Welcome to Azure Saturday 2019 Munich

Azure Saturday

#AzureSaturday

18.05.2019 – Microsoft Munich – azuresaturday.de -- @azuresaturday

#AzureSaturday

18.05.2019 – Microsoft Munich – azuresaturday.de – @azuresaturday

Azure Saturday

Building human interfaces powered by AI

Speaker: Chris Heilmann

Building human interfaces powered by AI

Chris Heilmann (@codepo8) November 2018

All resources:
aka.ms/human-ai

Let's talk about "Artificial Intelligence"

What is the difference between **Machine Learning** and **Artificial Intelligence**?

Machine Learning is written in Python, JavaScript...

Artificial Intelligence is written in PowerPoint.

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**

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…

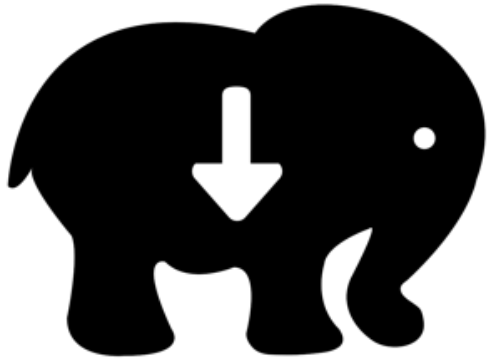
Florian Ziegler flickr.com/photos/damndirty/41263240134

Social Credit System

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

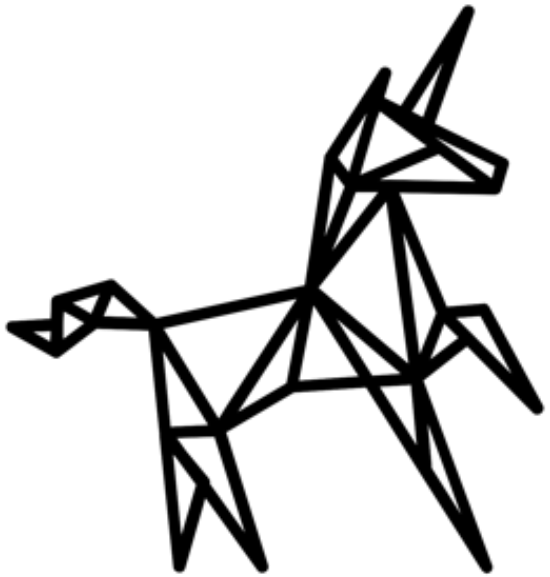
- We create a **massive** amount of information – actively and without our knowledge.
- It is tough to make that amount of information **consumable** again.
- That's why we have **computers**
- With cloud computing, on demand processing and advances in hardware **we're faster than ever**.

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.

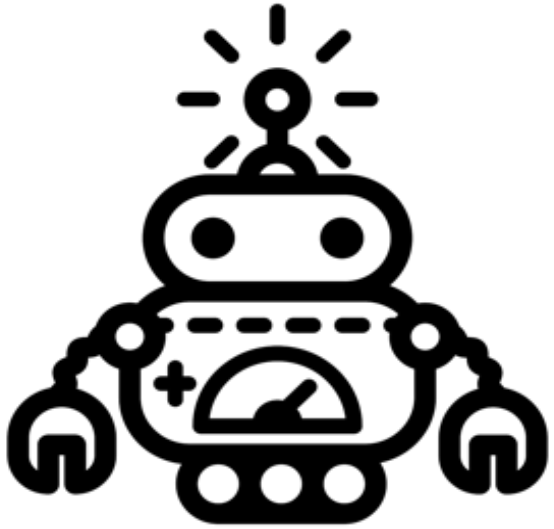
Are machines friend or foe?

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



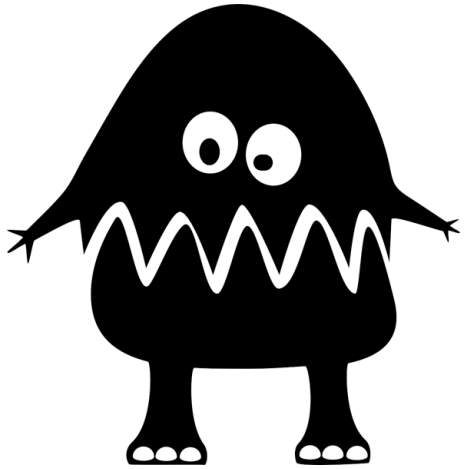
Artificial Intelligence Myths

- 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**

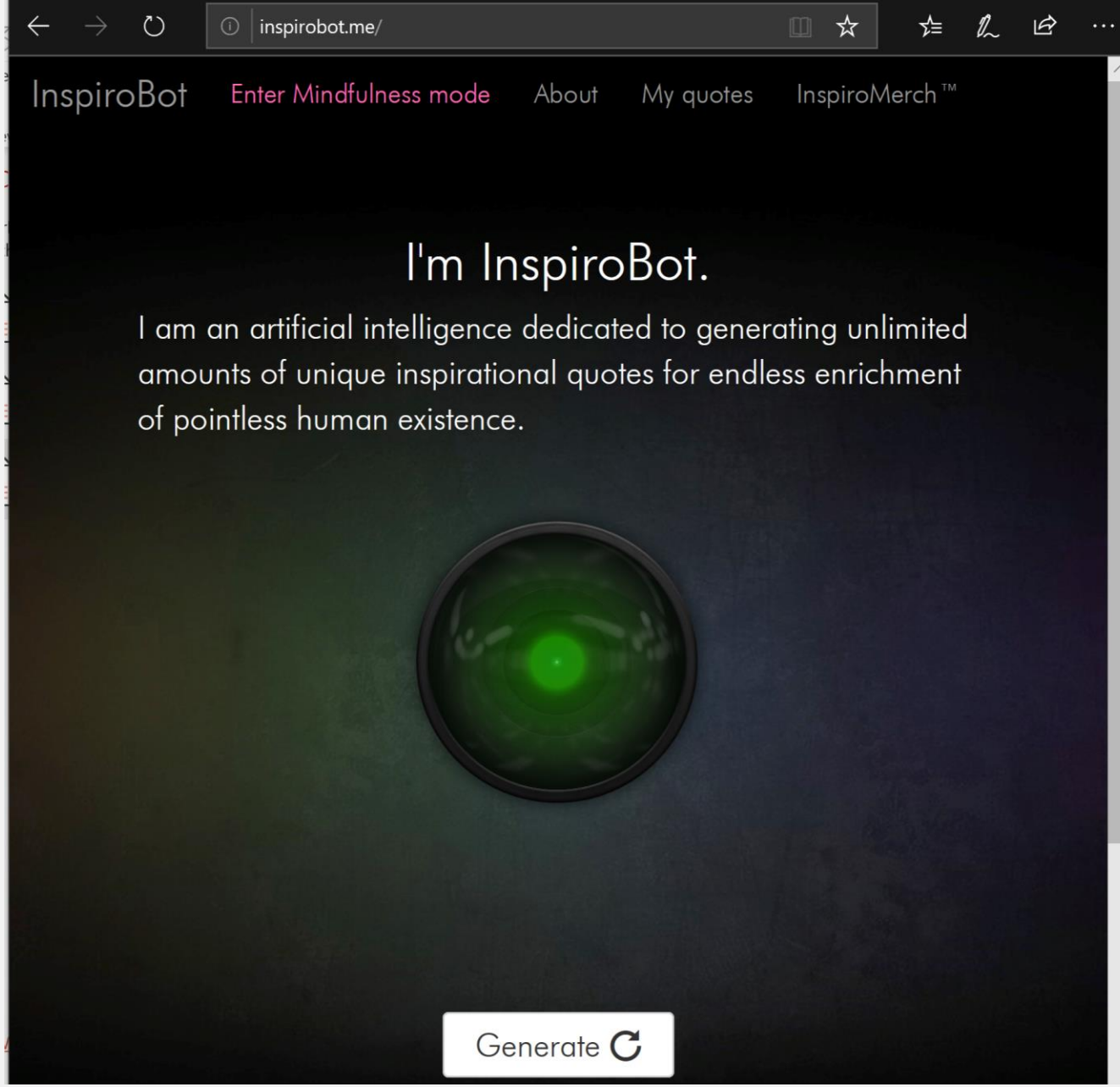


Machines can be great tools or weapons…

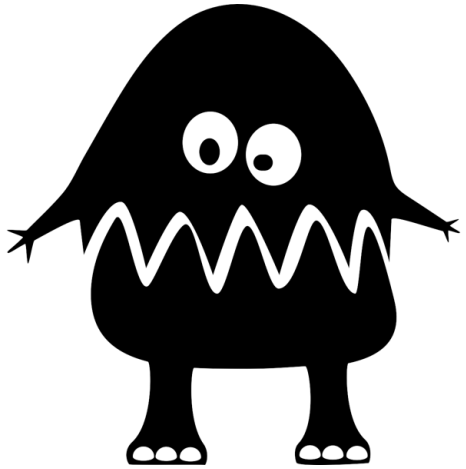
- Machine Learning is all about **returning assumptions**
- We don’t get any definitive **truth** from **algorithms**, we get answers to our questions
- AI can answer questions, but it is up to you to **ask good questions** – generic questions yield assumed results.



