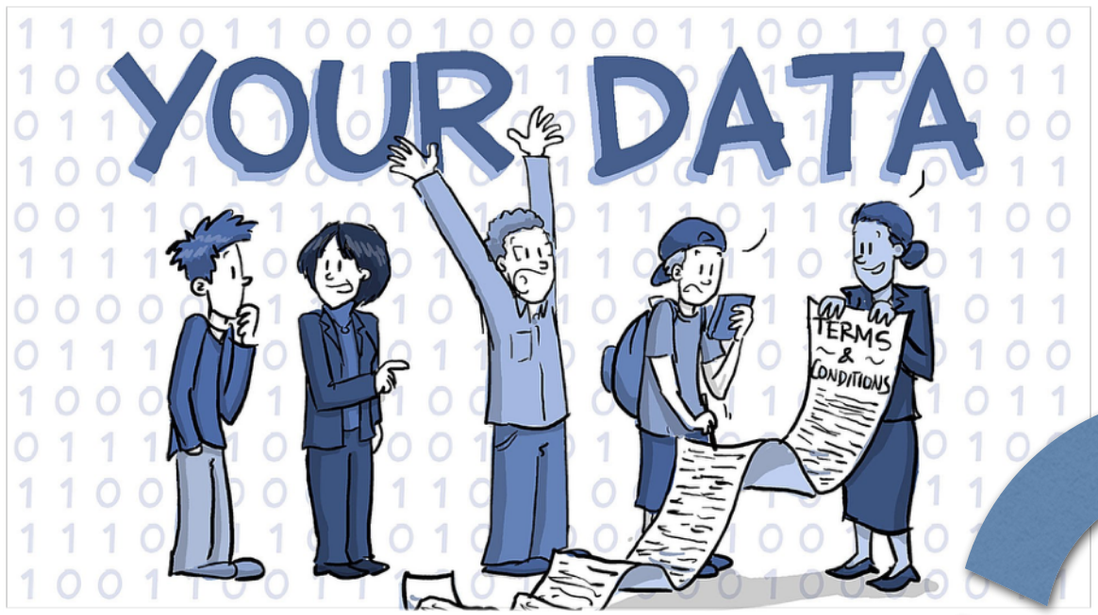
What is AI?

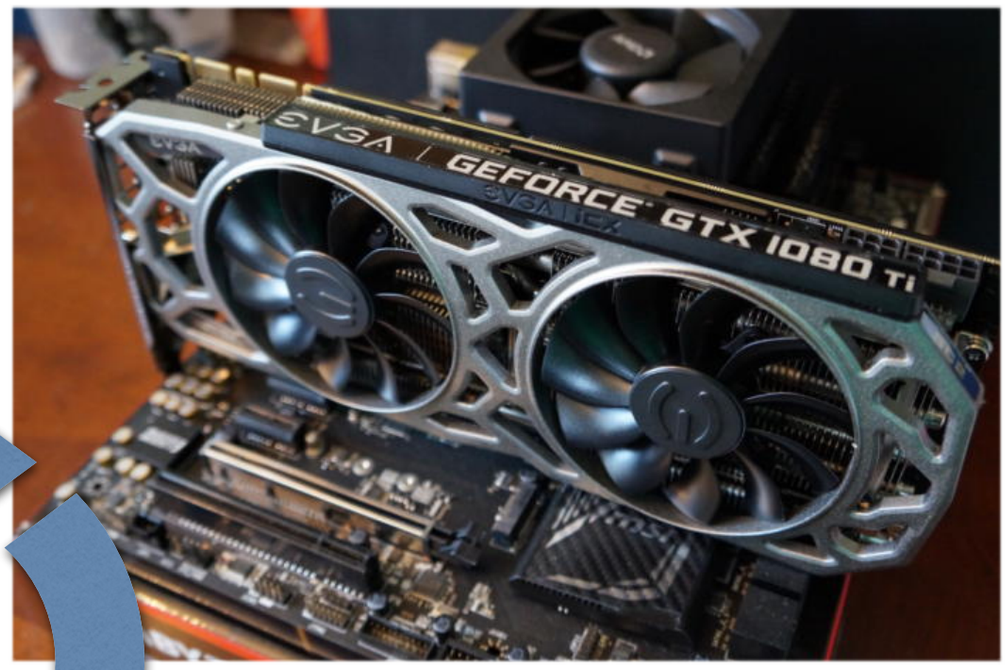
- ❌ Programming machines to learn by themselves
- ✅ Machine learning is an important sub-field of AI, but there are many other AI techniques

What is AI?

- ❌ Programming machines to possess general intelligence, self-awareness, consciousness
- ✅ Maybe one day, but for now this is pure sci-fi
- ✅ Programming machines to carry out (or learn to carry out) a specific type of task

Why now?





