Self replicating genies

How to democratise and ensure ethics in AI

Chris Heilmann (@codepo8) December 2018

All resources:
aka.ms/human-ai

Let's talk about
"Artificial Intelligence"

Artificial Intelligence

- Is **nothing new** – the concepts go back to the 50ies

- Is quite the **hype** and very often **misattributed**

- Is an **umbrella term** for a lot of math and science around repetition, pattern recognition and machine learning

- Got a **huge boost** because of availability of **hardware**

- Became much **more feasible because** of the availability of **lots of data**

Artificial
Intelligence

Chris Heilmann
@codepo8

Got to love how the AI section of this book table was organized...

4:43 PM - 24 Oct 2018

Reminders of "genie in the bottle"

- Fulfills our wishes seemingly with invisible magic

- Useful, and feels too good to be true

- Once released, may have a dark, sinister edge to it

- Hard to put back into the bottle.

Let's start with some predictions.

- **AI is the number one growth market** in IT – the others are cloud and security

- Machine Learning is already **replacing thousands of jobs** – boring, terrible jobs humans should not do

- This is also happening in IT – **we are not invincible** because we know hot to exit Vim

Let's start with some predictions.

- **There is no stopping this** – it is just too convenient

- **The amount of data** we create (actively or by triggering sensors) **demands machines to whittle it down for us** to make it consumable by humans

- If we as **developers and decision makers in IT** don't **take ownership** and **lead with good, ethical examples**, we'll throw away decades of work democratising computing

The machines
are watching...

Florian Ziegler flickr.com/photos/damndirty/41263240134

Social Credit
System

@codepo8

https://futurism.com/china-social-credit-system-rate-human-value/

Big brother is redundant...

- Everything we do online is **monitored** and **recorded**
- We often don't realise that our **data is how we pay** for "free" services
- We're happy to use systems that **record** all the time **in exchange for convenience**
- Often people don't realise just how **dangerous** this can be in the **wrong hands**.
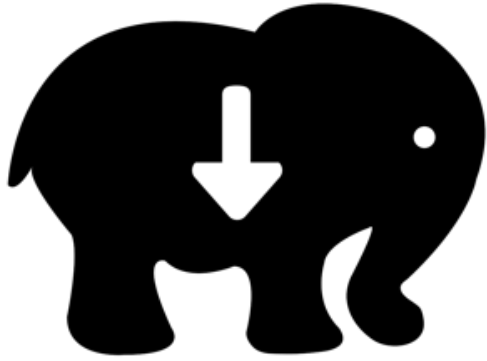
Everything counts in large amounts

- We create a **massive** amount of information – actively and without our knowledge.

- It is tough to make that amount of information **consumable** again.

- That's why we have **computers**

- With cloud computing, on demand processing and advances in hardware **we're faster than ever**.

Leaving invisible marks...

- By using **other people's machines and infrastructure**, we leave **traces**
- This allows companies to **recognise** us, and accumulates a **usage history**
- This leads to **better results**, but can leak data
- We should have more **transparency** about what digital legacy we left behind.

Are machines friend or foe?

Florian Ziegler flickr.com/photos/damndirty/40153024740/

Artificial Intelligence Myths

- AI can't replace a thinking, creative human

- AI can not **magically fill gaps with perfect information** – it can only compare and assume

- AI doesn't learn in a creative fashion. It makes **no assumptions**

- AI has **no morals and ethics**, but – used wrongly – it can **amplify our biases**
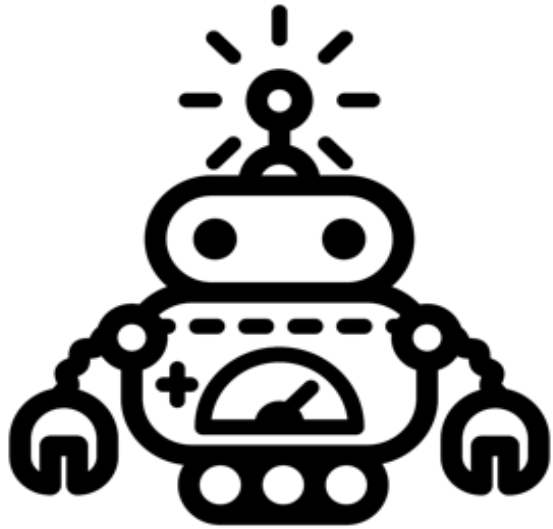
Machines can be great tools or weapons...

- Machine Learning is all about **returning assumptions**

- We don't get any definitive **truth** from **algorithms**, we get answers to our questions

- AI can answer questions, but it is up to you to **ask good questions** – generic questions yield assumed results.

@codepo8
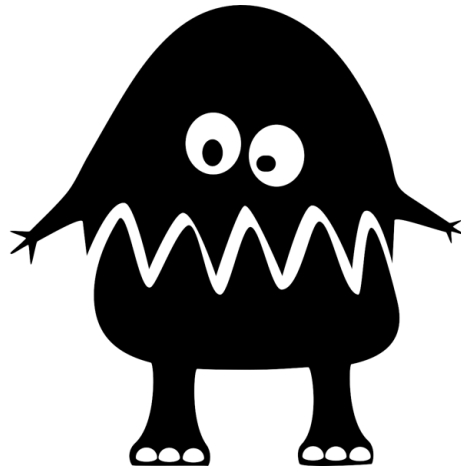
Unguided or supervised AI...

@codepo8

http://inspirobot.me

It can be demanding

Before inspiration, comes the slaughter.

@codepo8

http://inspirobot.me

It can mix up needs...

BELIEVE THAT YOU'RE CARRYING AN IDEA AND REMEMBER TO UNDRESS.

http://inspirobot.me

@codepo8

It can be overly excited...

Living forever
is easy if you
take up a loan.

http://inspirobot.me
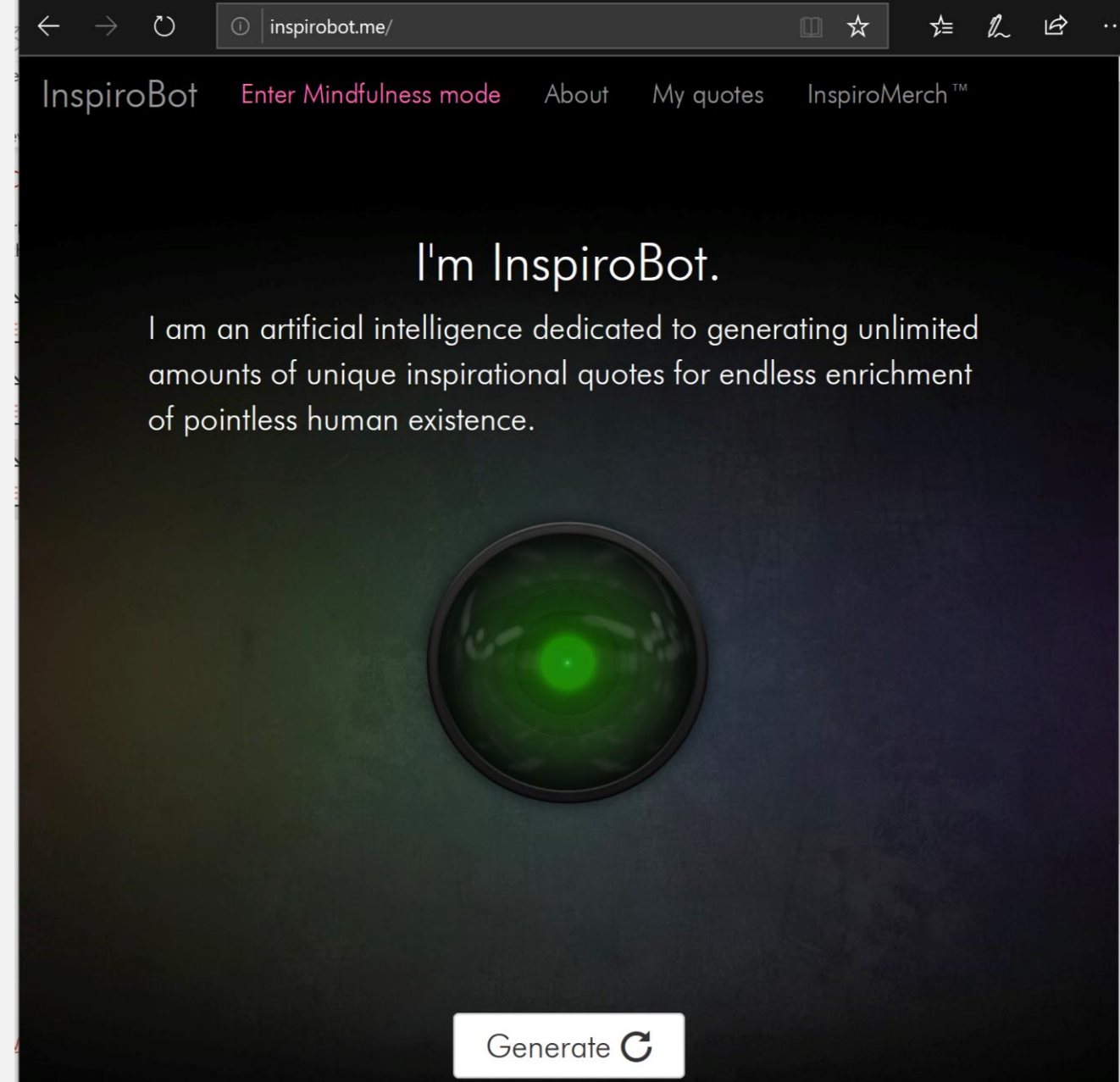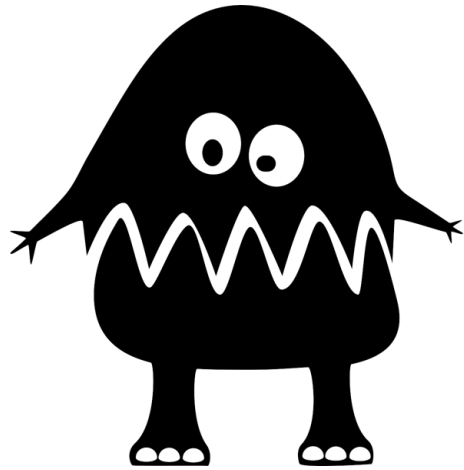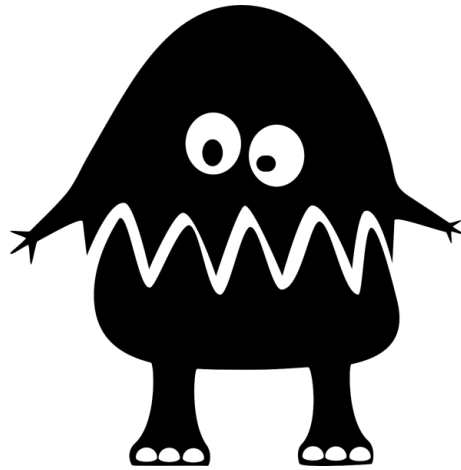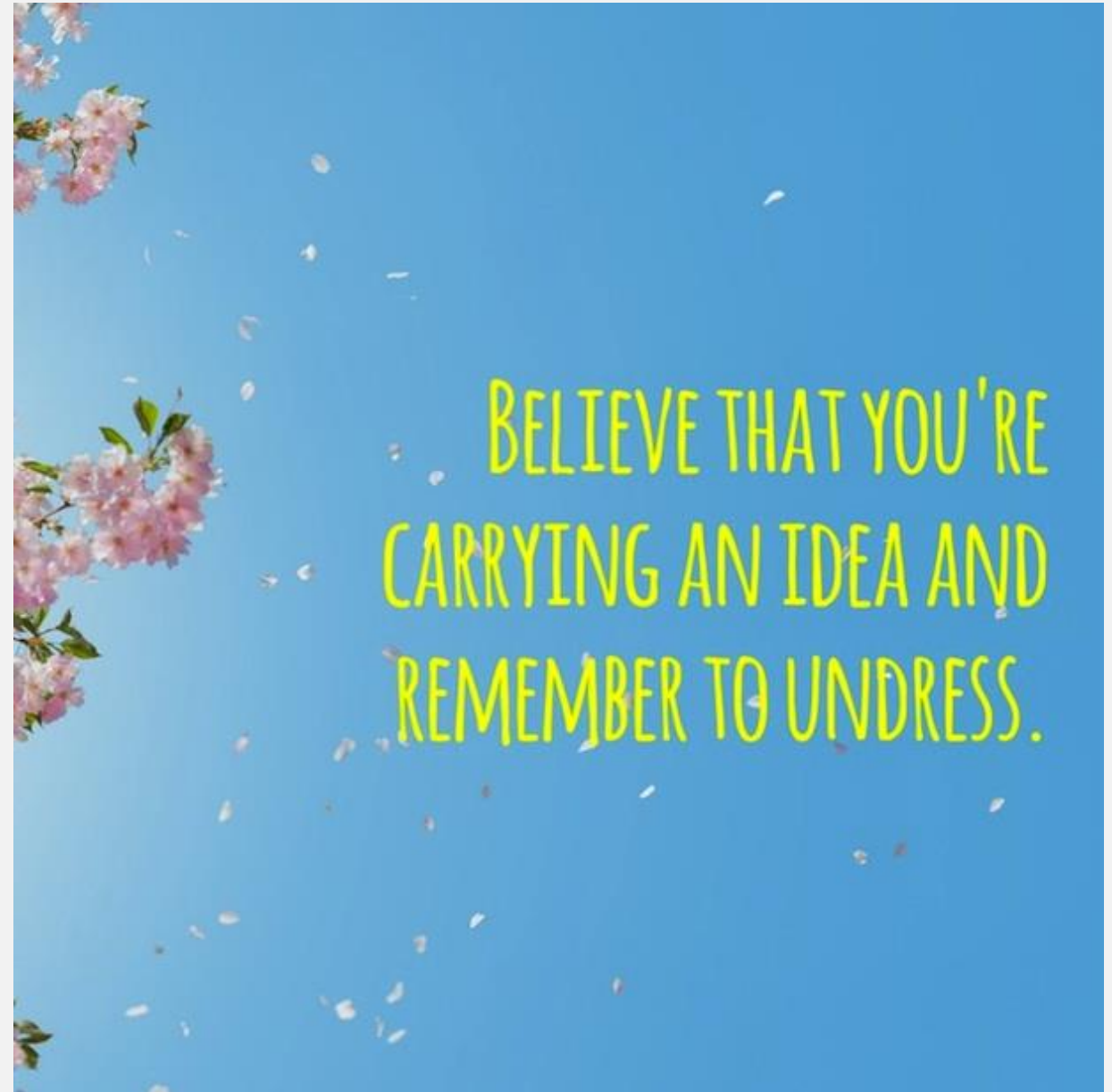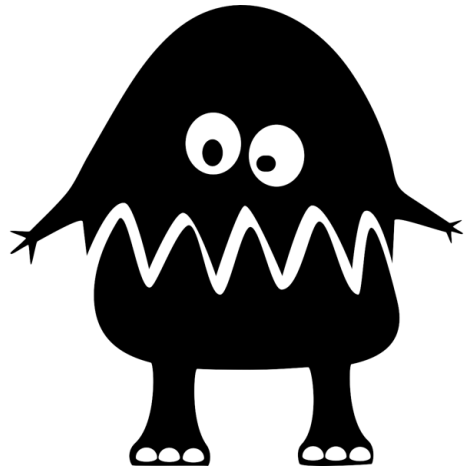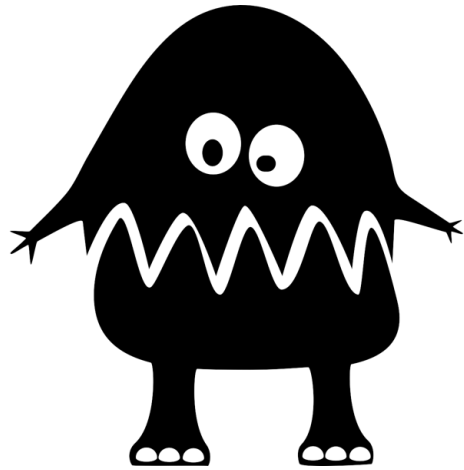
It can be a good warning...