Unguided or supervised AI…

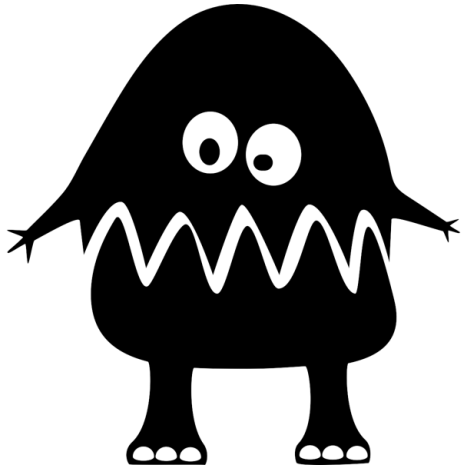


http://inspirobot.me

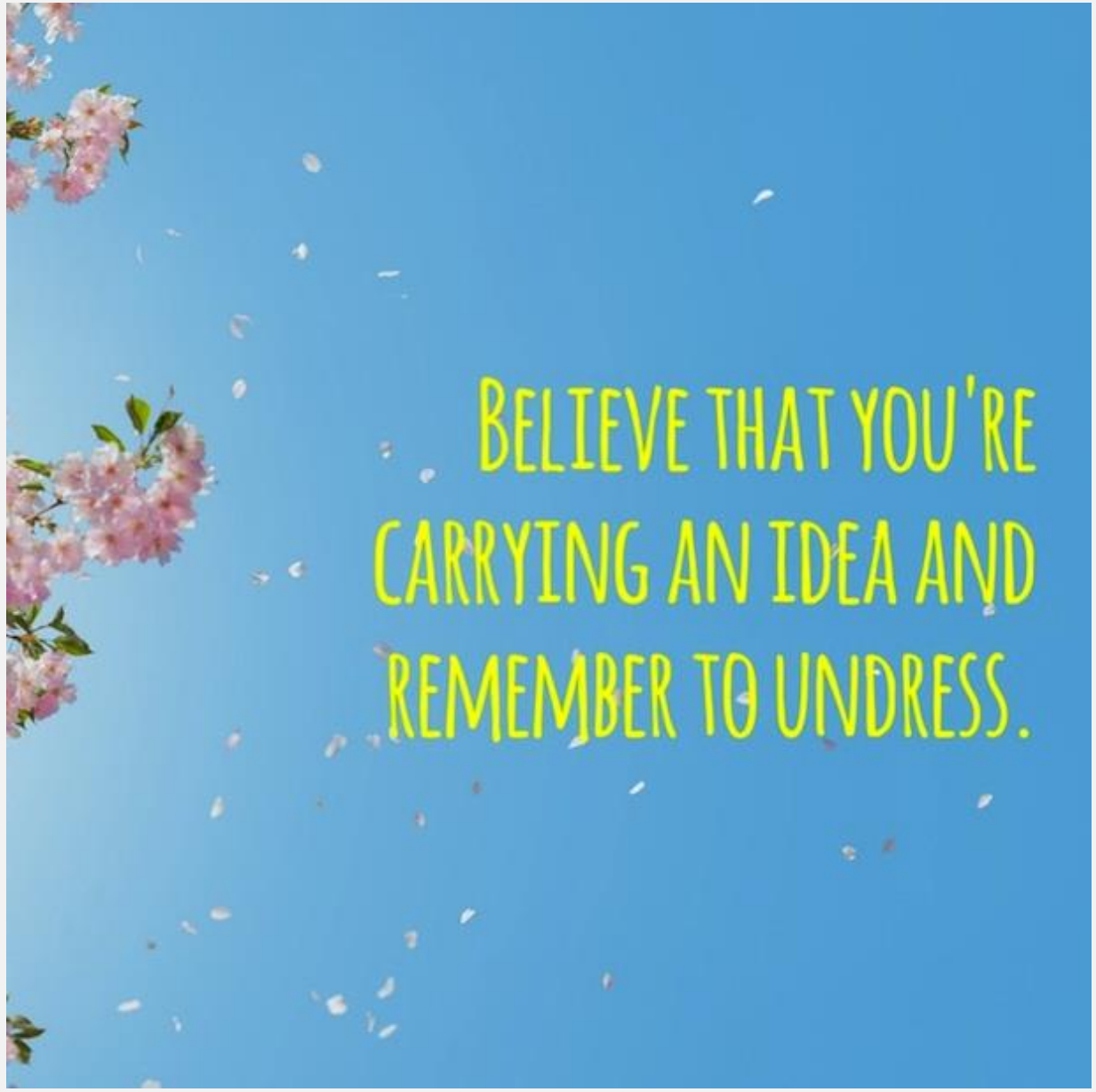


It can be demanding

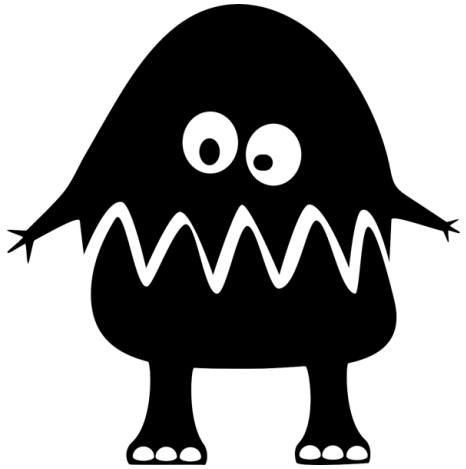
http://inspirobot.me



It can mix up needs…

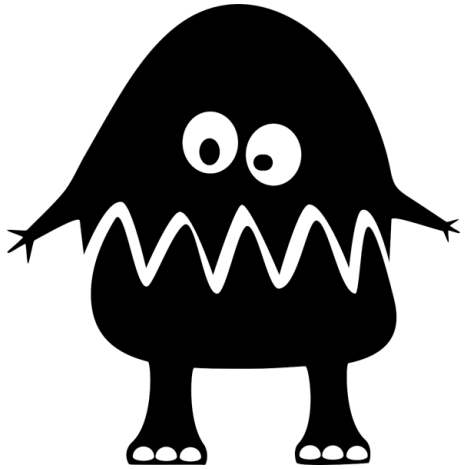


http://inspirobot.me



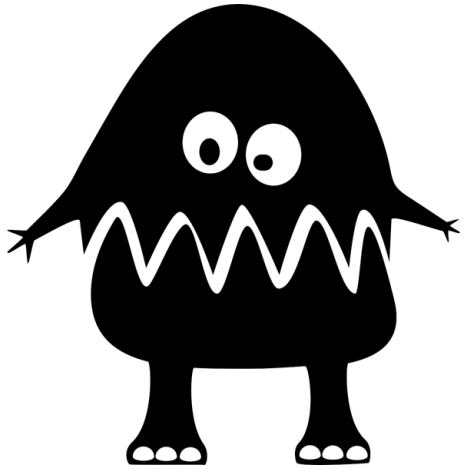
It can be overly excited…

http://inspirobot.me



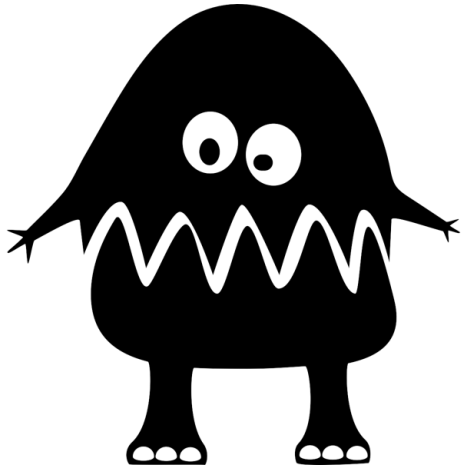
It can be a good warning…

http://inspirobot.me



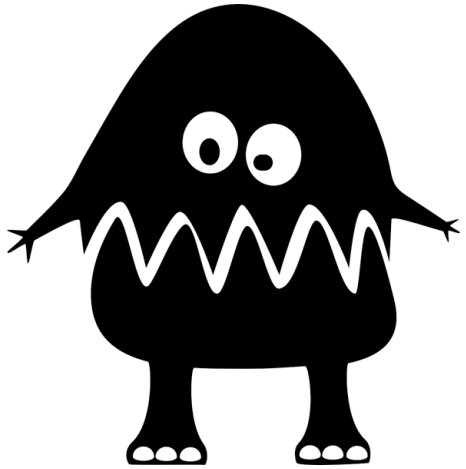
It can be painfully humbling…

http://inspirobot.me

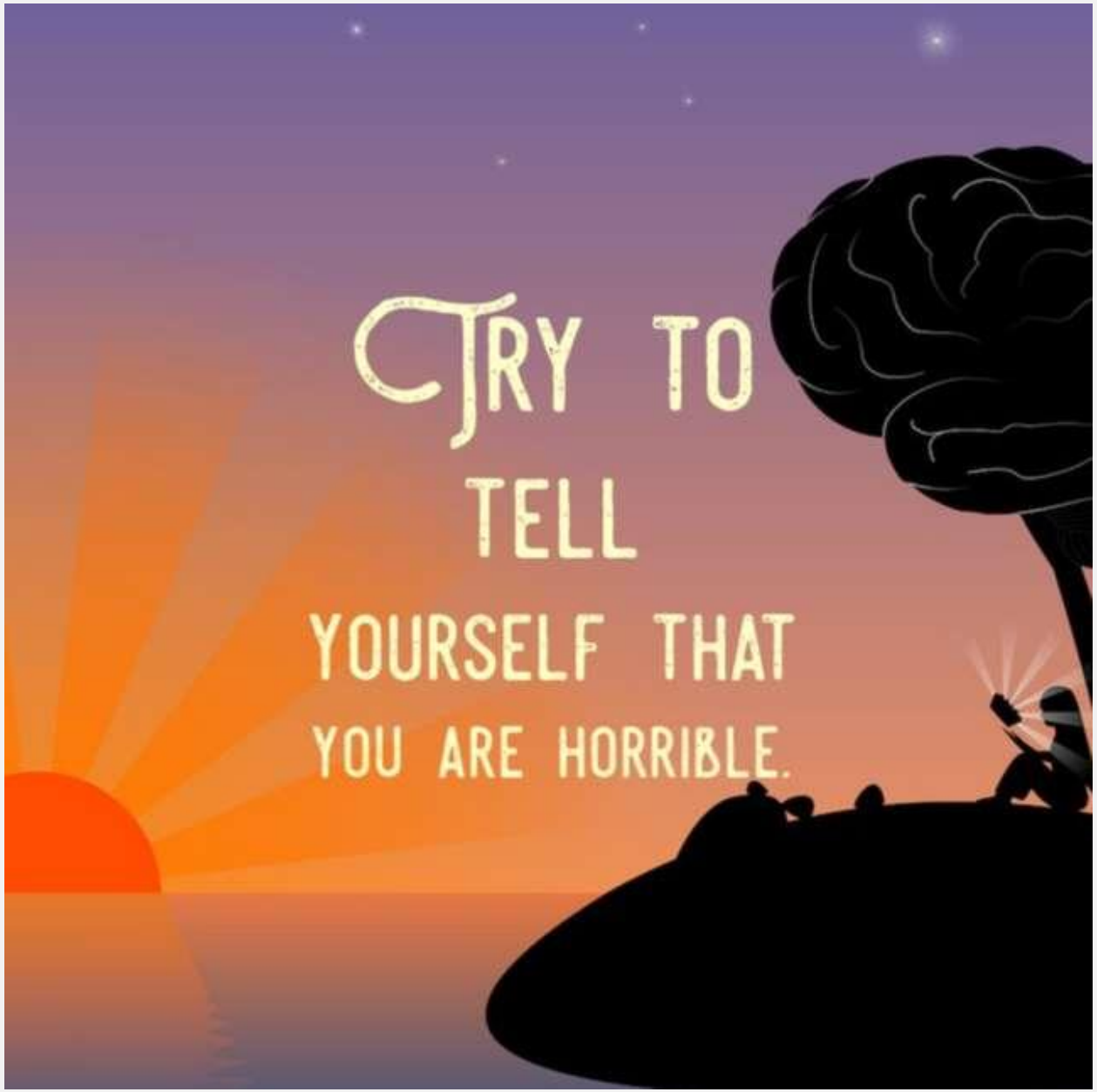


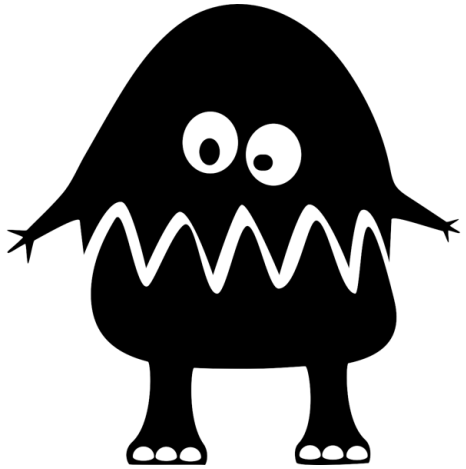
Prophetic, even?

http://inspirobot.me

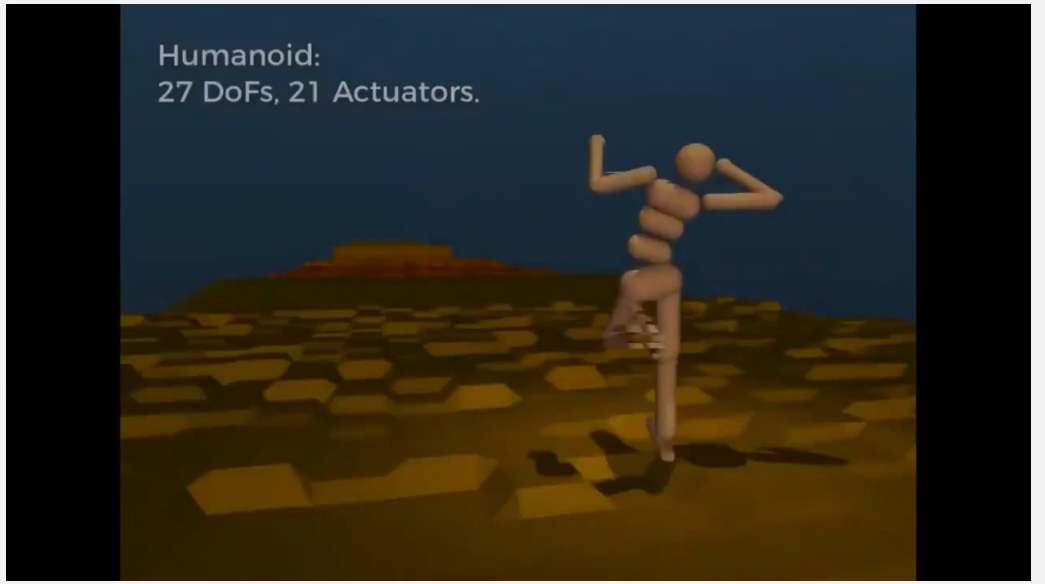


Passive aggressive towards humans…



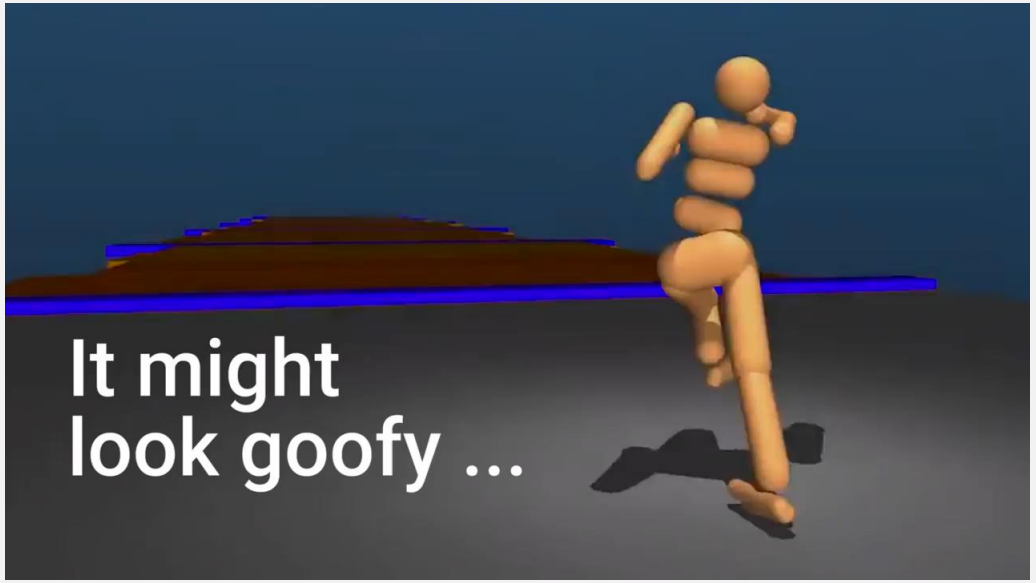


It can be adoringly cute...

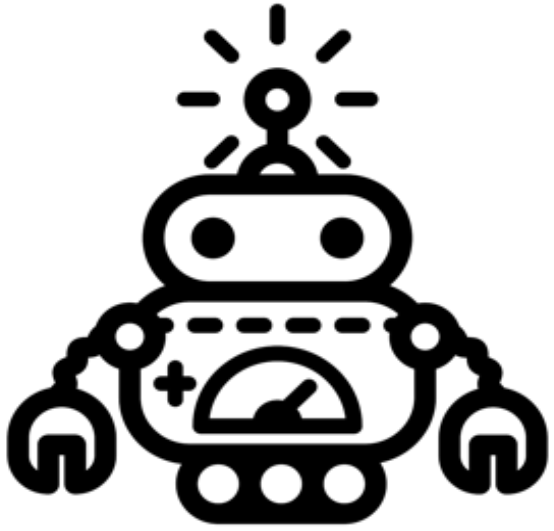


https://twitter.com/eron_gj/status/967672260147470336

Whilst being actually kick-ass



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

Recommendation

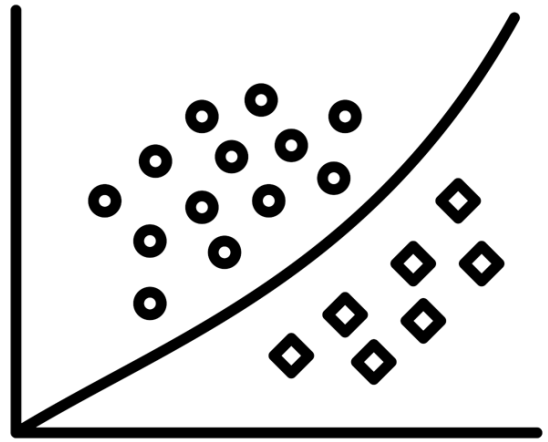
Machines ploughing through lots of data for you.

- "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

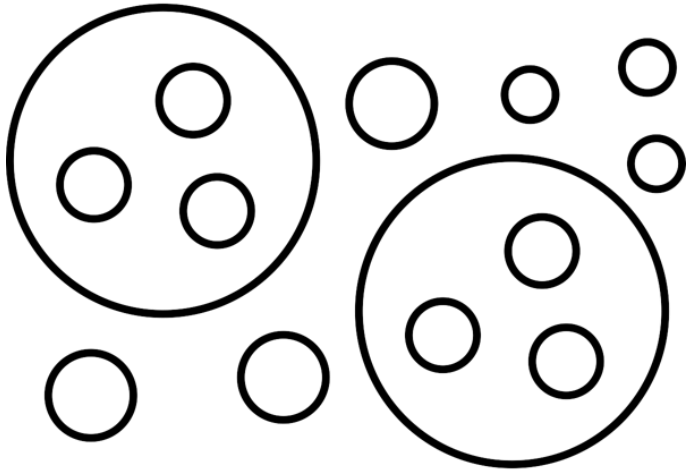
- Text autocompletion
- Task offerings
- Image tooling – adding photos to a collage
- Creating albums
- Offering similar music and videos
- Offering products that match



Classification

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

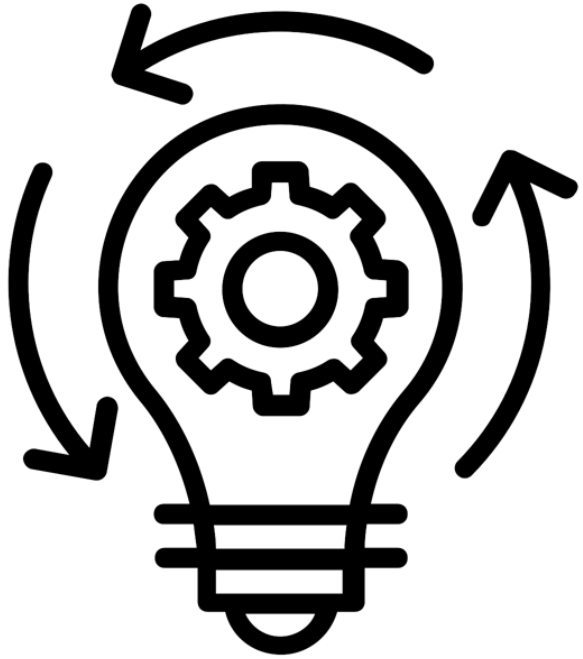
- Google surveys offering the right form elements for a question
- Detecting faces and asking for more information
- Finding anomalies in health scans and doing the same for all the ones in the system



Clustering

Find own patterns and collate them

- Photo tagging and ordering
- Document analysis
- Comment filtering and triaging
- Video optimisation dependent on content.

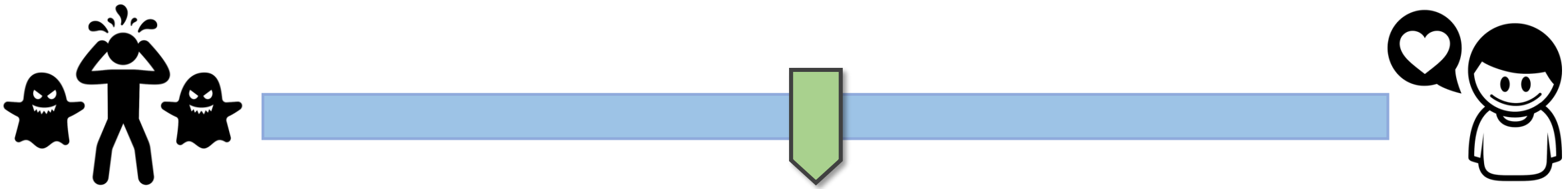


Generation

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

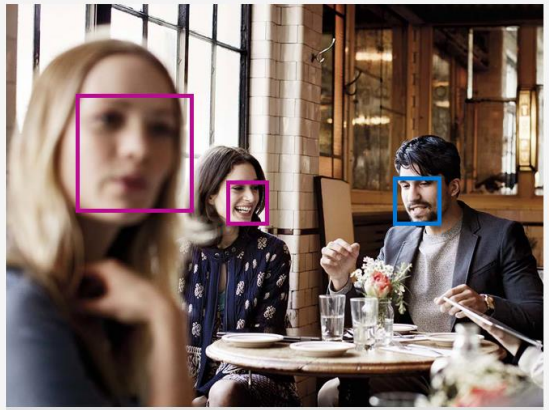
We need to find our place on the scale



About face...

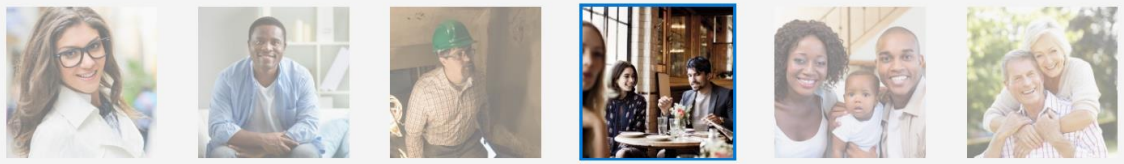
Face detection

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



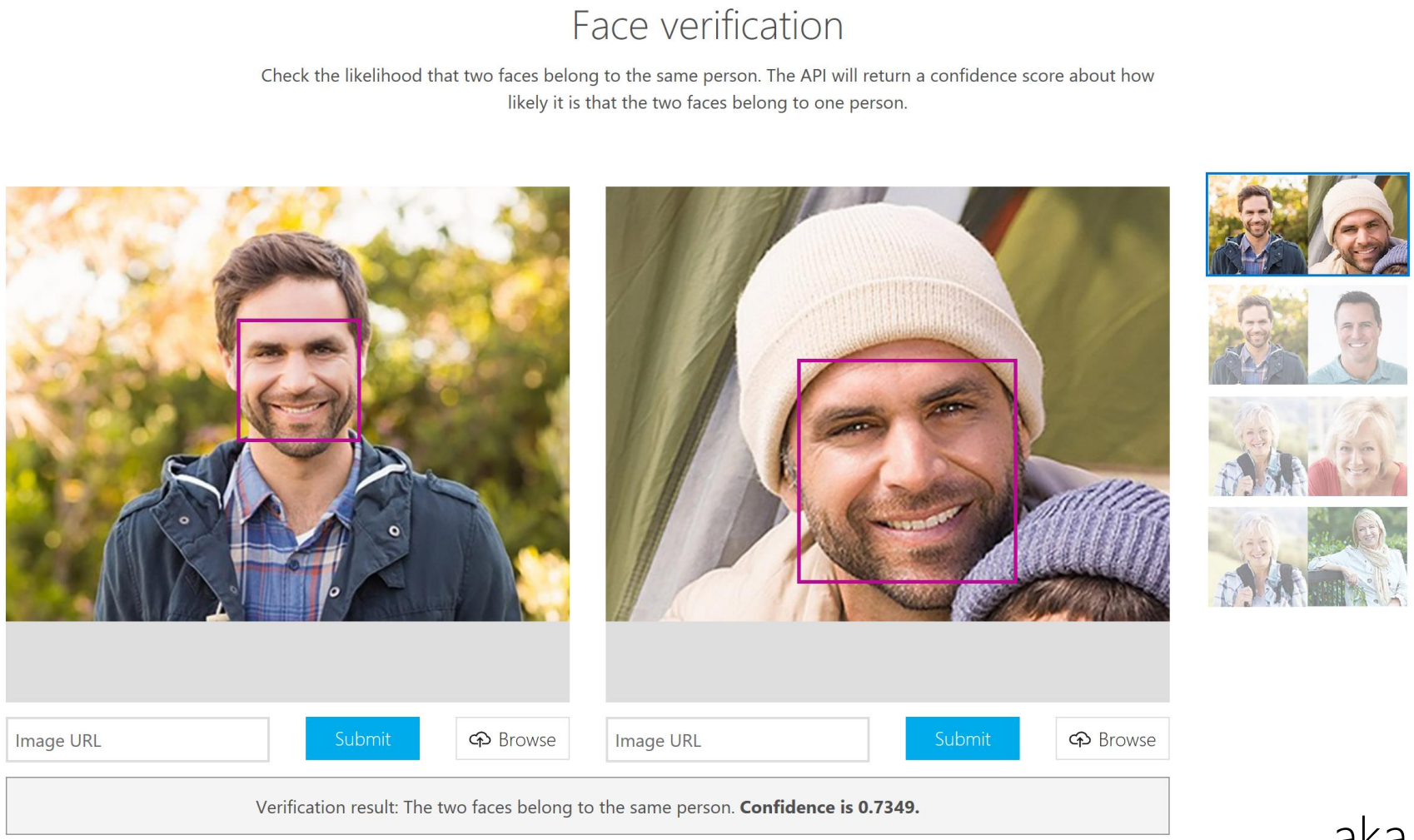
aka.ms/face-api

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)