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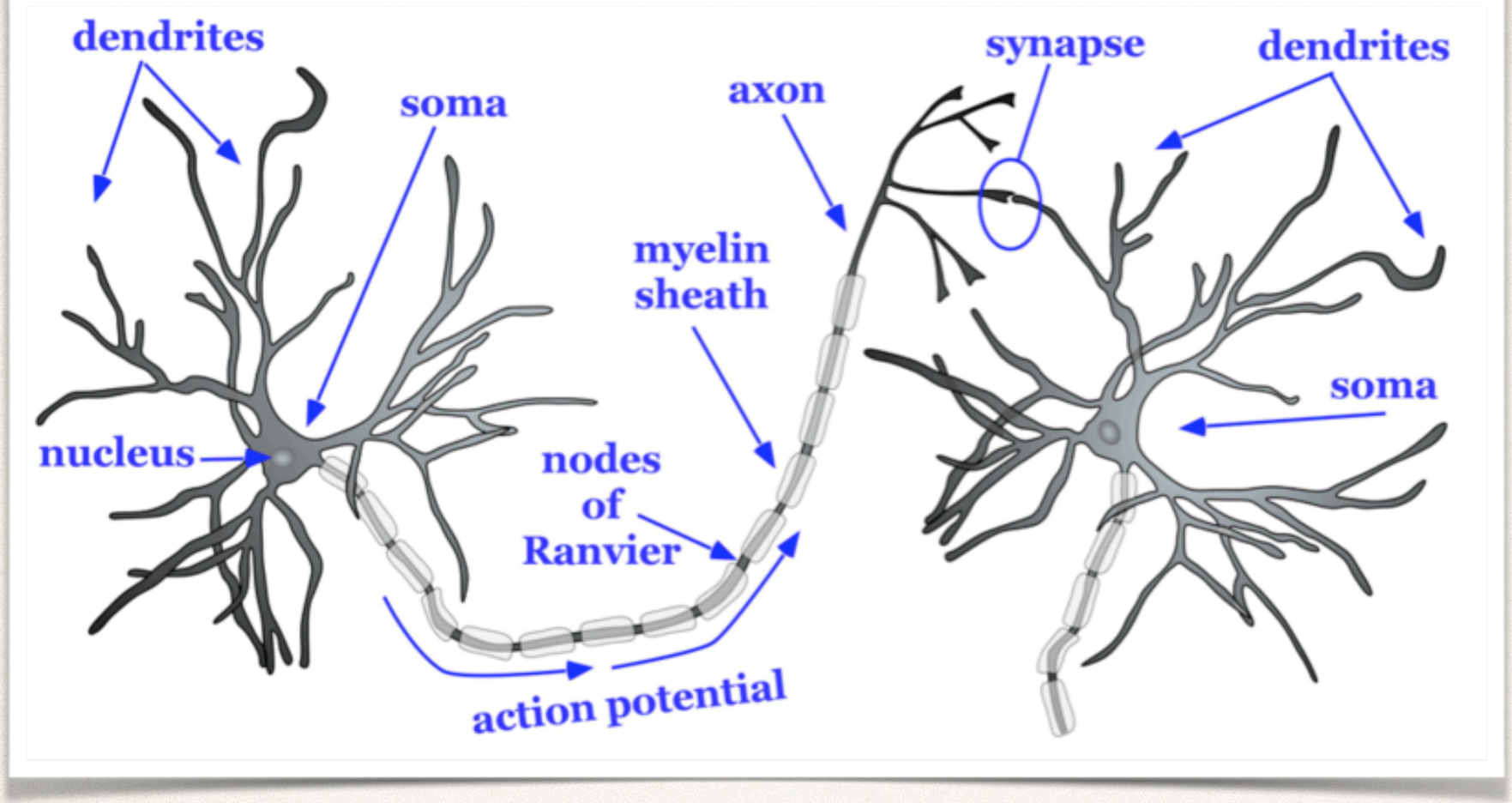
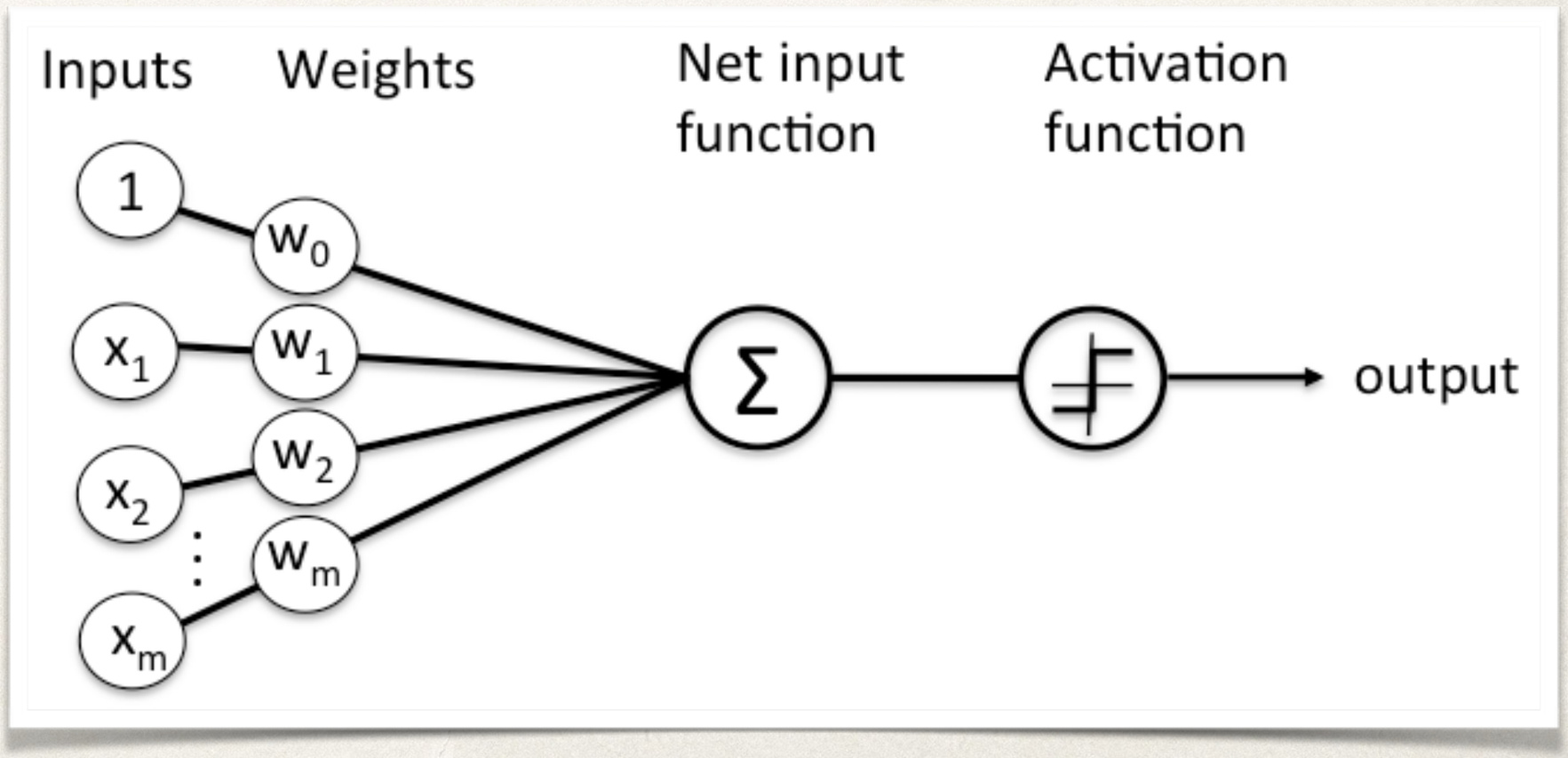
Artificial Neural Networks (ANNs)