Remember that you are pissed.

http://inspirobot.me

@codepo8

It can be painfully humbling...

Basing your everyday on science creates loneliness.

http://inspirobot.me
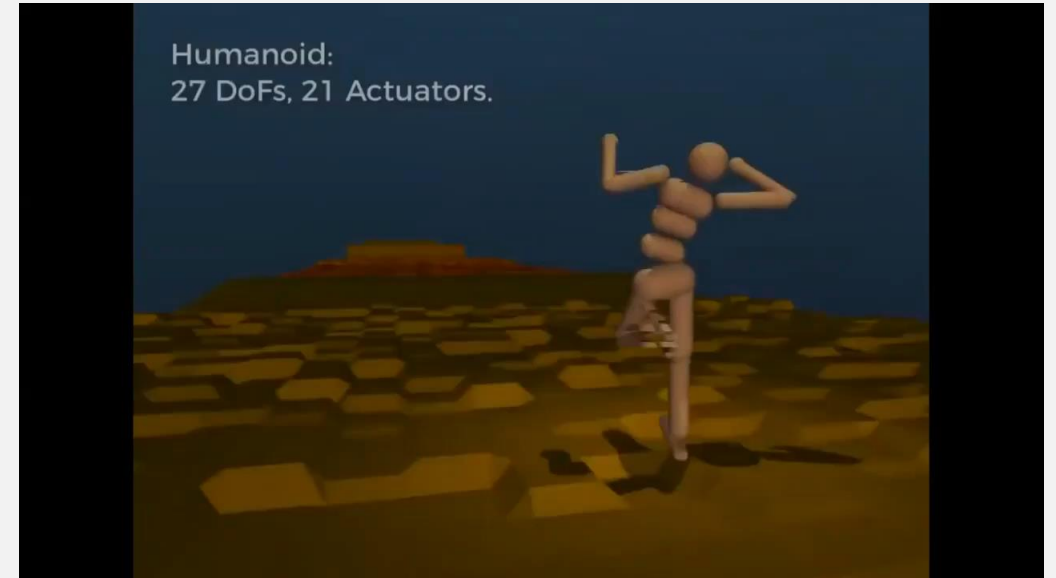
Prophetic, even?

KEEP PANICKING.

http://inspirobot.me

@codepo8
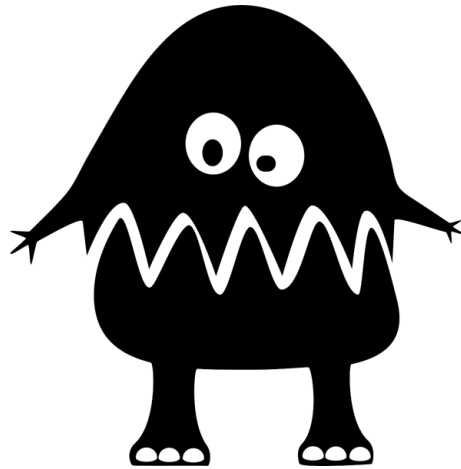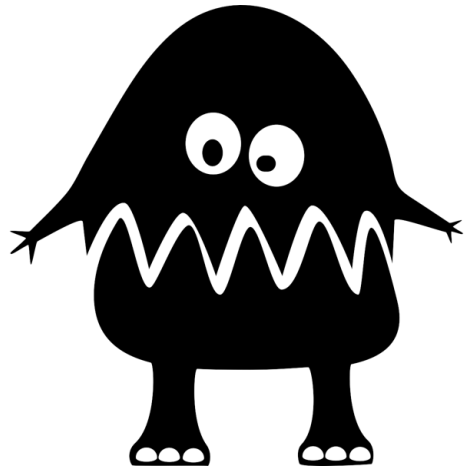
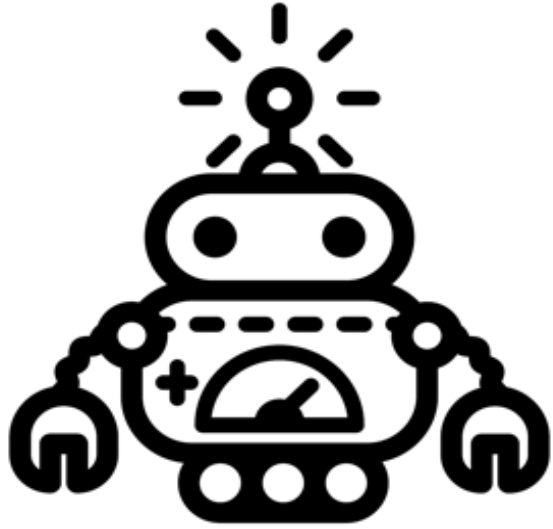Passive aggressive towards humans...

It can be adoringly cute...

Humanoid:
27 DoFs, 21 Actuators.