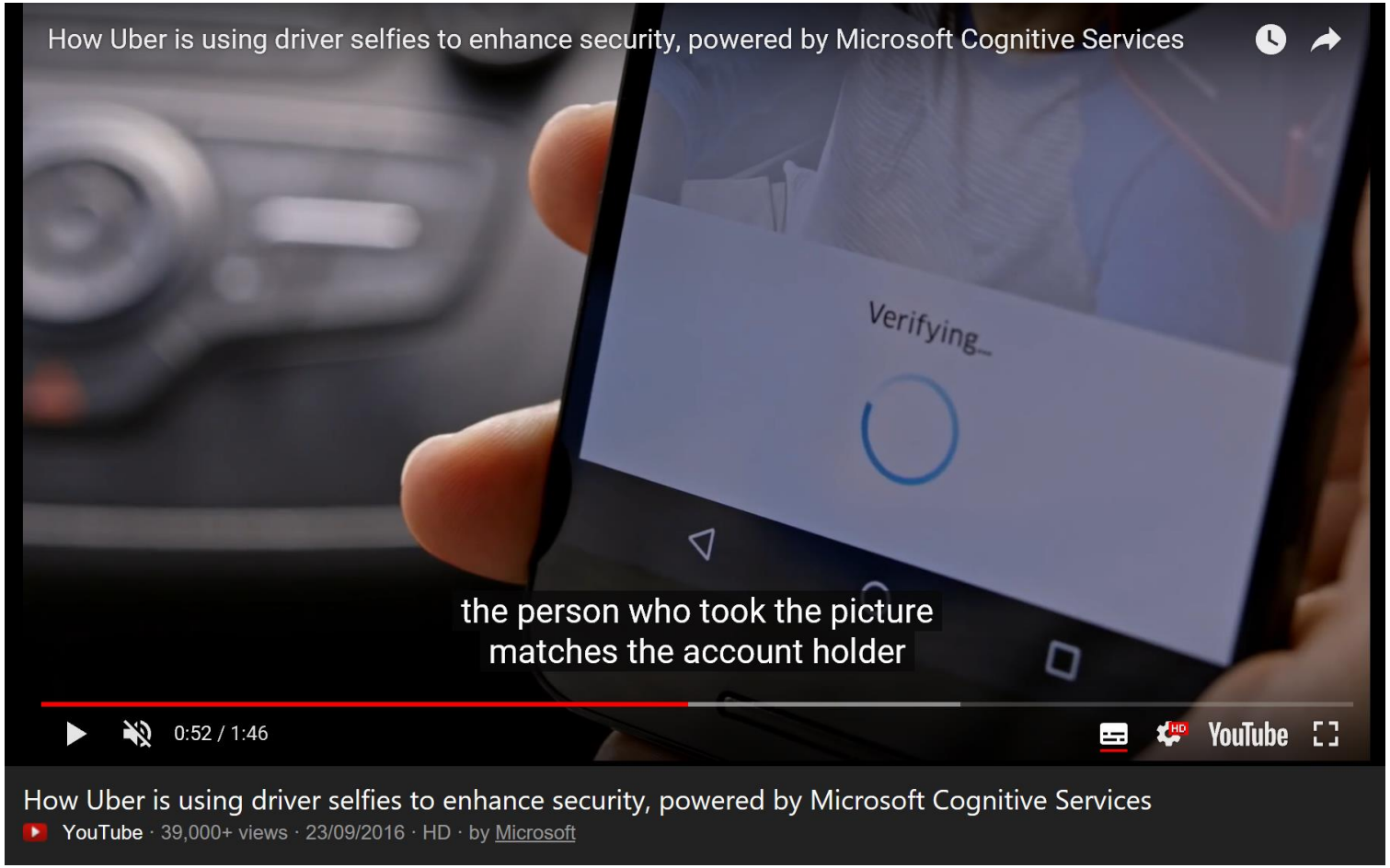
aka.ms/face-api

Is this you? Are those also you?



aka.ms/face-api

Is this your driver?



youtube.com/watch?v=aEBi4OpXU4Q

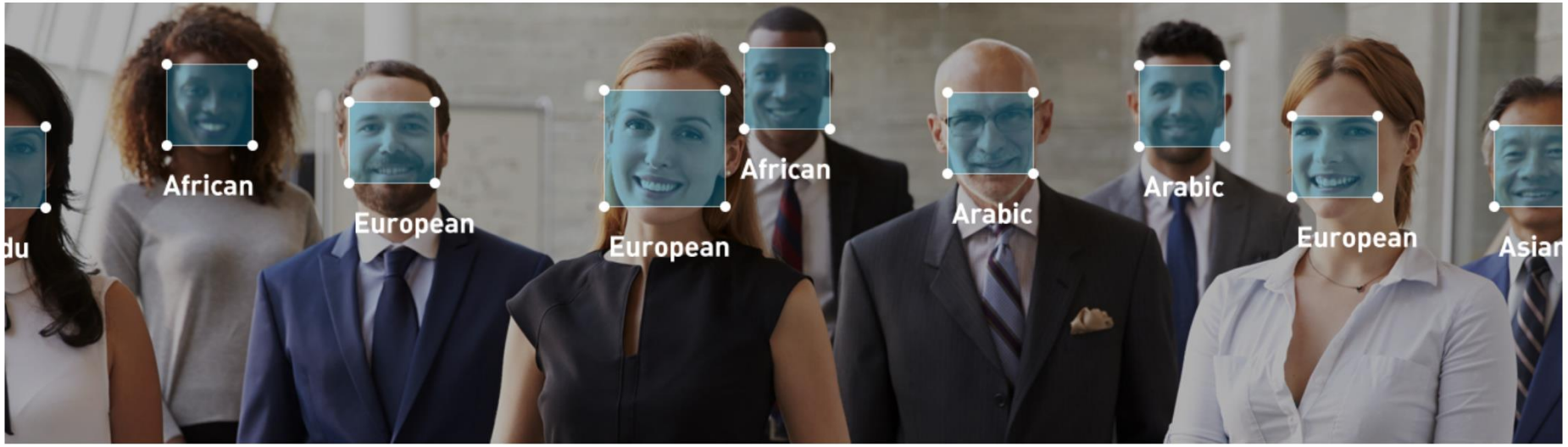
Taking it too far?

https://ntechlab.com/

Coming soon

PATH TRACKING | ETHNICITY RECOGNITION

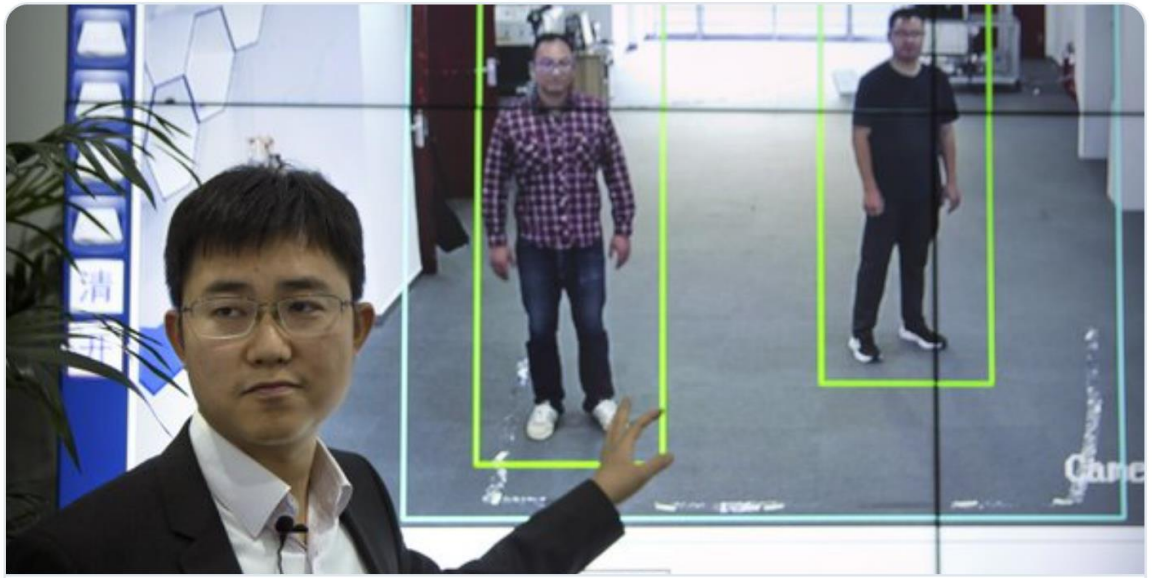
Recognizes a person's ethnicity



ntechlab.com

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

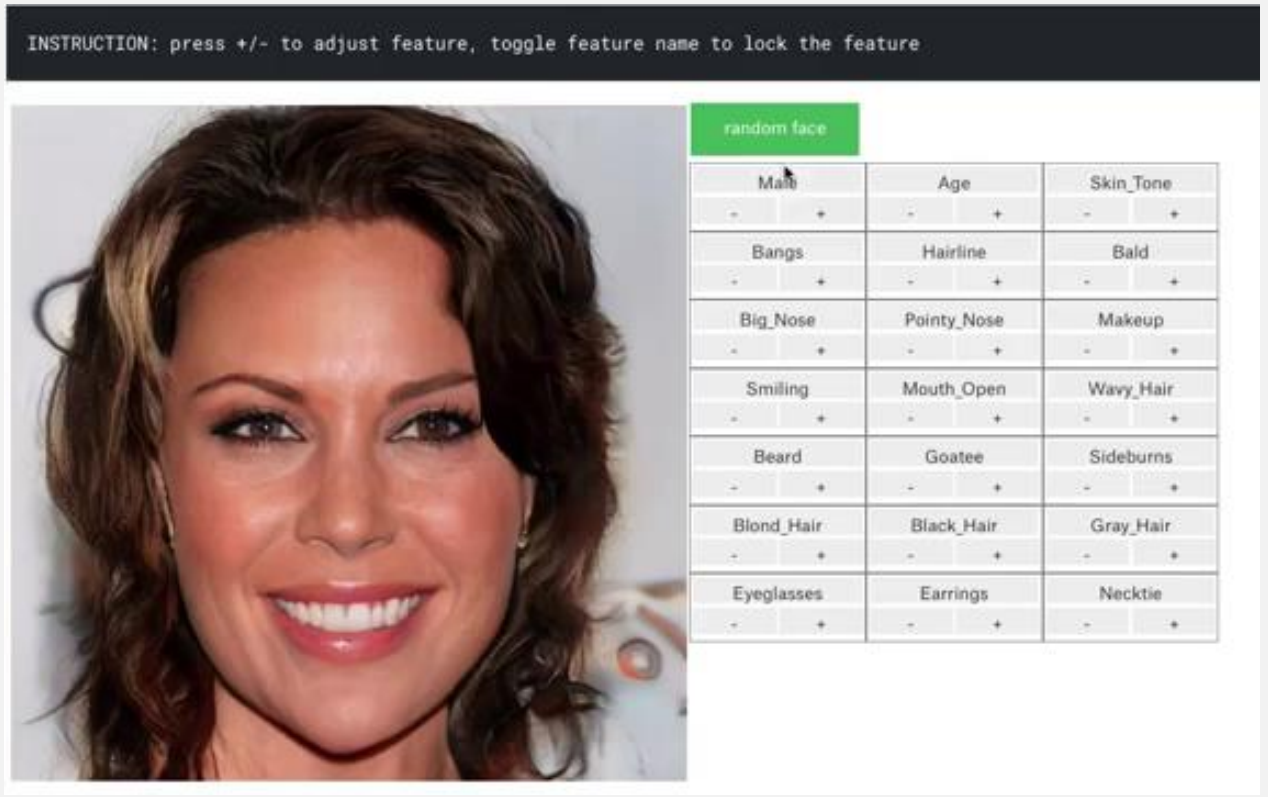
apnews.com

https://apnews.com/bf75dd1c26c947b7826d270a16e2658a

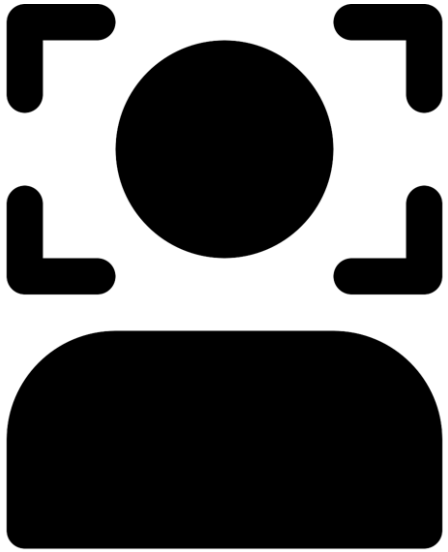
Those trustworthy avatars…

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

Those trustworthy avatars…



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



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.

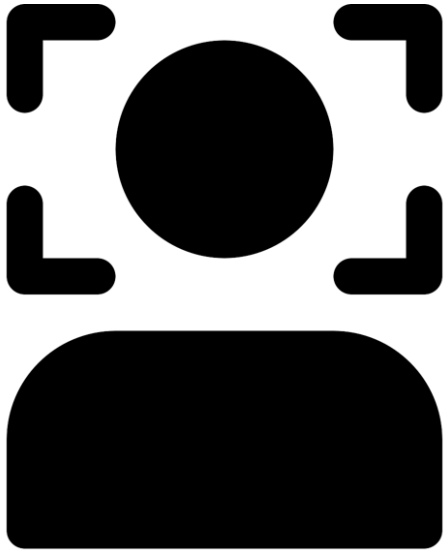
Social Mapper supports the following social media platforms:

- 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...

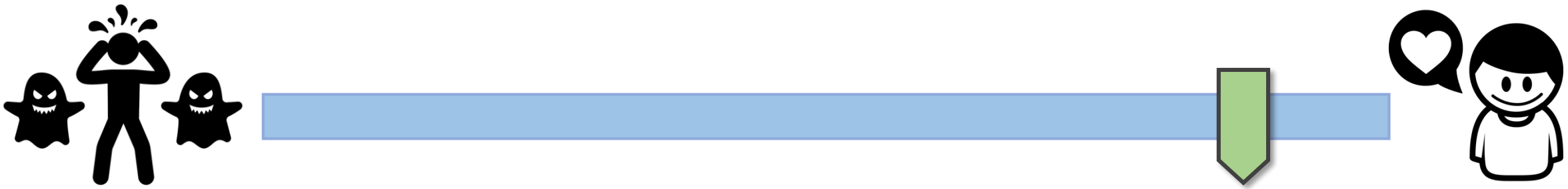
- Create fake social media profiles to 'friend' the targets and send them links or malware. Recent statistics show social media users are more than twice as likely to click on links and open documents compared to those delivered via email.
- Trick users into disclosing their emails and phone numbers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

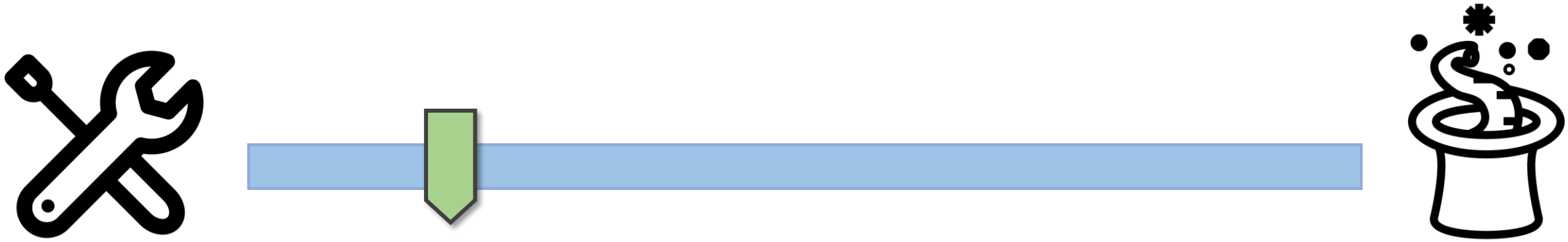
AI for humans

Andreas Dantz flickr.com/photos/szene/40193567250

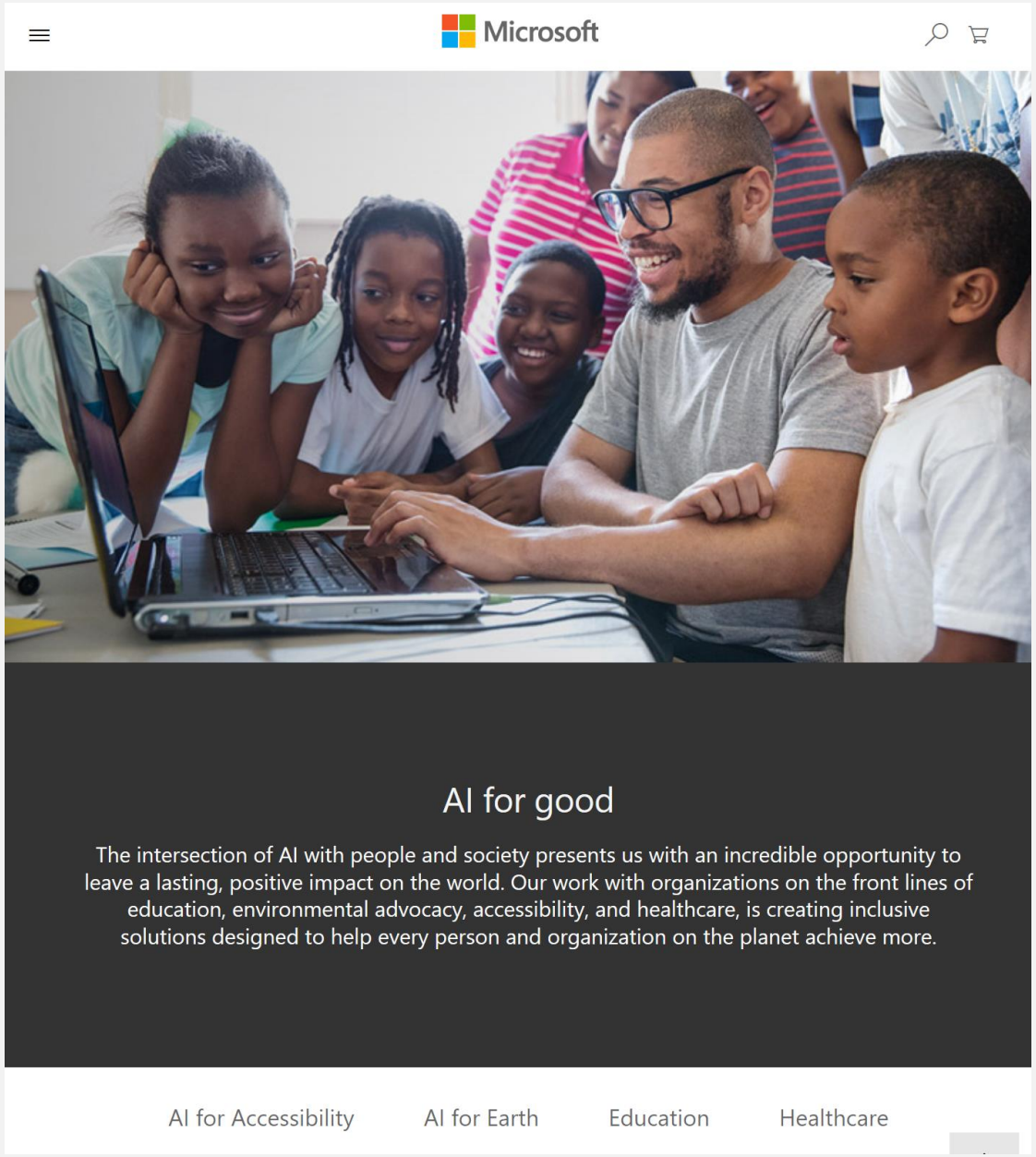
I want people to appreciate AI, without giving up their data unwillingly...



