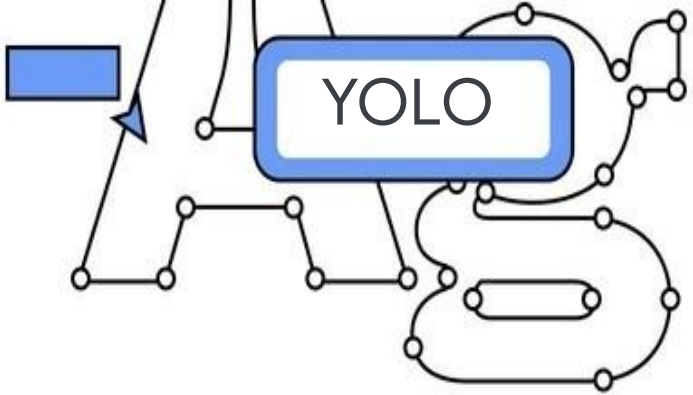
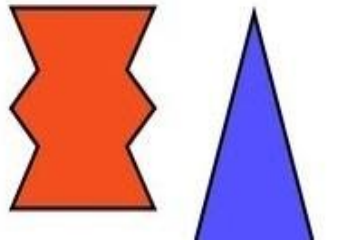
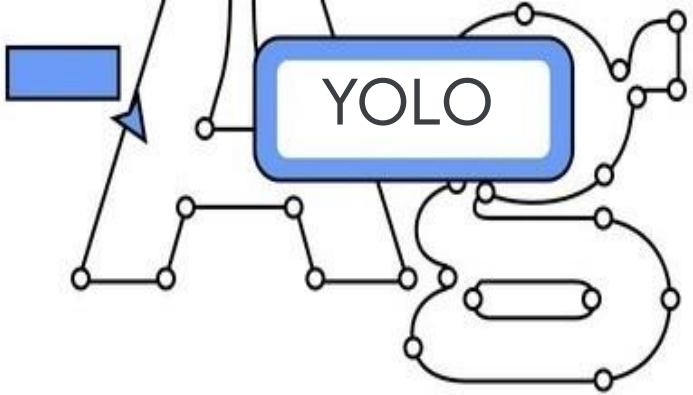