- Inspired by real neural networks (i.e. brains)
  - … but **not** a simulation of them!

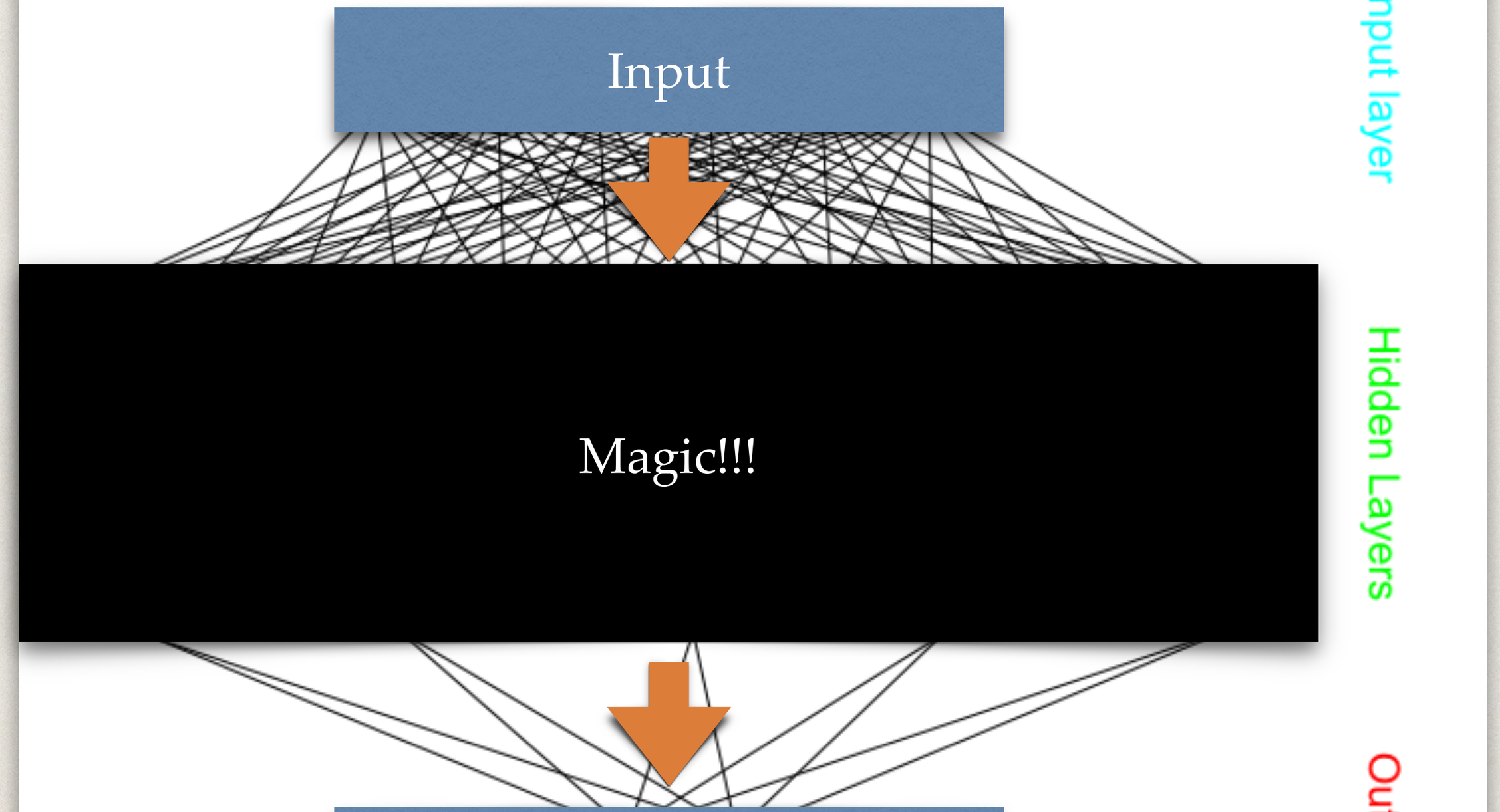


