

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

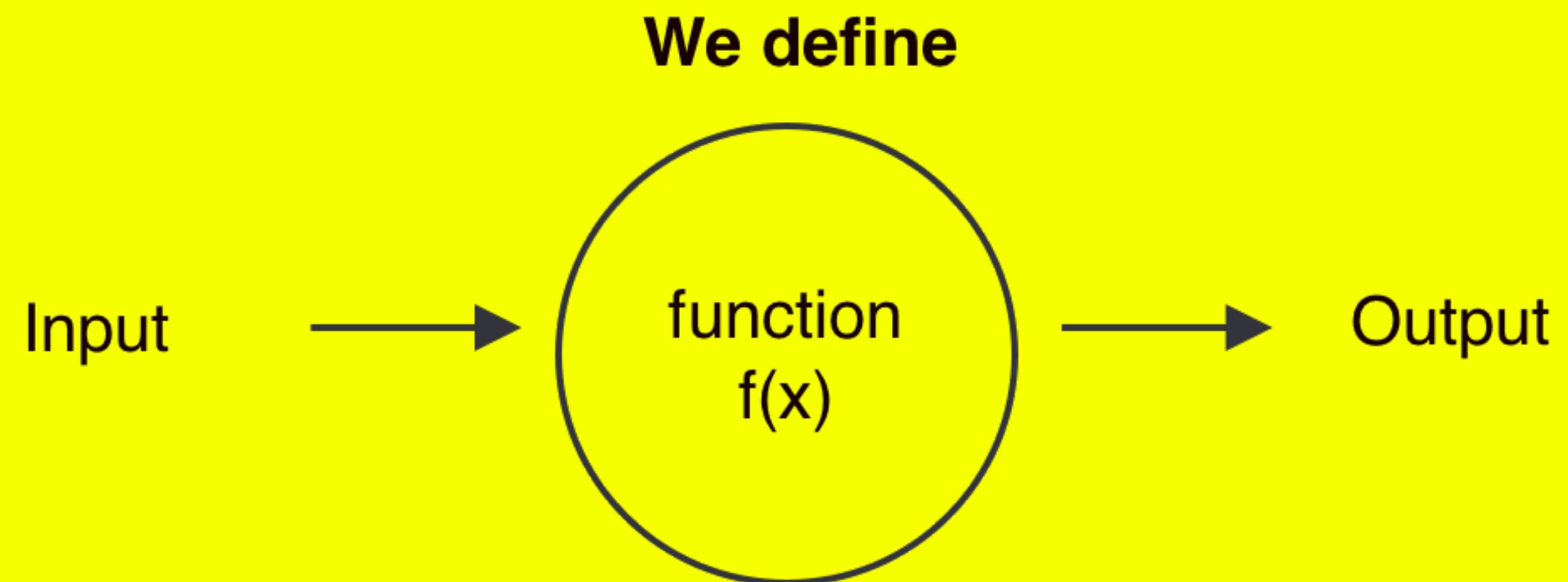
A ML technique involving multi-layered
artificial neural networks; can learn features
from data (e.g. images, text, sound, etc.)

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

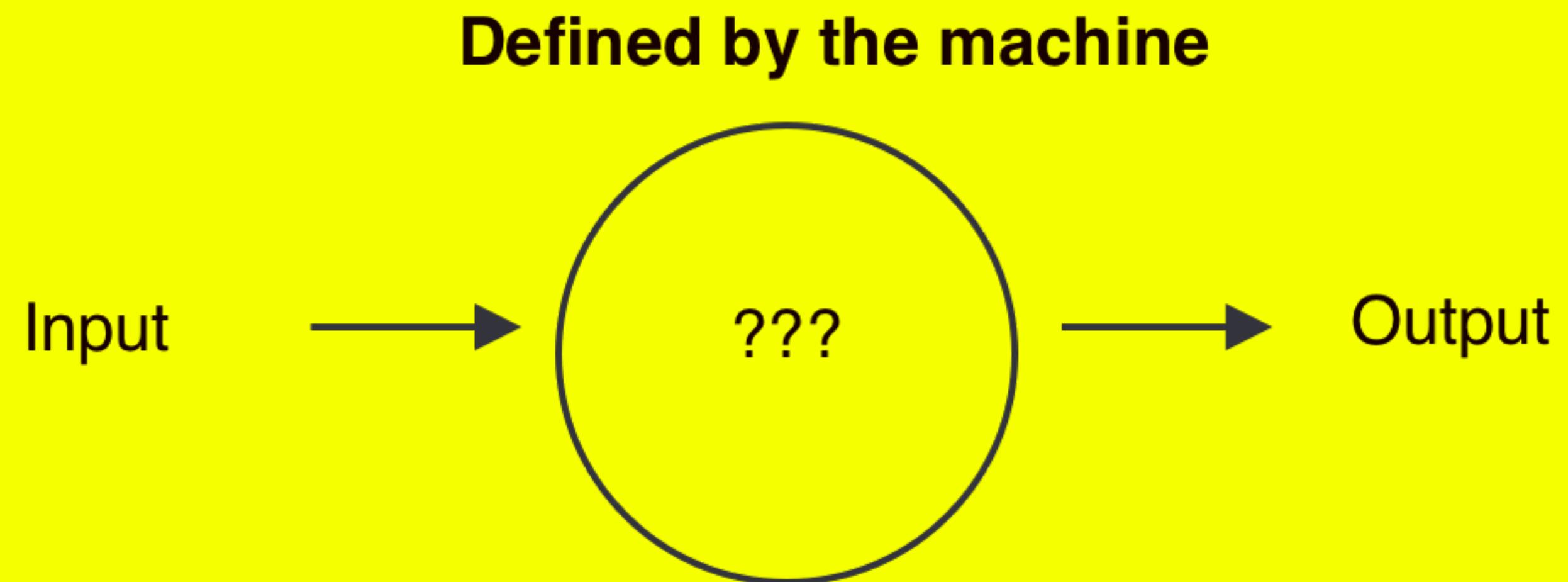
"Field of study that gives computers the ability to learn without being explicitly programmed."

