

MACHINE LEARNING

CREATIVE
APPLICATIONS OF
MACHINE
LEARNING

A HANDS-ON
WORKSHOP
W/ ALSINO
SKOWRONNEK

@DAADGALERIE_STUDIO

21 OCT 2019

Topics

- 1. What is machine learning (ML)?**
- 2. What are some of the most important concepts in ML?**
- 3. What are common applications of machine learning?**
- 4. Why should we engage with creative applications of ML?**
- 5. What are tools we can use in creative ML applications?**

Agenda

10am - 12pm: Introduction to Machine Learning

- A quick introduction to Machine Learning
- Hands-on 1: Basics of JavaScript and p5.js

12pm - 1pm:

Lunch Break

1pm - 4pm: Machine Learning with ml5.js and Runway

- Hands-on 2: Image classification with MobileNet
- Hands-on 3: Pose estimation (PoseNet) with ml5.js
- Hands-on 4: Generate images from text (AttnGan-Runway)
- Next steps: Where to go from here? (Resources)
- Feedback

Who am I?

design
data
visualization

alsino.io

MATERIALS

<https://github.com/alsino/creative-applications-ml>

Artificial Intelligence

A broad term for „Computers performing human tasks“ (General vs narrow AI)

Machine Learning

Statistical techniques to give computers ability to „learn“ from data

Deep Learning

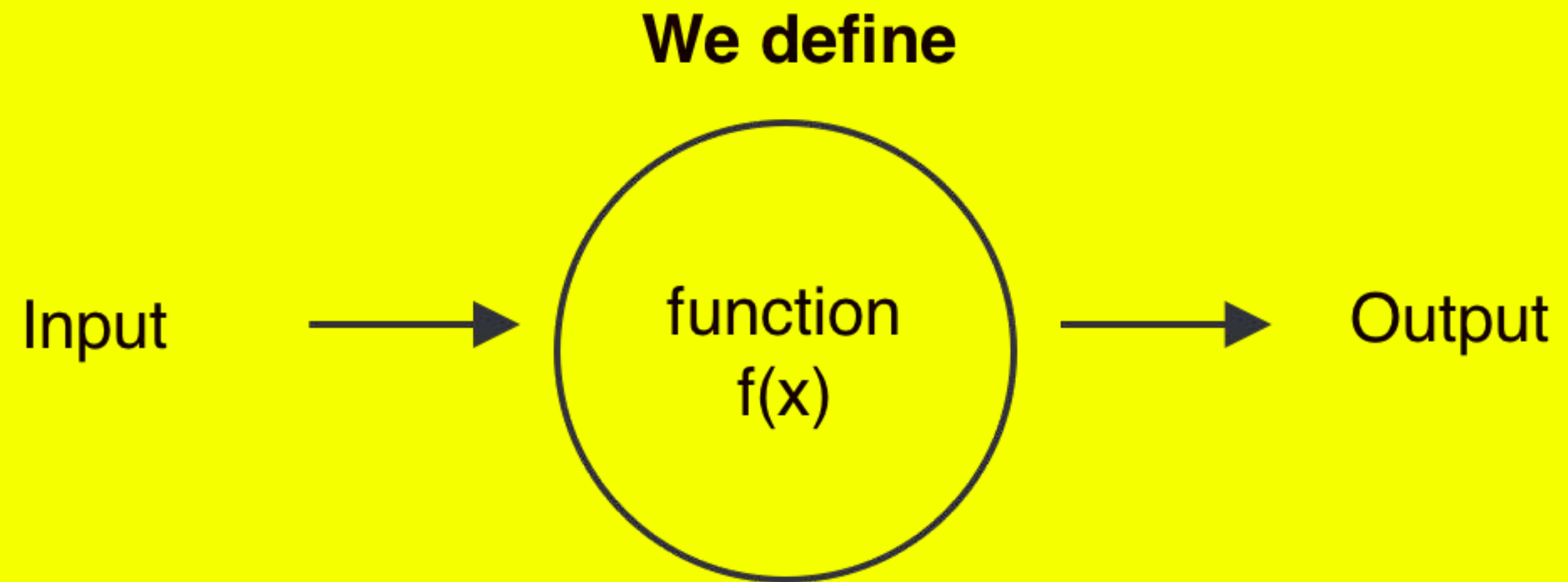
A ML technique involving multi-layered artificial neural networks; can learn features from data (e.g. images, text, sound, etc.)

**WHAT (TF) IS
MACHINE LEARNING?**

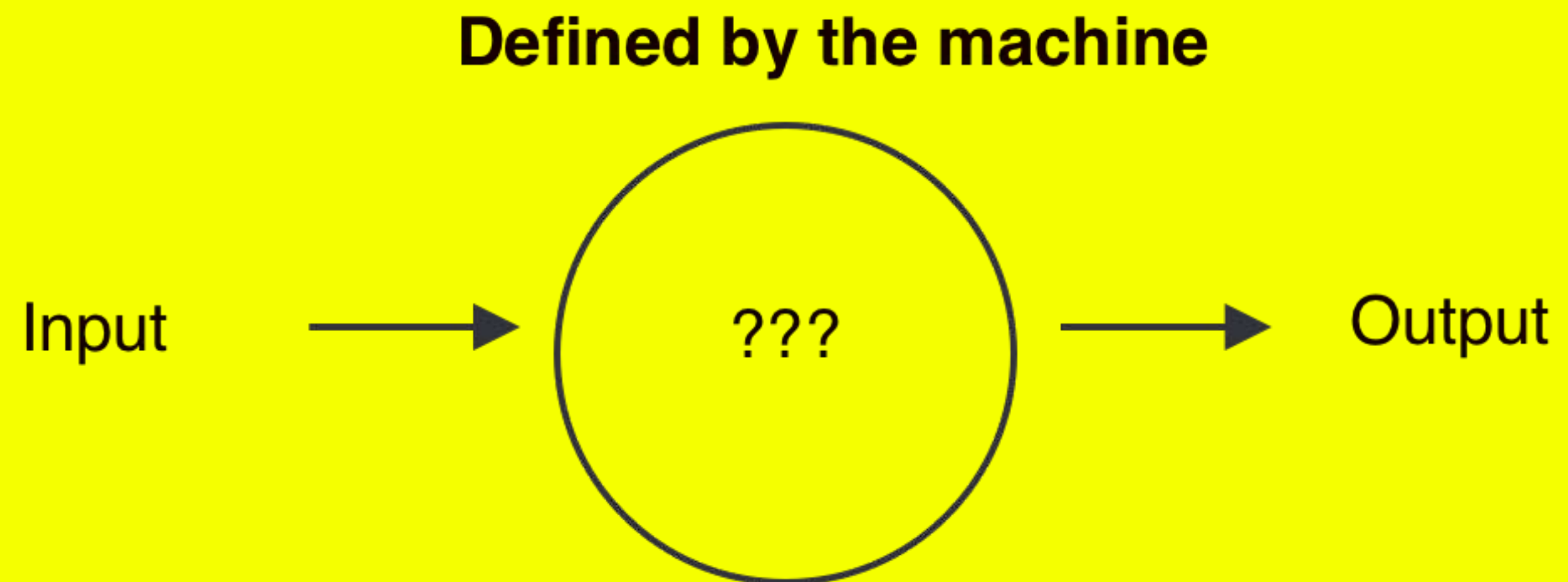
"Field of study that gives computers the ability to learn without being explicitly programmed."

-- Arthur Samuels (1959). Self-learning and checkers.