Biological neuron



Artificial neuron

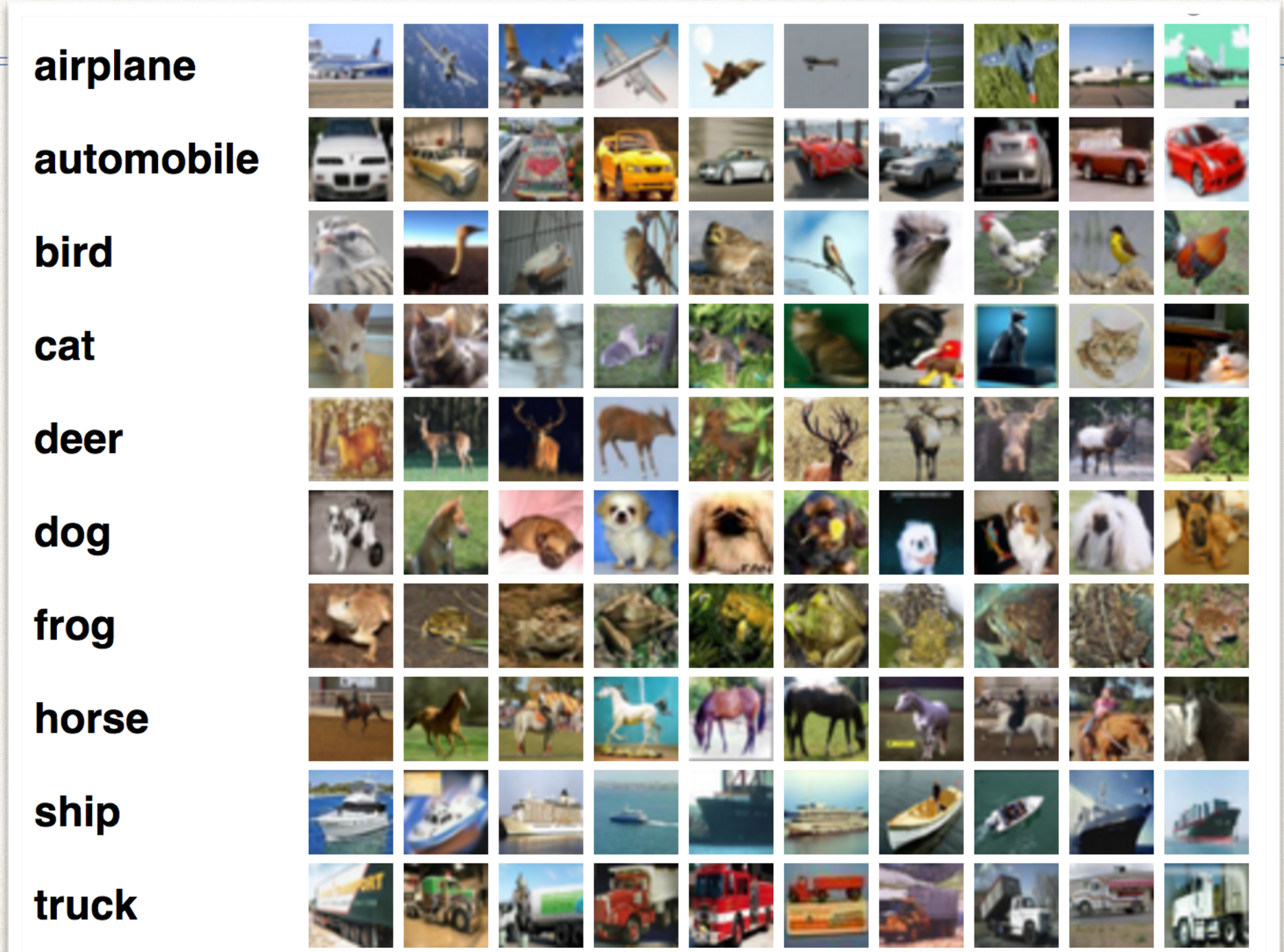
Input

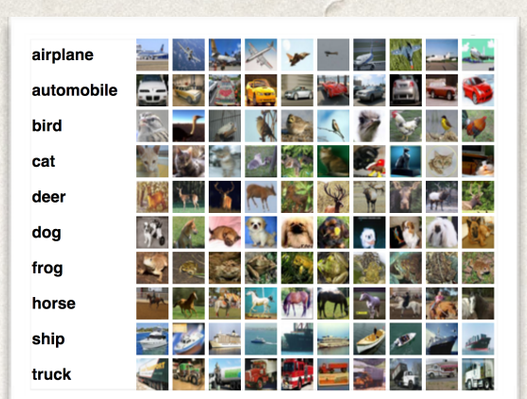


Magic!!!