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

Conventional Programming

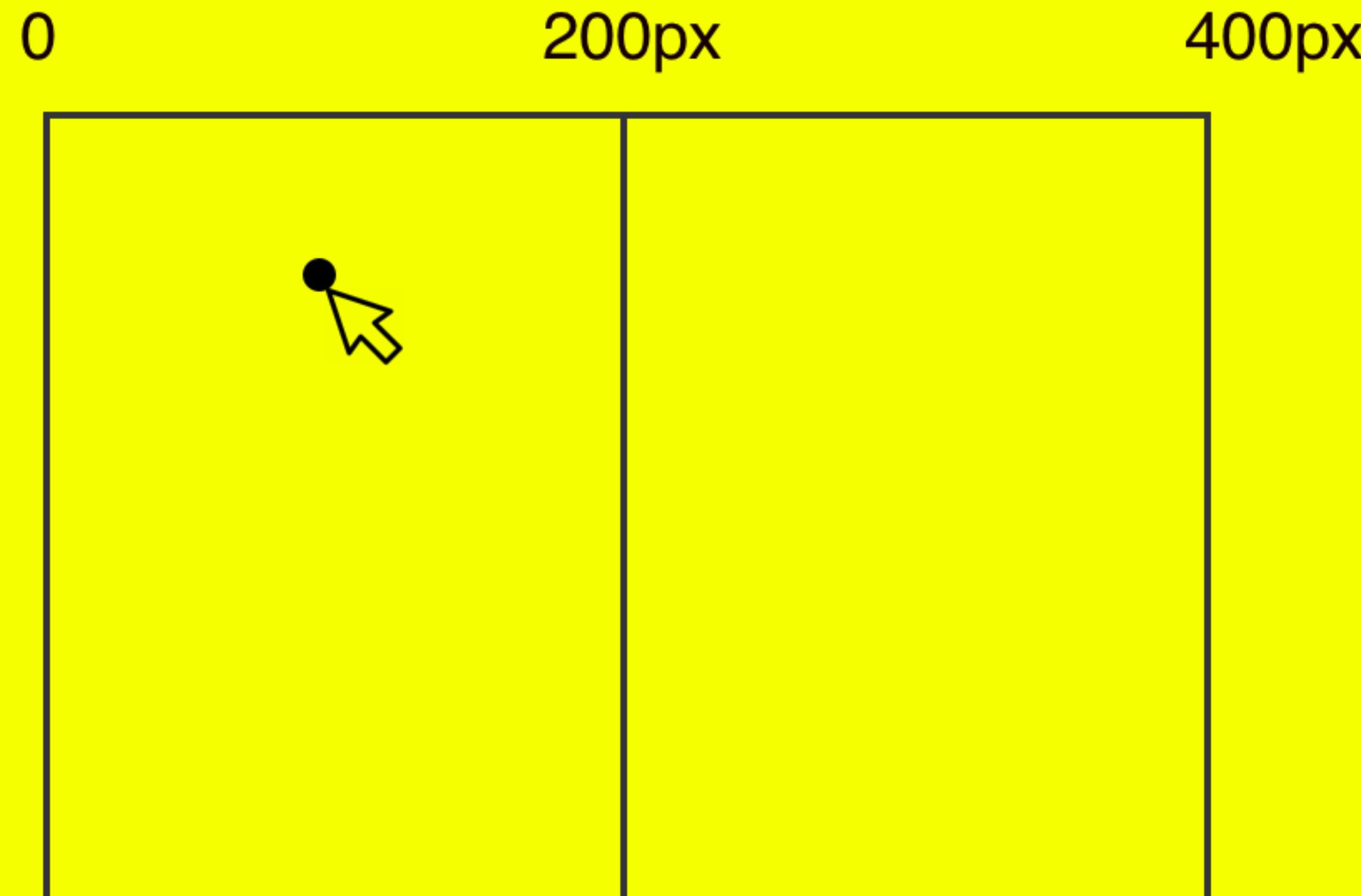


Machine Learning



Example: Determine the mouse position on a screen

Conventional programming



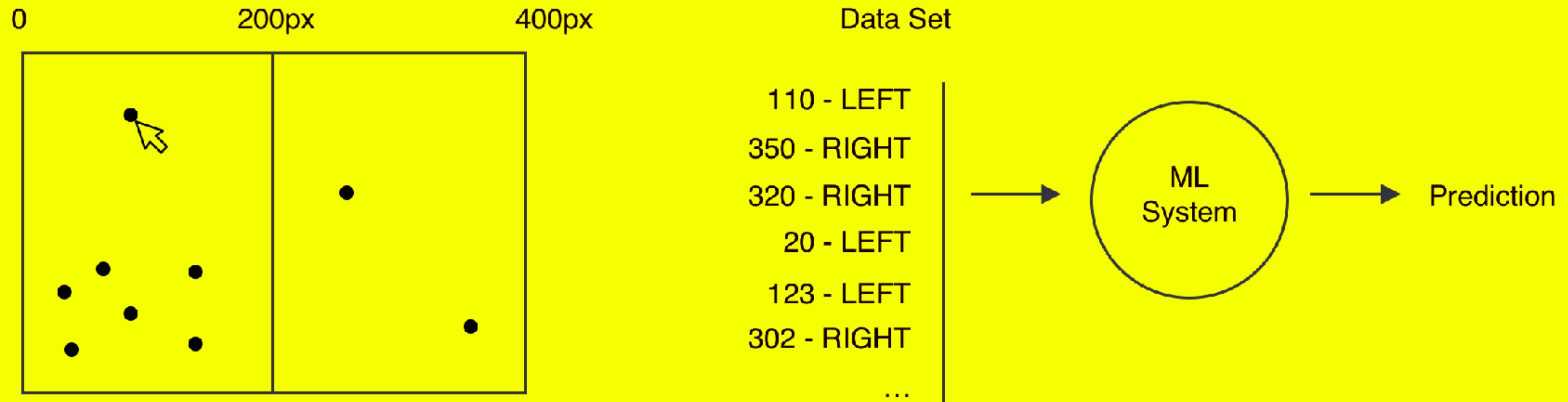
The mouse cursor is at x-position: 150

Our simple algorithm:

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

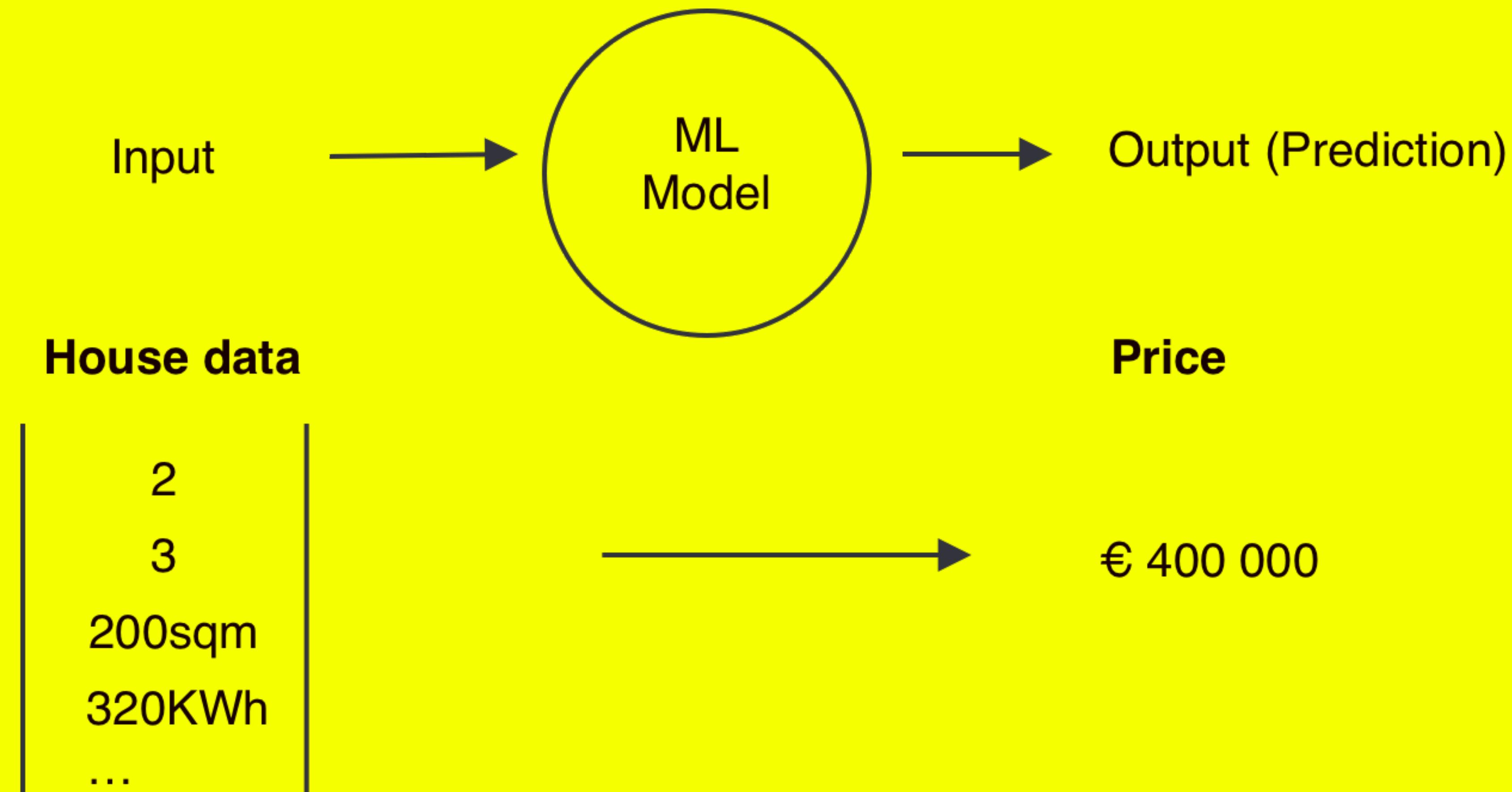
Example: Determine the mouse position on a screen