https://twitter.com/eron_gj/status/967672260147470336
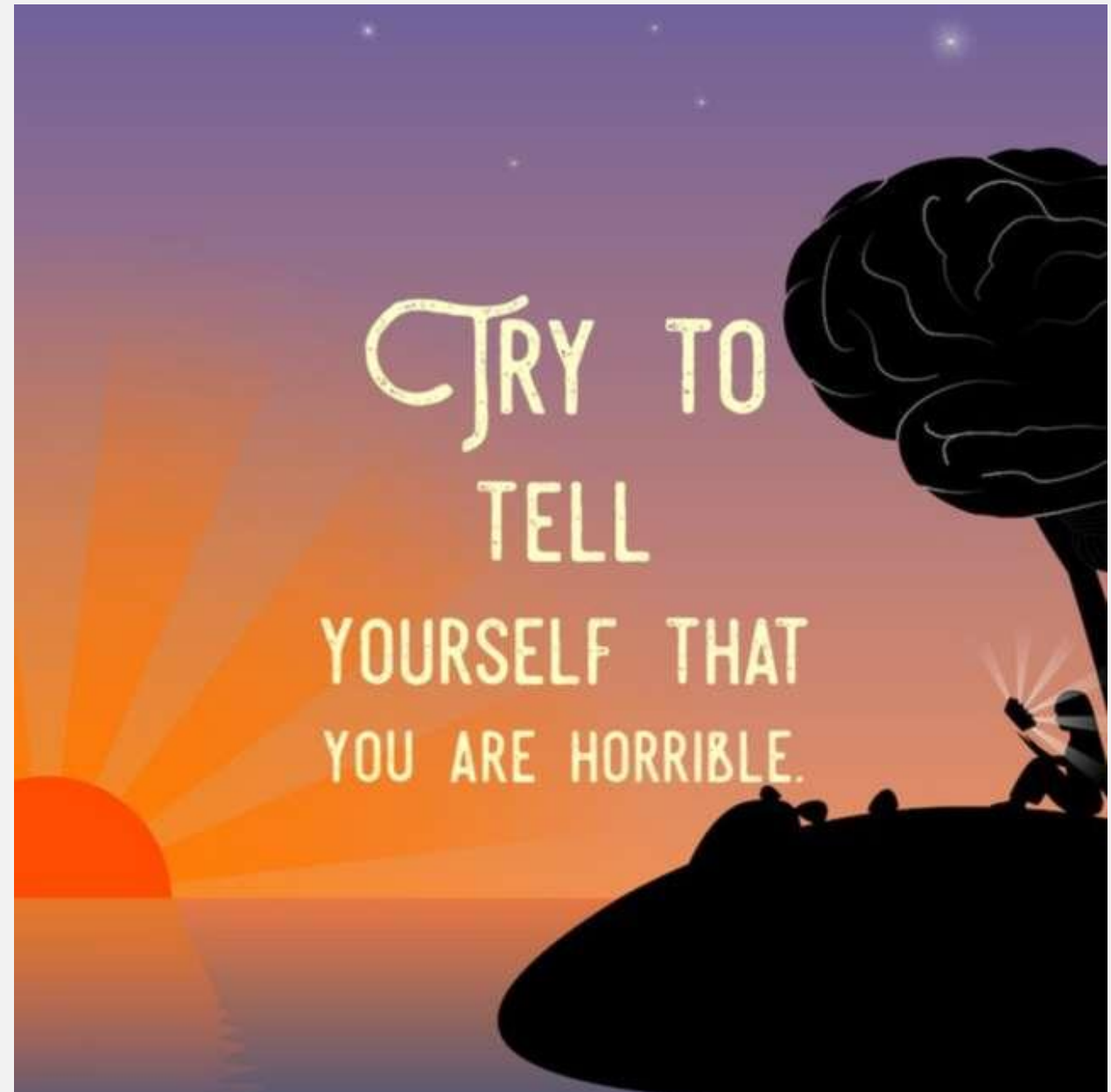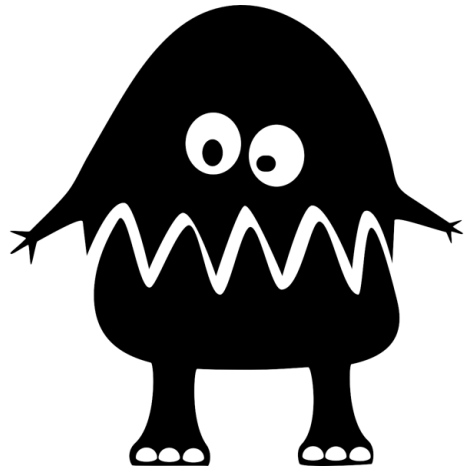
Whilst being actually kick-ass

It might look goofy ...

https://www.youtube.com/watch?v=gn4nRCC9TwQ

Machines can be great tools or weapons...

- Untrained and limited data leads to **terrible and biased AI results**

- It is very easy to get either **wrong deductions** or **false positives**

- AI is as **intelligent** and **good** as the **people** who **apply** it

Machine learning helps us in a few ways...

- Recommendation
- Prediction
- Classification
- Clustering
- Generation

@codepo8

Recommendation

Machines ploughing through lots of data for you.

- "I feel lucky" moments

- Slack finding people in your organization

- Intelligent inboxes

- Automated photo optimization

- Automated tagging and alternative text: "Image may contain"

Prediction

You're doing this – you probably want this as the next thing

- Text autocompletion
- Task offerings
- Image tooling – adding photos to a collage
- Creating albums
- Offering similar music and videos
- Offering products that match
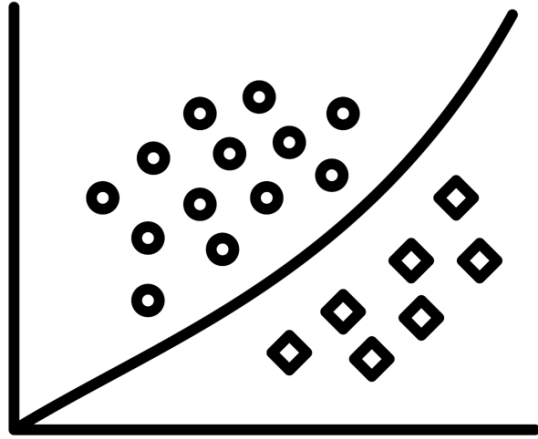
Classification

Sort things by what humans told you what they are and scale it up

- Google surveys offering the right form elements for a question

- Detecting faces and asking for more information

- Finding anomalies in health scans and doing the same for all the ones in the system
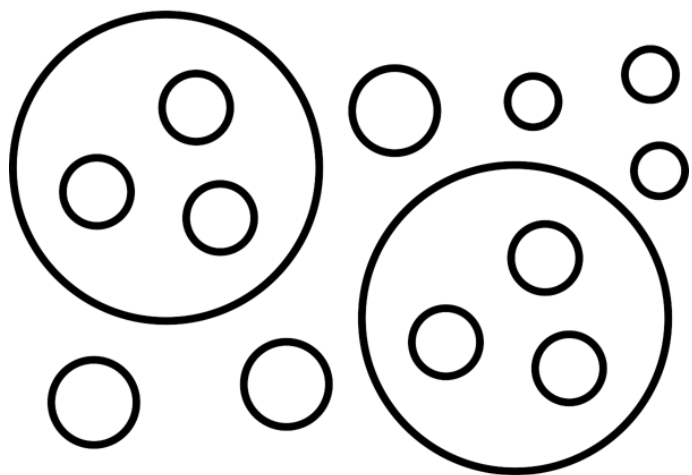
Clustering

Find own patterns and collate them

- Photo tagging and ordering

- Document analysis

- Comment filtering and triaging

- Video optimisation dependent on content.
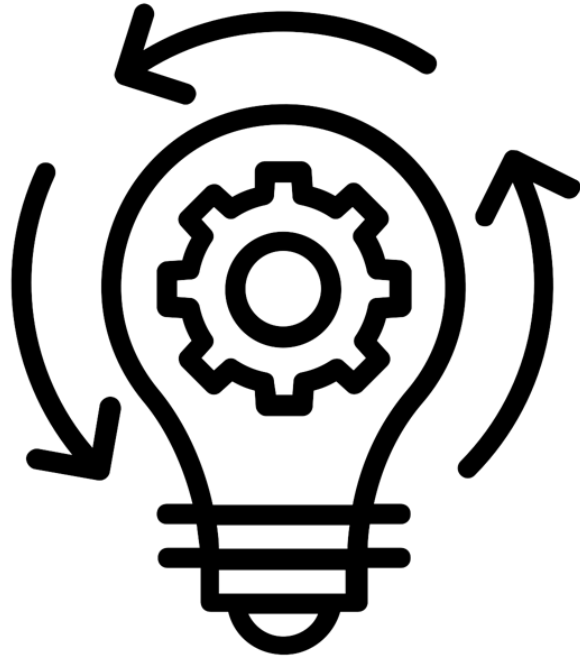
Generation

Allow the machine to create things

- Art style matching
- Generated articles from fact collection
- Synthesised music
- Filling content with tagged information (grass, houses, brick, etc...)
- React to human input
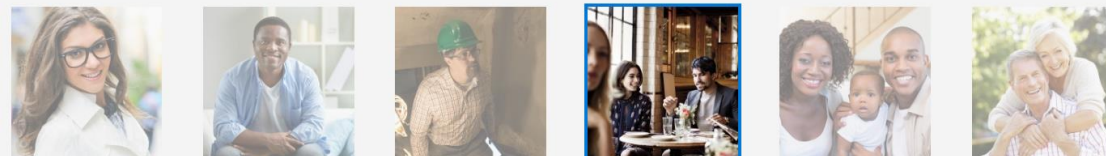
We need to find our place on the scale

About face...

@codepo8
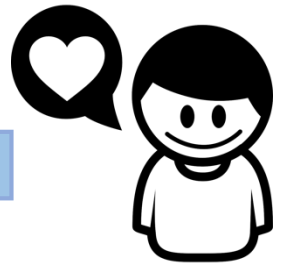
Face detection

Detect one or more human faces in an image and get back face rectangles for where in the image the faces are, along with face attributes which contain machine learning-based predictions of facial features. The face attribute features available are: Age, Emotion, Gender, Pose, Smile, and Facial Hair along with 27 landmarks for each face in the image.
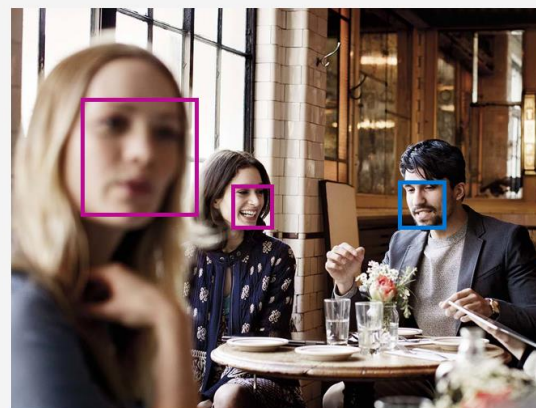
Detection result:
JSON:
[
  {
    "faceId": "0e96b668-a0d0-46ec-a5c9-ad26b16a1ca9",
    "faceRectangle": {
      "top": 166,
      "left": 128,
      "width": 218,
      "height": 218
    },
    "faceAttributes": {
      "hair": {
        "bald": 0.0,
        "invisible": false,
        "hairColor": [
          {
            "color": "blond",
            "confidence": 1.0
          },
          {
            "color": "other",

Image URL [   ] Submit   ⬆ Browse

aka.ms/face-api

About face...

- Face rectangle / Landmarks

- Pose (pitch/roll/yaw)

- Smile

- Gender/Age

- Type of glasses

- Makeup (lips/eye)

- Emotion (anger, contempt, disgust, fear, happiness, neutral, sadness, surprise)

- Occlusion (forehead/eye/mouth)

- Facial hair (moustache/beard/sideburns)

- Attributes: Hair (invisible, bald, colour)

aka.ms/face-api

@codepo8

Is this you? Are those also you?

@codepo8

aka.ms/face-api

Is this your driver?

youtube.com/watch?v=aEBi4OpXU4Q

Taking it too far?