HOT JS in ML Soup

Shuvam Manna

Twitter @shuvam360

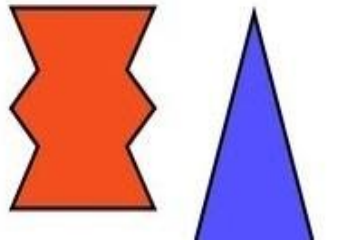




HOT JS in ML Soup

OR

ML Soup for JS Soul



Intro

Things I work on

The Web

Voice Apps

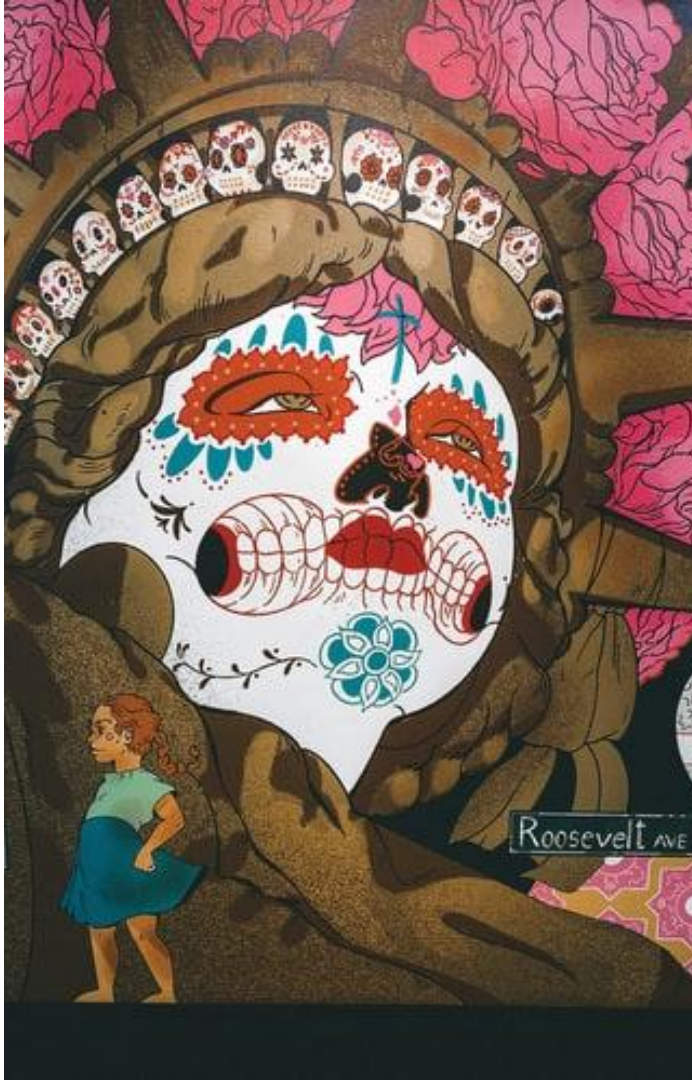
... a bit of Machine Learning

Agenda

What we won't cover

The nitty-gritty of ML

Why JS is/is not amazing



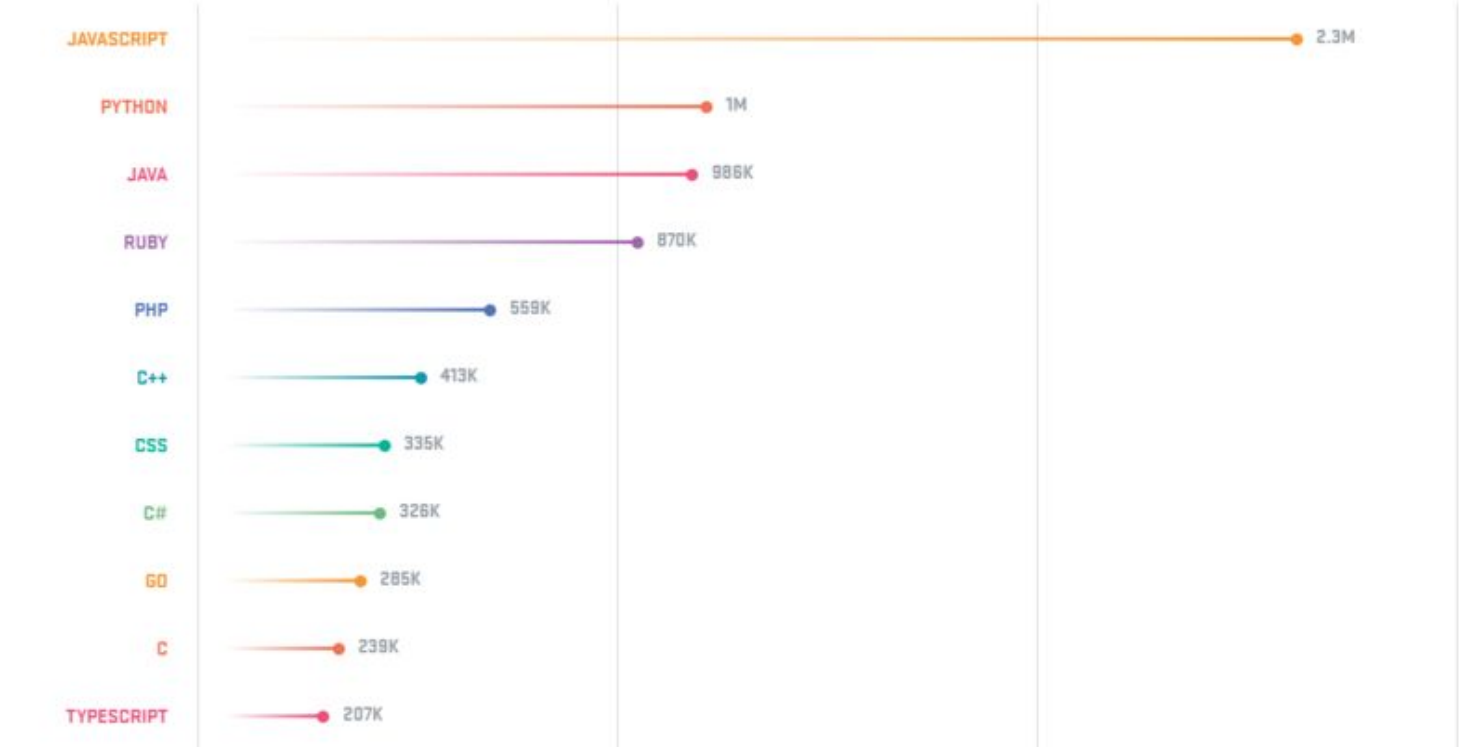

Java


AND THUS WAS BORN
...
JS
JAVASCRIPT
imgflip.com

The fifteen most popular languages on GitHub

by opened pull request

GitHub is home to open source projects written in 337 unique programming languages—but especially JavaScript.