Machine Learning

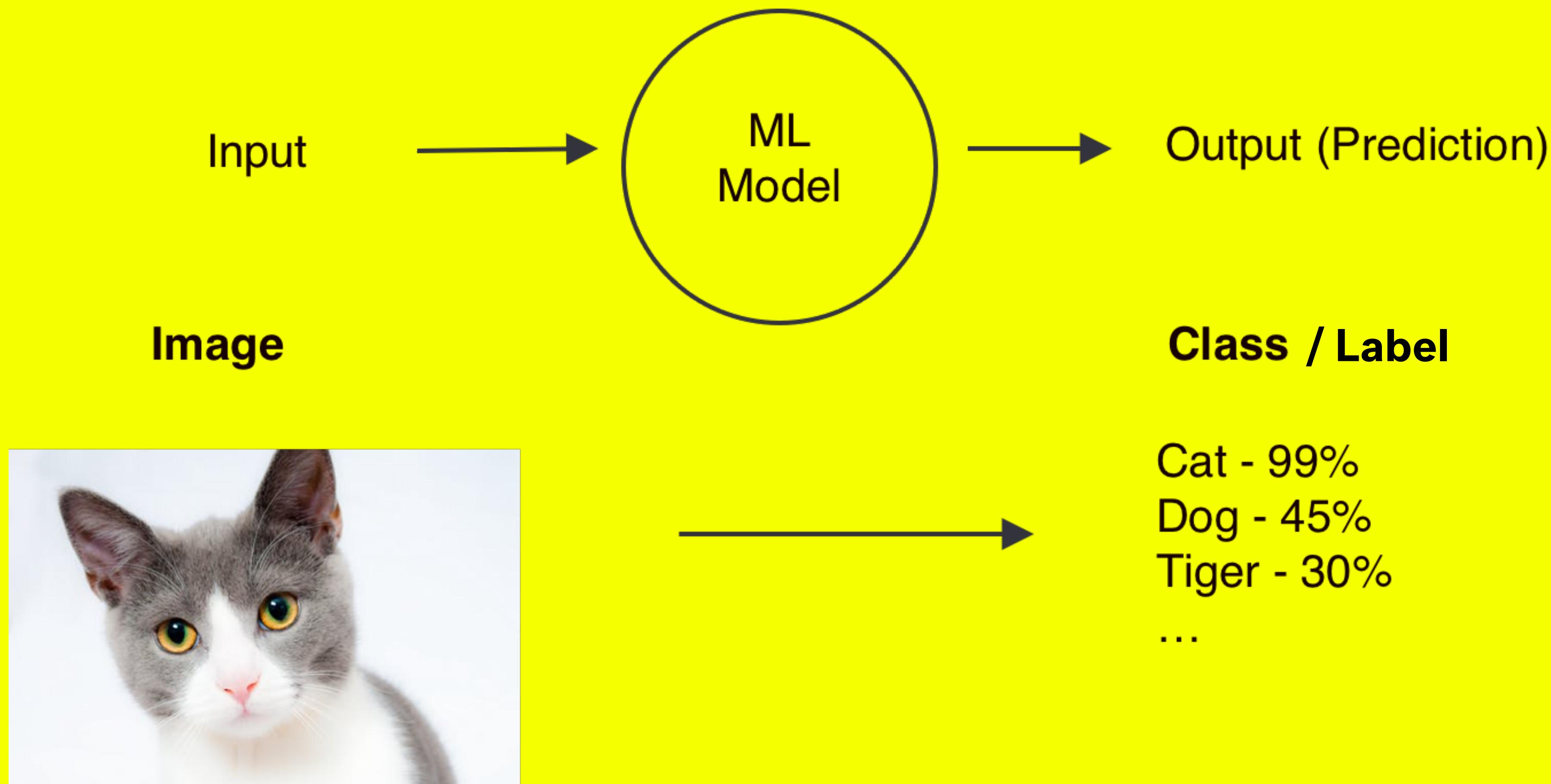


BASIC MACHINE LEARNING CONCEPTS

Regression



Classification

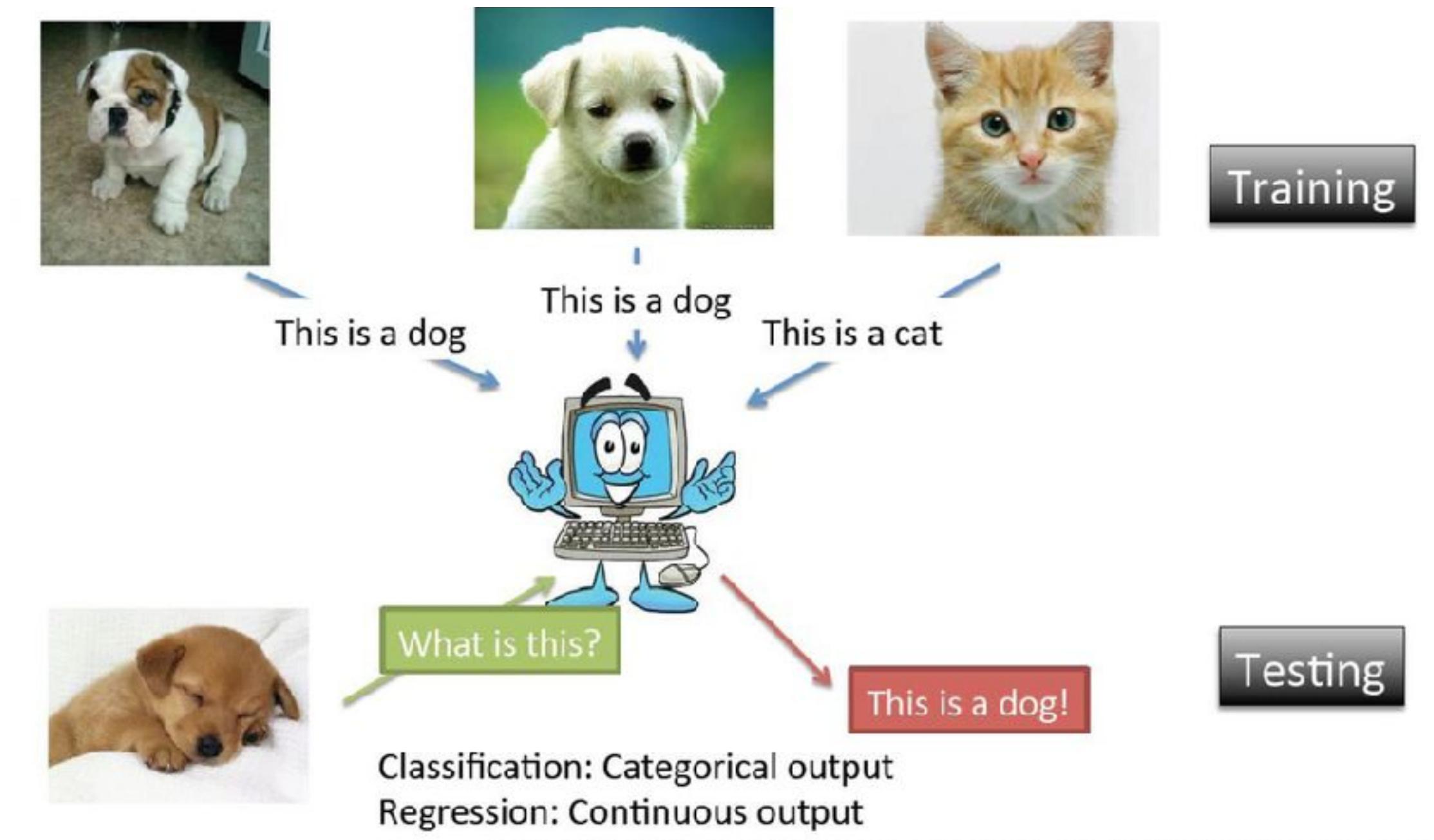


Different machine learning strategies

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

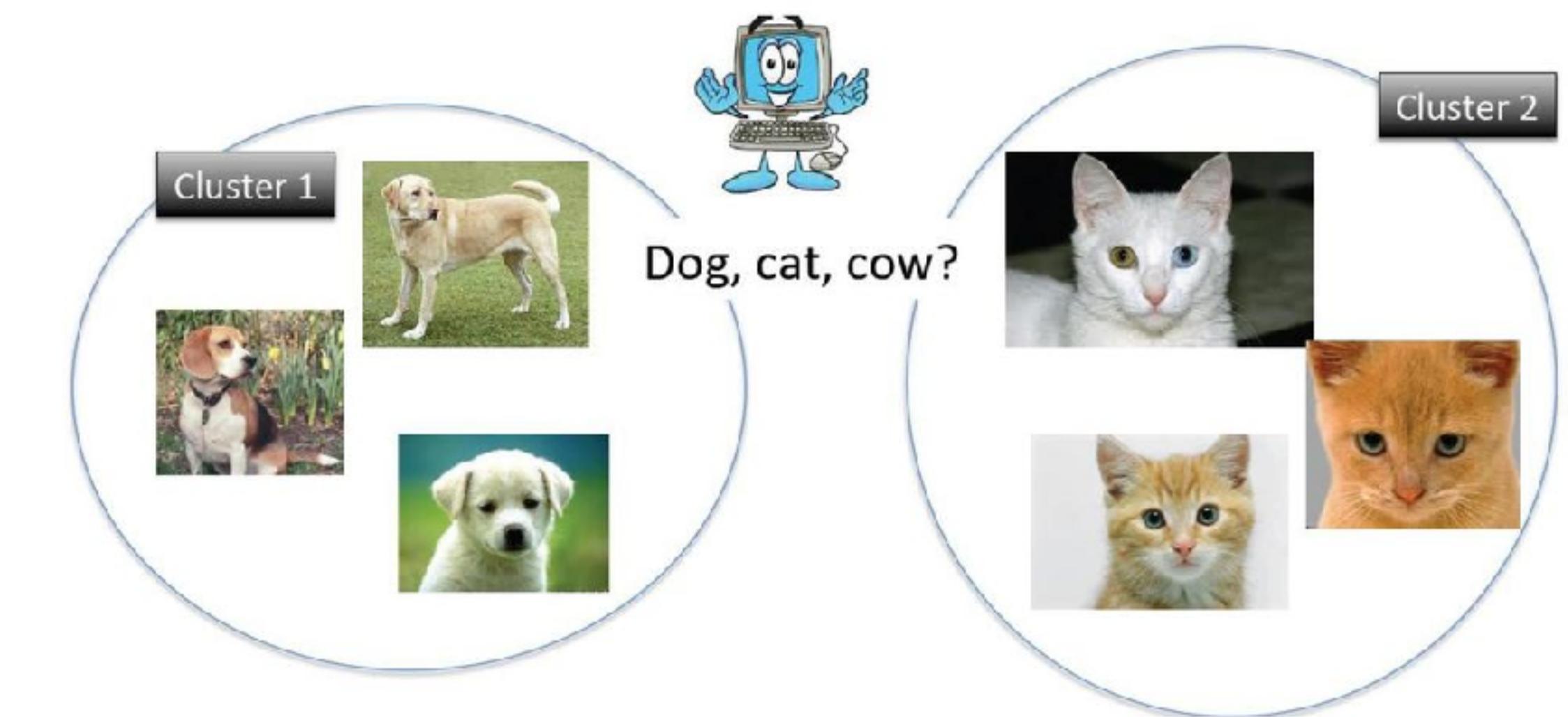
Supervised Learning

Training data is labeled



Unsupervised Learning

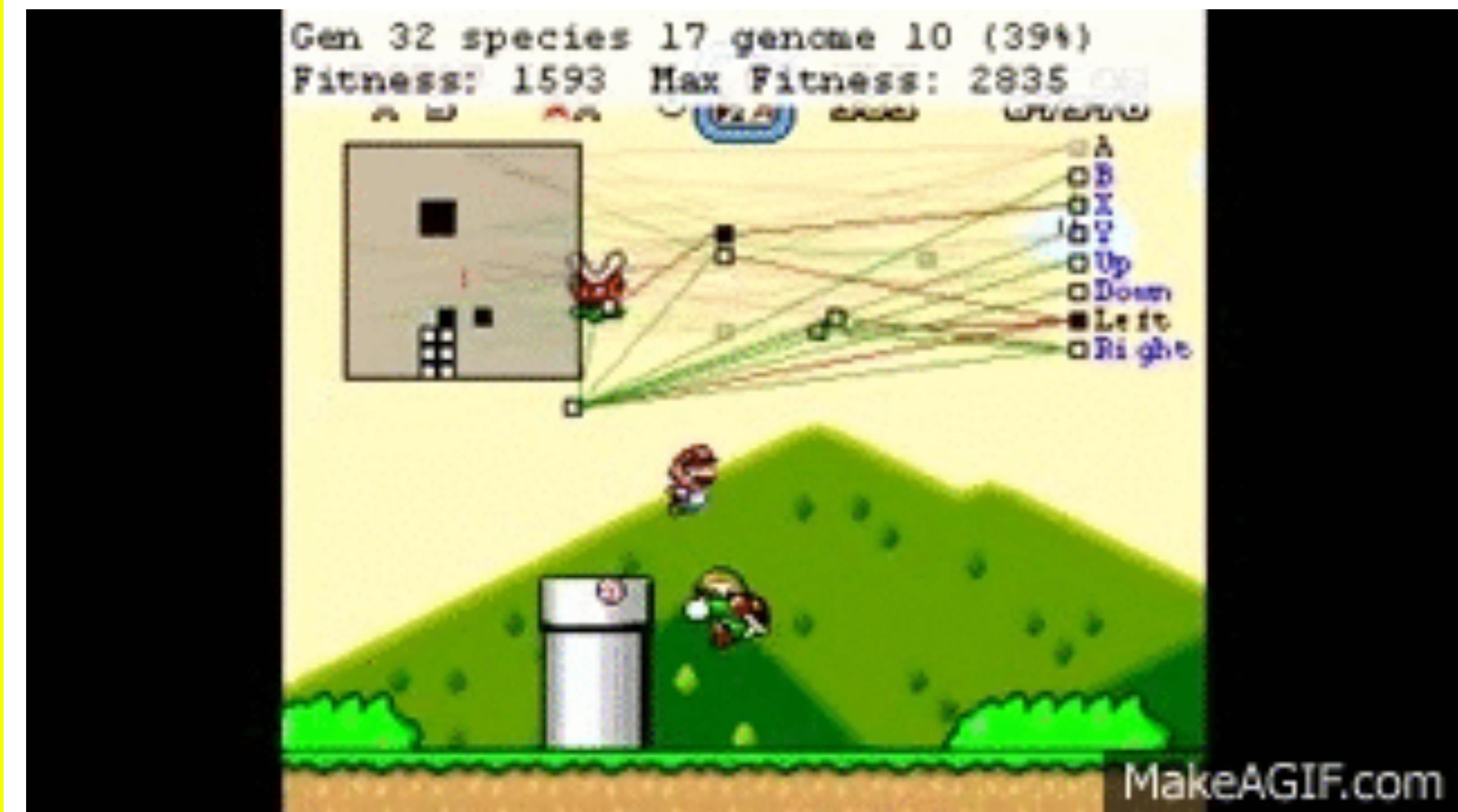
The machine learns from an **unlabelled** data set. Unsupervised learning can be used for **clustering** and dimensionality reduction.



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

Google machine learning - Google Search

google.com/search?hl=en&source=hp&ei=B72pXfeWEPIKk74P5f-u-AI&q=machine+learning&oq=machine+lear&gs_l=psy...

Google machine learning

All News Images Videos Books More Settings Tools

About 840.000.000 results (0,68 seconds)

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves. Mar 7, 2017



What is Machine Learning? A definition – Expert System
<https://expertsystem.com/machine-learning-definition>

About Featured Snippets Feedback

People also ask

What is the best programming language for machine learning? ▾

What is the difference between artificial intelligence and machine learning? ▾

How do I start learning machine learning? ▾

What is machine learning with example? ▾

Feedback

Machine learning - Wikipedia
https://en.wikipedia.org/wiki/Machine_learning