@codepo8
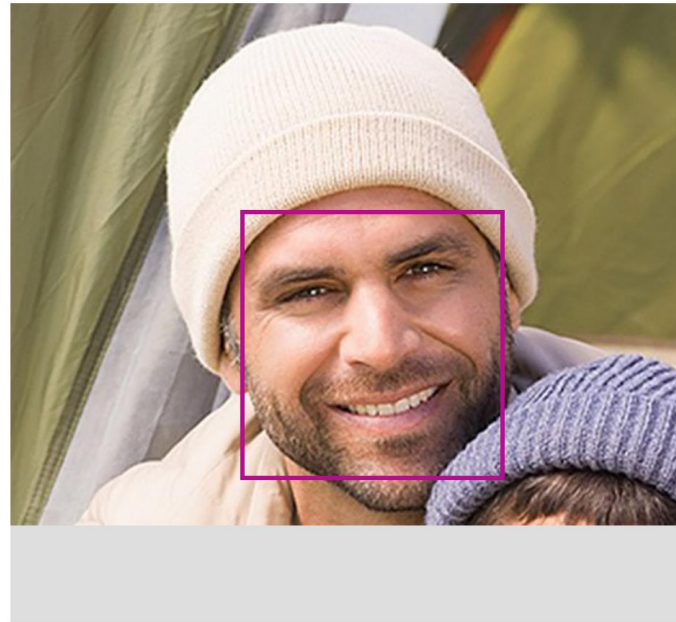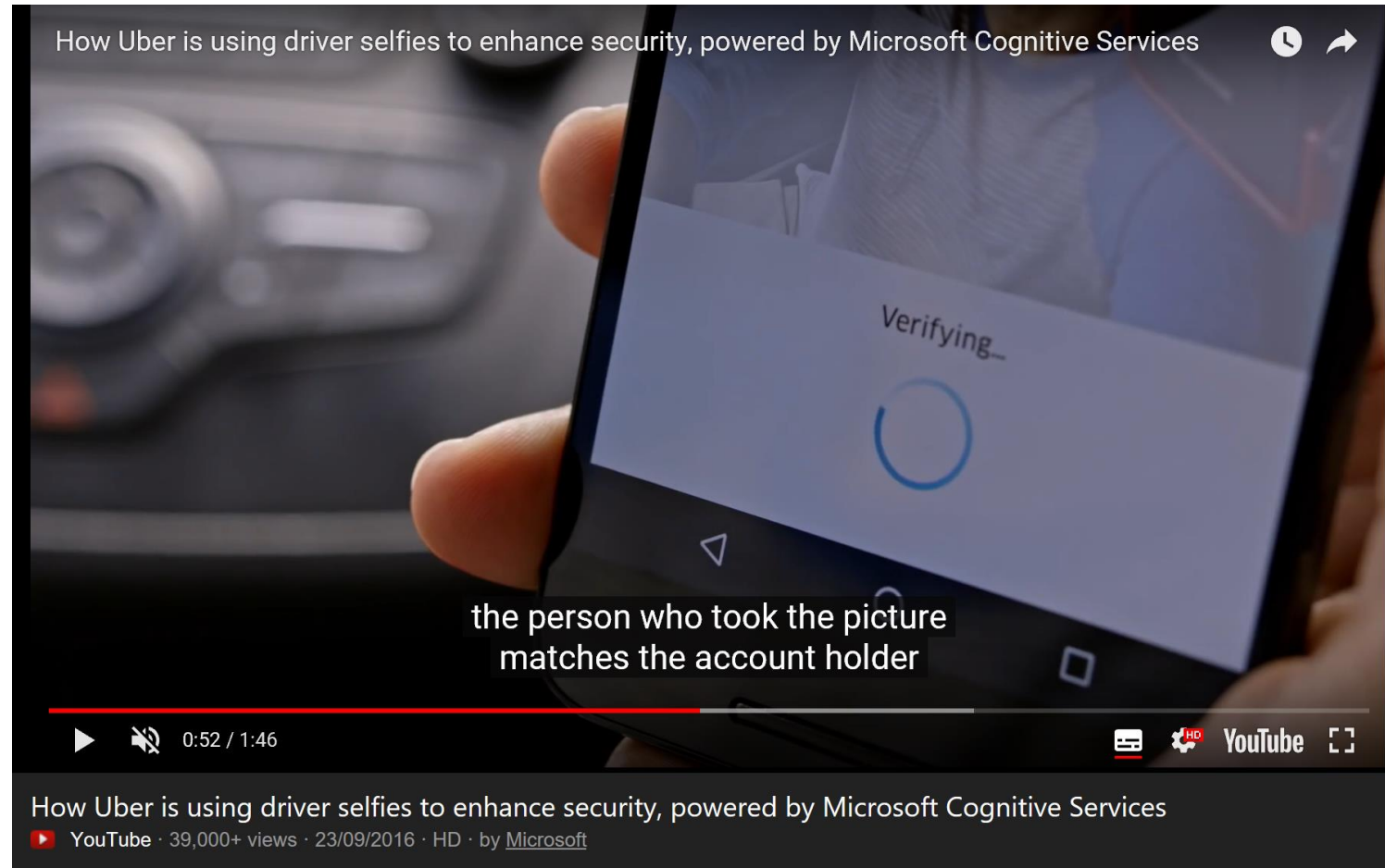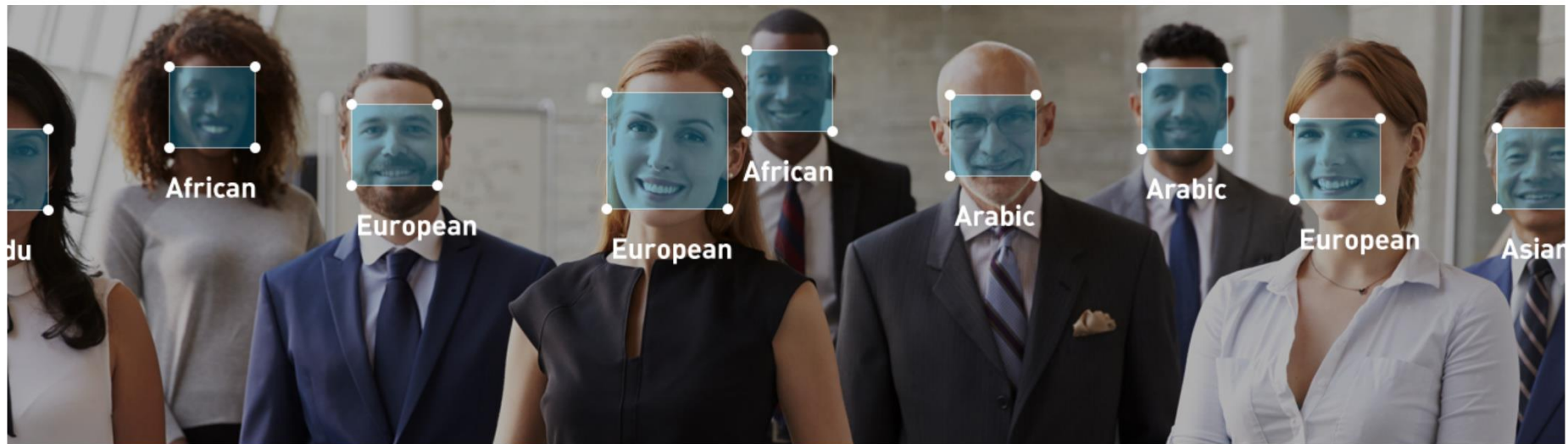
Detecting even more...

Chinese authorities have begun deploying "gait recognition" AI software in Beijing and Shanghai that identifies people via their body shapes and how they walk (Dake Kang/Associated Press)
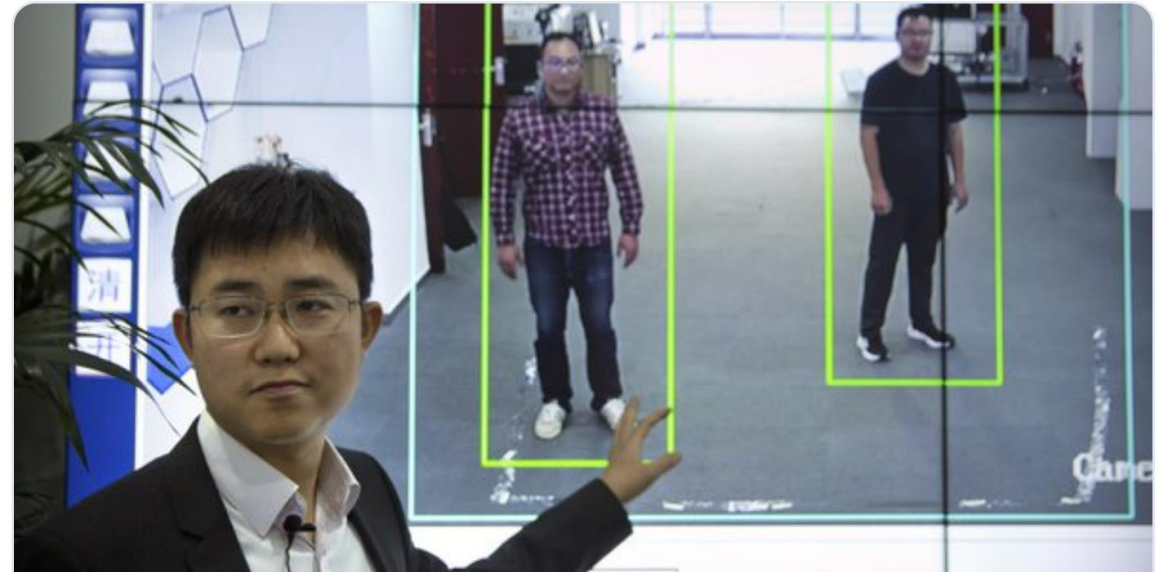
Chinese 'gait recognition' tech IDs people by how they walk

BEIJING (AP) — Chinese authorities have begun deploying a new surveillance tool: "gait recognition" software that uses people's body shapes and how they walk to

apnews.com

https://apnews.com/bf75dd1c26c947b7826d270a16e2658a

Those trustworthy avatars...

https://blog.insightdatascience.com/
generating-custom-photo-realistic-faces-using-ai-d170b1b59255

Those trustworthy avatars...

INSTRUCTION: press +/- to adjust feature, toggle feature name to lock the feature

random face

Male	Age	Skin_Tone
-	+	-	+	-	+
Bangs	Hairline	Bald
-	+	-	+	-	+
Big_Nose	Pointy_Nose	Makeup
-	+	-	+	-	+
Smiling	Mouth_Open	Wavy_Hair
-	+	-	+	-	+
Beard	Goatee	Sideburns
-	+	-	+	-	+
Blond_Hair	Black_Hair	Gray_Hair
-	+	-	+	-	+
Eyeglasses	Earrings	Necktie
-	+	-	+	-	+

https://blog.insightdatascience.com/
generating-custom-photo-realistic-faces-using-ai-d170b1b59255

@codepo8
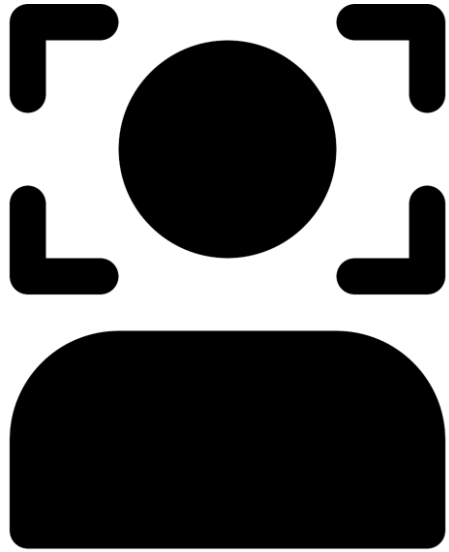
Automated face mapping...

Social Mapper has a variety of uses in the security industry, for example the automated gathering of large amounts of social media profiles for use on targeted phishing campaigns. Facial recognition aids this process by removing false positives in the search results, so that reviewing this data is quicker for a human operator.