So, if
0 == "0"
and
0 == []
then surely "0" == []
JS
That makes sense to me.

Written in 10 Days

Java-like
Syntax

Non-blocking
Event Loop

Dynamic
Typing

Prototype-based

Just-In-Time
Compiled

Standardized

Single-Threaded

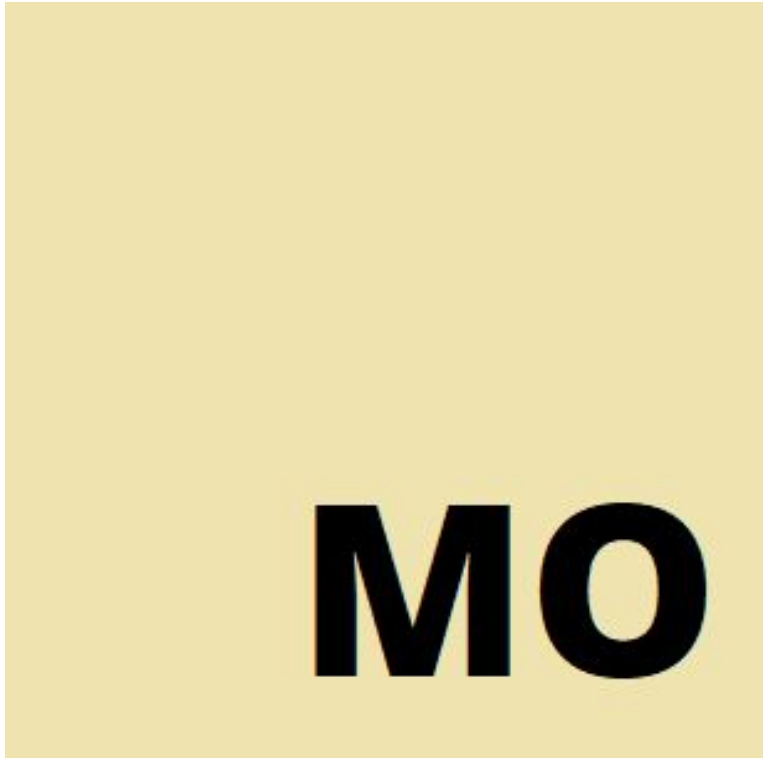
Garbage-Collected

Interpreted

Multi-paradigm

“Any App that can be written in Javascript, will eventually be written in Javascript.”