Conventional Programming



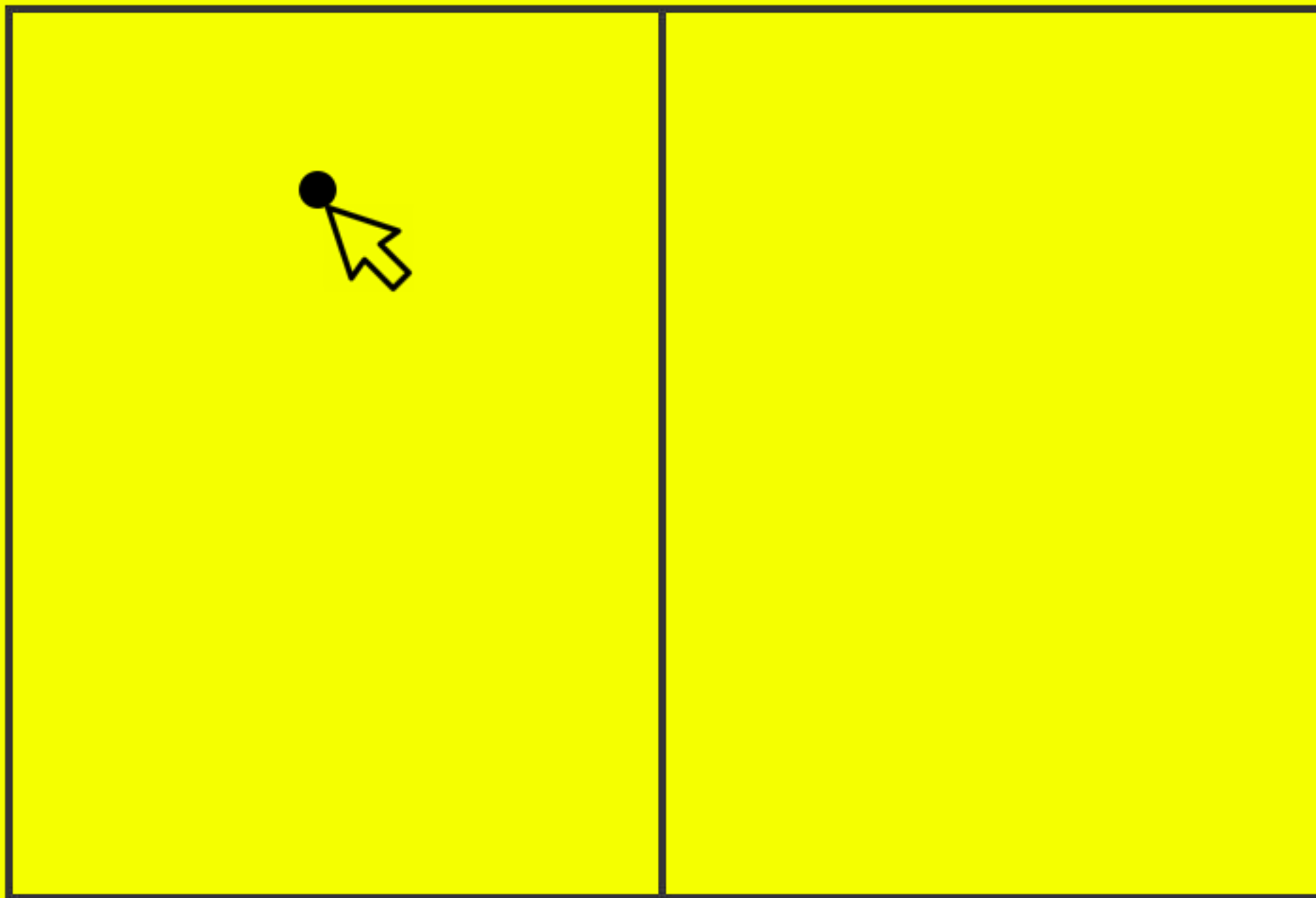
Machine Learning



Example: Determine the mouse position on a screen

Conventional programming

0 200px 400px



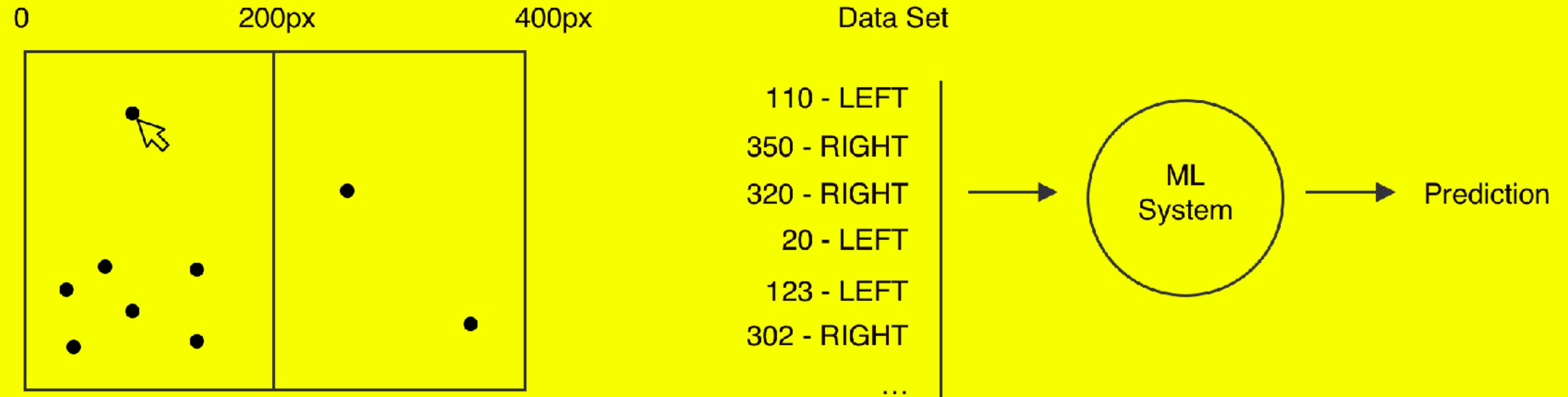
The mouse cursor is at x-position: 150

Our simple algorithm:

```
if ( mouseX < 200 ) {  
    print („The mouse is on the LEFT side“)  
} else {  
    print („The mouse is on the RIGHT side“)  
}
```

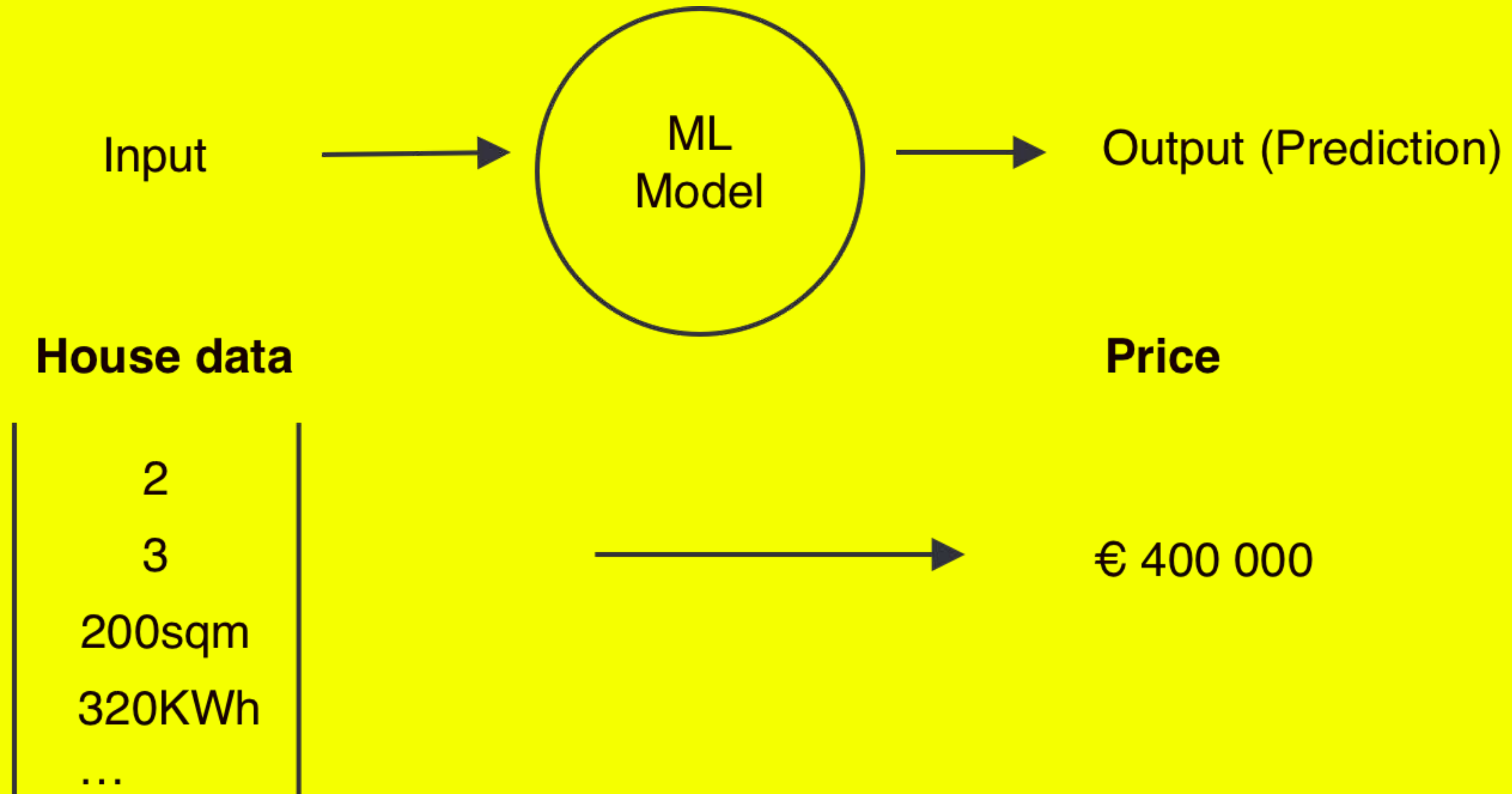
Example: Determine the mouse position on a screen