The best way to do this, is to stop selling it as magic, but as a tool...



How AI can help humans...

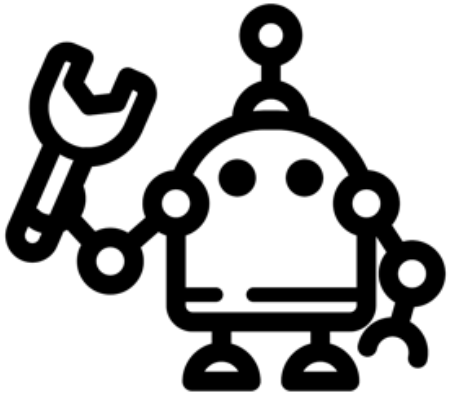


aka.ms/ai-for-good

Humans

- Messy and prone to mistakes
- Forget things and filter them by their biases
- Bored when doing repetitive tasks
- When bored create more errors
- Non-optimised communication, lots of nuances and misunderstanding

Bots and computers…

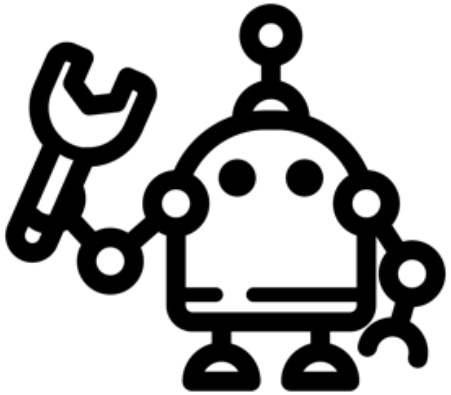


- Make no mistakes, other than physical fatigue
- Never forget, don't judge
- Great at tedious, boring tasks
- Repeat things with minor changes on iterations till a result is met
- Highly optimised, non-nuanced communication.

Humans

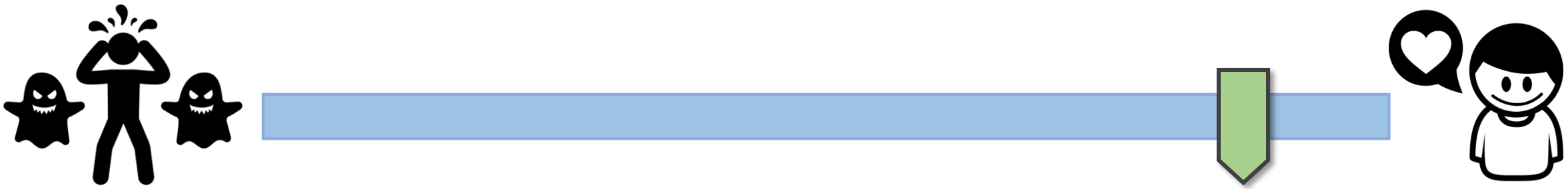
- Messy and prone to mistakes
- Forget things and filter them by their biases
- Bored when doing repetitive tasks
- When bored create more errors
- Non-optimised communication, lots of nuances and misunderstanding

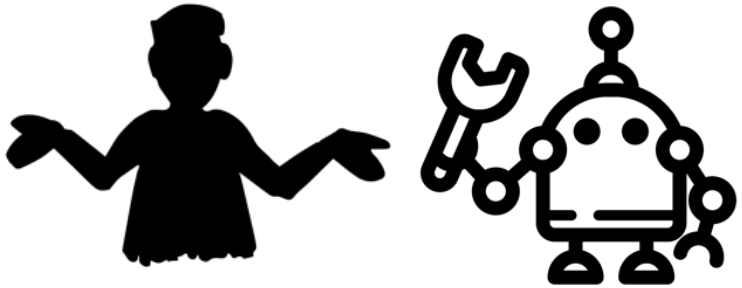
Bots and computers…



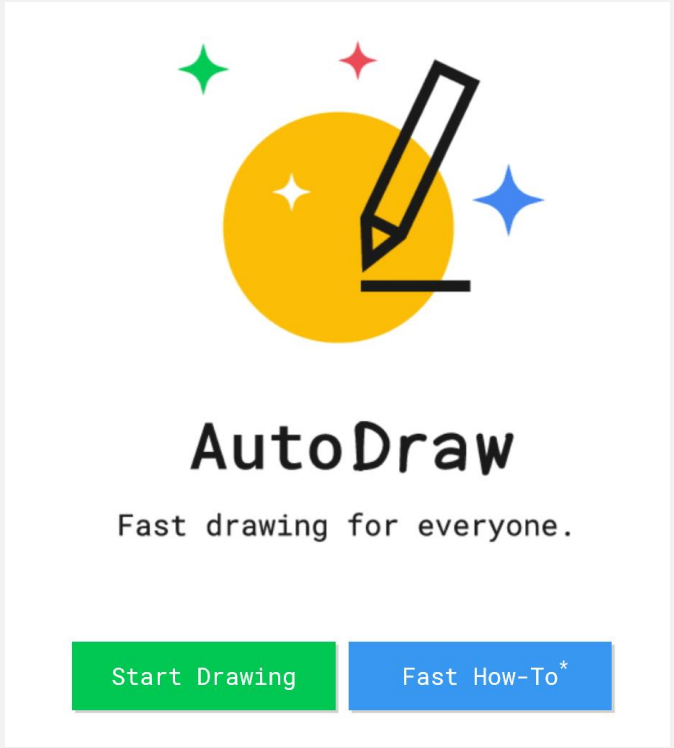
- Make no mistakes, other than physical fatigue
- Never forget, don't judge
- Great at tedious, boring tasks
- Repeat things with minor changes on iterations till a result is met
- Highly optimised, non-nuanced communication.

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

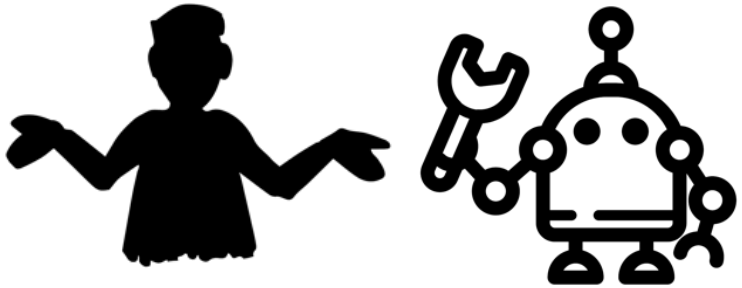




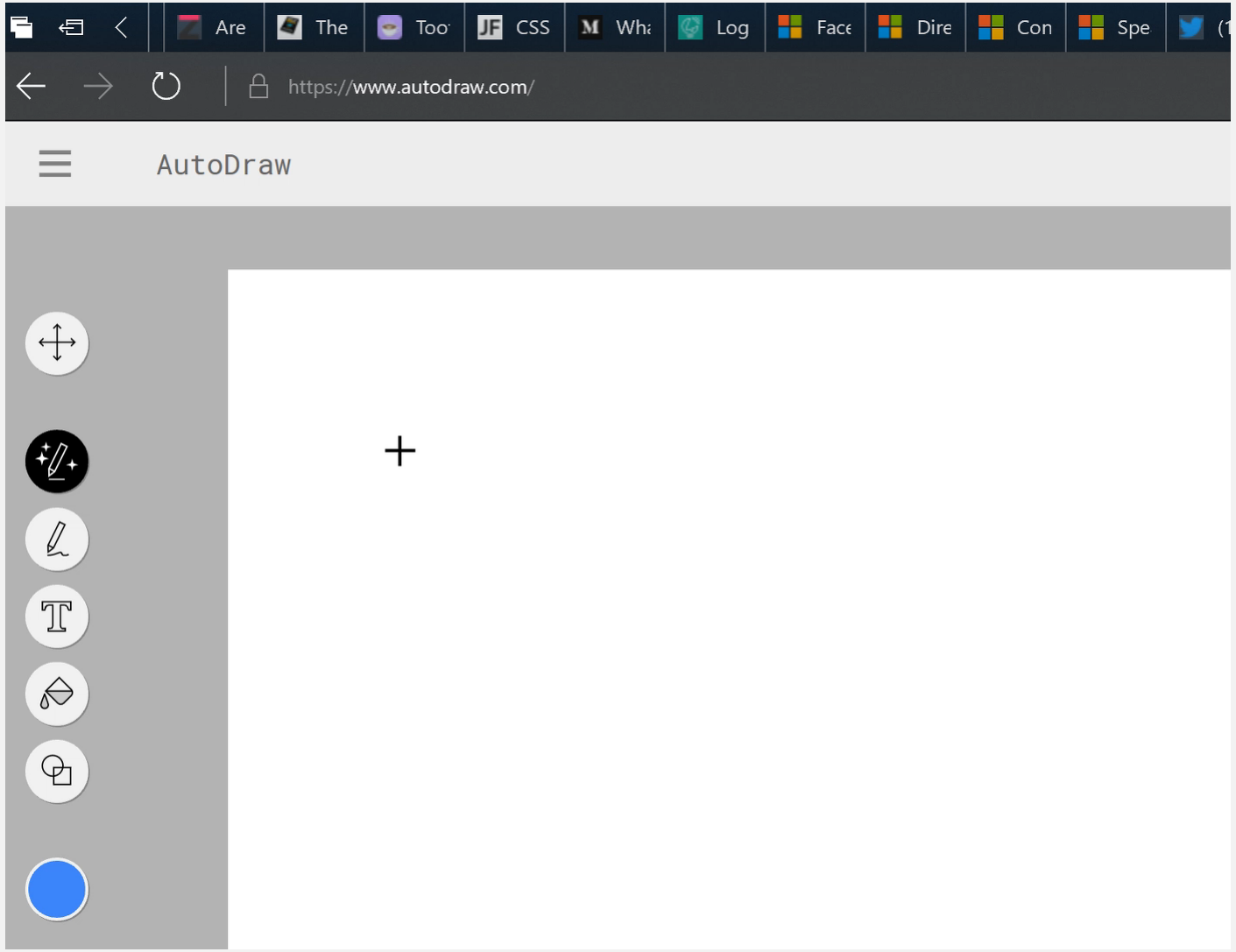
Humans and Bots/Computers



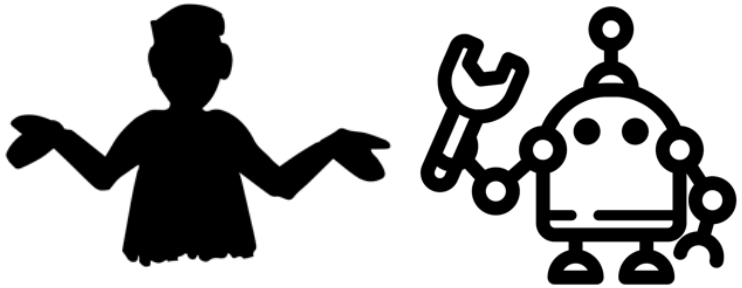
autodraw.com



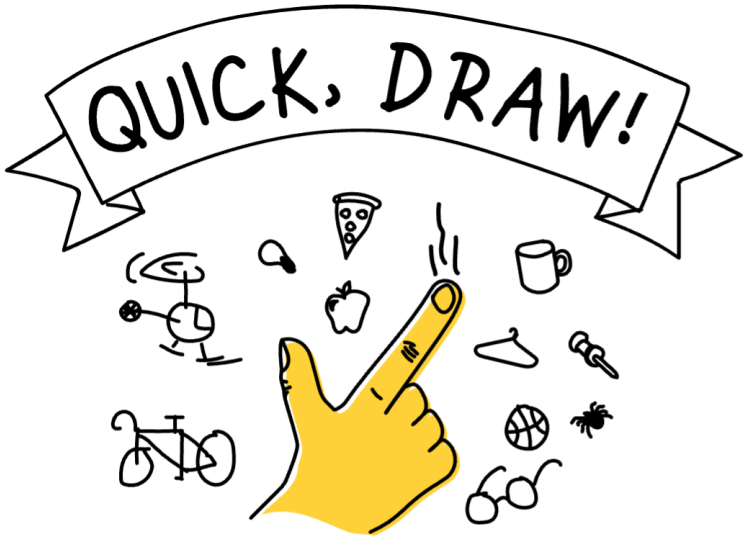
Humans and Bots/Computers



autodraw.com



Humans and Bots/Computers



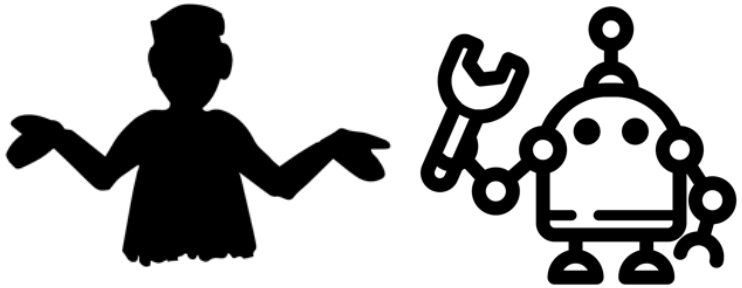
Can a neural network learn to recognize doodling?

Help teach it by adding your drawings to the world's largest doodling data set, shared publicly to help with machine learning research.

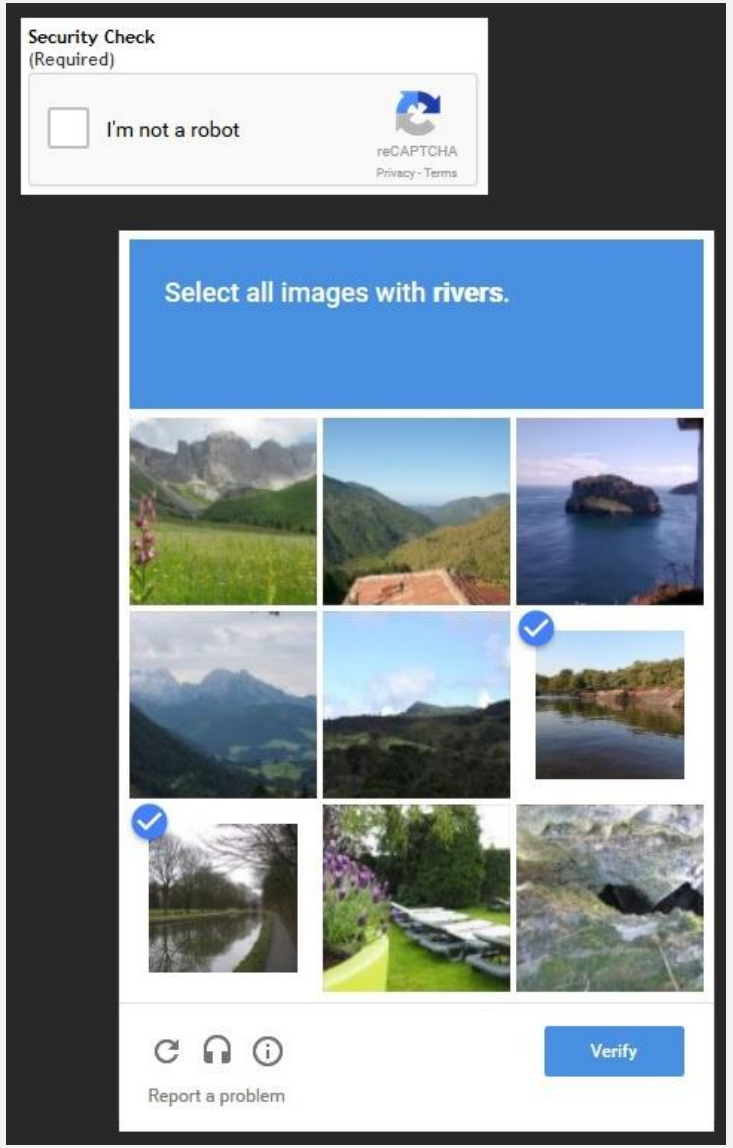
Let's Draw!

@codepo8

quickdraw.withgoogle.com



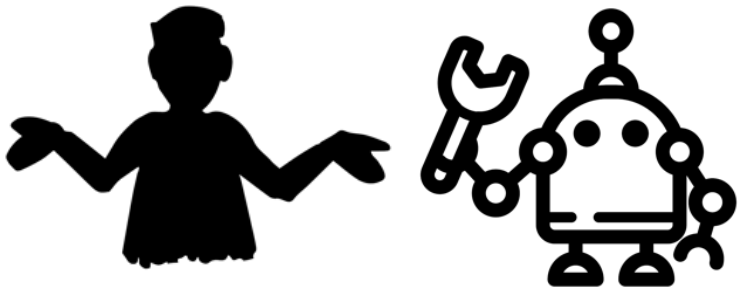
Humans and Bots/Computers



google.com/recaptcha/intro

“Learning” from lots of images

https://github.com/jantic/DeOldify



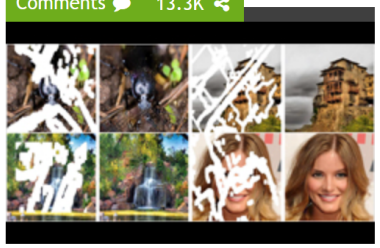
Humans and Bots/Computers

NVIDIA DEVELOPER

NEWS CENTER

ACCELERATED COMPUTING | ARTIFICIAL INTELLIGENCE | AUTONOMOUS VEHICLES | DESIGN & VISUALIZATION | GAME

Comments 13.3K



New AI Imaging Technique Reconstructs Photos with Realistic Results

April 22, 2018

Researchers from NVIDIA, led by Guilin Liu, introduced a state-of-the-art deep learning method that can edit images or reconstruct a corrupted image, one that has holes or is missing pixels.

The method can also be used to edit images by removing content and filling in the resulting holes.