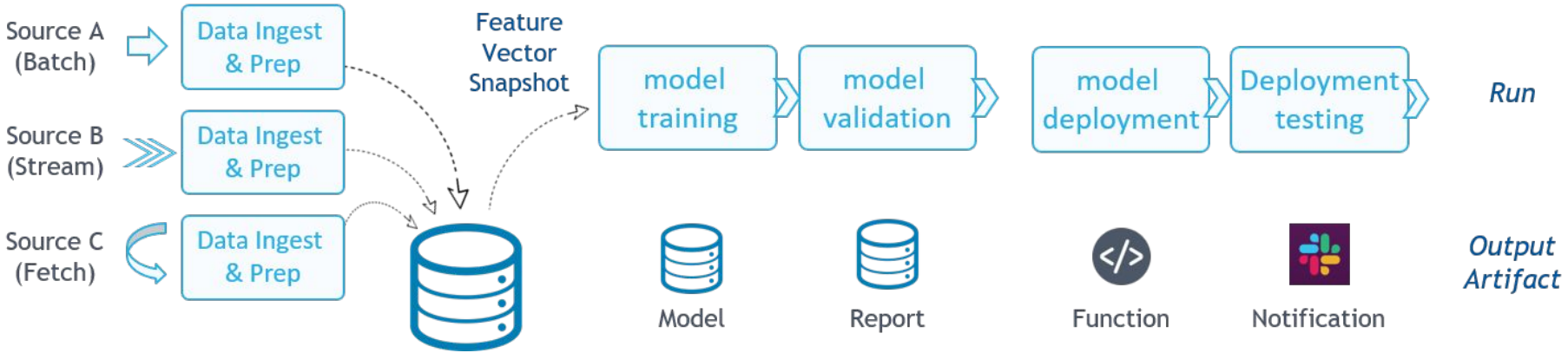
2007

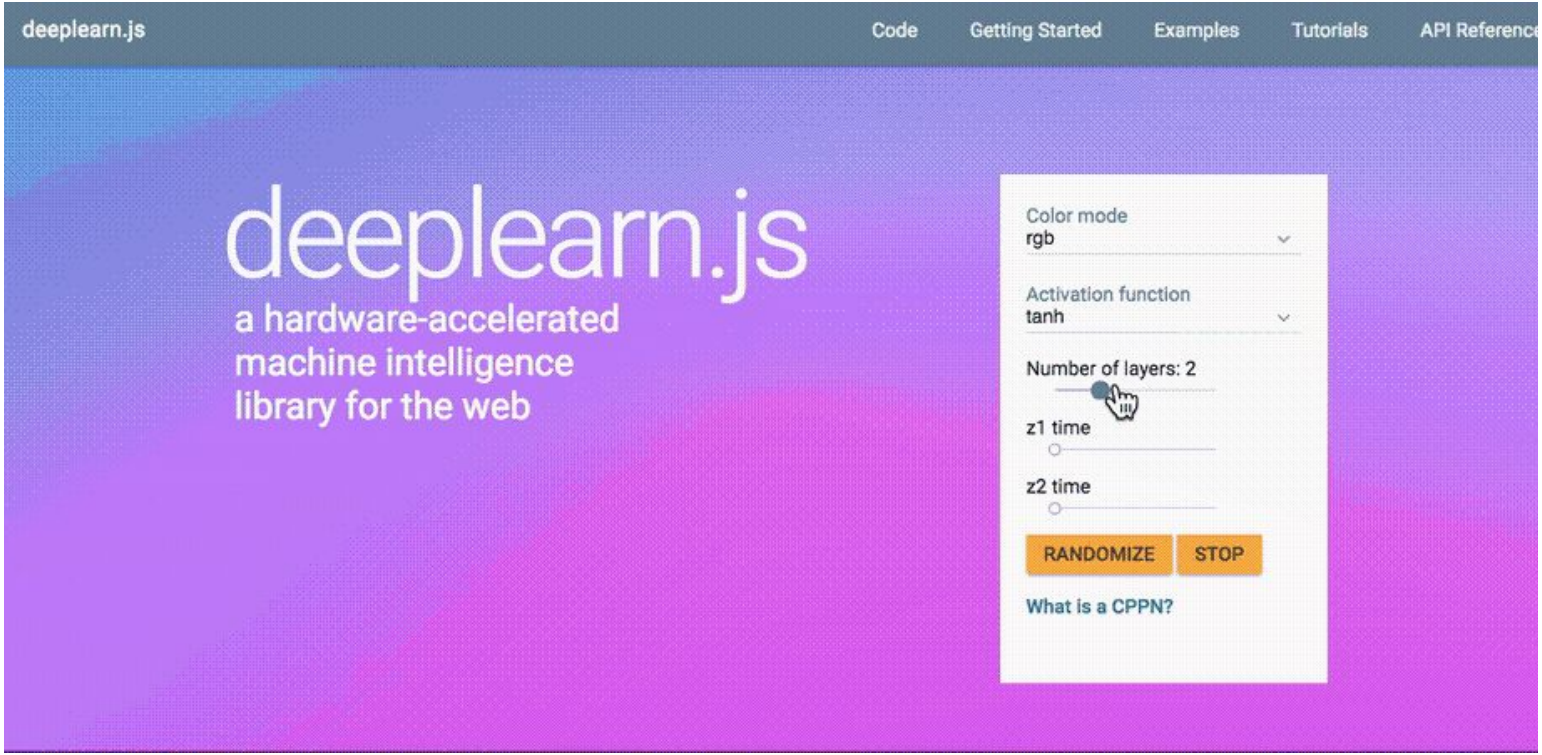

MO

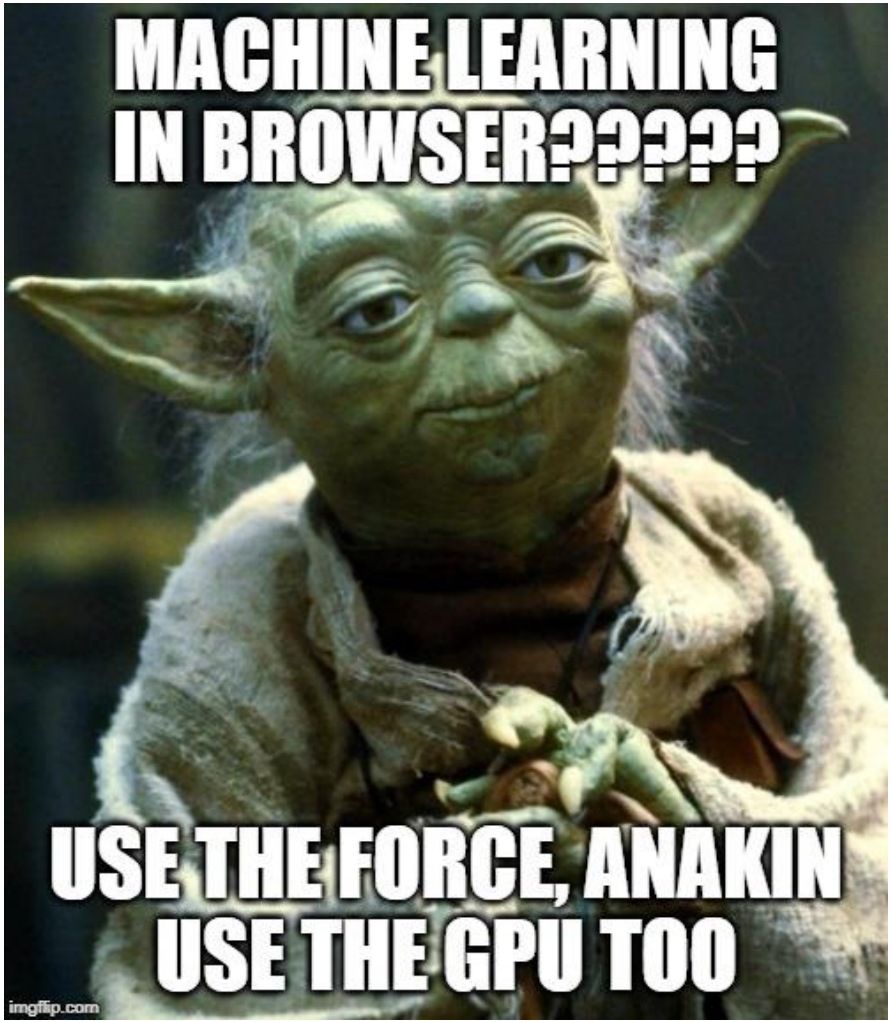

YEAH...IF YOU COULD JUST DO THAT THING I NEEDED YESTERDAY BUT AM ONLY ASKING FOR RIGHT NOW
THAT'D BE GREATTT!!