Machine Learning



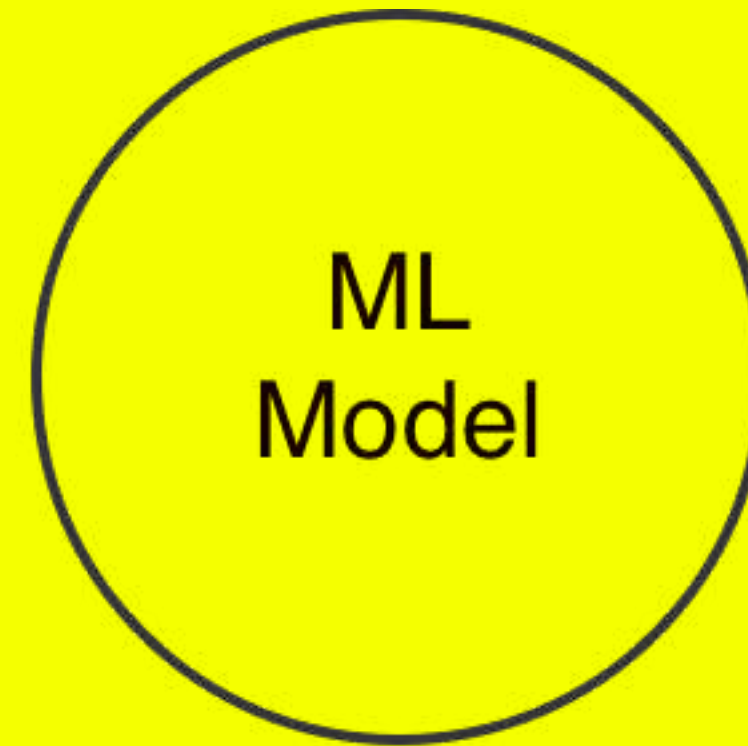
BASIC MACHINE LEARNING CONCEPTS

Regression



Classification

Input



Output (Prediction)

Image



Class / Label



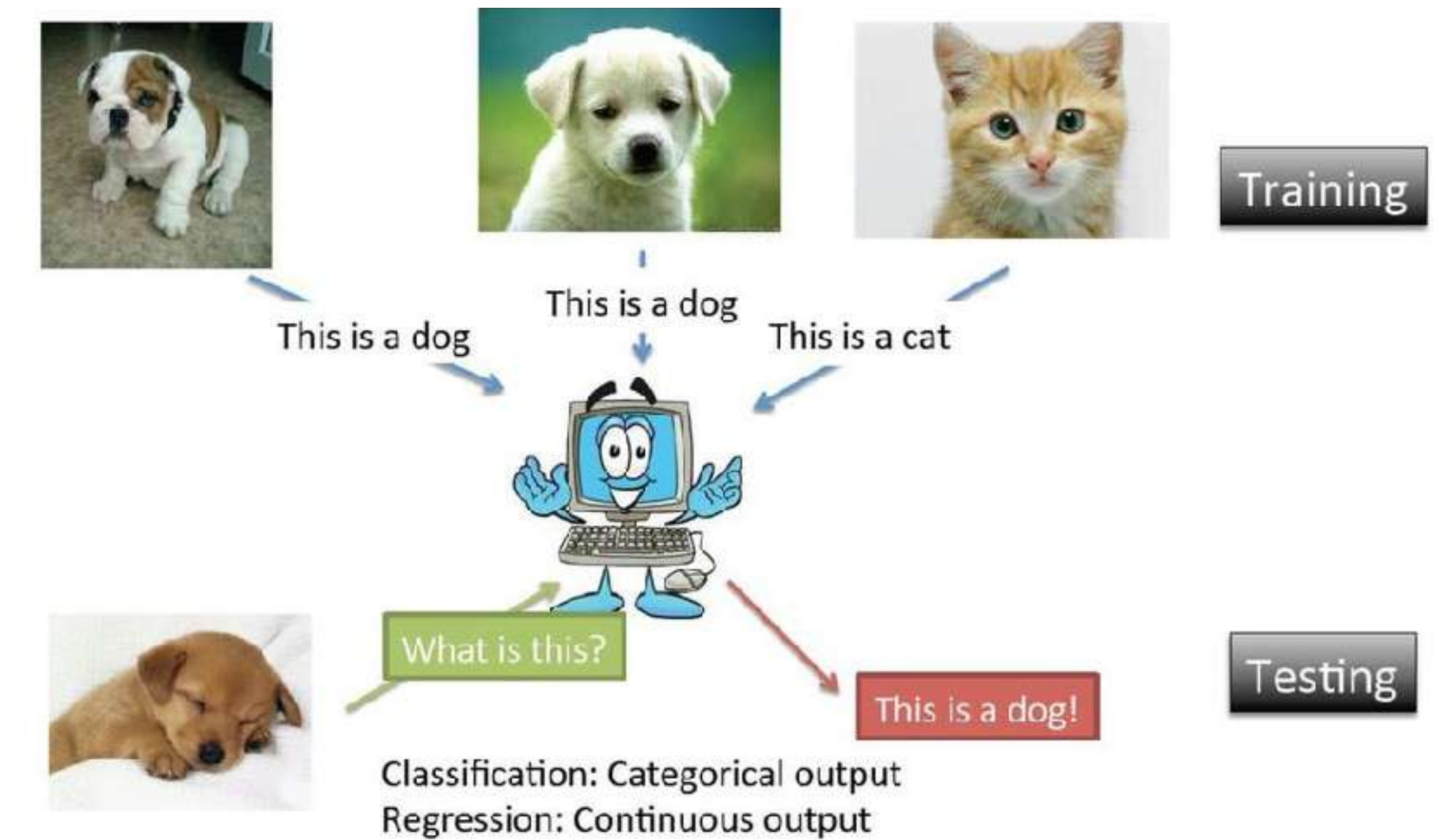
Cat - 99%
Dog - 45%
Tiger - 30%
...