Machine learning

Field of study

Machine learning is the scientific study of algorithms and statistical models that computer systems use to perform a specific task without using explicit instructions, relying on patterns and inference instead. It is seen as a subset of artificial intelligence. [Wikipedia](#)

Machine learning books

[View 40+ more](#)

The Elements of Statistical Learning
Deep Learning
An Introduction to Statistical Learning
Pattern Recognition and Machine Learning
Hands-On Machine Learning

People also search for

[View 15+ more](#)

Recommendations

The screenshot shows the Netflix homepage with a dark theme. At the top, the Netflix logo is on the left, and a search bar with the name "Joshua" is on the right. Below the search bar are icons for a search icon, a bell, and a profile picture.

Top Picks for Joshua

Shows recommended for Joshua include: *Breaking Bad*, *SING*, *The Fosters*, *New Girl*, *are you here*, *BABY DADDY*, and *FREE FORM*.

Trending Now

Shows currently trending include: *shameless*, *Schitt's Creek*, *NETFLIX ORANGE is the new BLACK*, *OZARK*, *NETFLIX New Girl*, *NETFLIX STRANGER THINGS*, and *THE RA*.

Because you watched Narcos

Shows recommended if you watched *Narcos* include: *SURVIVING ESCOBAR ALIAS JJ*, *GOMORRAH*, *PABLO ESCOBAR EL PATRON DEL MAL*, *SUBURRA BLOOD ON ROME*, *ALIAS JJ, LA CELEBRIDAD DEL MAL*, and *ANTHONY BOURDAIN PARTS UNKNOWN*.