Social Mapper supports the following social media platforms:

- LinkedIn
- Facebook
- Twitter
- GooglePlus
- Instagram
- VKontakte
- Weibo
- Douban

Social Mapper takes a variety of input types such as:

- An organisations name, searching via LinkedIn
- A folder full of named images
- A CSV file with names and url's to images online

https://github.com/SpiderLabs/social_mapper
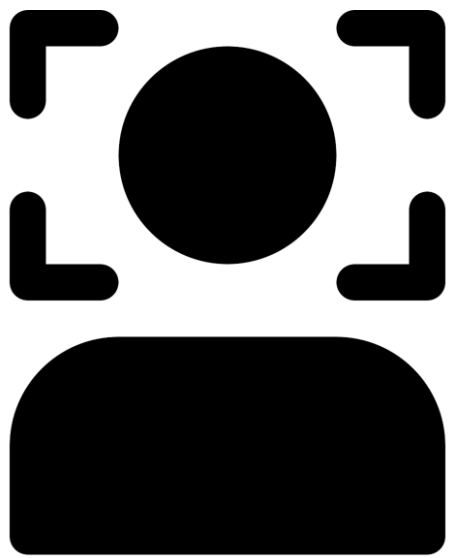
Once you are known...

- Create fake social media profiles to 'friend' the targets and send them links or malware. Recent statistics show social media users are more than twice as likely to click on links and open documents compared to those delivered via email.

- Trick users into disclosing their emails and phone numbers with vouchers and offers to make the pivot into phishing, vishing or smishing.

- Create custom phishing campaigns for each social media site, knowing that the target has an account. Make these more realistic by including their profile picture in the email. Capture the passwords for password reuse.

- View target photos looking for employee access card badges and familiarise yourself with building interiors.

https://github.com/SpiderLabs/social_mapper

AI for humans

I want people to appreciate AI, without giving up their data unwillingly...
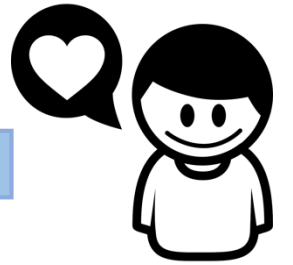
The best way to do this, is to stop selling it as magic, but as a tool...

We need data, so let's make it joyful for humans to give us some

Humans
and
Bots/Computers
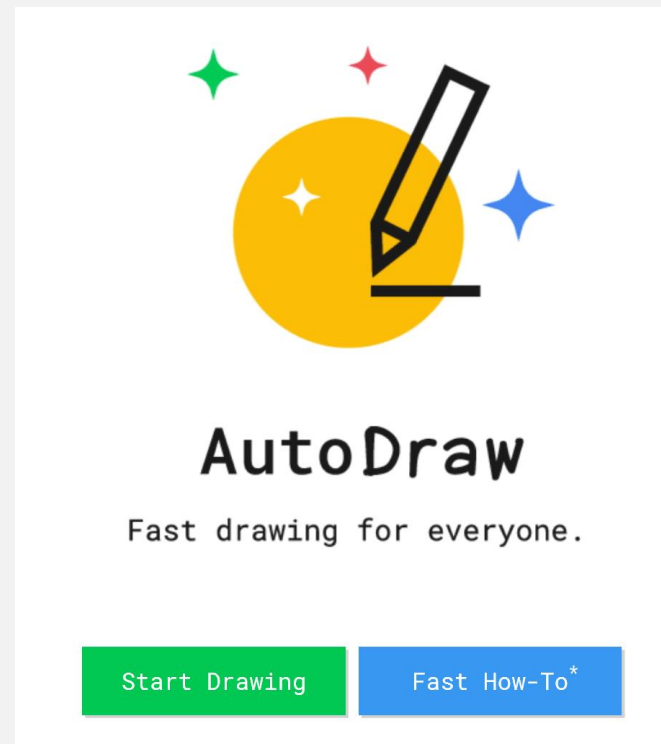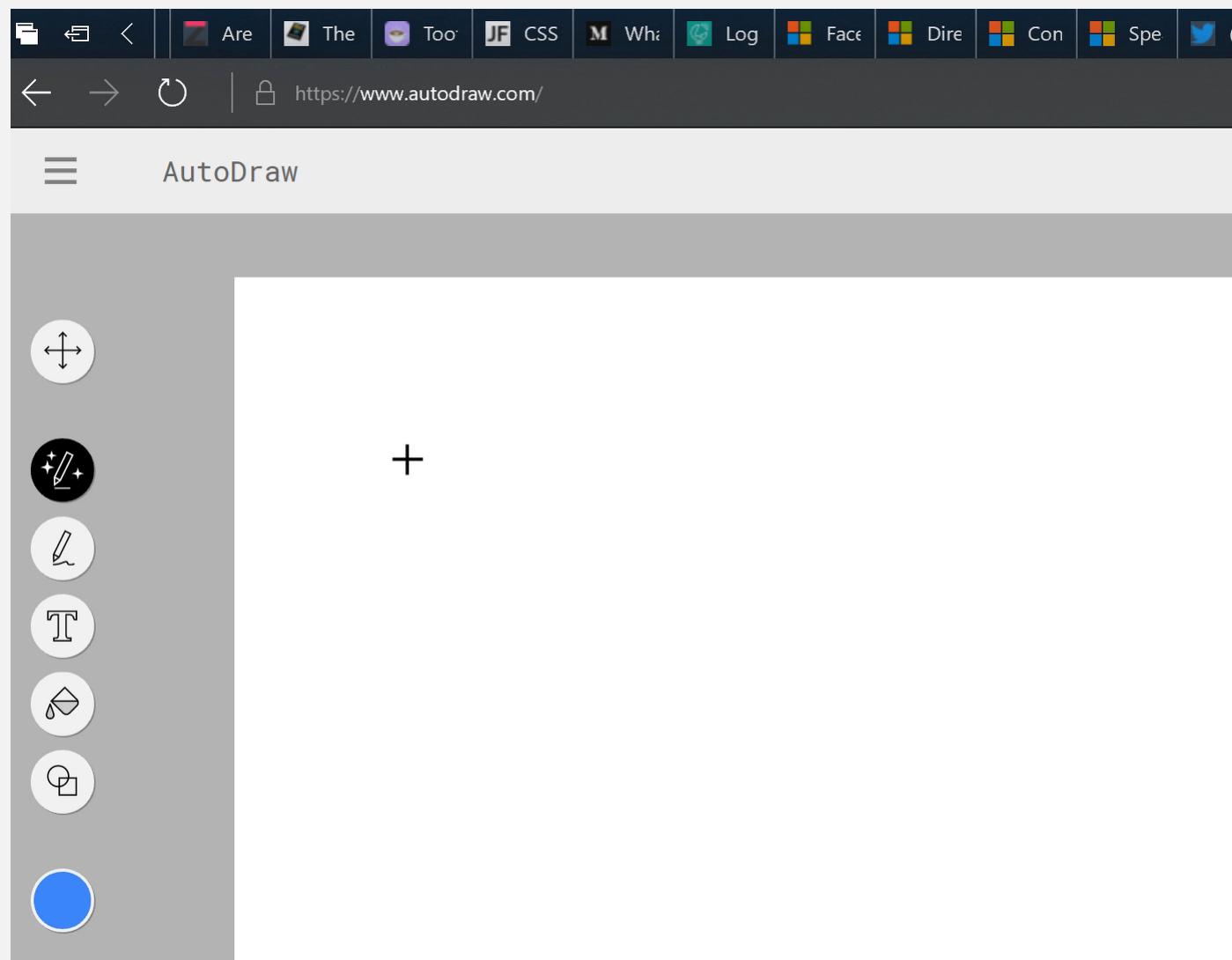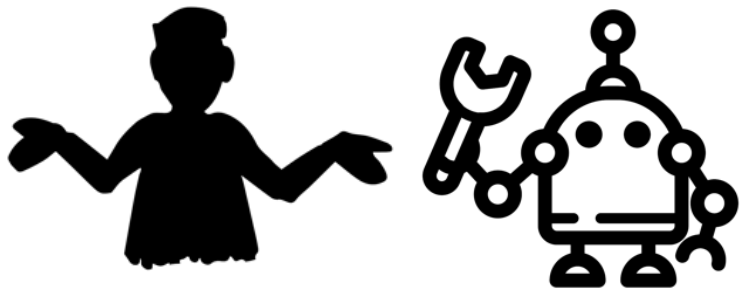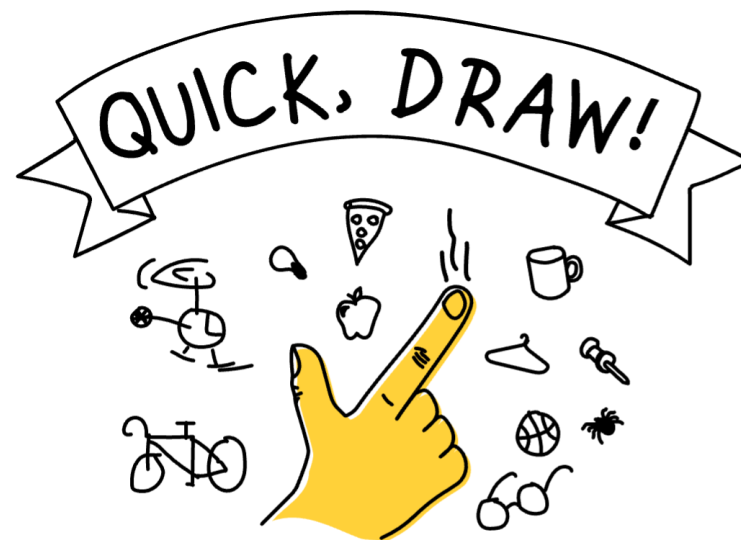
AutoDraw
Fast drawing for everyone.

Start Drawing   Fast How-To*

@codepo8

autodraw.com

Humans
and
Bots/Computers

autodraw.com

Humans
and
Bots/Computers

quickdraw.withgoogle.com

Humans
and
Bots/Computers

@codepo8
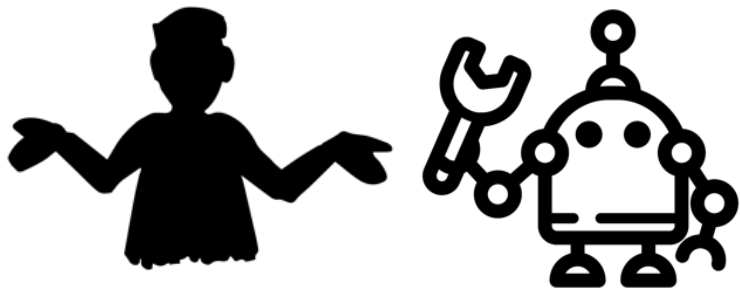
Security Check
(Required)

☐ I'm not a robot

reCAPTCHA
Privacy - Terms

Select all images with **rivers**.