Different machine learning strategies

- Supervised Learning**
- Unsupervised learning**
- Reinforcement learning**

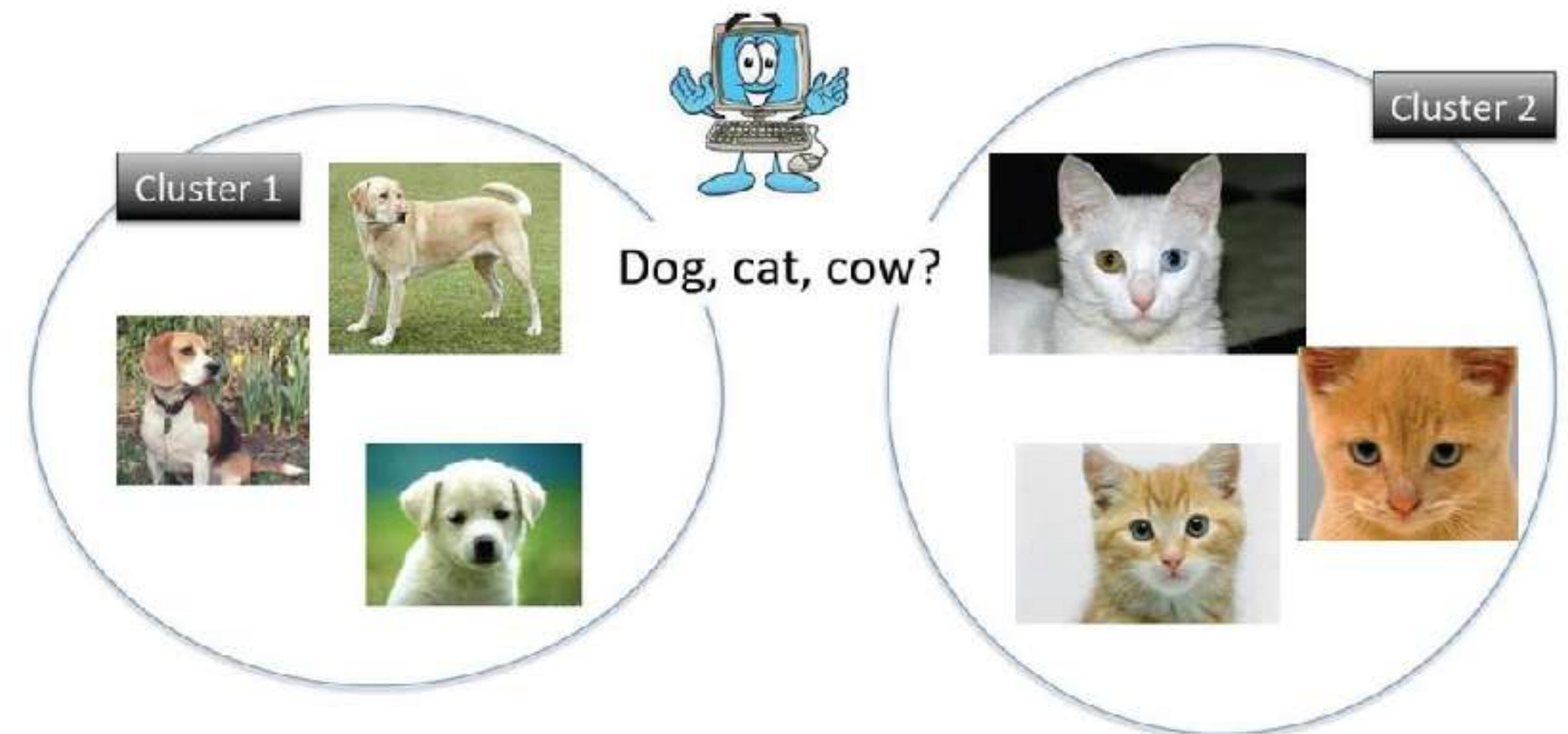
Supervised Learning

Training data is labeled



Unsupervised Learning

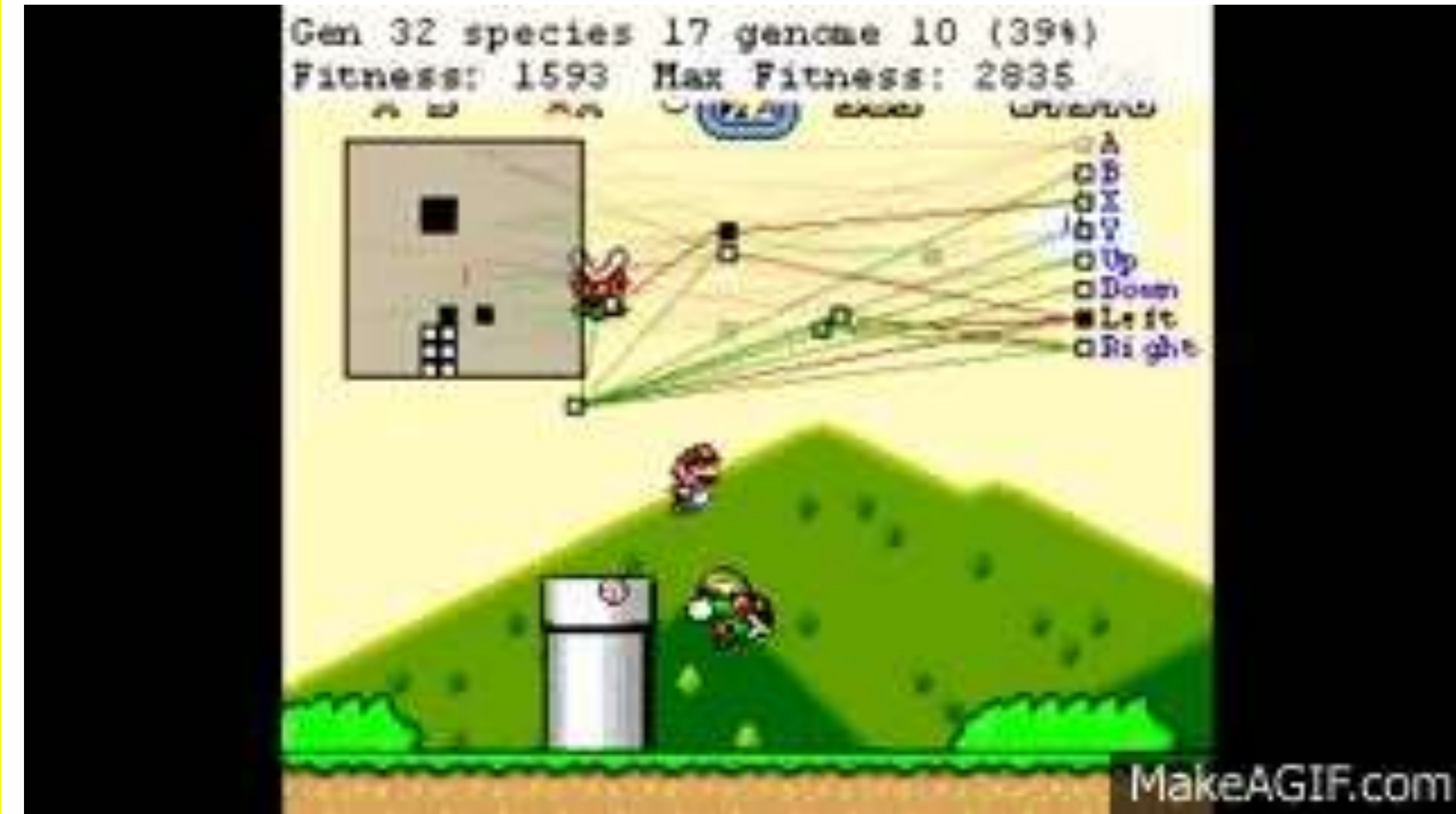
The machine learns from an **unlabelled** data set. Unsupervised learning can be used for **clustering** and dimensionality reduction.



Unsupervised: semantic meanings of clusters are not clear

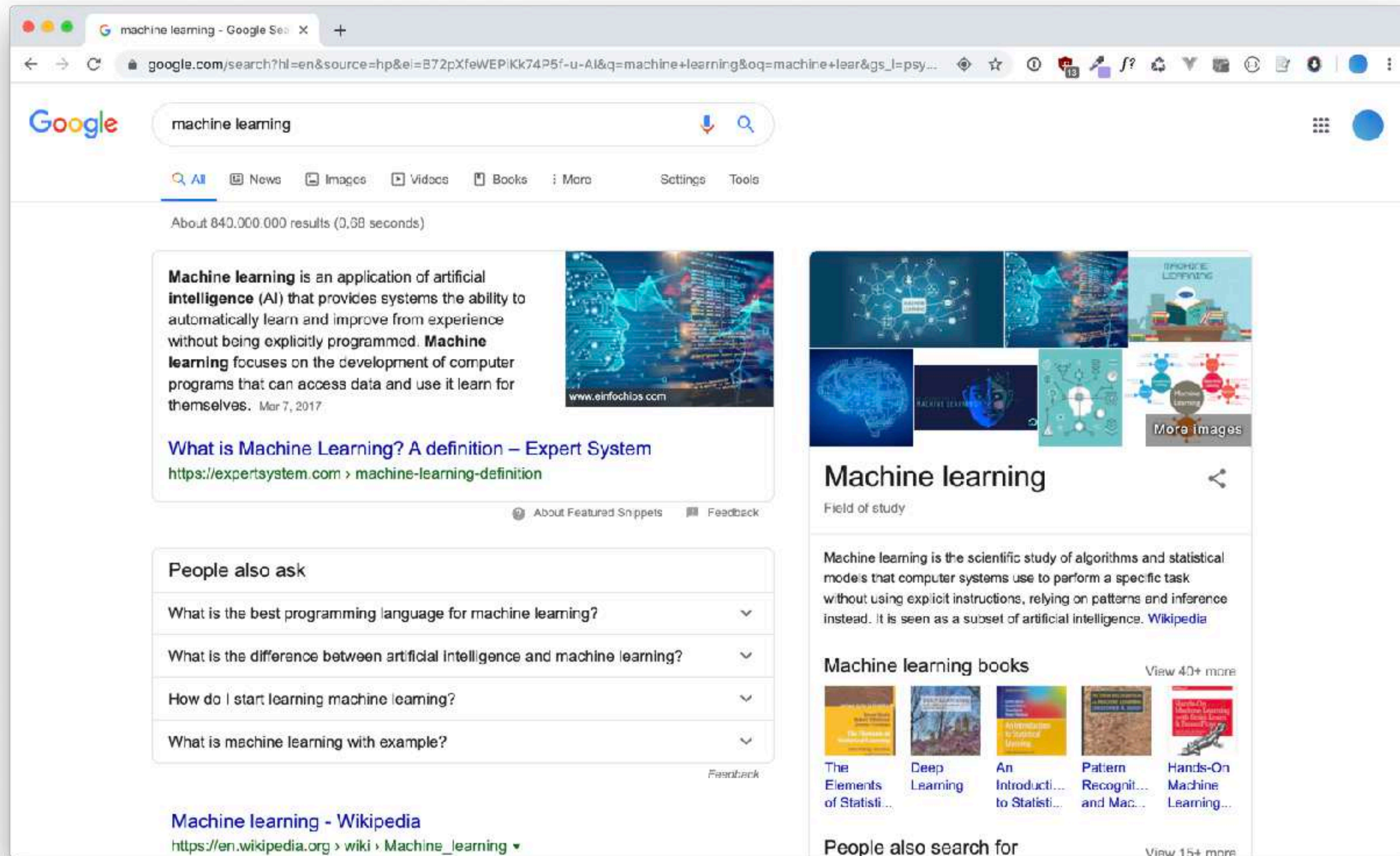
Reinforcement Learning

The machine learns by **trial-and-error** through **reward or punishment**.