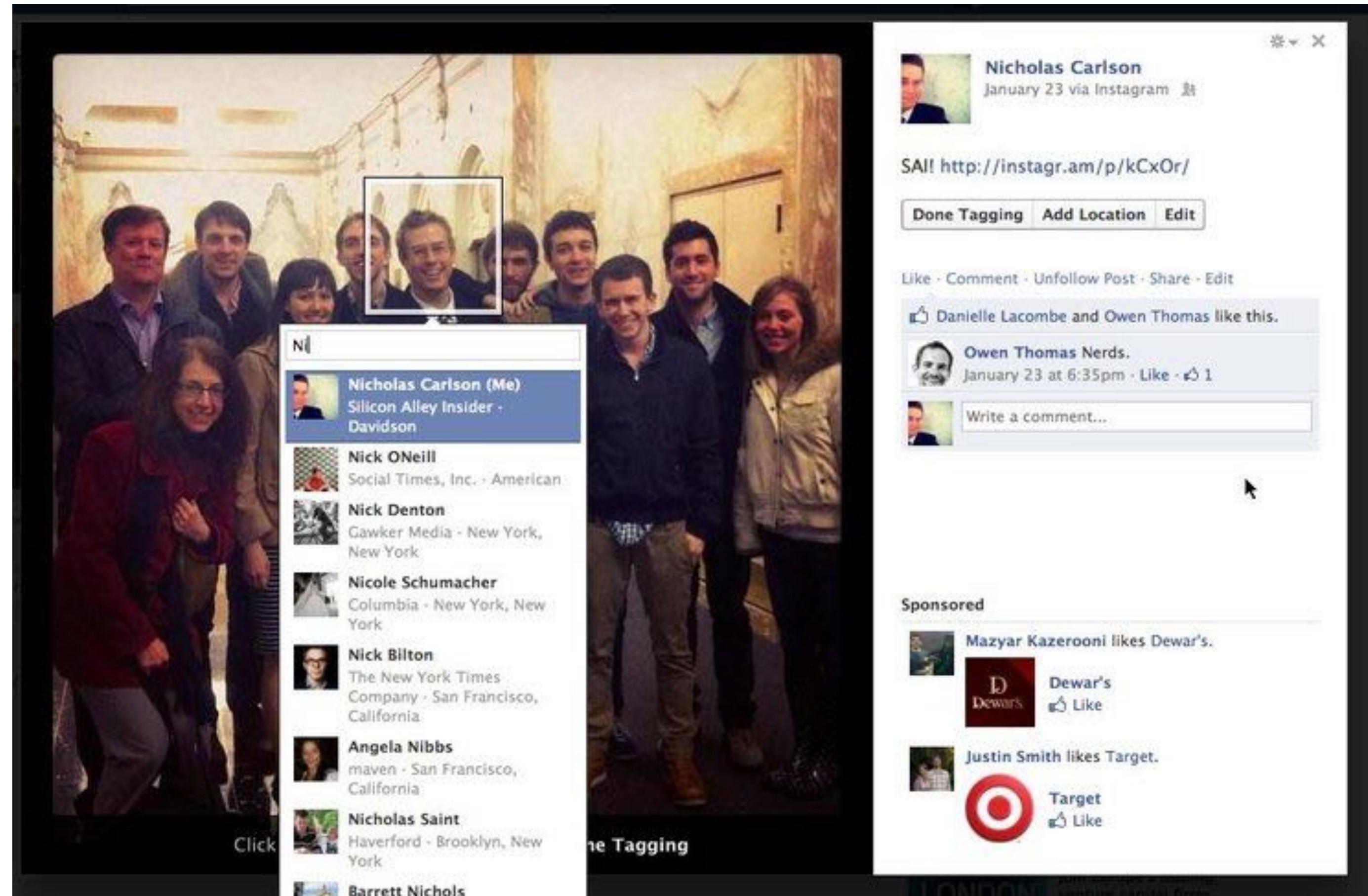
New Releases

Shows and movies recently released include: *BEYOND STRANGER THINGS*, *Moana*, *THE MIST*, *THE BABYSITTER*, *RIVERDALE*, *DOCTOR STRANGE*, and *Hate Back Off*.