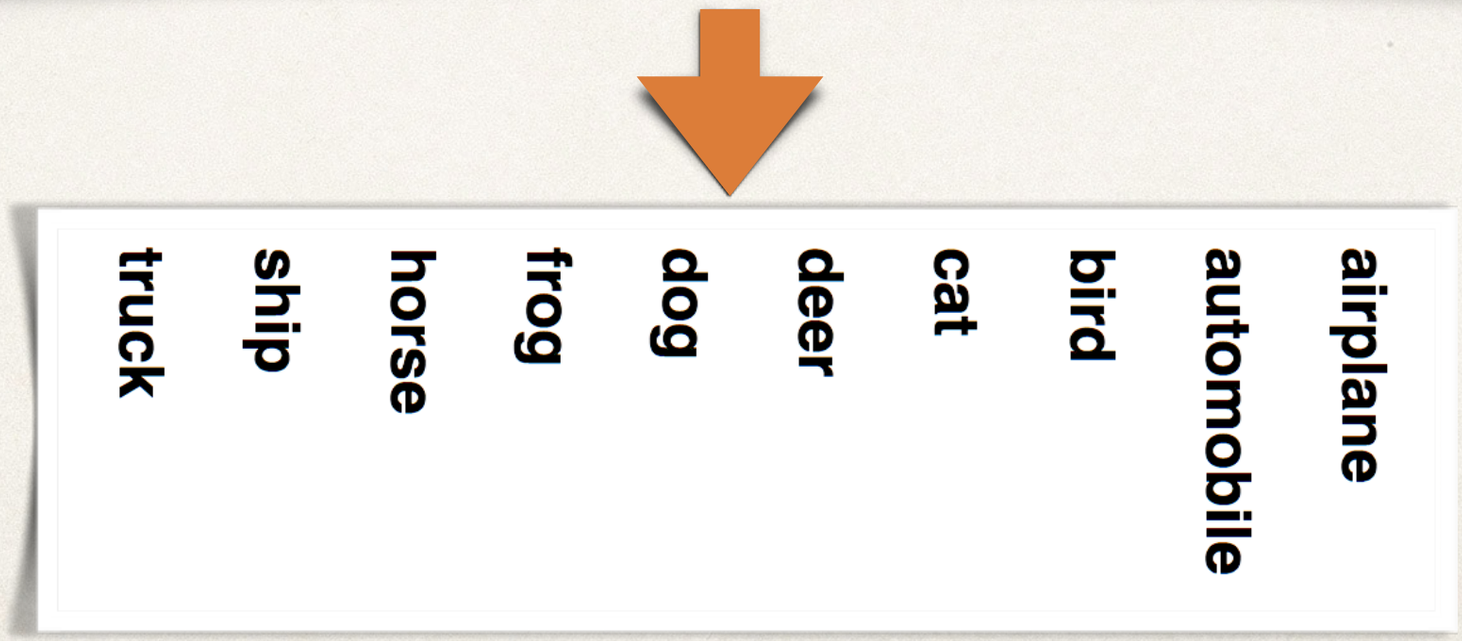
Output

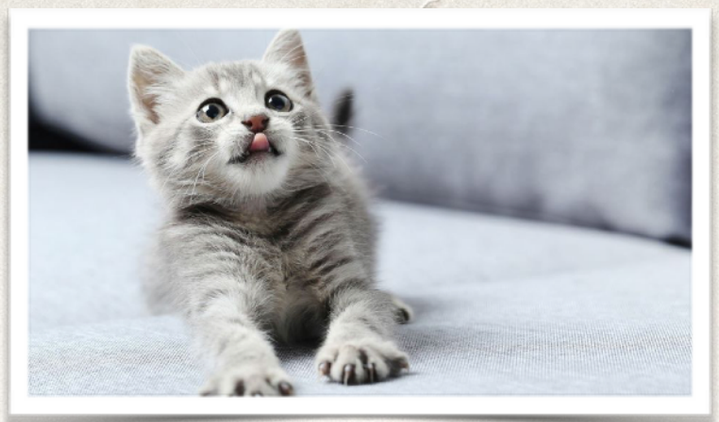
Training data



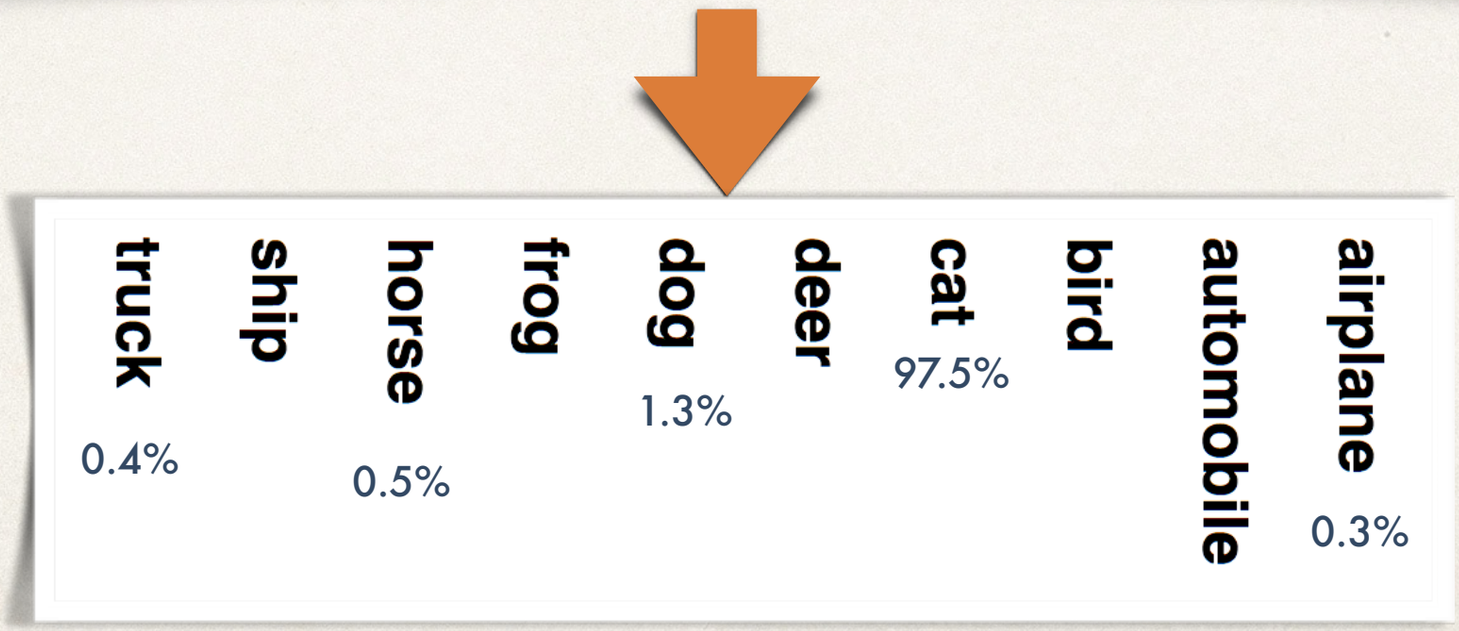


Network is **trained** to give the correct answer for the training data





Trained network



What is machine learning good for?