Chrome
Firefox

The Data Pipeline



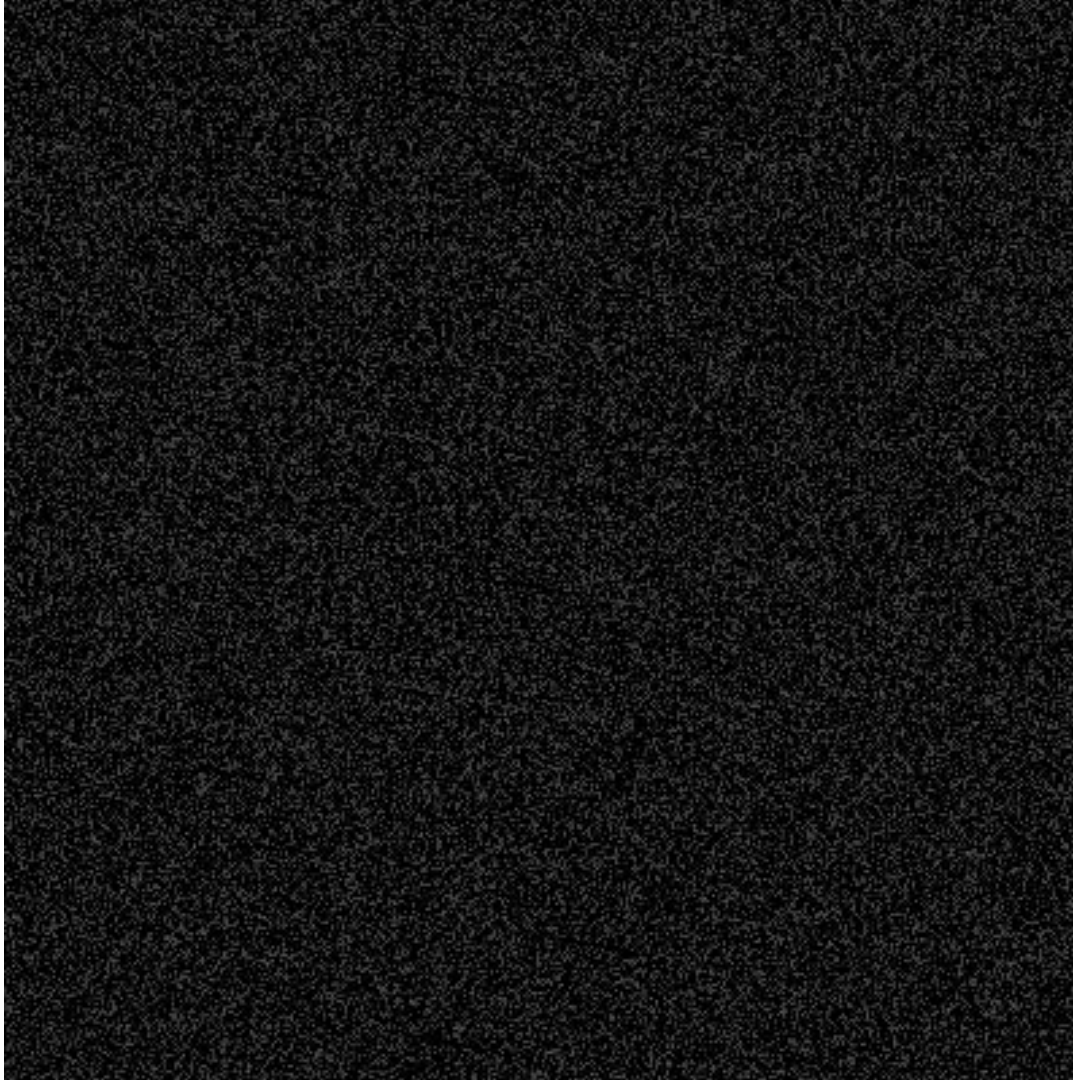

deeplearn.js
Code
Getting Started
Examples
Tutorials
API Reference
deeplearn.js
a hardware-accelerated
machine intelligence
library for the web
Color mode
rgb
Activation function
tanh
Number of layers: 2
z1 time
z2 time
RANDOMIZE
STOP
What is a CPPN?


MACHINE LEARNING
IN BROWSER?????
USE THE FORCE, ANAKIN
USE THE GPU TOO
imgflip.com

gpu.js

Perform massively parallel computations using GPU.

Graceful pure JavaScript fallback when GPU is not available.



```
const generateMatrices = () => {
    const matrices = [[], []];
    for (let y = 0; y < 512; y++){
      matrices[0].push([]);
      matrices[1].push([]);
      for (let x = 0; x < 512; x++){
        matrices[0][y].push(Math.random());
        matrices[1][y].push(Math.random());
      }
    }
    return matrices;
  }
```

```
const gpu = new GPU();
  const multiplyMatrix =
gpu.createKernel(function(a, b) {
    var sum = 0;
    for (var i = 0; i < 512; i++) {
      sum += a[this.thread.y][i] *
b[i][this.thread.x];
    }
    return sum;
  }).setOutput([512, 512]);
```

```
const matrices = generateMatrices();

const out =
multiplyMatrix(matrices[0],matrices[1]);
```