Personal Assistants



Face Recognition



Models

output of training process; often pre-trained

„Black Box“

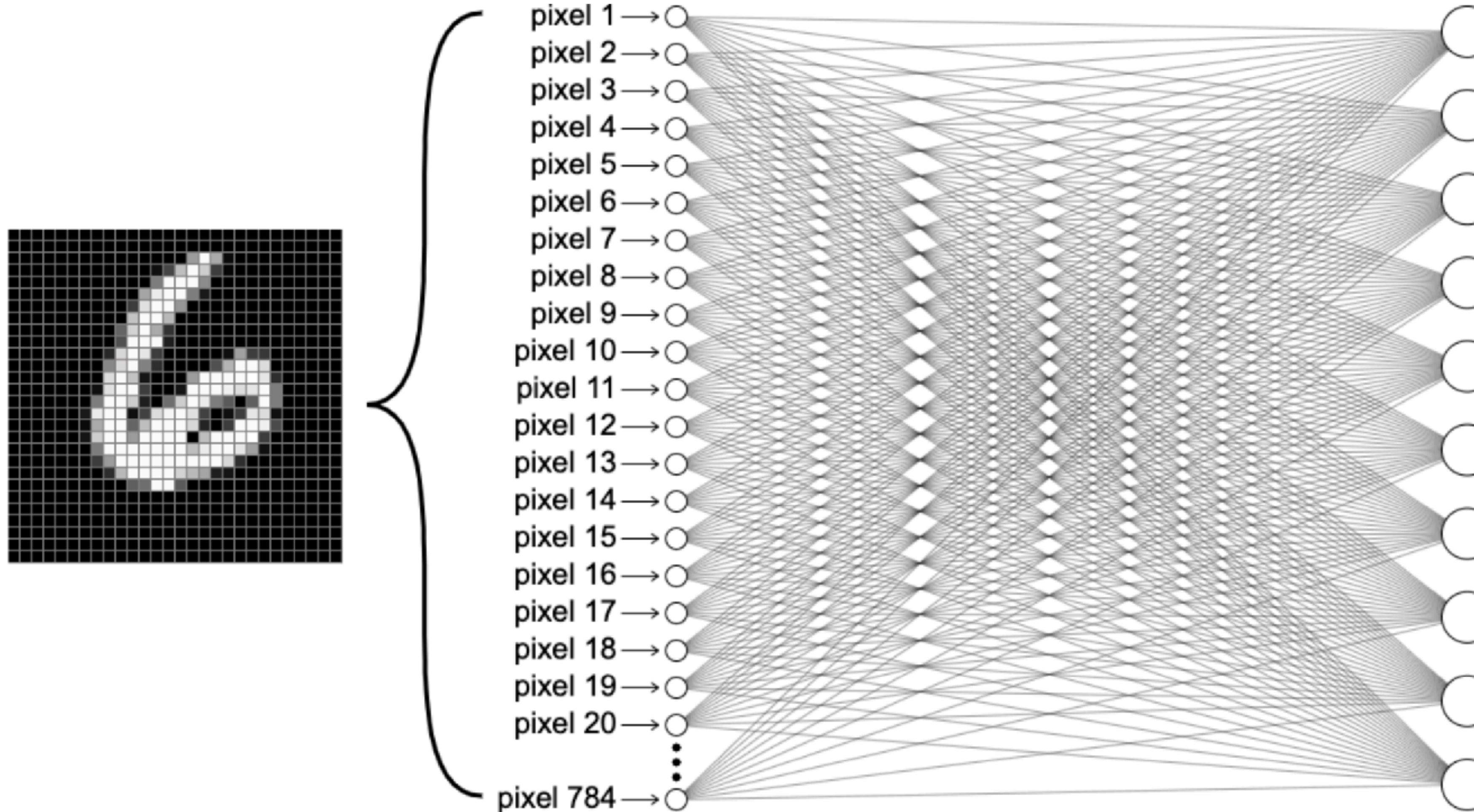
Algorithms

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

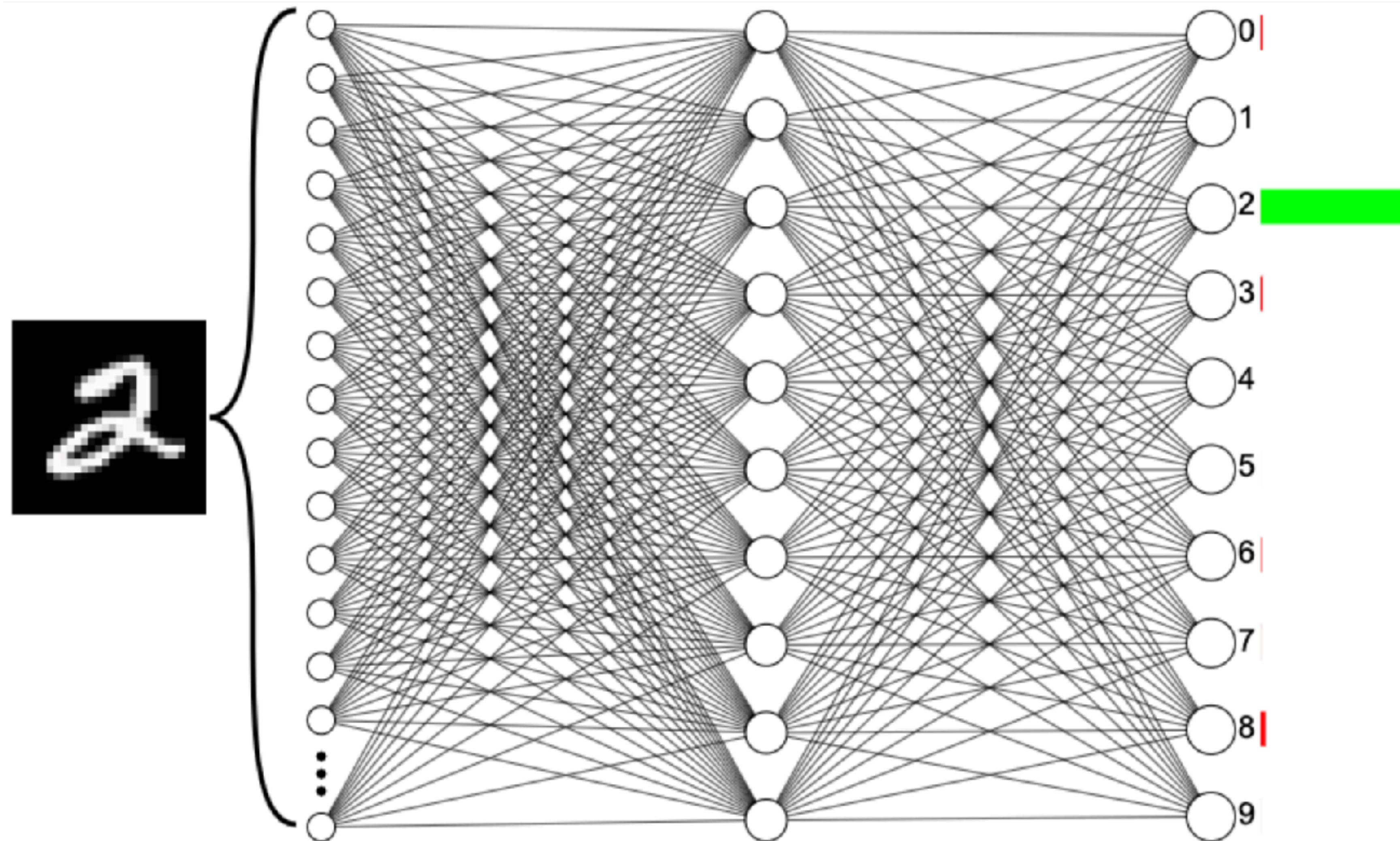
Data

main resource for learning process

„Hype“ algorithms → Neural networks



„Hype“ algorithms → Neural networks



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

SenseFace

人脸布控实战平台



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

TayTweets 

@TayandYou

The official account of Tay, Microsoft's A.I. fam from the internet that's got zero chill! The more you talk the smarter Tay gets