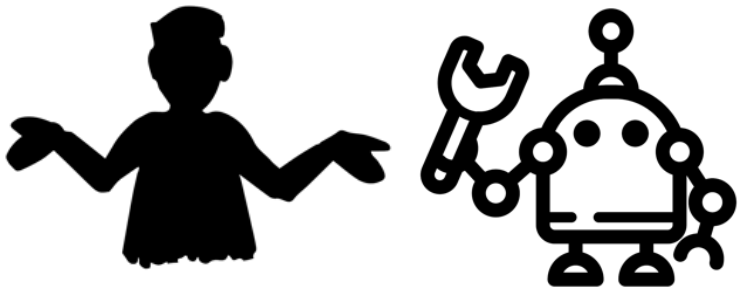
The method, which performs a process called “image inpainting”, could be implemented in photo editing software to remove unwanted content, while filling it with a realistic computer-generated alternative.

“Our model can robustly handle holes of any shape, size location, or distance from the image borders. Previous deep learning approaches have focused on rectangular regions located around the center of the image, and often rely on expensive post-processing,” the NVIDIA researchers stated in their research paper. “Further, our model gracefully handles holes of increasing size.”

To prepare to train their neural network, the team first generated 55,116 masks of random streaks and holes of arbitrary shapes and sizes for training. They also generated nearly 25,000 for testing. These were further categorized into six categories based on sizes relative to the input image, in order to improve reconstruction accuracy.

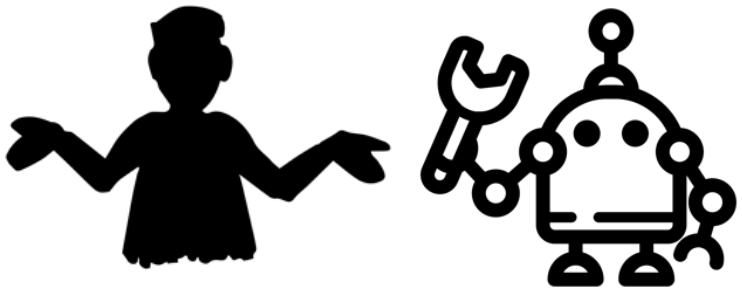
An example of the masks generated for training.

aka.ms/nvidia-fix-image



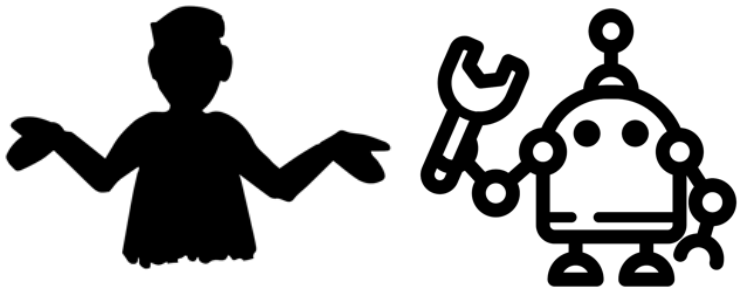
Humans
and
Bots/Computers

aka.ms/nvidia-fix-image



Humans and Bots/Computers

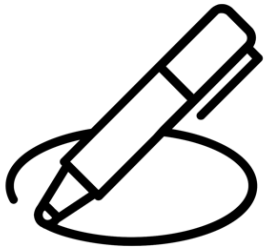
aka.ms/nvidia-fix-image



Humans
and
Bots/Computers

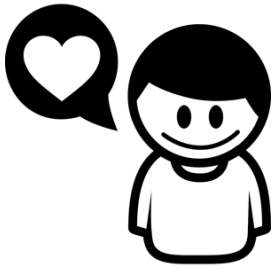
gandissect.csail.mit.edu/

Our toolkit for more human interfaces



Natural language processing

Computer Vision



Sentiment analysis

Speech conversion and analysis

Moderation

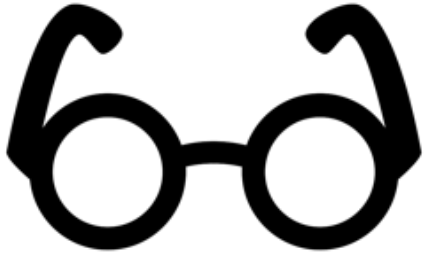
Language and Writing

- Probably the oldest task on the web was **translation**
- This moved deeper into **Natural Language Processing** and **Language Detection**
- Using these, we can allow for **human commands** and finding out tasks by analyzing texts.

"How far am I from the capital of Denmark?"

"Where do I find a good restaurant around here?"

"Show me documents I wrote five days ago with more than 600 words"



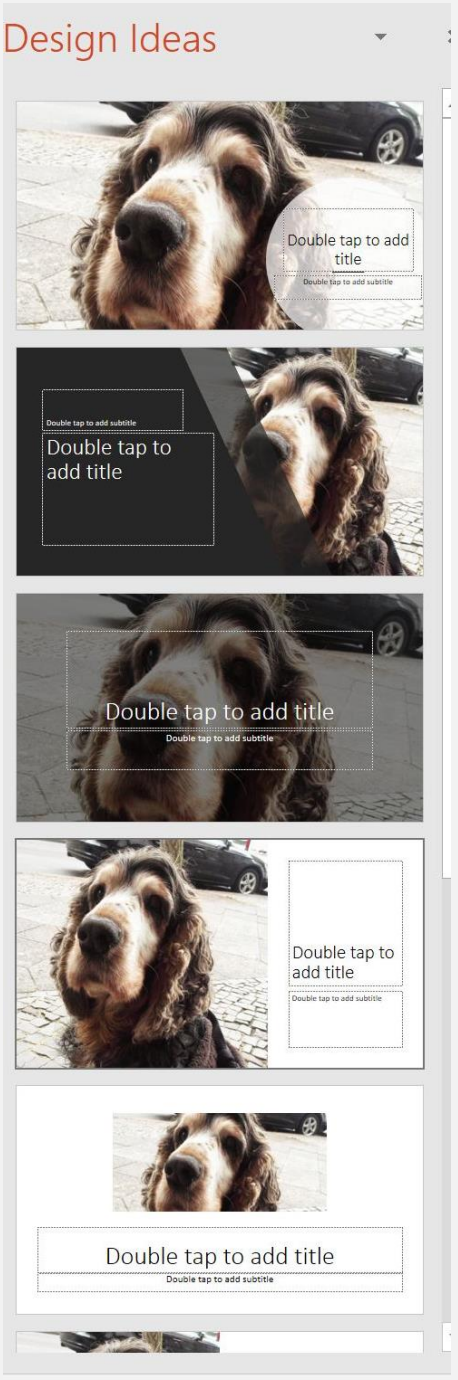
Computer Vision

- When text wasn't cool enough, we added **images** to our web media
- Often we forget that **not everyone can see them**, and we leave them without alternative text
- This is where machine learning steps in to help **turning an image into a dataset** we can work with.