- Discovering patterns in data
- Making inferences or predictions based on these patterns

Caution required

- ML is just number crunching and pattern recognition
- The machine is not “thinking”!
- It can’t tell the difference between the patterns we wanted to find, and biases that might exist in the training data
- It can’t follow a code of ethics or take responsibility for its own uses and actions

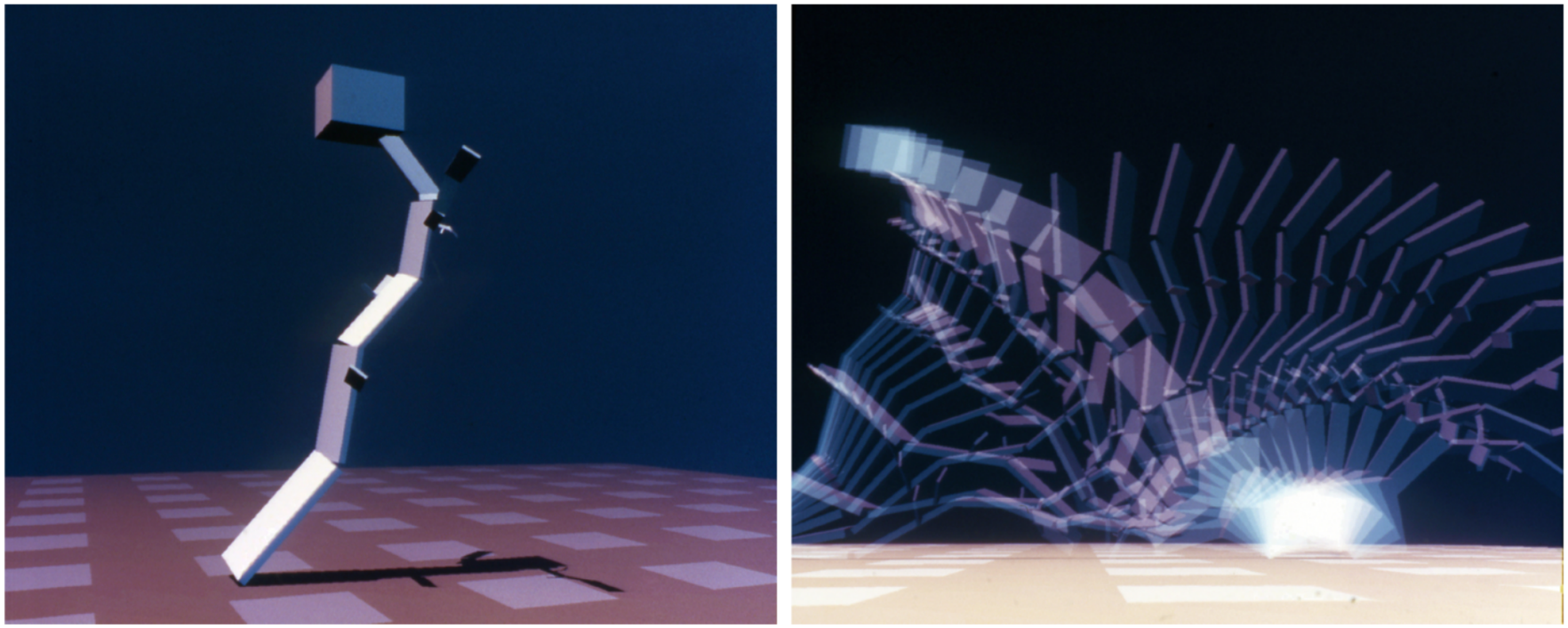


Figure 1. Exploiting potential energy to locomote. Evolution discovers that it is simpler to design tall creatures that fall strategically than it is to uncover active locomotion strategies. The left figure shows the creature at the start of a trial and the right figure shows snapshots of the figure over time falling and somersaulting to preserve forward momentum.

"Instead of relying on algorithms, which we can be accused of manipulating for our benefit, we have turned to machine learning, an ingenious way of disclaiming responsibility for anything. Machine learning is like **money laundering for bias**. It's a clean, mathematical apparatus that gives the status quo the aura of logical inevitability. The numbers don't lie."

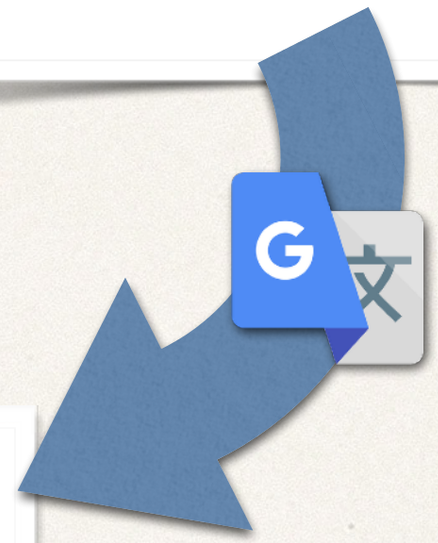
–Maciej Cegłowski

English

He is a nurse. She is a doctor. Edit

Turkish

O bir hemşire. O bir doktor. Edit



English

She is a nurse. He is a doctor.

The New York Times

Facial Recognition Is Accurate, if You're a White Guy

By Steve Lohr

Feb. 9, 2018

Facial recognition technology is improving by leaps and bounds. Some commercial software can now tell the gender of a person in a photograph.

When the person in the photo is a white man, the software is right 99 percent of the time.

But the darker the skin, the more errors arise — up to nearly 35 percent for images of darker skinned women, according to a new study that breaks fresh ground by measuring how the technology works on people of different races and gender.

These disparate results, calculated by Joy Buolamwini, a researcher at the M.I.T. Media Lab, show how some of the biases in the real world can seep into artificial intelligence, the computer systems that inform facial recognition.

Bernard Parker, left, was rated high risk; Dylan Fugett was rated low risk. (Josh Ritchie for ProPublica)

Machine Bias

There's software used across the country to predict future criminals. And it's biased against blacks.

by Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, ProPublica

May 23, 2016

BUSINESS NEWS OCTOBER 10, 2018 / 4:12 AM / 23 DAYS AGO

Amazon scraps secret AI recruiting tool that showed bias against women

Jeffrey Dastin

8 MIN READ

SAN FRANCISCO (Reuters) - Amazon.com Inc's (AMZN.O) machine-learning specialists uncovered a big problem: their new recruiting engine did not like women.