ALL HAIL THE KING OF KINGS
imgflip.com


WebGL
TM

TensorFlow

TensorFlow .js

ml5.js

Getting Started Reference Community About

Friendly Machine Learning for the Web

A neighborly approach to creating and exploring artificial intelligence in the browser.

```
// Step 1: Create an image classifier with MobileNet
const classifier = ml5.imageClassifier('MobileNet',
onModelReady);
```

```
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const classifier = ml5.imageClassifier('MobileNet',
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// Step 2: select an image
const img = document.querySelector("#myImage")
```

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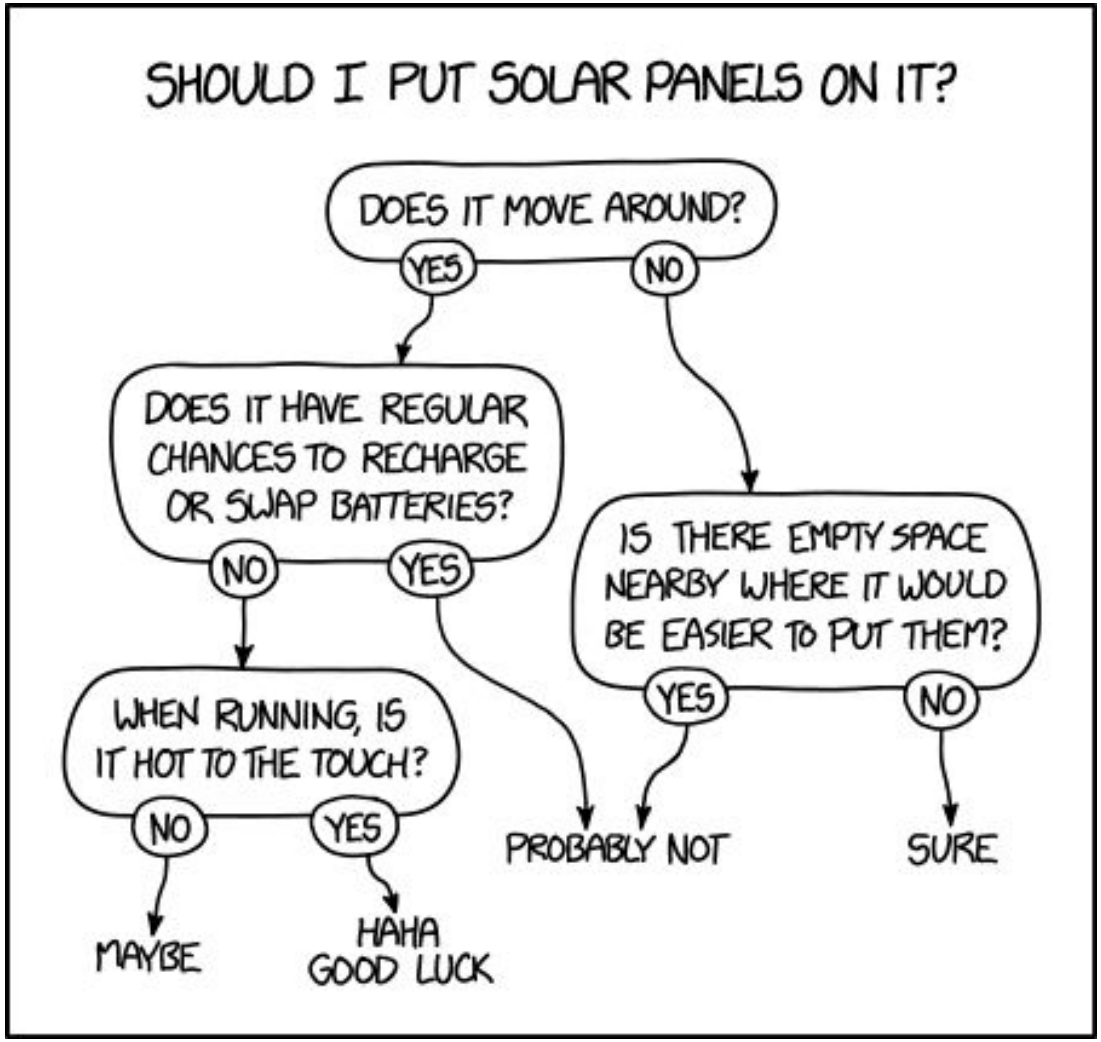
// Step 3: Make a prediction
let prediction = classifier.predict(img, gotResults);
```