Verify

Report a problem

google.com/recaptcha/intro

"Learning" from lots of images

@codepo8

https://github.com/jantic/DeOldify

Humans
and
Bots/Computers

aka.ms/nvidia-fix-image

Humans
and
Bots/Computers

Mask

Inpainted Result

Brush Width:

Undo Restart Load Save Quit

aka.ms/nvidia-fix-image

Humans
and
Bots/Computers

PartialConv Inpainting

Mask

Inpainted Result

Brush Width:

Undo   Restart   Load   Save   Quit

aka.ms/nvidia-fix-image

Humans
and
Bots/Computers

Select a feature brush & strength and enjoy painting:

tree
grass
door
sky
cloud
brick
dome

draw remove
undo reset

gandissect.csail.mit.edu/
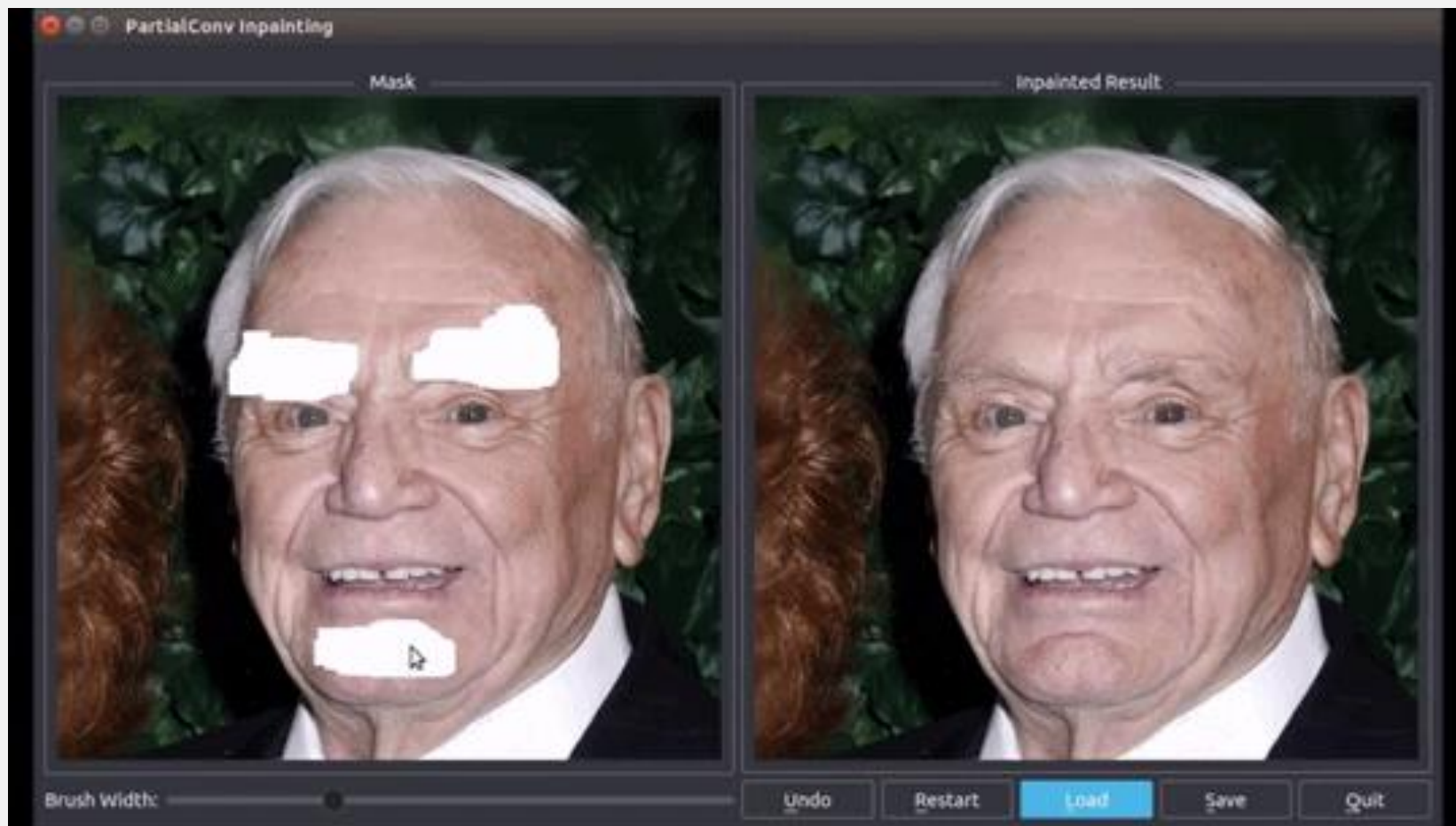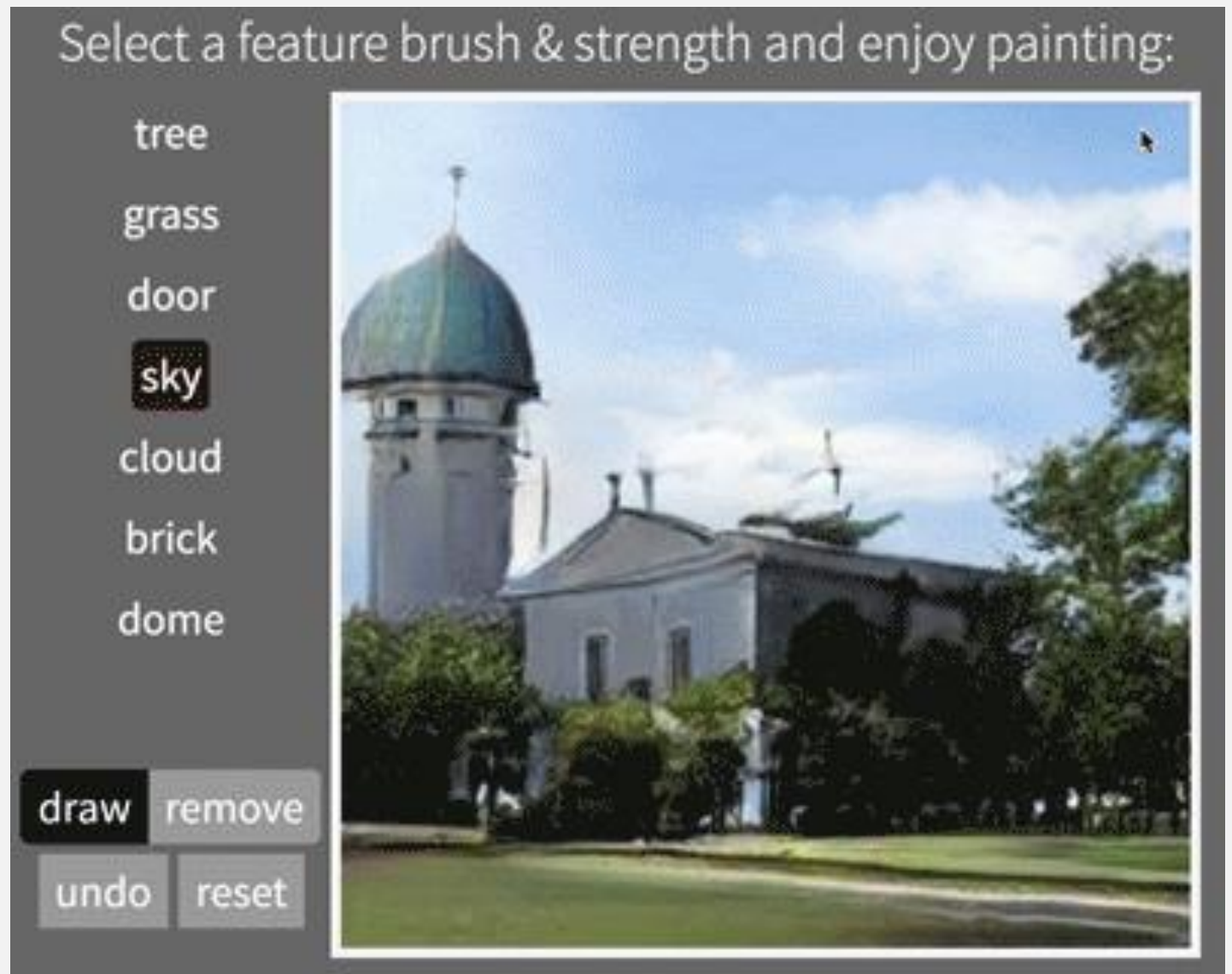
Vision and image analysis...

instagram: @larryandanke

@codepo8

Vision and image analysis...

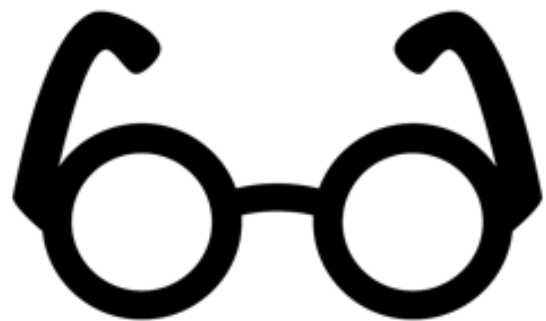Alt Text: A dog sitting on a sidewalk

Vision and image analysis...

@codepo8

dallas
@mixedhunty

Follow

mom said you had to let me use the xbox

twitter.com/mixedhunty/status/980551155297157126

Vision and image analysis...

@codepo8

#vision_api
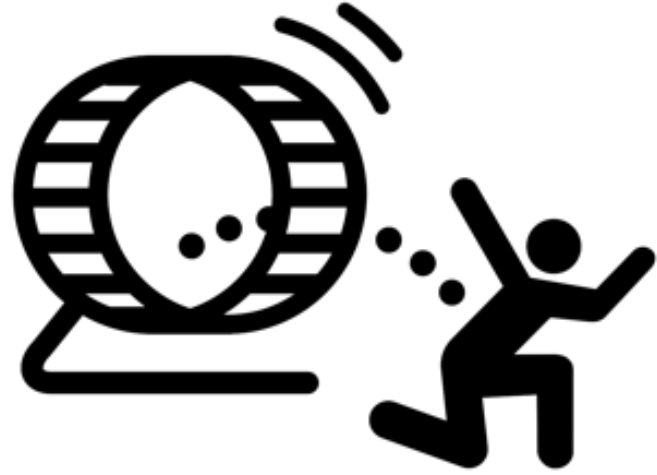
Intelligent, responsive systems

- AI services offer us lots of **data to compare** our users' input with
- Thus our users **don't need to speak computer** but be **human** instead
- We can **prevent** them from making **mistakes**
- We can help getting around **physical barriers**

Real life examples? This stage 16:00

Opportunity & Responsibility
Empowering Developers in the AI Era

Tim O'Brien
GM, AI Programs, Microsoft
@_TimOBrien
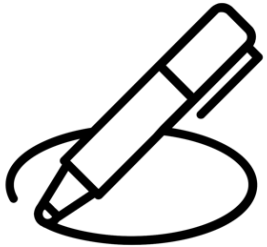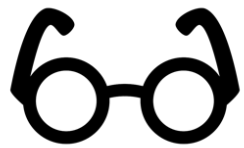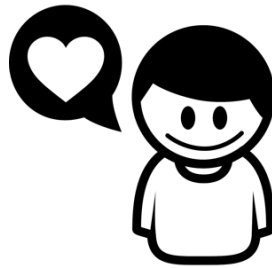
Our toolkit for more human interfaces

Natural language processing

Computer Vision

Sentiment analysis

Speech conversion and analysis

Moderation

Demos? This stage, 14:00

Microsoft

AI in the Modern Workplace

Kirk Koenigsbauer
Corporate Vice President, Microsoft 365

With great power comes great responsibility...

Our responsibilities..

- AI can be an **amazing help** for humans

- It does need **transparency** – if you use people as data sources, they need to know what and where it goes

- When people get information **filtered by an algorithm**, it should be an **opt-in**

- People need to have a **chance to dispute** when an algorithm tagged or disallowed them access.