That is because Amazon's computer models were trained to vet applicants by observing patterns in resumes submitted to the company over a 10-year period. Most came from men, a reflection of male dominance across the tech industry.

In effect, Amazon's system taught itself that male candidates were preferable. It penalized resumes that included the word "women's," as in "women's chess club captain." And it downgraded graduates of two all-women's colleges, according to people familiar with the matter. They did not specify the names of the schools.

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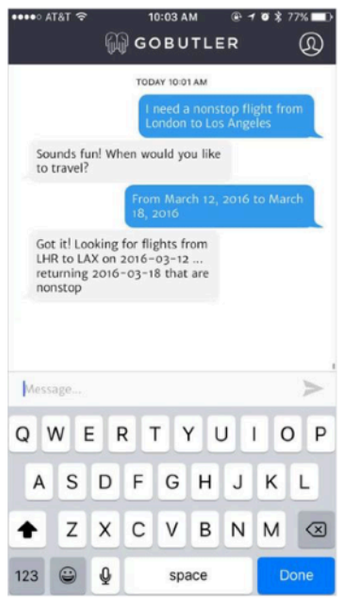
Technology

The Humans Hiding Behind the Chatbots

Behind the artificial intelligence personal assistants and concierges are actual people, reading e-mails and ordering Chipotle.

By Ellen Huet
18 April 2016, 13:00 BST



The GoButler app. *Source: GoButler*

GoButler's website said the service uses human-assisted AI to fulfill customer requests 24/7, and Pichardo said customers constantly asked her if she was a robot. But she and another former employee, Alex Gioiella, said the only automated part of the service they saw was the occasional marketing text message. That meant humans had to be on duty at all times. GoButler's workers, who were called Heroes, worked shifts from 8 a.m. to 4 p.m. or 4 p.m. to midnight and for one week a month switched to the midnight to 8 a.m. shift, swapping places at shared desks in the company's New York City office with those leaving from the previous shift. They were required to eat lunch at their desks and, last December, attended the office holiday party in 30-minute shifts so as not to have too many people away from their computers at once, Pichardo said. A spokeswoman said the company's leadership team also took turns working Hero shifts during the holiday party.

Apple apologizes for Siri audio recordings, announces privacy changes going forward

Apple will no longer keep Siri recordings by default

By Chaim Gartenberg | @cgartenberg | Aug 28, 2019, 11:07am EDT

Apple was one of several major tech companies — including Google, Amazon, Facebook, and Microsoft — that was caught using paid human contractors to review recordings from its digital assistant, a fact that wasn't made clear to customers. According to *The Guardian's* report, those contractors had access to recordings that were full of private details, often due to accidental Siri triggers, and workers were said to each be listening to up to 1,000 recording a day.

How Cambridge Analytica turned Facebook 'likes' into a lucrative political tool

The Guardian

The algorithm at the heart of the Facebook data breach sounds almost too dystopian to be real. It trawls through the most apparently trivial, throwaway postings -the "likes" users dole out as they browse the site - to gather sensitive personal information about sexual orientation, race, gender, even intelligence and childhood trauma.

But five years ago psychology researchers showed that far more complex traits could be deduced from patterns invisible to a human observer scanning through profiles. Just a few apparently random "likes" could form the basis for disturbingly complex character assessments.

When users liked "curly fries" and Sephora cosmetics, this was said to give clues to intelligence; Hello Kitty likes indicated political views; "Being confused after waking up from naps" was linked to sexuality.

Christopher Wylie, who worked with a Cambridge University academic to obtain the data, told the *Observer*: "We exploited Facebook to harvest millions of people's profiles. And built models to exploit what we knew about them and target their inner demons. That was the basis the entire company was built on."

Automated Inference on Criminality using Face Images

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Abstract

We study, for the first time, automated inference on criminality based solely on still face images, which is free of any biases of subjective judgments of human observers. Via supervised machine learning, we build four classifiers (logistic regression, KNN, SVM, CNN) using facial images of 1856 real persons controlled for race, gender, age and facial expressions, nearly half of whom were convicted criminals, for discriminating between criminals and non-criminals. All four classifiers perform consistently well and empirically establish the validity of automated face-induced inference on criminality, despite the historical controversy surrounding this line of enquiry. Also, some discriminat-

management science, criminology, etc.

In all cultures and all periods of recorded human history, people share the belief that the face alone suffices to reveal innate traits of a person. Aristotle in his famous work Prior Analytics asserted, "It is possible to infer character from features, if it is granted that the body and the soul are changed together by the natural affections". Psychologists have known, for as long as a millennium, the human tendency of inferring innate traits and social attributes (e.g., the trustworthiness, dominance) of a person from his/her facial appearance, and a robust consensus of i
ences . These are the facts found through
[3, 39, 5, 6, 10, 26, 27, 34, 32].

Independent of the validity of pedest

(a) Three samples in criminal ID photo set S_c.

(b) Three samples in non-criminal ID photo set S_n

Figure 1. Sample ID photos in our data set.

Deep neural networks are more accurate than humans at detecting sexual orientation from facial images

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Abstract

We show that faces contain much more information about sexual orientation than can be perceived and interpreted by the human brain. We used deep neural networks to extract features from 35,326 facial images. These features were entered into a logistic regression aimed at classifying sexual orientation. Given a single facial image, a classifier could correctly distinguish between gay and heterosexual men in 81% of cases, and in 71% of cases for women. Human judges achieved much lower accuracy: 61% for men and 54% for women. The accuracy of the algorithm increased to 91% and 83%, respectively, given five facial images per person. Facial features employed by the classifier included both fixed (e.g., nose shape) and transient facial features (e.g., grooming style). Consistent with the prenatal hormone theory of sexual orientation, gay men and women tended to have gender-atypical facial morphology, expression, and grooming styles. Prediction models aimed at gender alone allowed for detecting gay males with 57% accuracy and gay females with 58% accuracy. Those findings advance our understanding of the origins of sexual orientation and the limits of human perception. Additionally, given that companies and governments are increasingly using computer vision algorithms to detect people's intimate traits, our findings expose a threat to the privacy and safet of gay men and women.