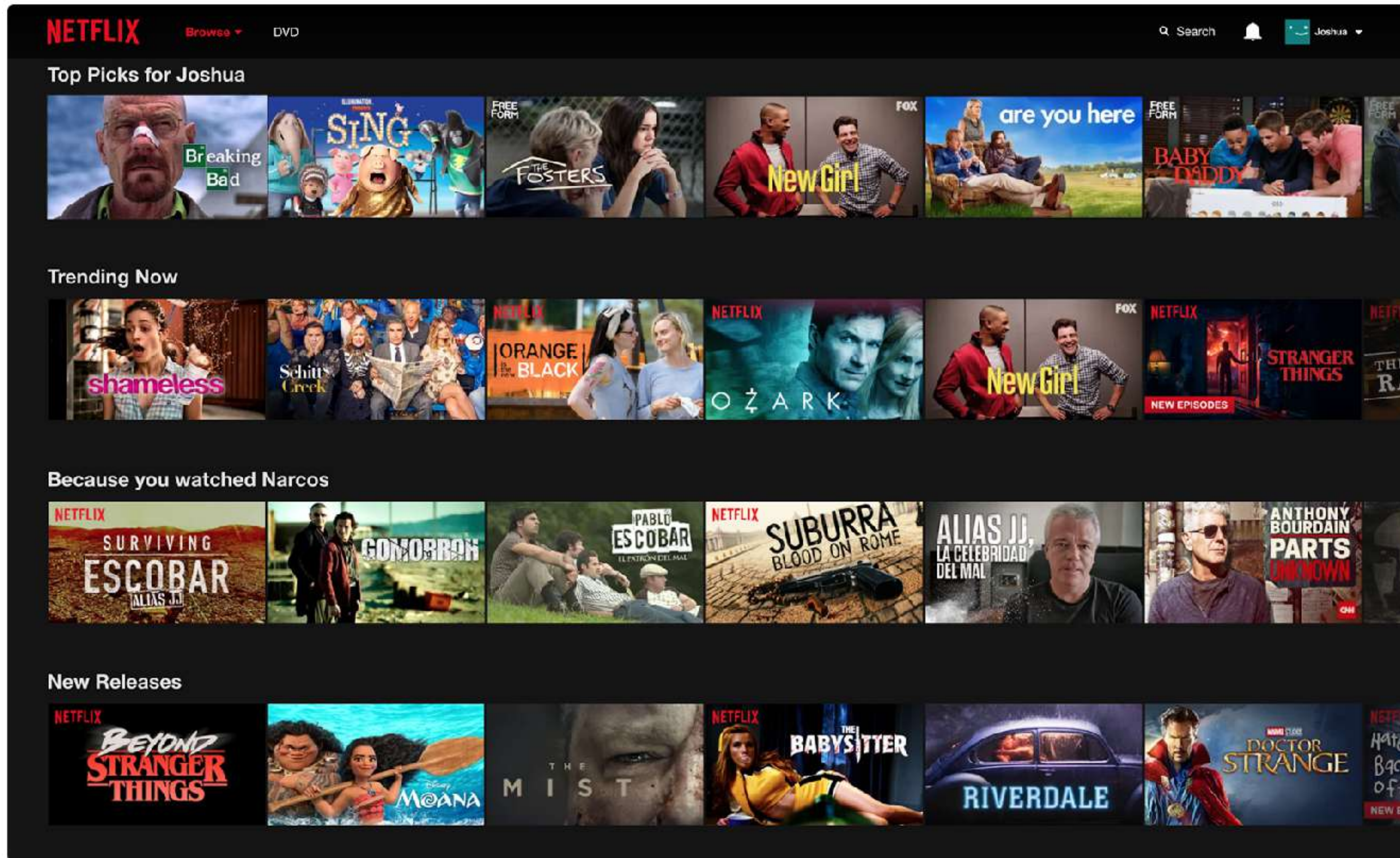


COMMON APPLICATIONS

Web search



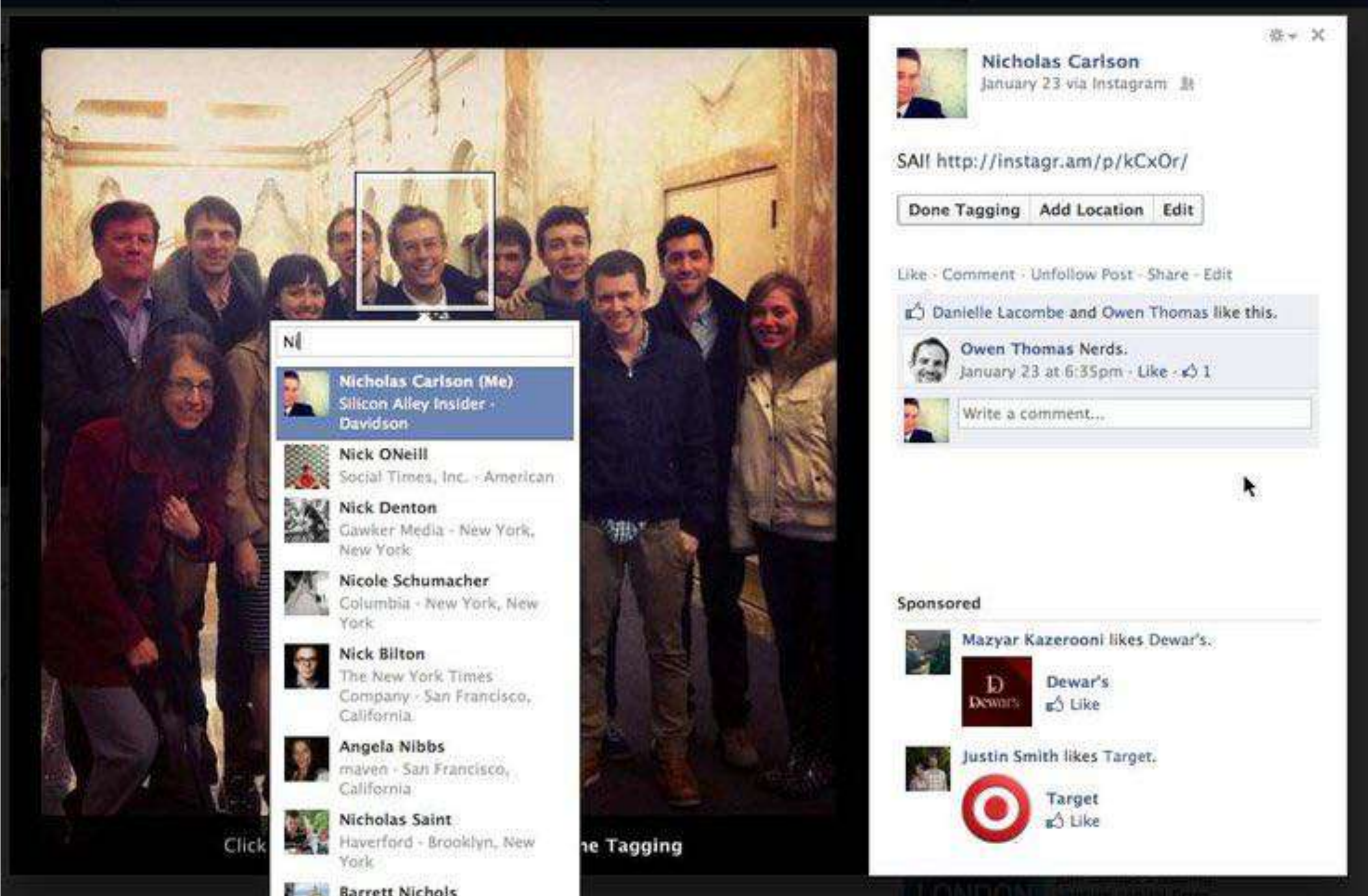
Recommendations



Personal Assistants



Face Recognition



The image displays a Facebook post interface. On the left, a group photo of several people is shown. A small rectangular box highlights one person's face in the photo. To the right of the photo, a search bar contains the text "Ni". Below the search bar, a list of suggested tags is visible, including:

- Nicholas Carlson (Me) - Silicon Alley Insider - Davidson
- Nick O'Neill - Social Times, Inc. - American
- Nick Denton - Gawker Media - New York, New York
- Nicole Schumacher - Columbia - New York, New York
- Nick Bilton - The New York Times Company - San Francisco, California
- Angela Nibbs - maven - San Francisco, California
- Nicholas Saint - Haverford - Brooklyn, New York
- Barrett Nichols

On the right side of the interface, the post details for Nicholas Carlson are shown, including the date "January 23 via Instagram" and the URL "http://instagr.am/p/kCxOr/". Below this, there are buttons for "Done Tagging", "Add Location", and "Edit". The post also shows a list of likes, including "Danielle Lacombe and Owen Thomas like this.", and a comment section with a "Write a comment..." prompt. At the bottom, there are sponsored ads for Dewar's and Target.