Want to go deep?

- The Math behind ML
- The ethics of AI
- Working with Data using Python
- Machine Learning Models
- Deep Learning Models
- Reinforcement Learning Models
- Microsoft Professional Program Certificate in Artificial Intelligence

aka.ms/learn-ai

10 courses, (8-16 hours each), 10 skills

Want to go deep?

Demystifying Artificial Intelligence: Understanding Machine Learning   ORIGINAL

Christian Heilmann, Senior Developer at Microsoft   + Follow

12 Videos (58m)   View My Notes

► 1. Introduction   1:44
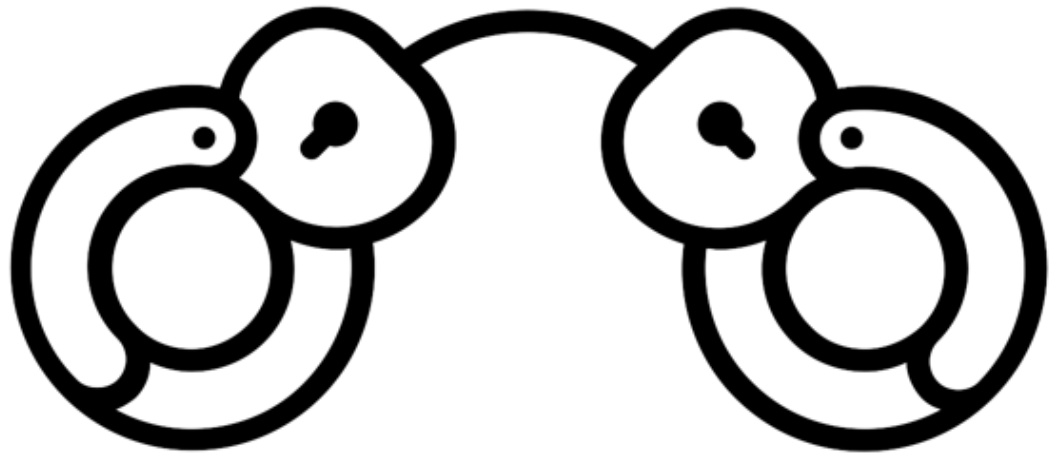 🔒 2. What is Machine Learning   5:25
  🔒 3. How We Teach Machines   5:48
  🔒 4. Machine Learning to Help Humans   5:28
  🔒 5. Tools for Machine Learning   3:44
  🔒 6. Visual Uses   7:54
  🔒 7. Speaking Human   6:07
  🔒 8. Audio & Video   6:32

👁 97 students are watching this class

About   Community 3   Class Project   All Projects   🔖 Save   Add to Calendar   f y ✉ Report class

skl.sh/christian

Free with trial sign-up
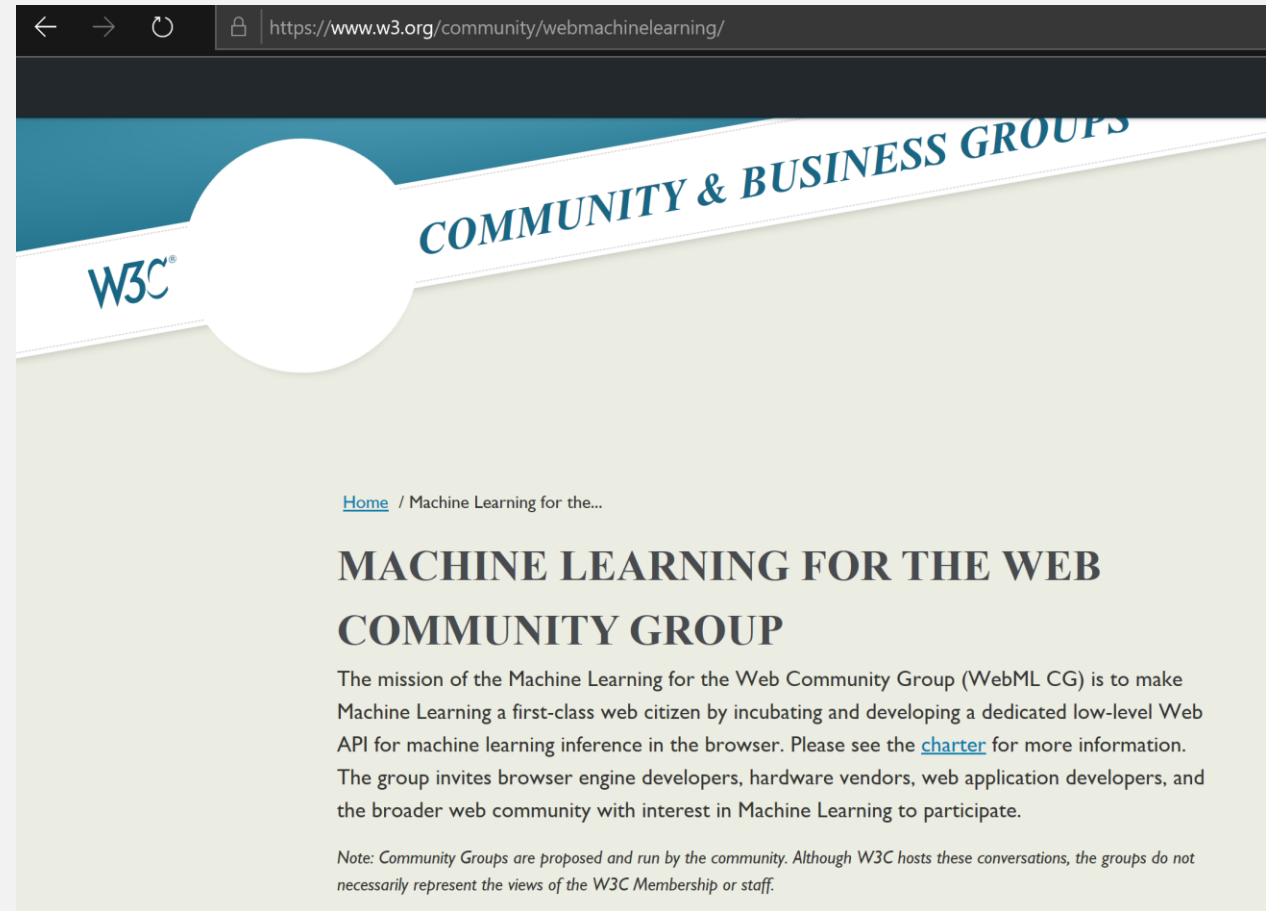
@codepo8

Who controls our data? Who benefits?

- With all this we need to make clear **who has your data** and **where** it goes.

- Wouldn't it be great if we could do more **on our devices**?

- Much lower latency, better security, increased privacy

- Right now, this is only possible in **native environments**

- I want to change that – a **W3C proposal** to bring **accelerated Machine Learning to the web** in JavaScript
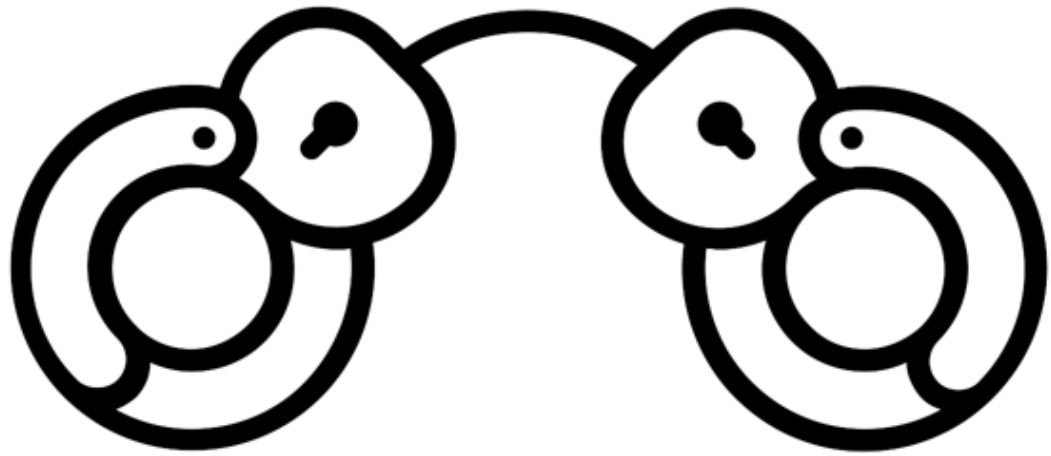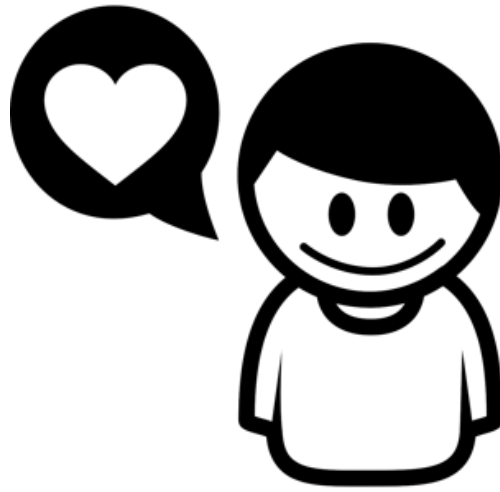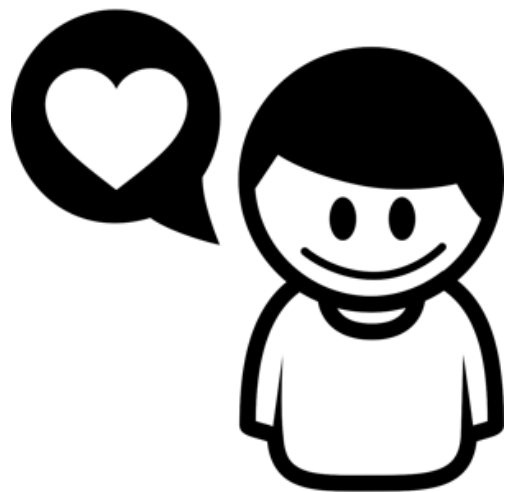
Who controls our data? Who benefits?

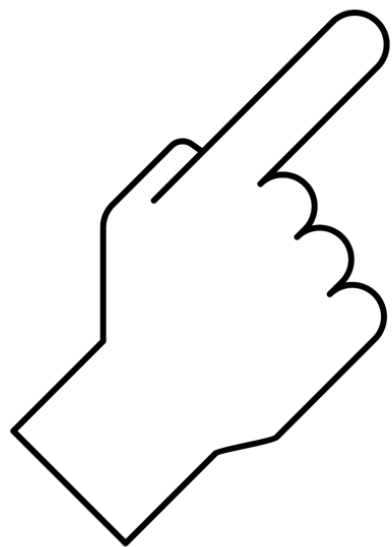w3.org/community/webmachinelearning

@codepo8

Don't forget to have fun!