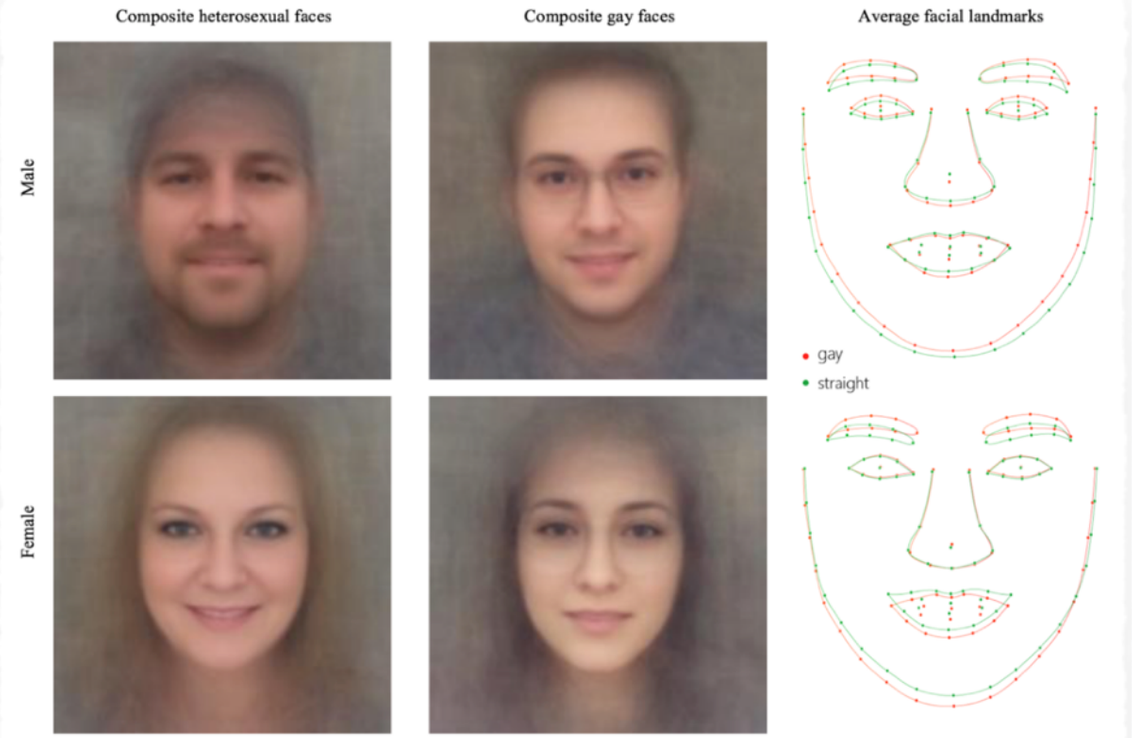

Figure 4. Composite faces and the average facial landmarks built by averaging faces classified as most and least likely to be gay.


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Bank of England chief economist warns on AI jobs threat

Kamal Ahmed
Economics editor
@bbckamal

20 August 2018

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The chief economist of the Bank of England has warned that the UK will need a skills revolution to avoid "large swathes" of people becoming "technologically unemployed" as artificial intelligence makes many jobs obsolete.

The polishing, rewrites, and reedits Rockstar does are immense. "We were working 100-hour weeks" several times in 2018, Dan says. The finished game includes 300,000 animations, 500,000 lines of dialogue, and many more lines of code. Even for each *RDR2* trailer and TV commercial, "we probably made 70 versions, but the editors may make several hundred. Sam and I will both make both make lots of suggestions, as will other members of the team."

THE VERGE TWITTER FACEBOOK

HOW ARTIFICIAL INTELLIGENCE WILL REVOLUTIONIZE THE WAY VIDEO GAMES ARE DEVELOPED AND PLAYED

The advances of modern AI research could bring unprecedented benefits to game development

By Nick Statt | @nickstatt | Mar 6, 2019, 10:00am EST

Cook sees a future in which AI becomes a kind of collaborator with humans, helping designers and developers create art assets, design levels, and even build entire games from the ground up. “I think you’re going to see tools that allow you to sit down and just make a game almost without thinking,” he says. “As you work, the system is recommending stuff to you. This doesn’t matter whether you’re an expert game designer or a novice. It will be suggesting rules that you can change, or levels that you can design.” Cook likens it to predictive text, such as Google’s machine learning-powered Smart Compose feature in Gmail, but for game design.

"YOU'RE GOING TO SEE TOOLS THAT ALLOW YOU TO SIT DOWN AND JUST MAKE A GAME ALMOST WITHOUT THINKING."

The result of such tools would be that smaller teams could make much bigger and more sophisticated games. Additionally, larger studios could push the envelope when it comes to crafting open-world environments and creating simulations and systems that come closer to achieving the complexity of the real world. “So yes on the hand it will be much easier to make games. We could probably make bigger games. You’ll see these open world games will become much larger,” Cook says. “But I think one thing that I think we’ll see in particular is games where the rules systems are mutable and the rules are not the same every time you play them. They’re not even the same between you and your friend’s computer.”

Conclusion

- AI isn't magic, it's just number crunching
- Human-level general intelligence is the realm of sci-fi (at least for now)
- AI is a tool — we are responsible for how it is used