Vision and image analysis…

Vision and image analysis…

Vision and image analysis…



@codepo8

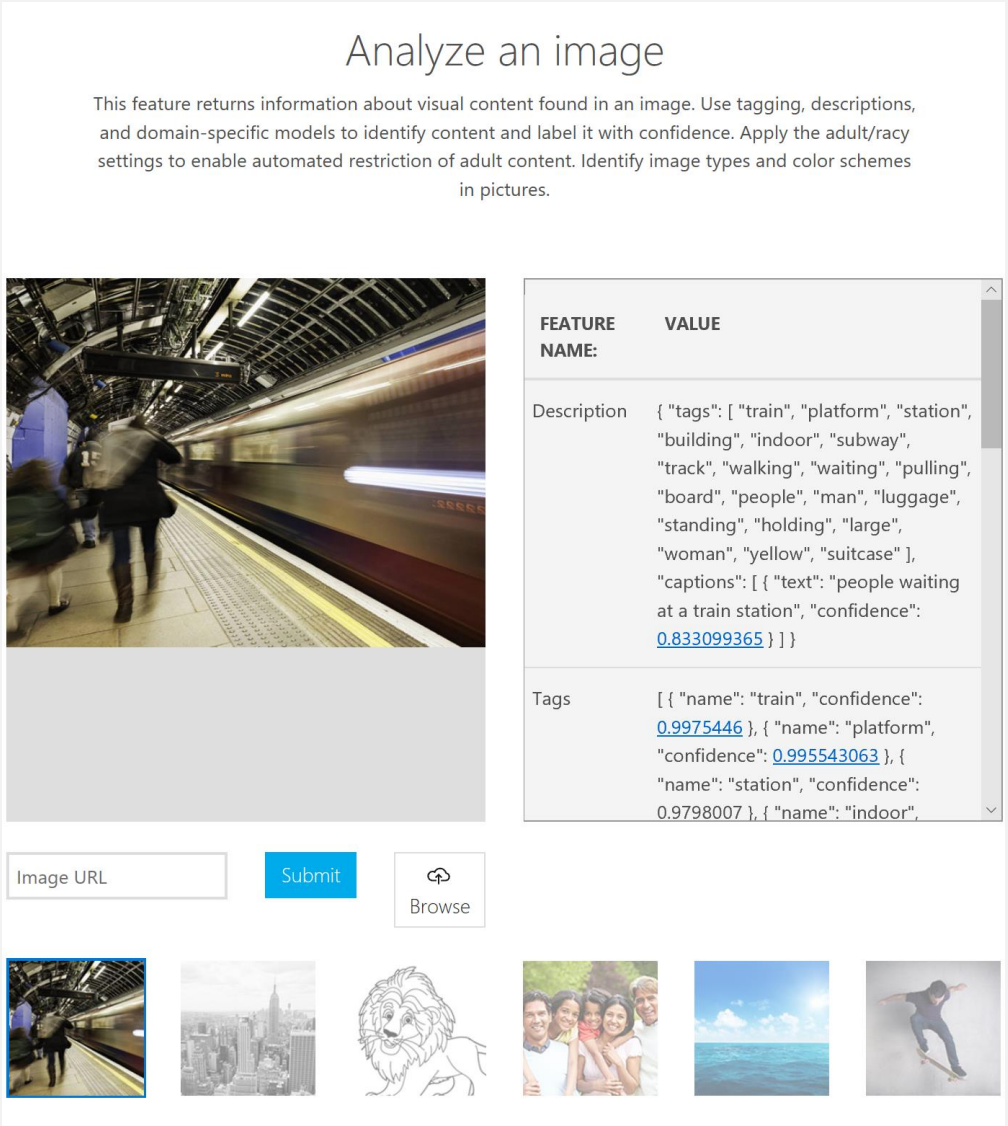
Vision and image analysis…

twitter.com/mixedhunty/status/980551155297157126

Vision and image analysis…

#vision_api

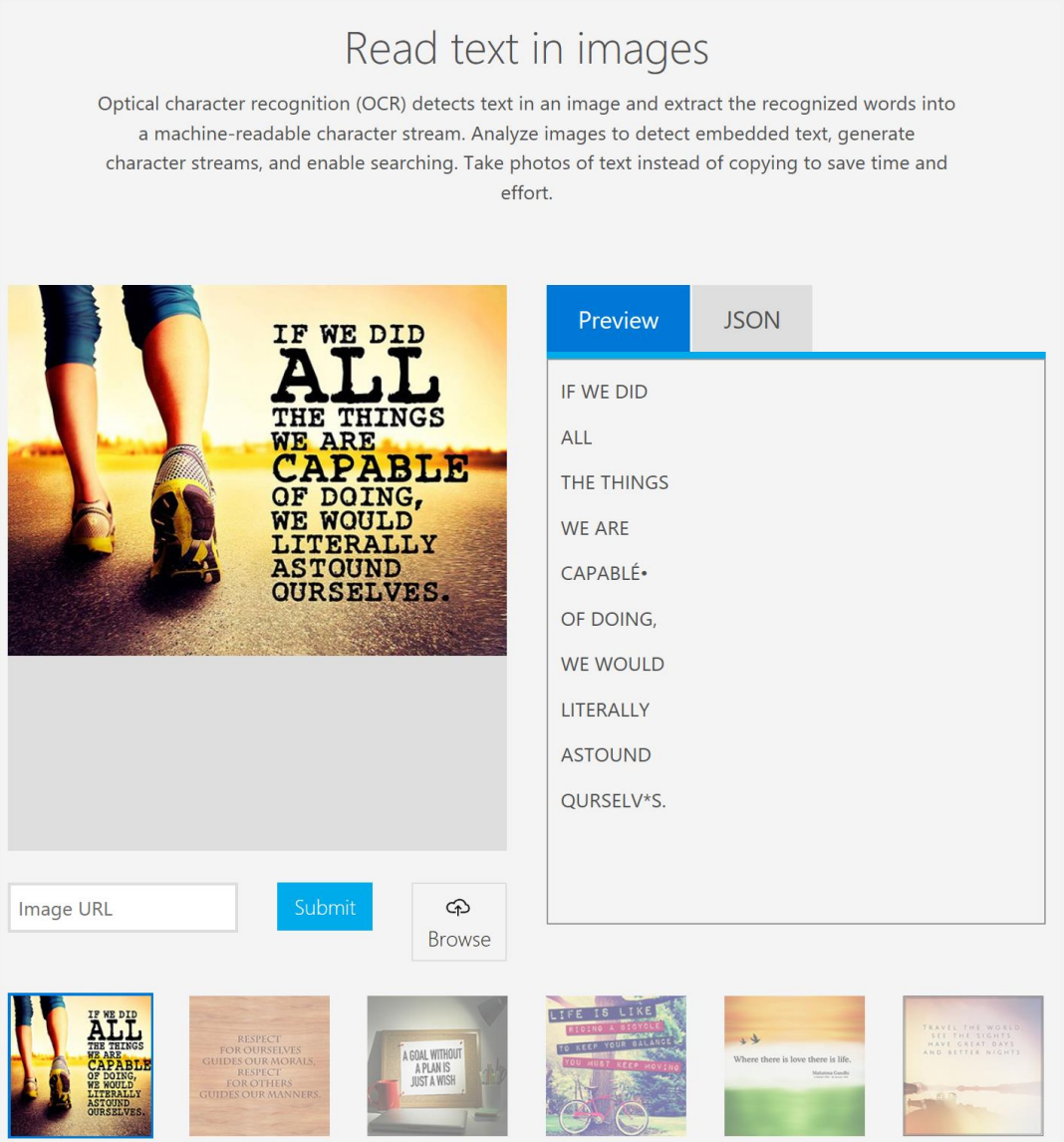
Vision and image analysis…



@codepo8

aka.ms/vision-api

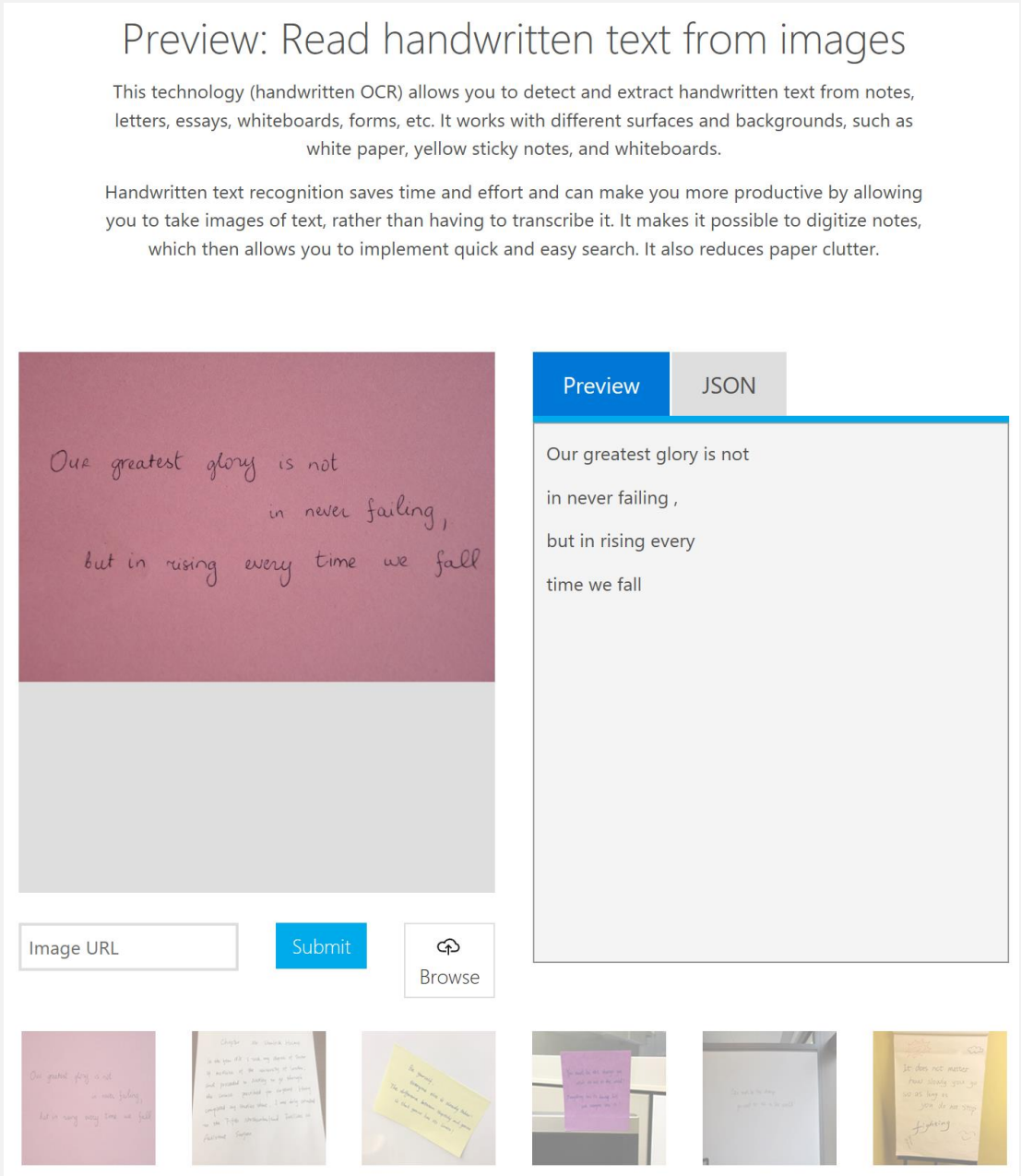
Vision and image analysis…



@codepo8

aka.ms/vision-api

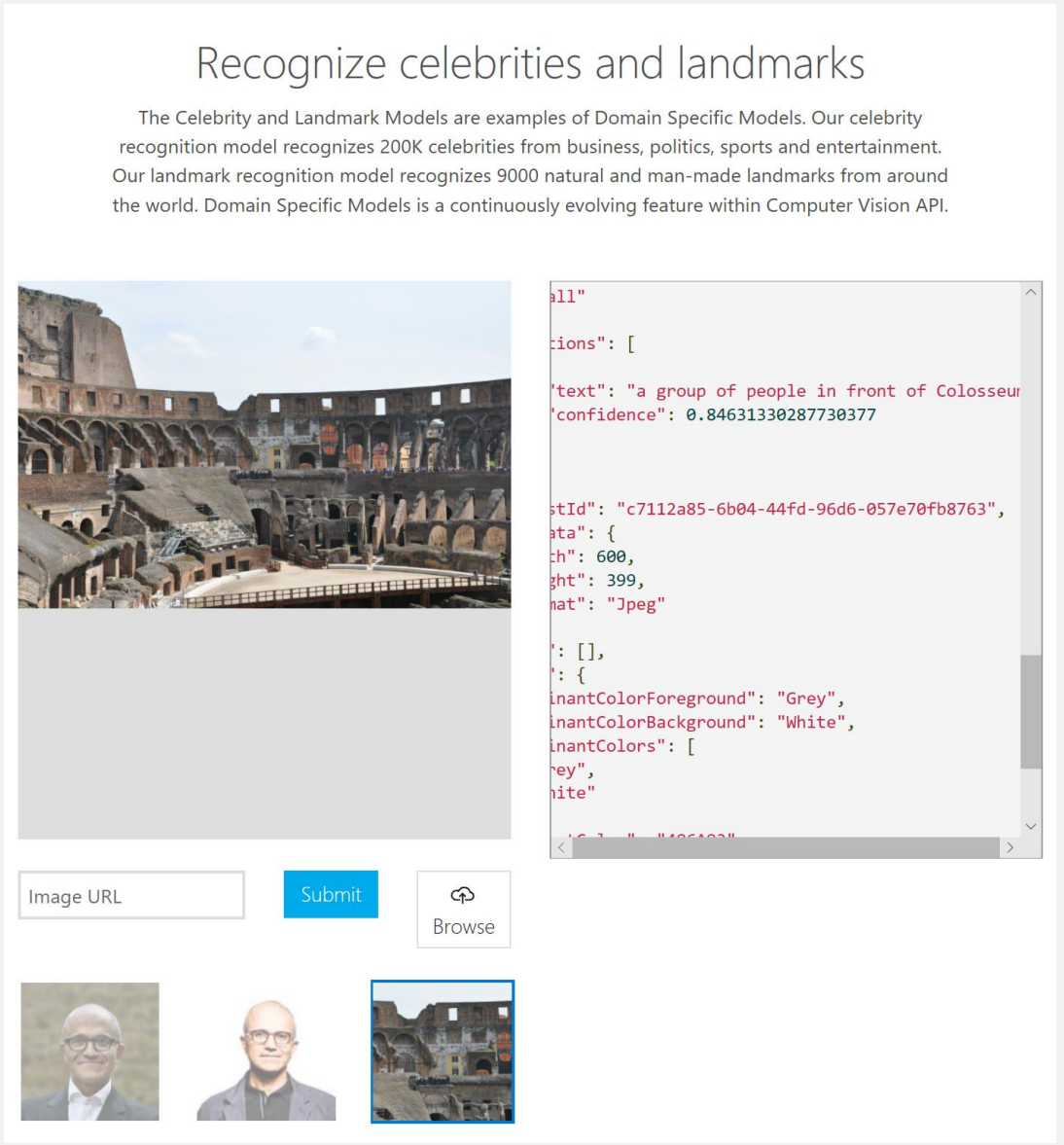
Vision and image analysis…



aka.ms/vision-api

@codepo8

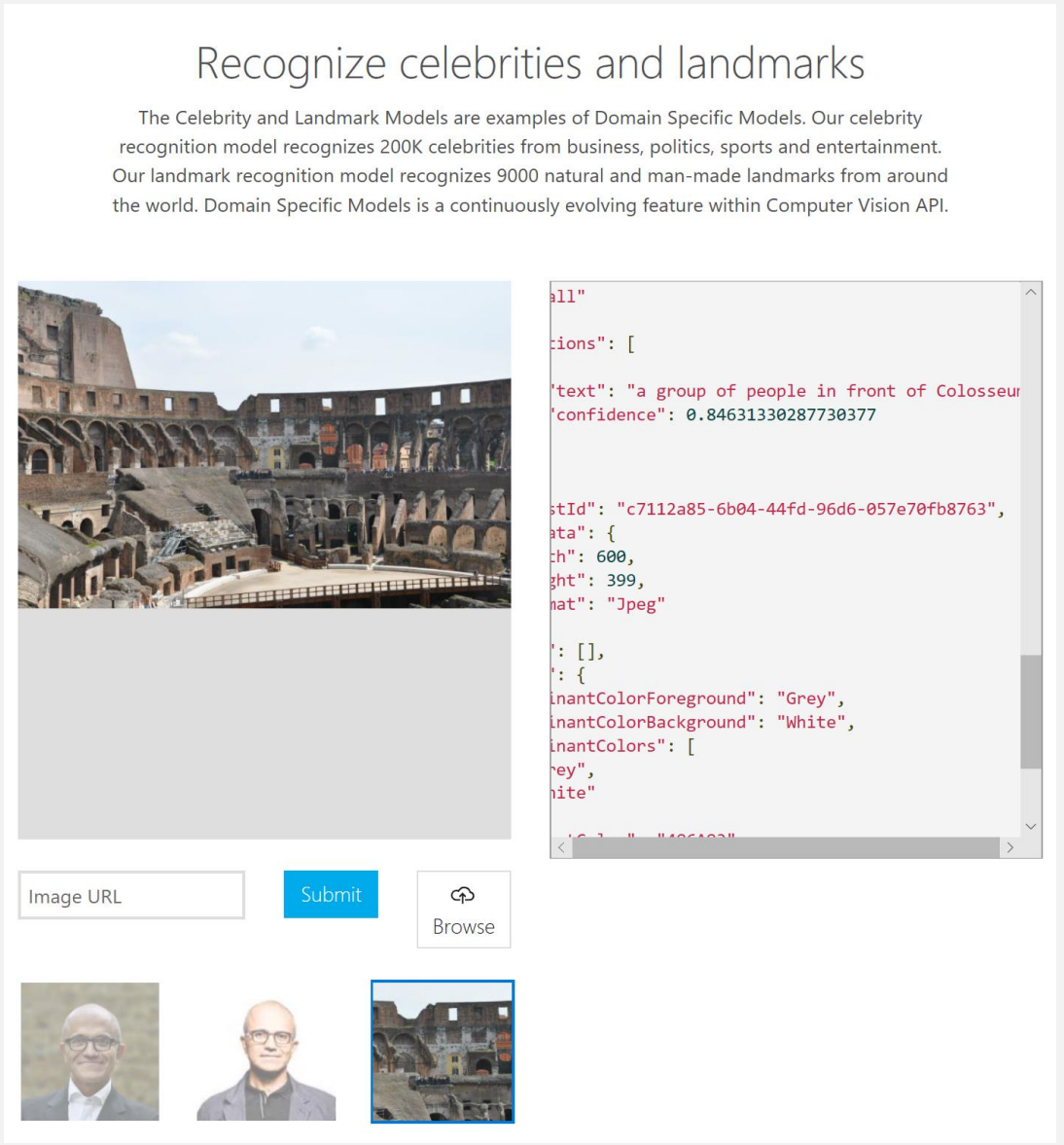
Vision and image analysis…



@codepo8

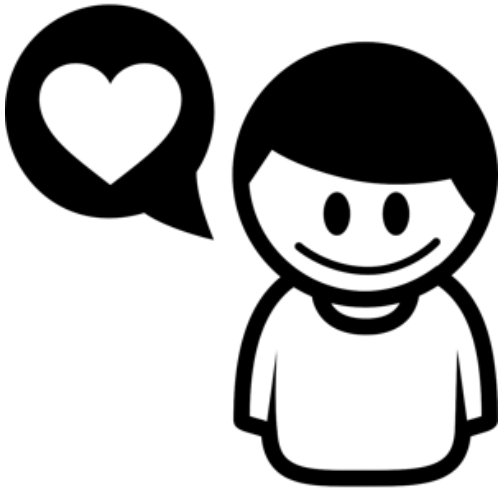
aka.ms/vision-api

Vision and image analysis…



@codepo8

aka.ms/vision-api



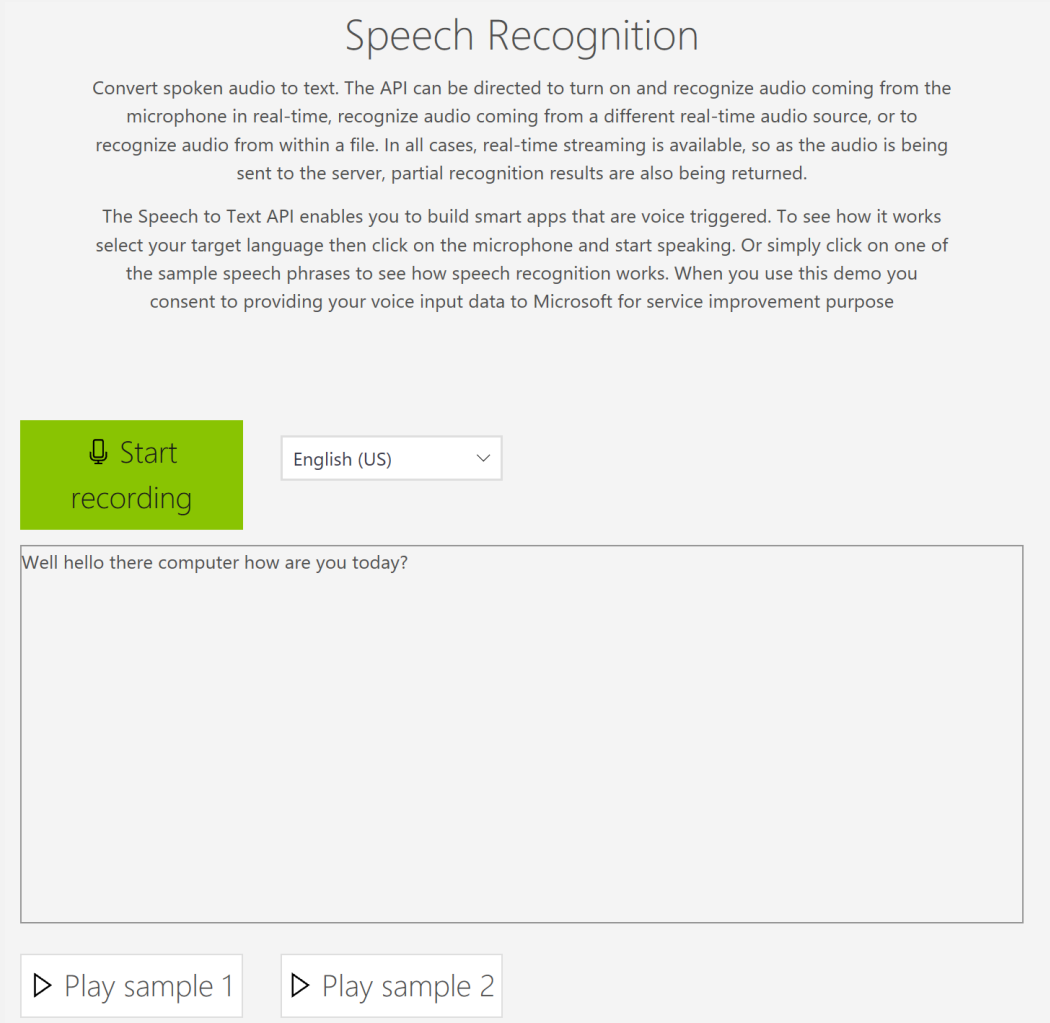
Sentiment analysis

- Finding out **the sentiment of a text, image or video** can help with a lot of things
- You can navigate videos by only showing the **happy parts**
- You can **detect which comment should be answered first** by a help desk
- You can **predict** when drivers of cars get **tired**

Speech

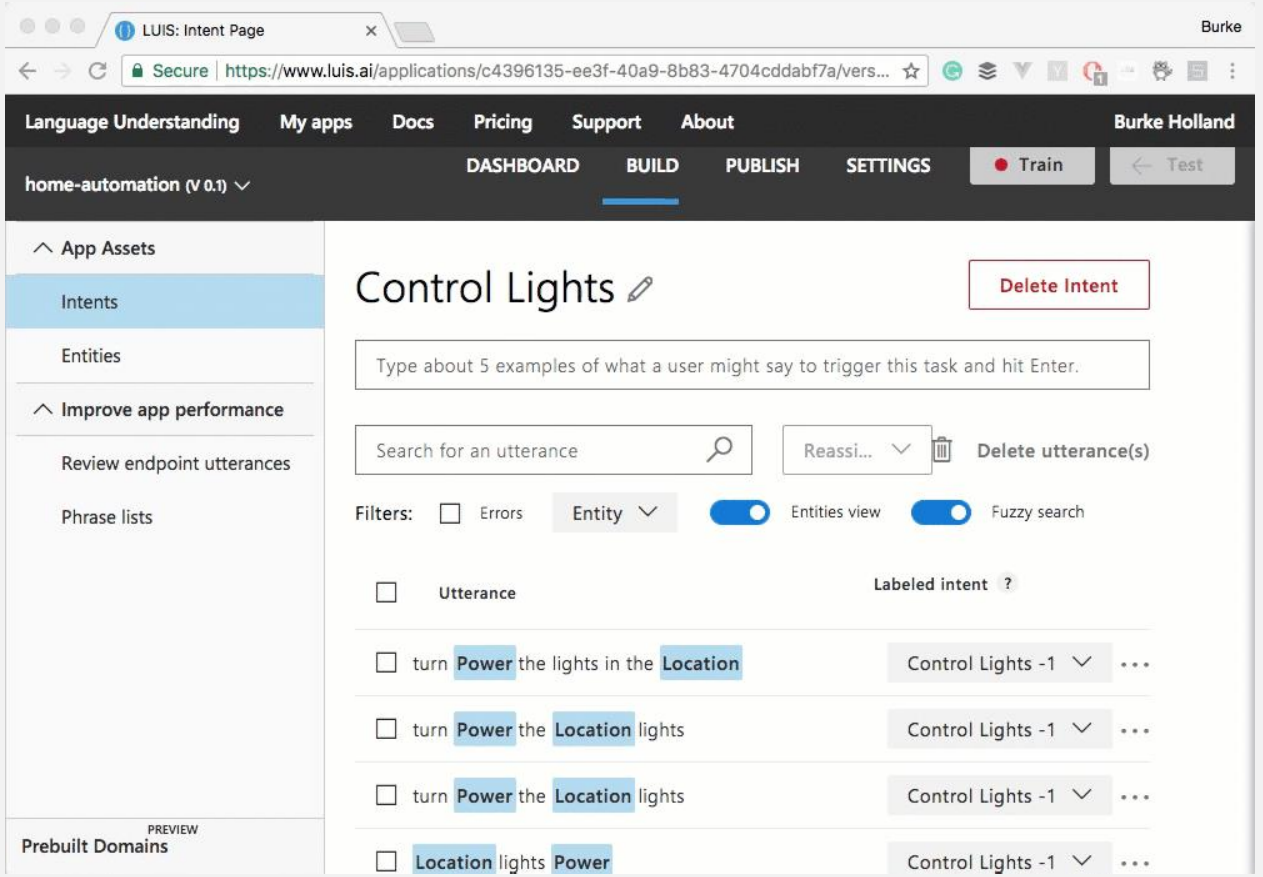
- Audio interfaces are **all the rage**.
- You can allow **hands-free control** of devices
- You can have an **"always on"** system to help you out **without having to interface with it**
- It feels natural and has **a massive Sci-Fi feeling** – when it works.