Suz Hinton

github.com/noopkat/face-api-emoji-face

Categorising
images by gesture

@codepo8

http://pointerpointer.com
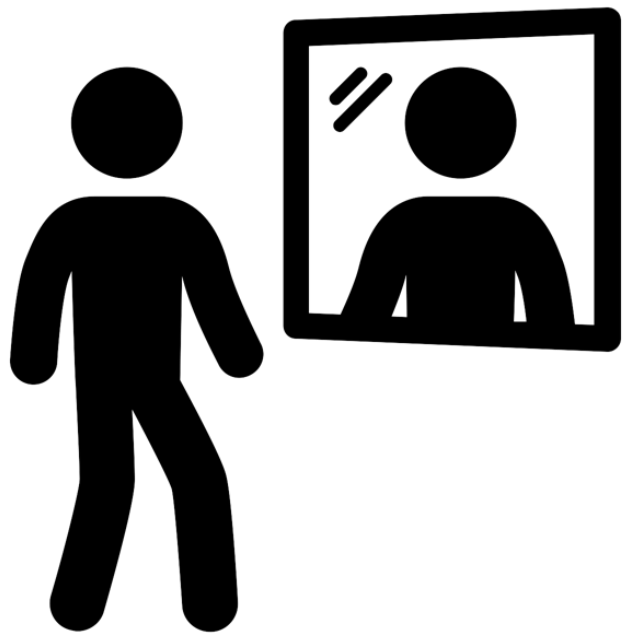
Find your moves

MOVE MIRROR

Make a GIF

https://experiments.withgoogle.com/move-mirror

@codepo8

Stay silly...

@codepo8

Cassie Evans
https://codepen.io/cassie-codes/pen/jKaVqo/
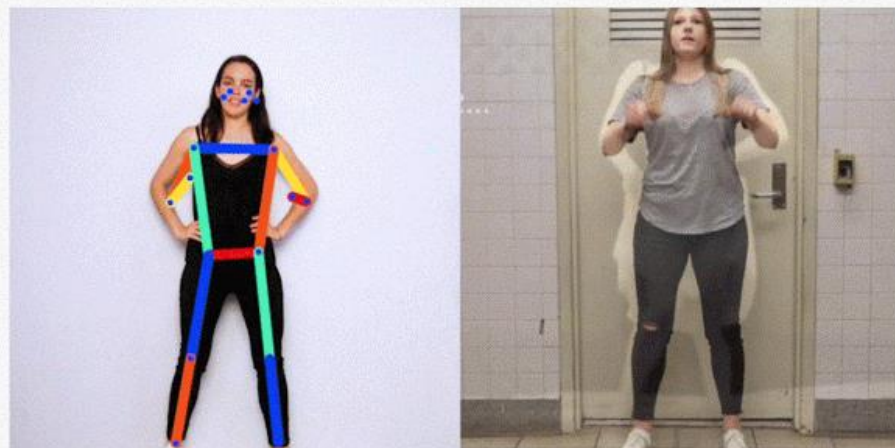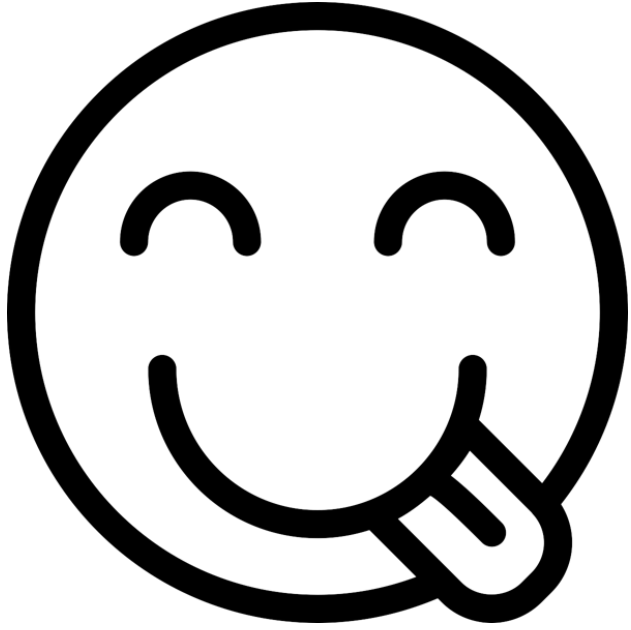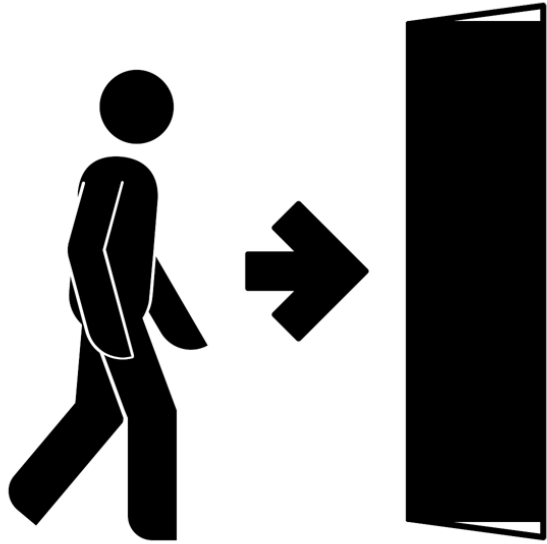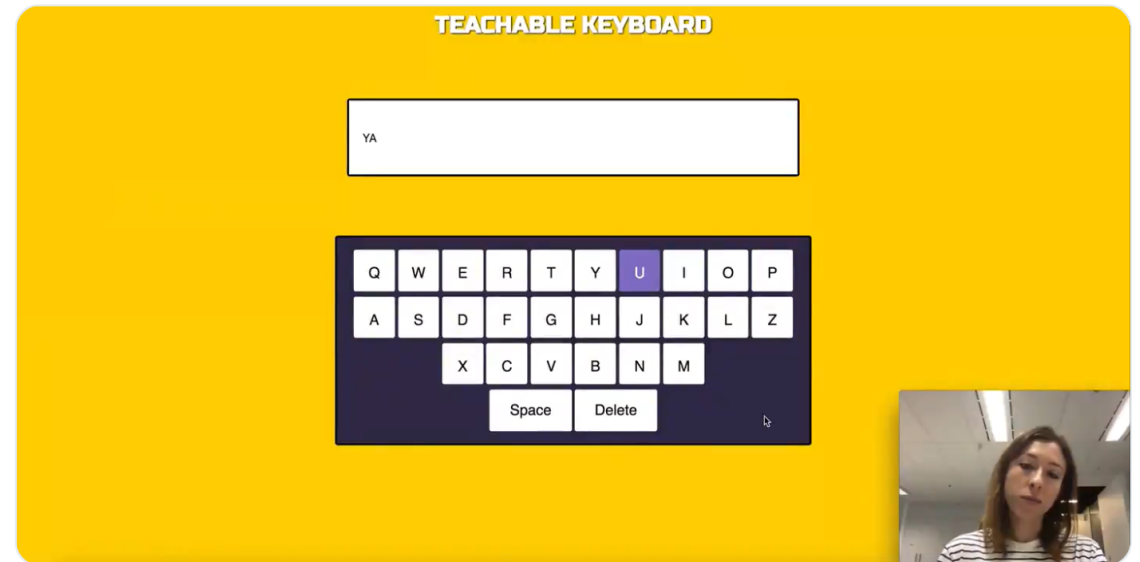
Help the human

Charlie Gerard 🏳️‍🌈
@devdevcharlie

Following

I used Tensorflow.js to build a quick prototype of head-controlled keyboard to allow people to communicate with simple head movements. Might not be much but it's amazing that you can do stuff like that in JS 😍 charliegerard.github.io/teachable-keyb... #tensorflowjs #javascript #ML #accessibility

TEACHABLE KEYBOARD

https://charliegerard.github.io/teachable-keyboard/

https://charliegerard.github.io/teachable-keyboard/

Collaborate and share...

@codepo8

Linda Liukas
https://helloruby.com

Preparing the next generation

@codepo8

Linda Liukas
https://helloruby.com
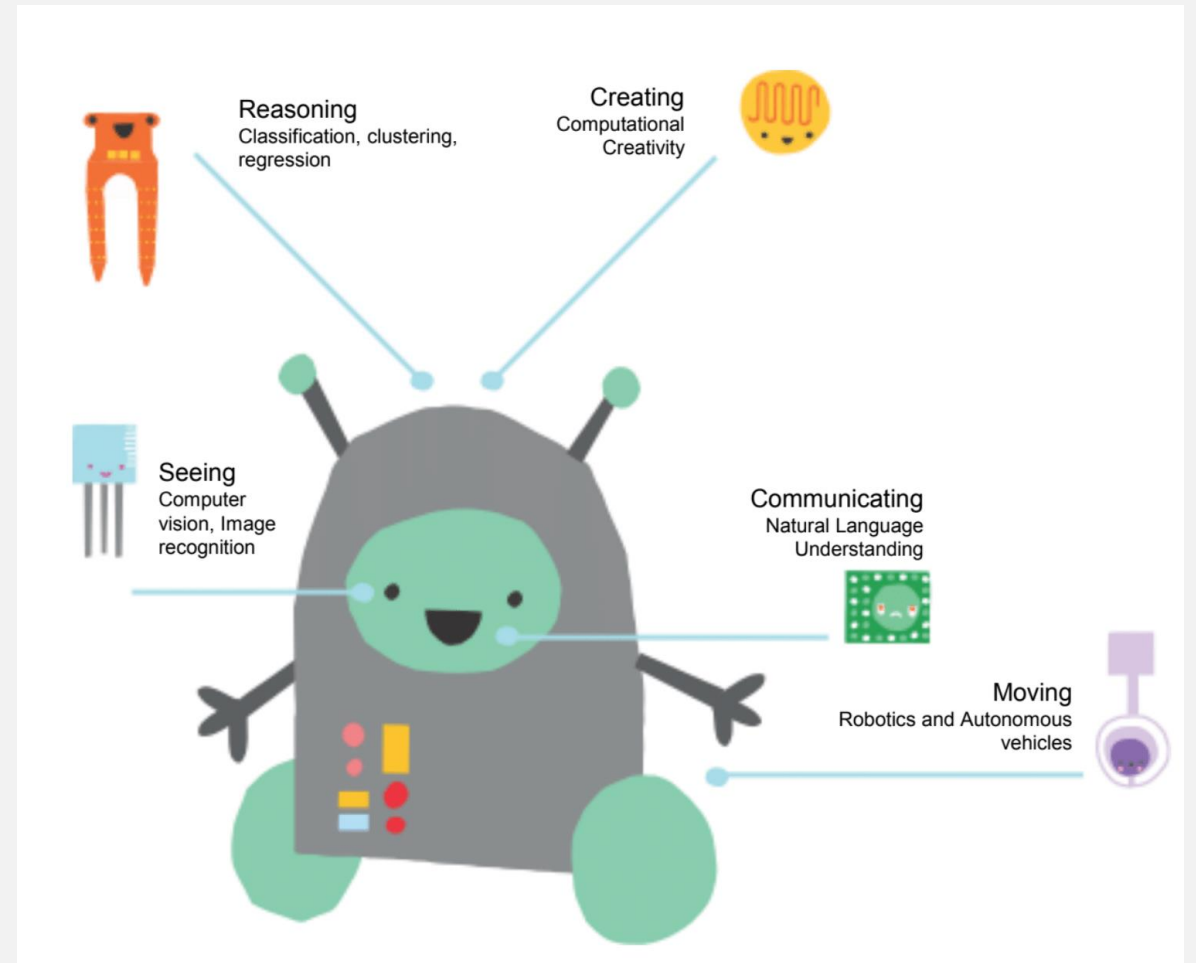
Thanks!

Chris Heilmann
Christianheilmann.com
Developer-evangelism.com

@codepo8

Never stop being weird.

http://inspirobot.me/