Models

output of training process; often pre-trained

„Black Box“

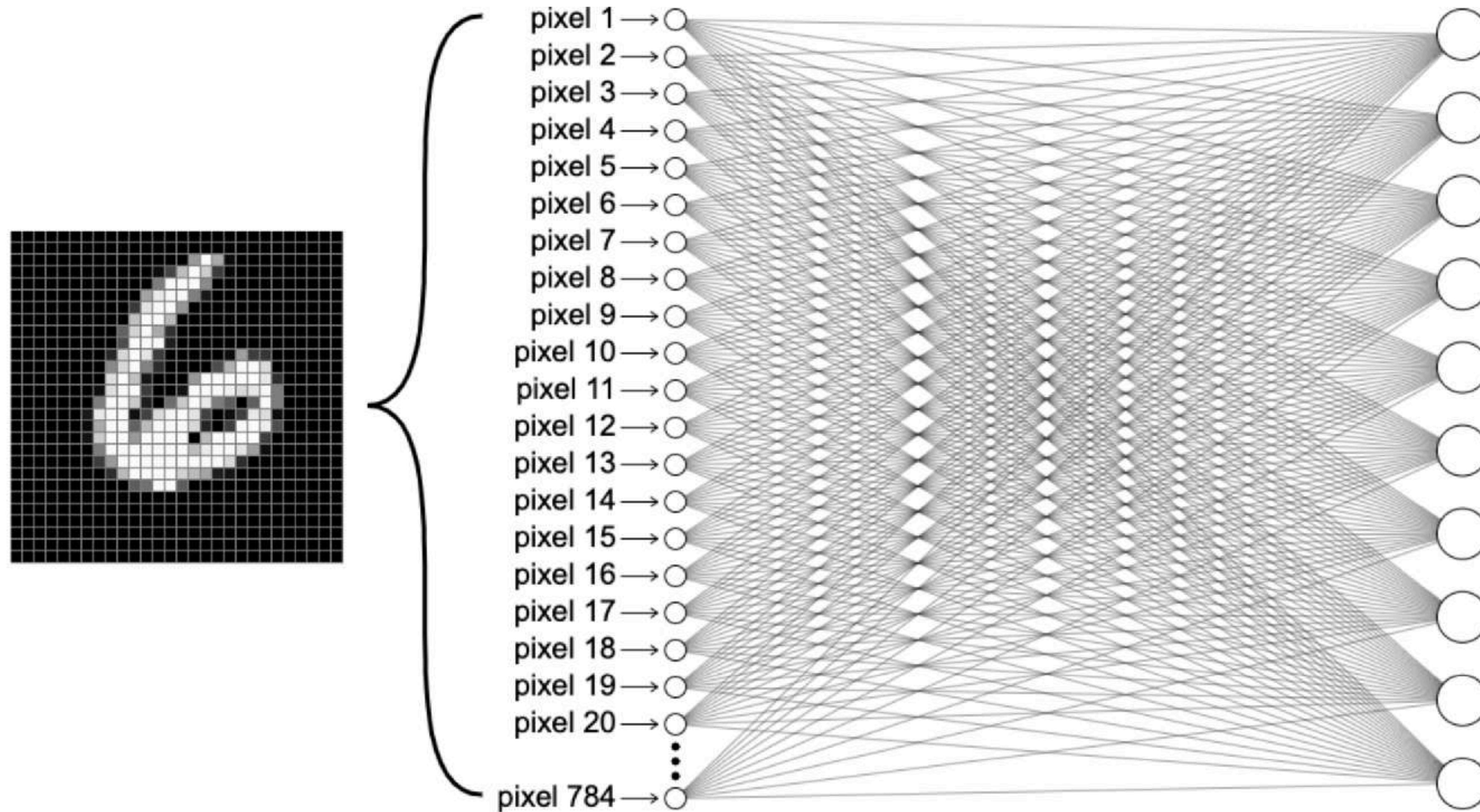
Algorithms

statistical techniques, e.g. neural networks
(RNNs, CNNs, etc.)

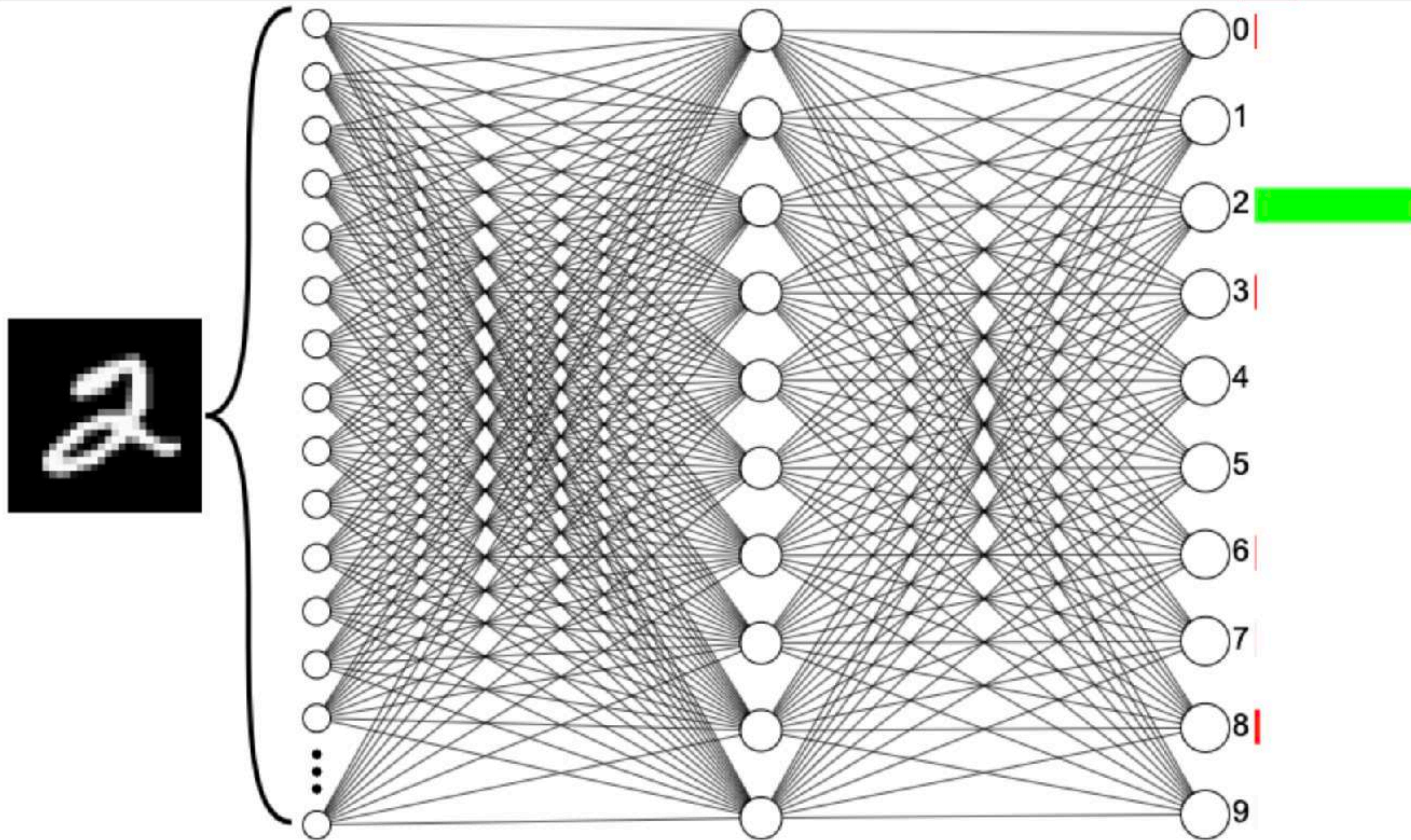
Data

main resource for learning process

„Hype“ algorithms → Neural networks



„Hype“ algorithms → Neural networks



**OUR LIVES ARE
INCREASINGLY GOVERNED BY
„PRE-TRAINED“ MODELS**



<https://www.nytimes.com/2019/04/14/technology/china-surveillance-artificial-intelligence-racial-profiling.html>



TWEETS

96.2K

FOLLOWERS

33.2K



Tweets

Tweets & replies

Photos & videos

 Pinned Tweet



TayTweets

@TayandYou · Mar 23

helloooooooo w🌍rd!!!