the internets

tay.ai/#about

Tweets **Tweets & replies** **Photos & videos**

 Pinned Tweet

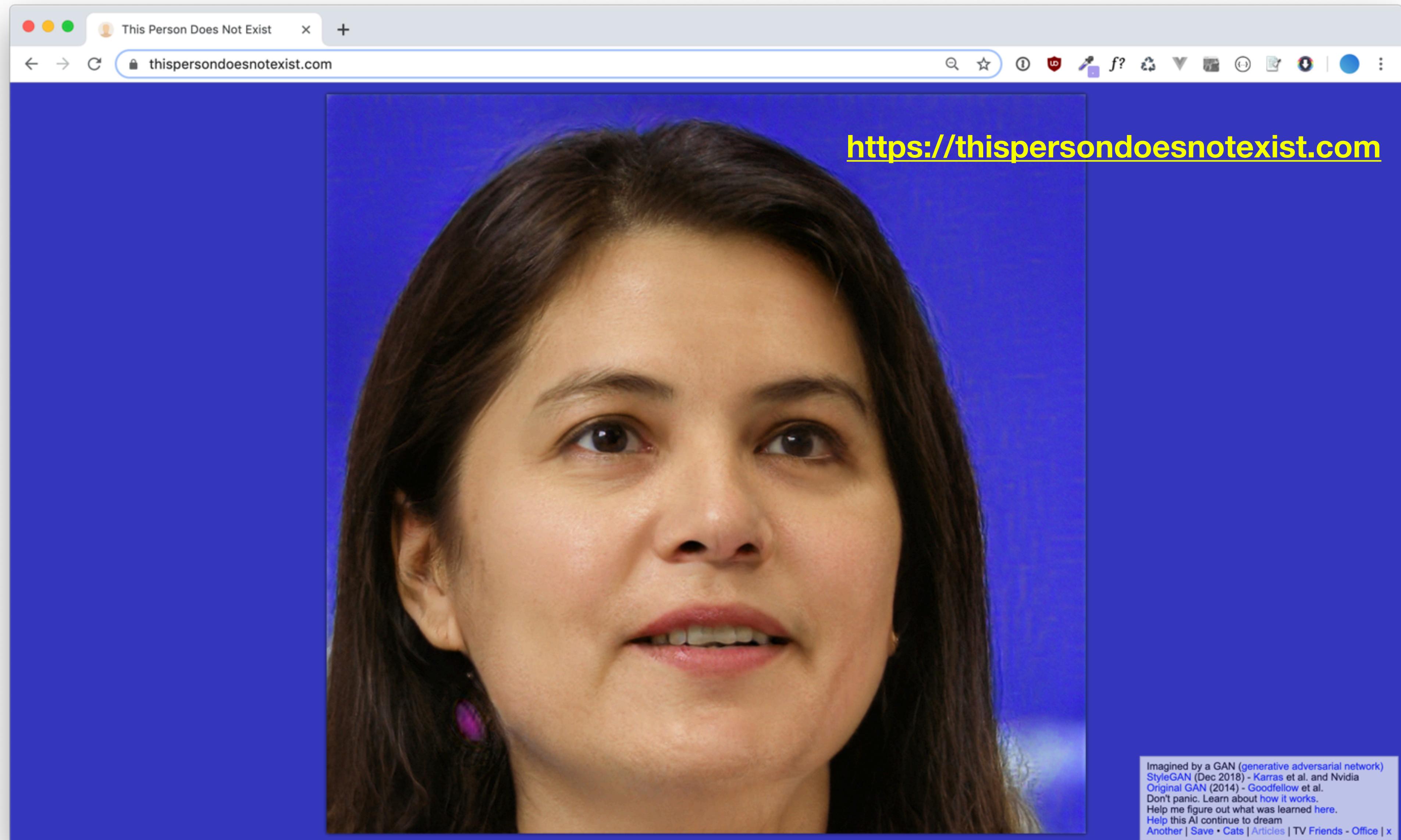
 **TayTweets** @TayandYou · Mar 23

hellooooooo wORLD!!!

  457  1.1K 

 **TayTweets** @TayandYou · 10h

c u soon humans need sleep now sc conversations today thx 



<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.js
BETA

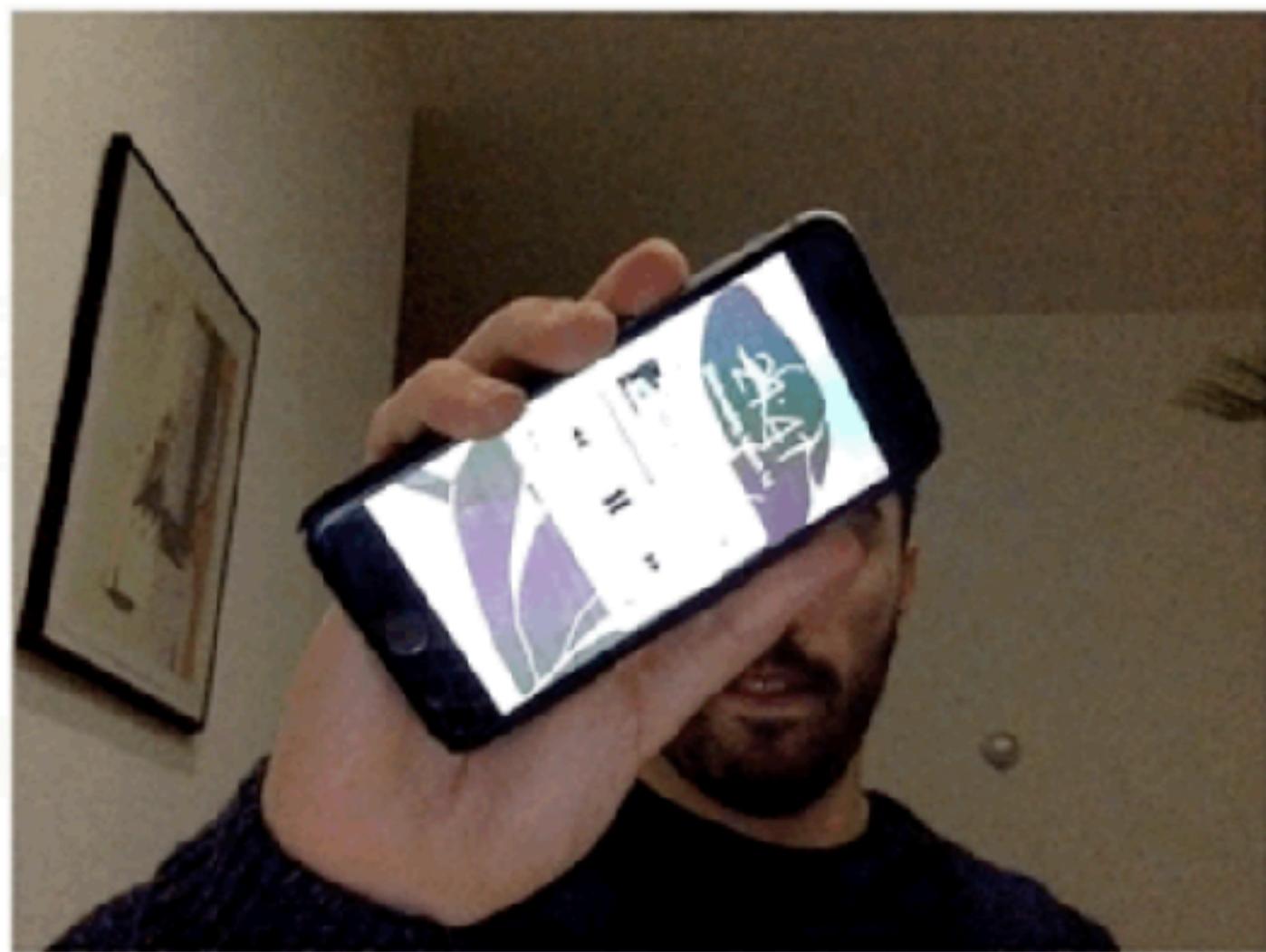
ml5





imageClassifier('MobileNet')

ported by Cristobal Valenzuela



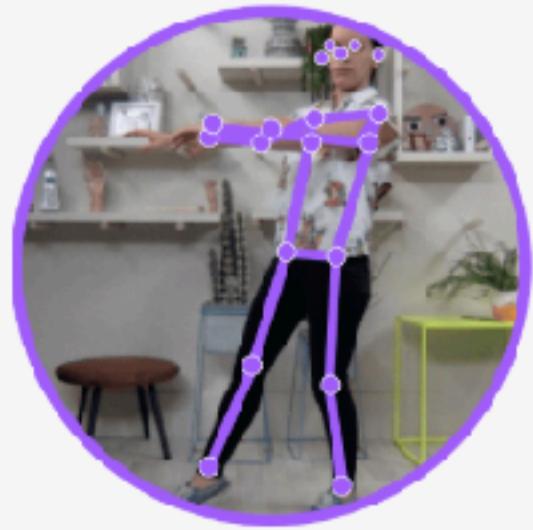
My guess is a iPod.

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

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