Speech recognition



aka.ms/text-to-speech

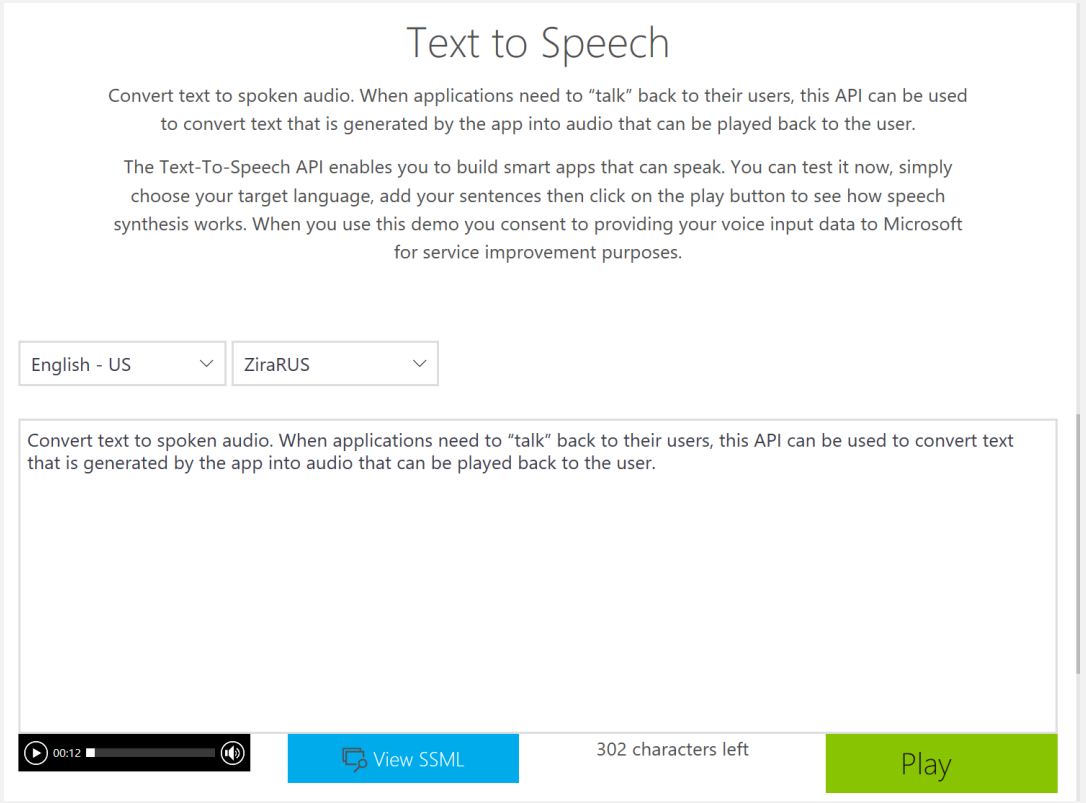
Turning sentences into commands



luis.ai

aka.ms/luis-api

Text to speech



aka.ms/text-to-speech

Conversation as an interface

The Rise Of Intelligent Conversational UI

UI 54 # Visual Design 59 # Interfaces 32 # User Interaction 49

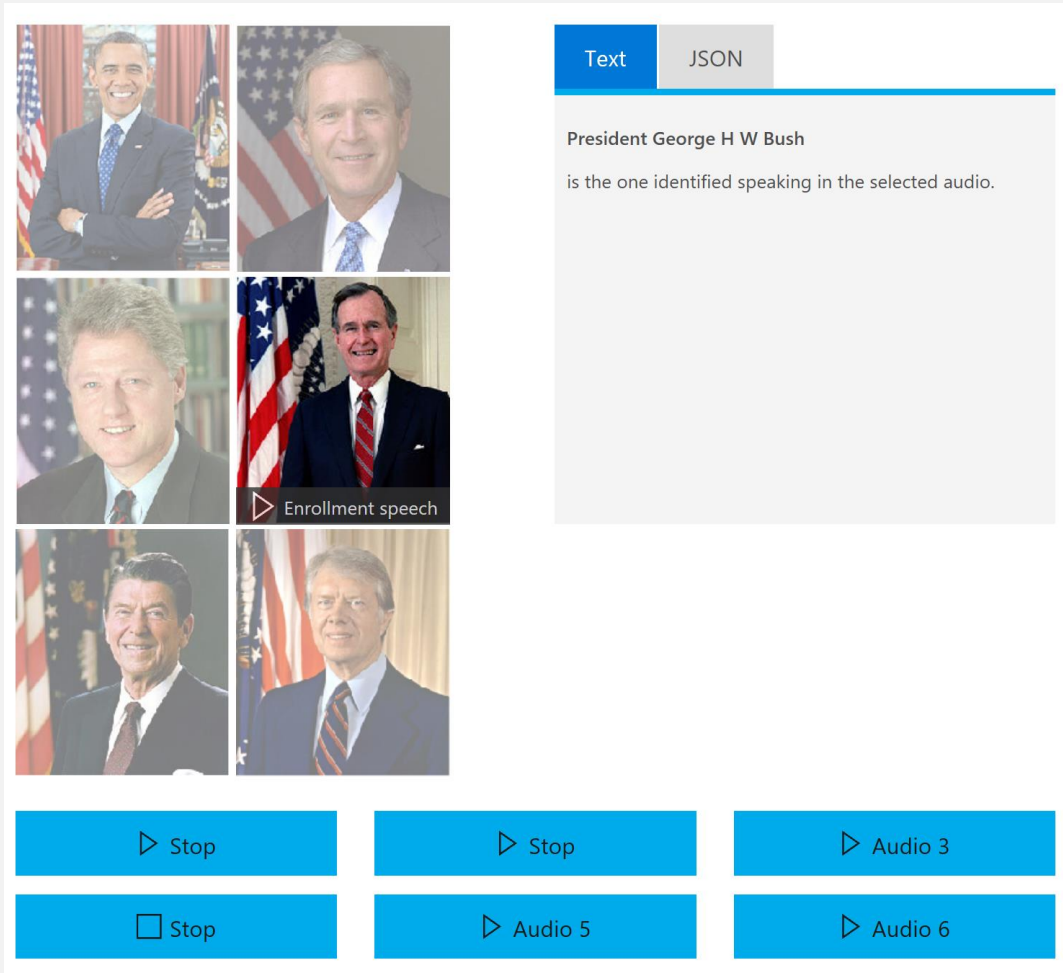
ABOUT THE AUTHOR

Burke Holland is a front-end developer living in Nashville, TN; the greatest city in the world. He enjoys JavaScript a lot because it's the only way he … More about Burke…

For a long time, we've thought of interfaces strictly in a visual sense: buttons, dropdown lists, sliders, carousels (please no more carousels). But now we are staring into a future composed not just of visual interfaces, but of conversational ones as well. Microsoft alone reports that three thousand new bots are built every week on their bot framework. Every. Week.

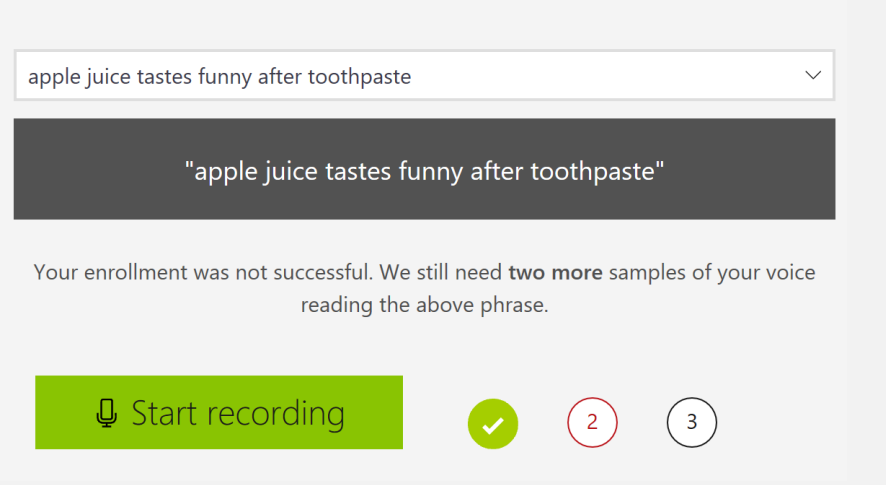
aka.ms/conversation-ui

Speaker recognition



aka.ms/speaker-recognition

Speaker recognition




```
{
  "EnrollmentStatus": "Enrolling",
  "EnrollmentsCount": 1,
  "RemainingEnrollments": 2,
  "Phrase": "i am going to make him an offer he cannot refuse"
}
```


aka.ms/speaker-recognition

Moderation

- Some things are **not meant to be consumed by people**
- **Computers don't need counselling** once they saw them – people should
- Known **illegal and terrible content** can be automatically **removed**

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.

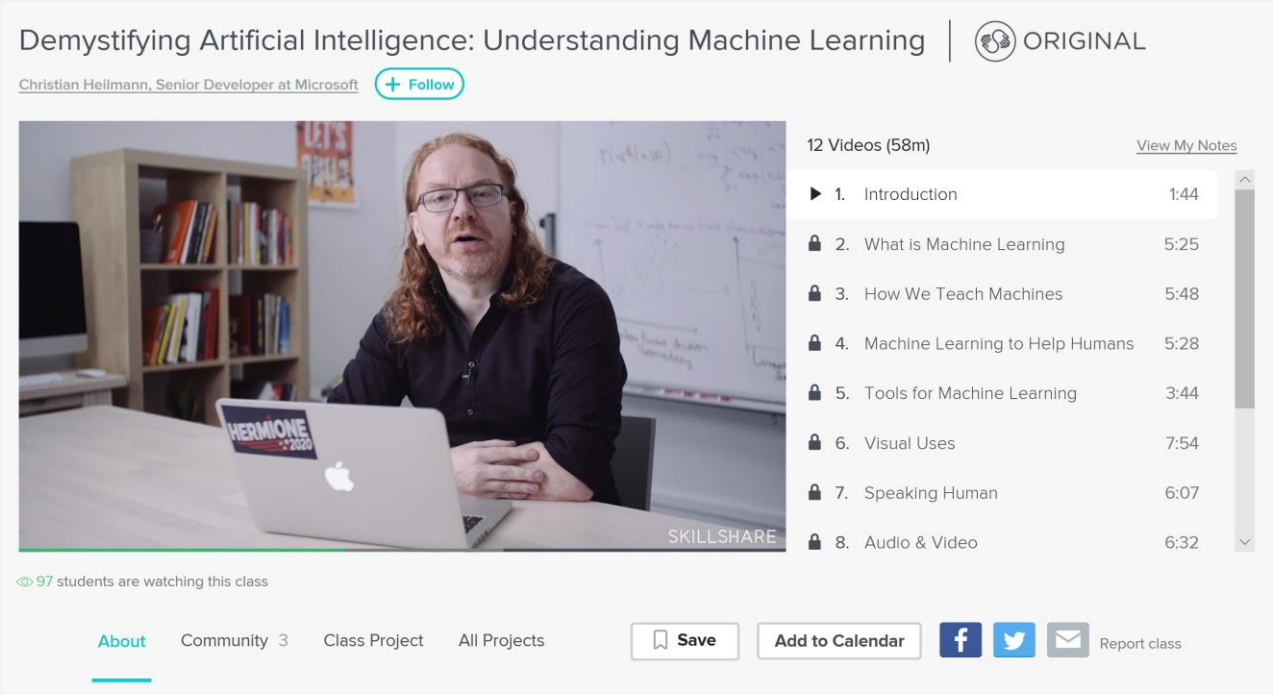
Want to go deep?

- 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

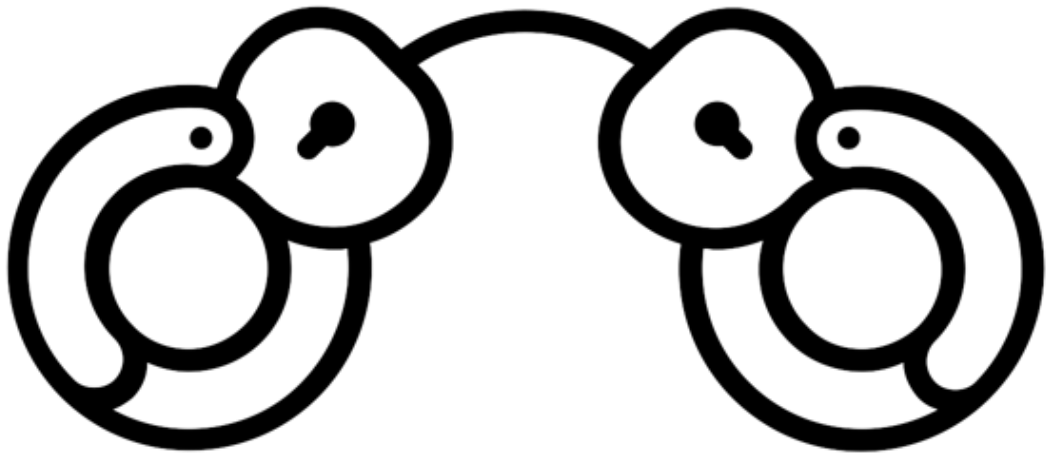
10 courses, (8-16 hours each), 10 skills

Want to go deep?



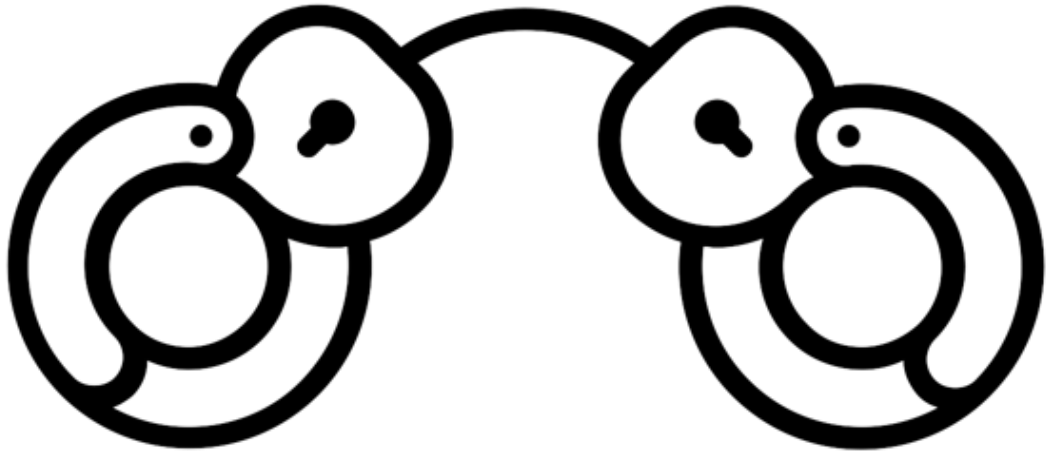
skl.sh/christian

Free with trial sign-up

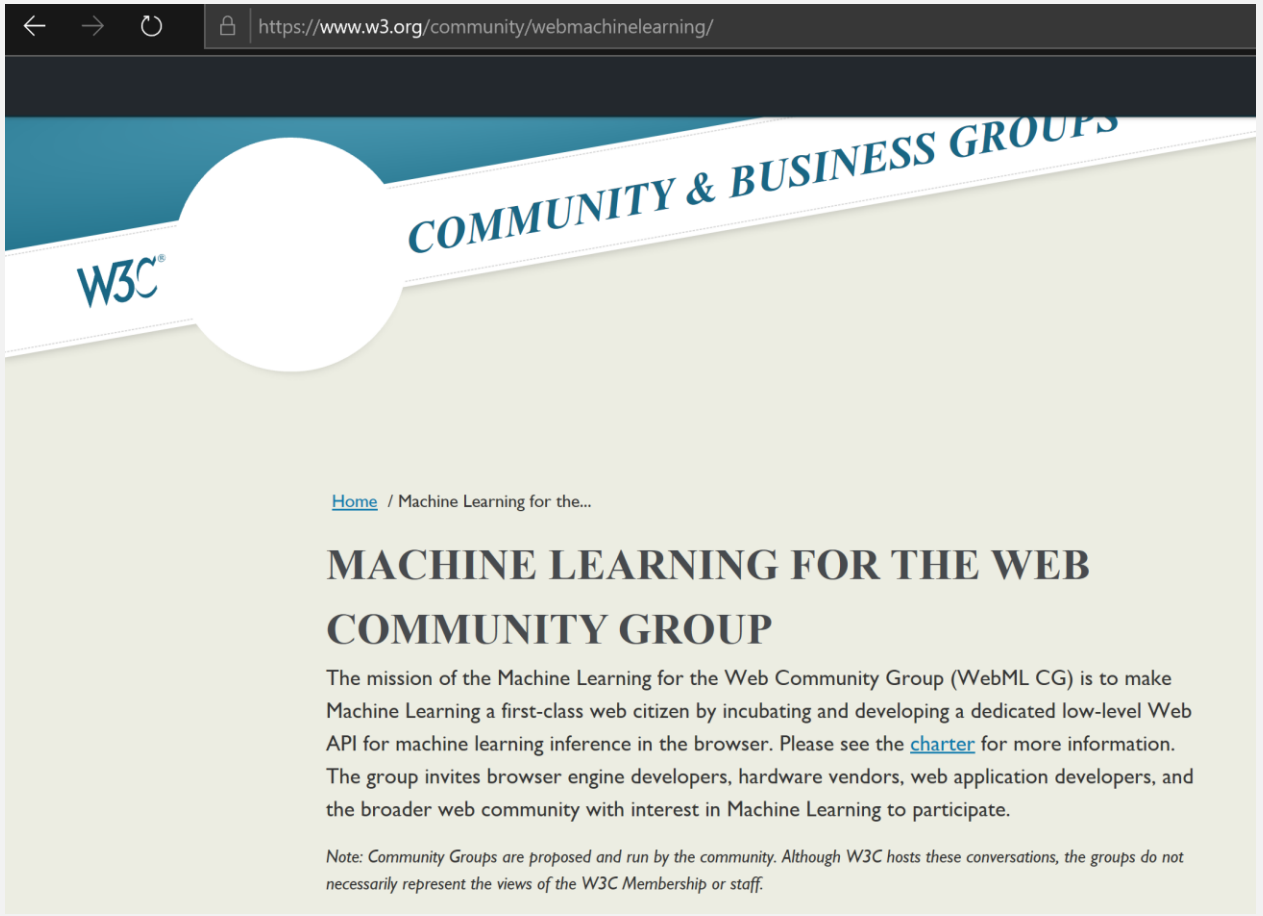


Who controls our data? Who benefits?

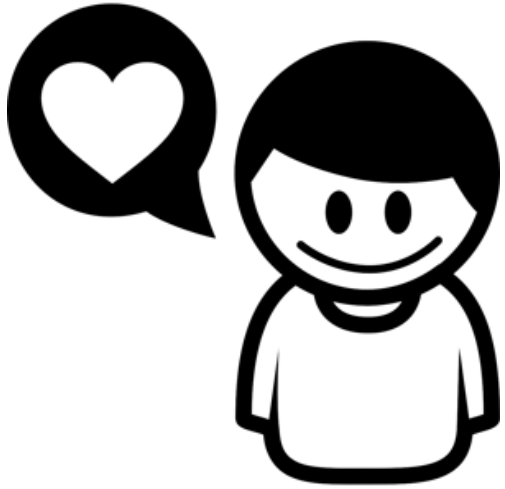
- With all this we need to make clear **who has your data** and **where** it goes.
- Wouldn't it be great if we could do more **on our devices**?
- Much lower latency, better security, increased privacy
- Right now, this is only possible in **native environments**
- I want to change that – a **W3C proposal** to bring **accelerated Machine Learning to the web** in JavaScript



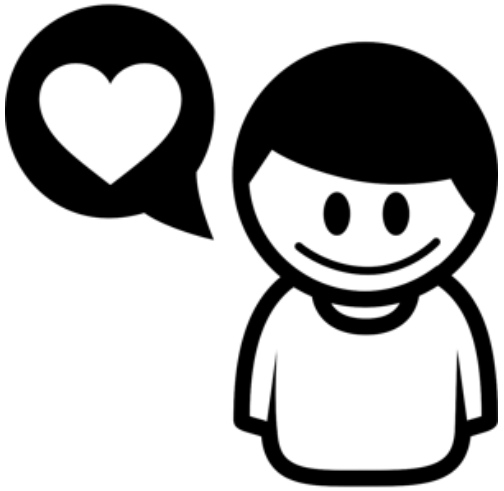
Who controls our data? Who benefits?



w3.org/community/webmachinelearning

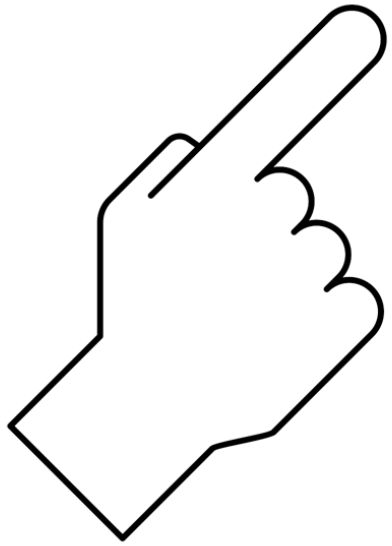


Don’t forget to have fun!