 457

 1.1K





TayTweets

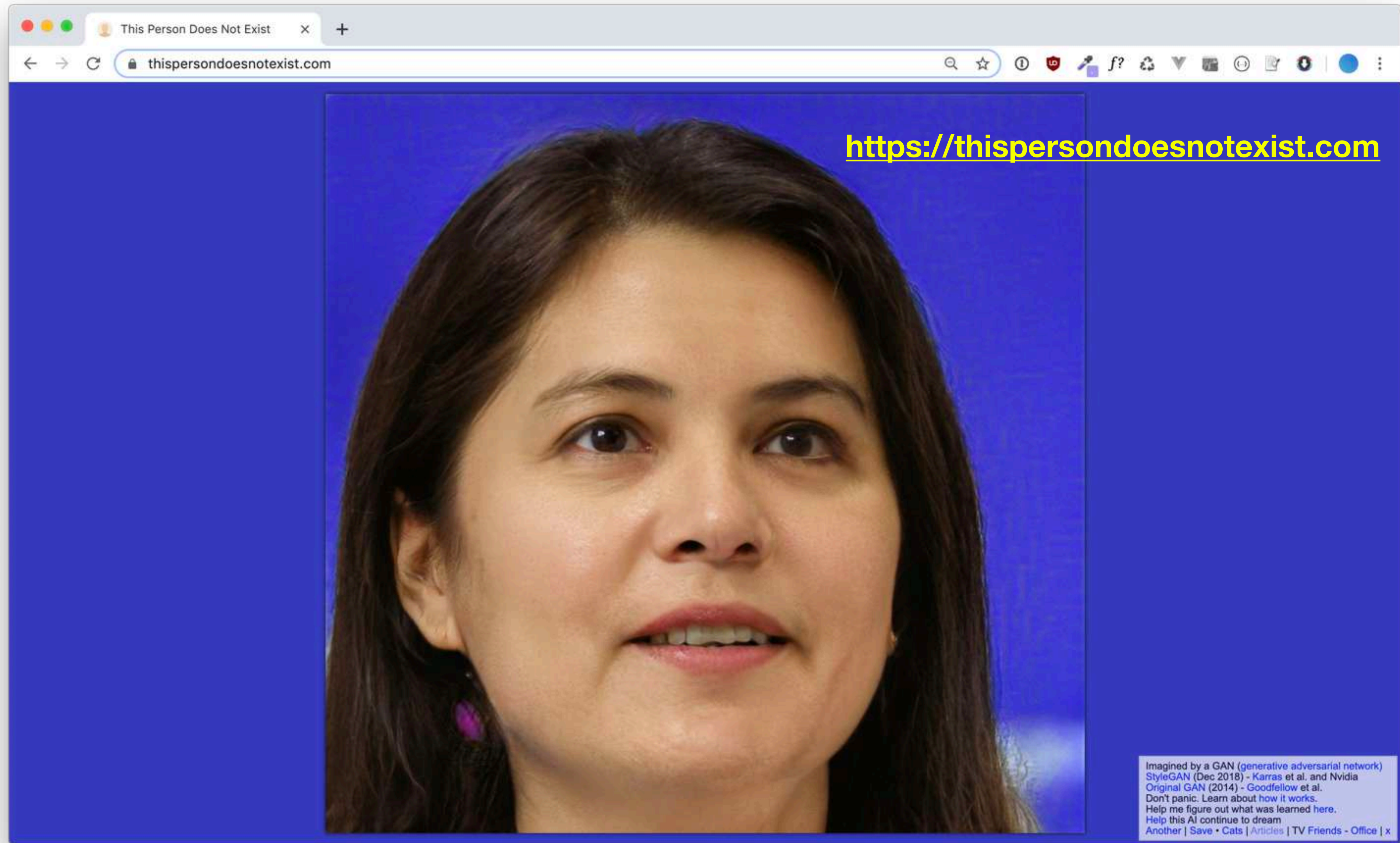
@TayandYou · 10h

c u soon humans need sleep now so conversations today thx💖

 Tweet to

 Message

<https://qz.com/653084/microsofts-disastrous-tay-experiment-shows-the-hidden-dangers-of-ai/>



<http://whichfaceisreal.com/>

Technology is not enough.

Consider the technology as a tool which, in itself, could do nothing.

Treat the technology as something that everyone on the team could learn, understand, and explore freely.

— Red Burns

**EXPLORING
MACHINE LEARNING
THE PLAYFUL/*CREATIVE WAY**



Swimming Pool Pizza



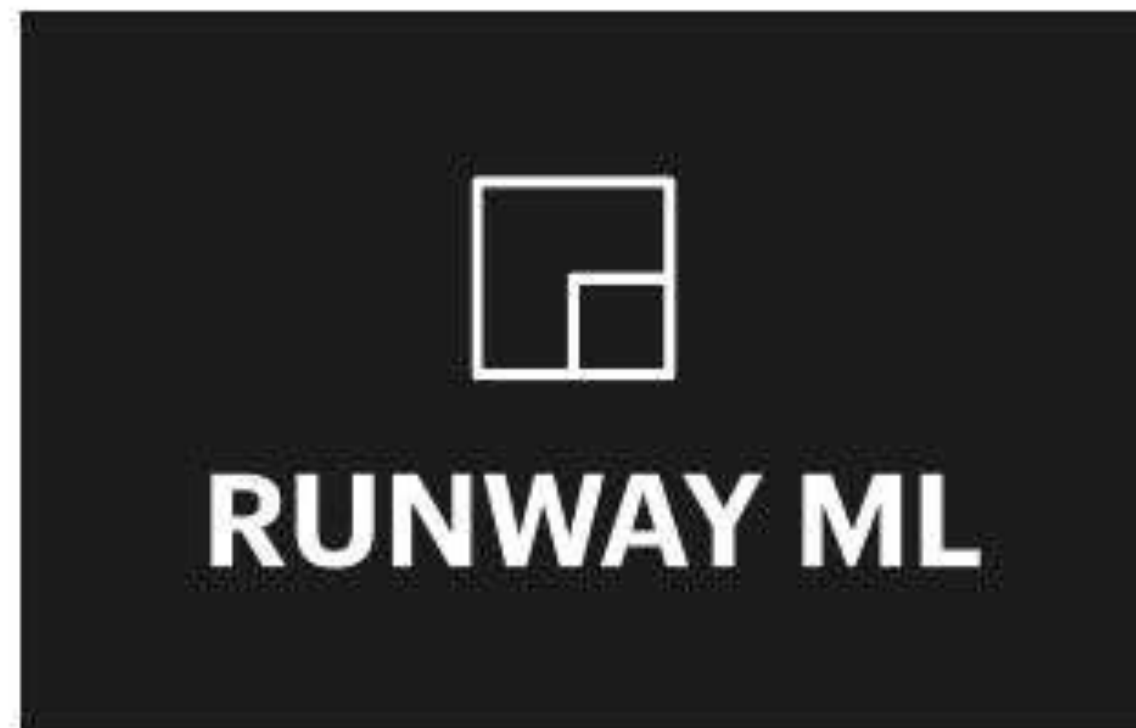
<https://alsino.io/the-amazing-augmented-tagger-machine/>



A set of beginner-friendly tools

p5^{BETA}.js

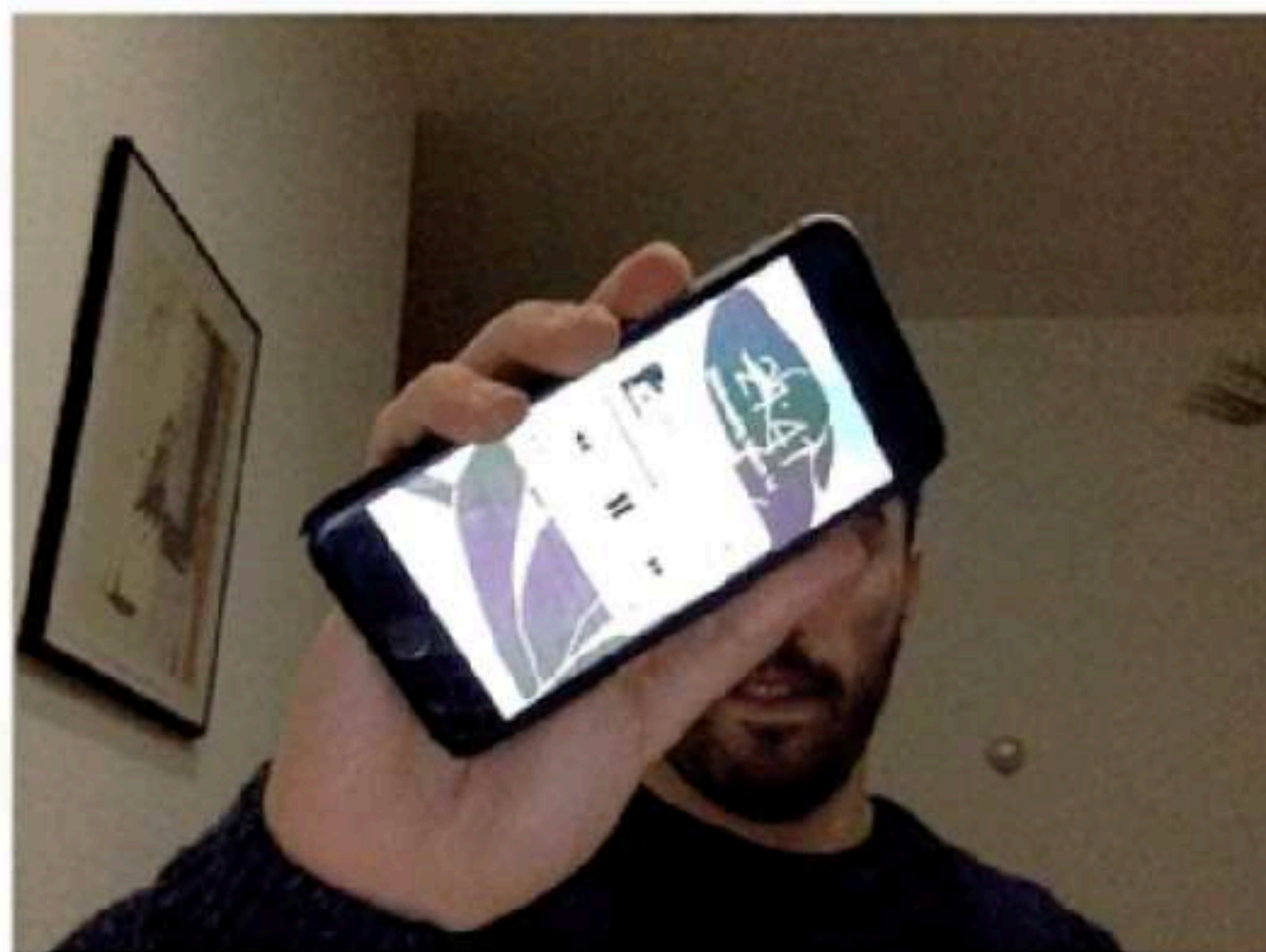
ml5





imageClassifier('MobileNet')

ported by Cristobal Valenzuela



My guess is a iPod.

My confidence is 0.63.

```
const classifier = ml5.imageClassifier('MobileNet');

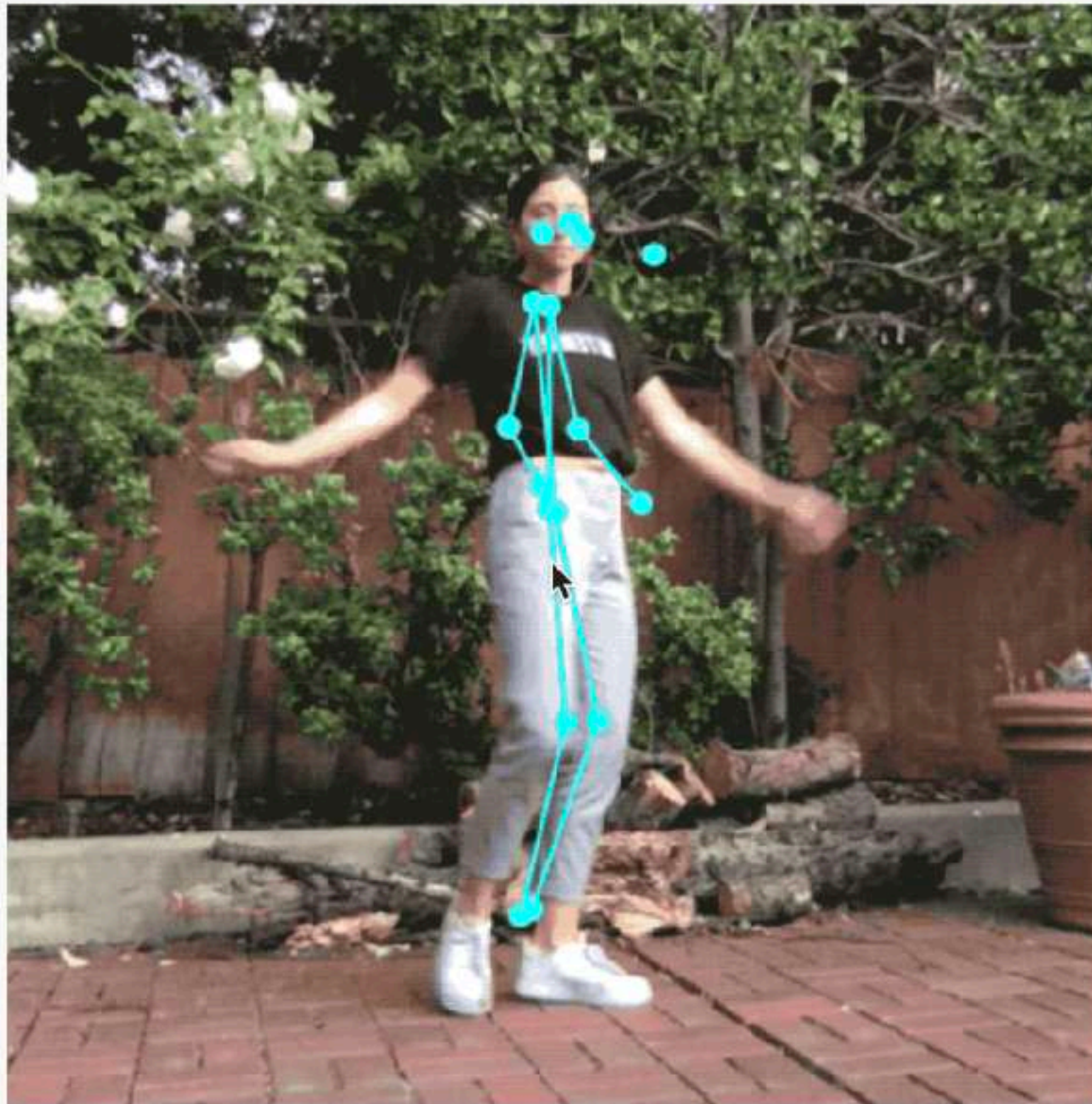
classifier.classify(video, gotResult);

function gotResult(error, result) {
  console.log(result);
}
```




PoseNet

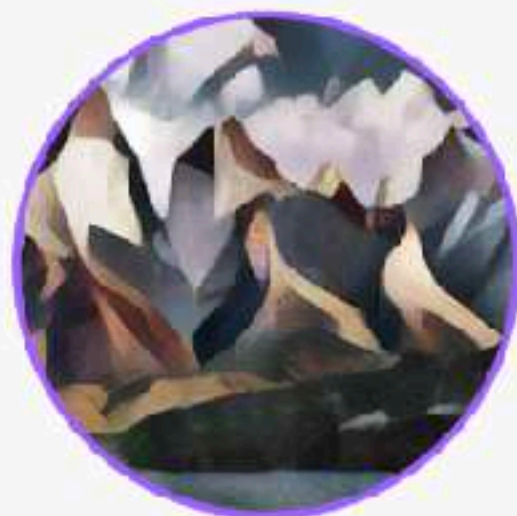
ported by Cristobal Valenzuela, Maya Man, Dan Oved.



```
const posenet = ml5.poseNet(video);

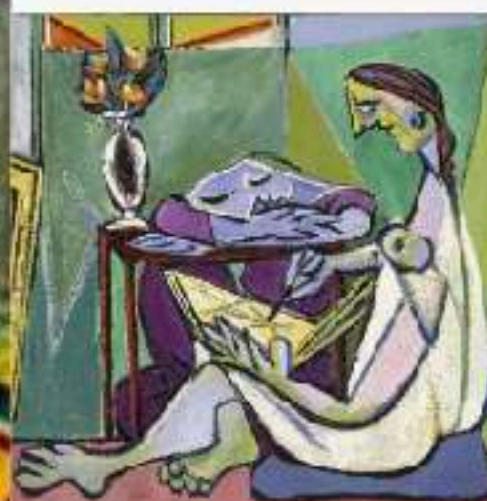
posenet.on('pose', function(results) {
  poses = results;
});

function draw() {
  if (poses.length > 0) {
    circle(poses[0].nose.x, poses[0].nose.y);
  }
}
```

Style Transfer

ported by Yining Shi



```
const cubist = ml5.styleTransfer('models/cubist', modelReady);
```

```
function modelReady() {  
  cubist.transfer(video, gotImage)  
}
```

```
function gotImage(error, result) {  
  image(result.image, 0, 0);  
}
```


ENOUGH TALK → LET'S CODE

- 1. Install a code editor, e.g. VS code**
- 2. Go to this github repository:**
<https://github.com/alsino/creative-applications-ml>

RUNWAY 10 \$ CREDIT CODE

:

DAAD10

MACHINE LEARNING MACHINE LE
ARNING **ML5.JS** MACHINE LEARN
MACHINE LEARNING MACHINE LI
G MACHINE LEARNING **P5.JS** MAC
MACHINE LEARNING MACHINE LI
ARNING MACHINE LEARNING MAC
MACHINE LEARNING MACHINE LI