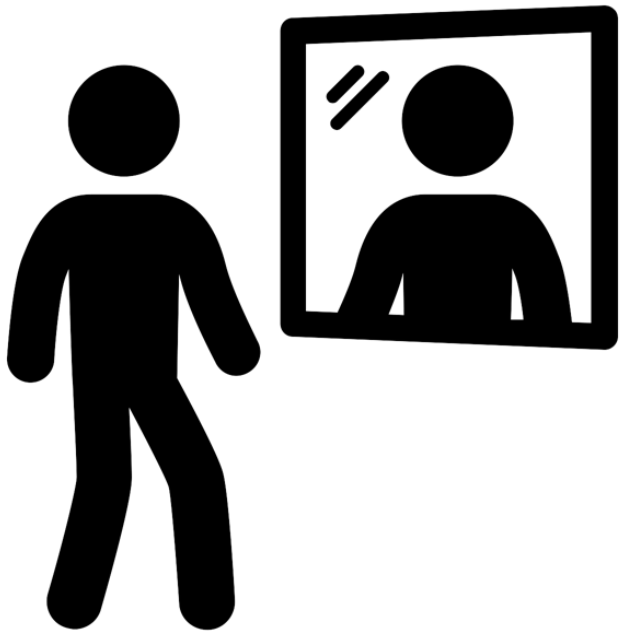
Suz Hinton

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

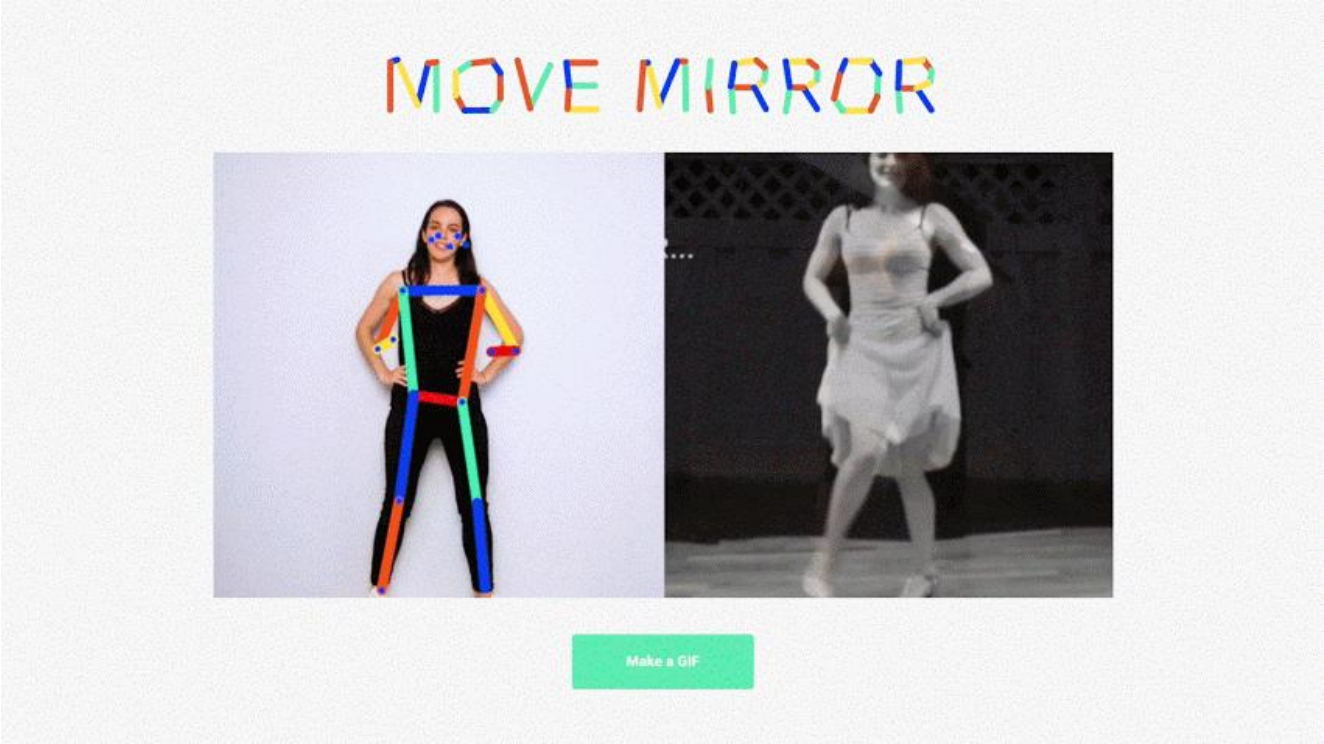


Categorising images by gesture

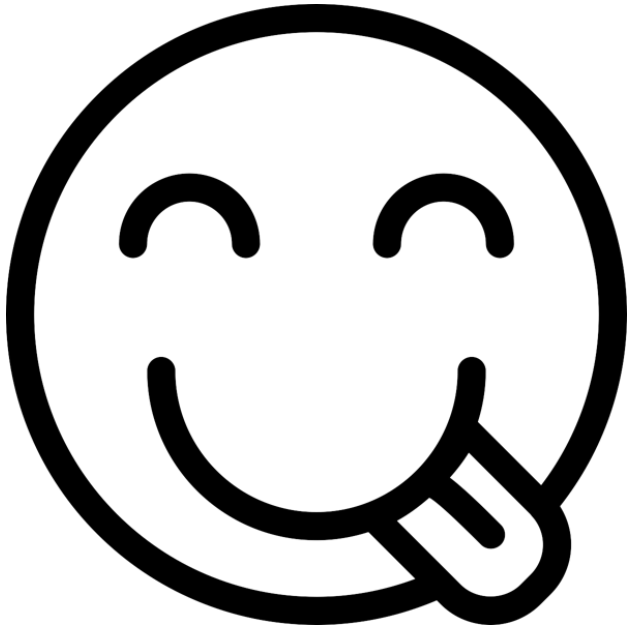
http://pointerpointer.com



Find your moves

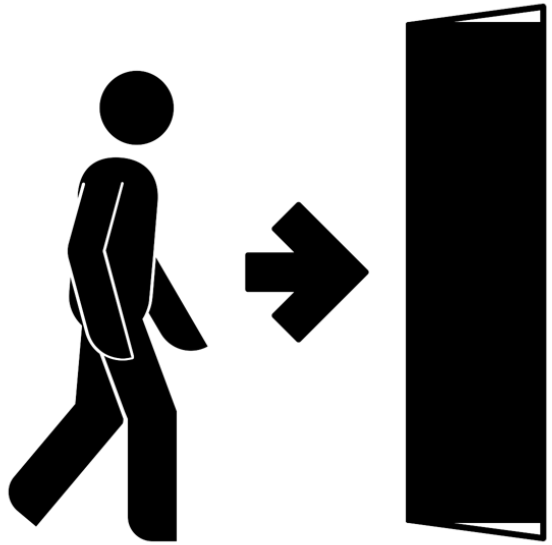


https://experiments.withgoogle.com/move-mirror

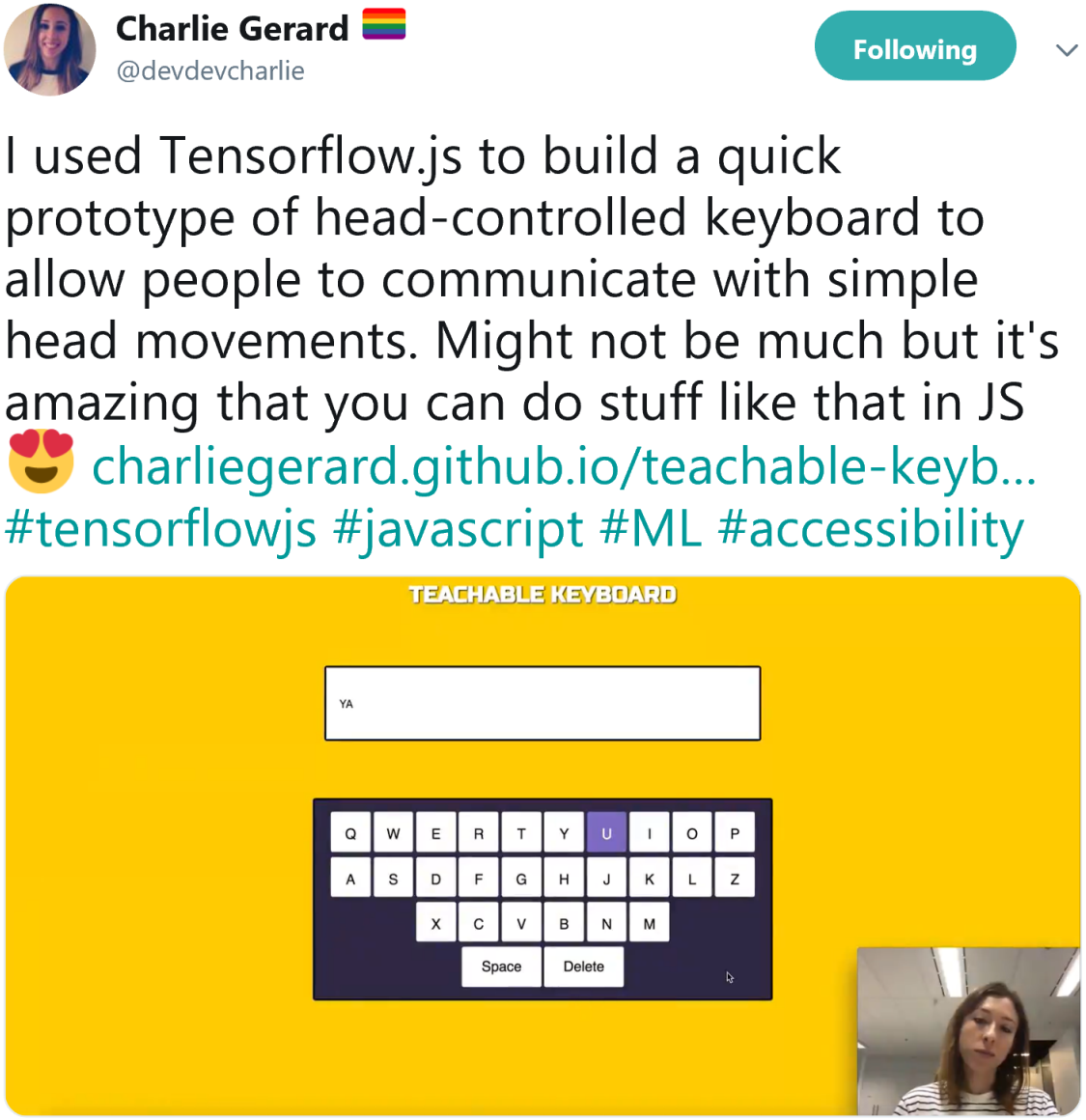


Stay silly...

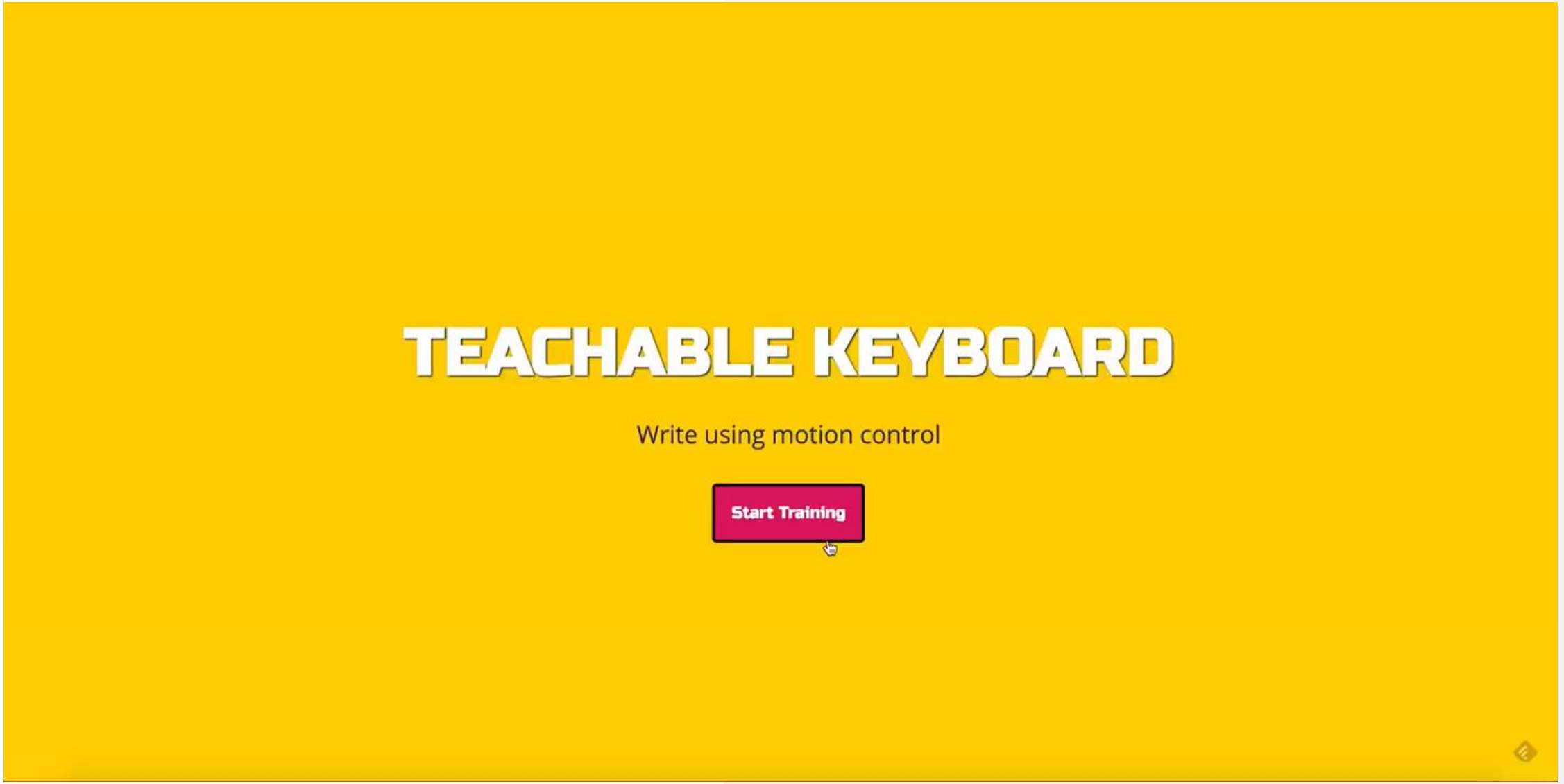
Cassie Evans
https://codepen.io/cassie-codes/pen/jKaVqo/



Help the human



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



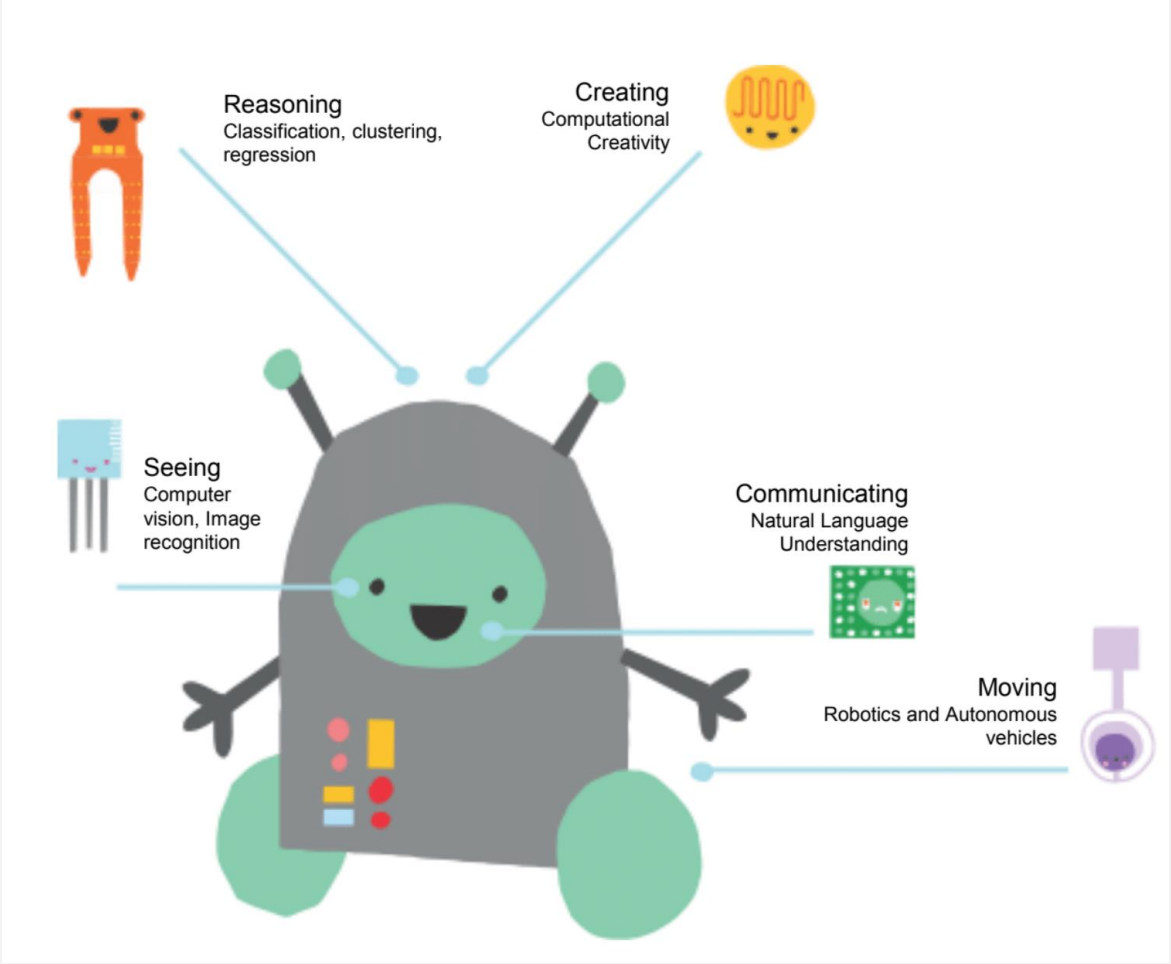
@codepo8

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

Collaborate and share…

Linda Liukas
https://helloruby.com

Preparing the next generation



Linda Liukas
https://helloruby.com

Thanks!

Chris Heilmann
Christianheilmann.com
Developer-evangelism.com

@codepo8

http://inspirobot.me/