```
// Step 1: Create an image classifier with MobileNet
const classifier = ml5.imageClassifier('MobileNet',
onModelReady);

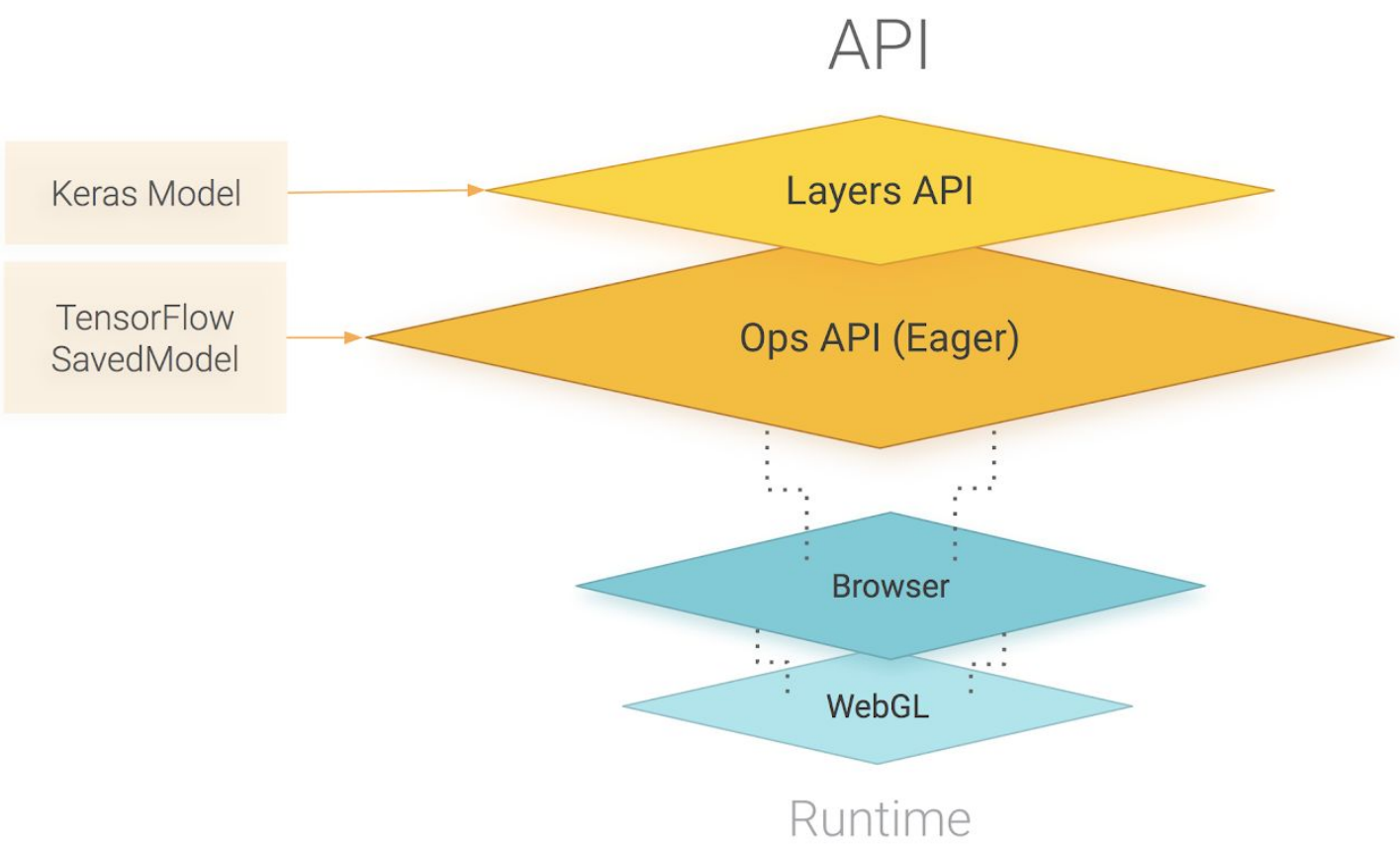
// Step 2: select an image
const img = document.querySelector("#myImage")

// Step 3: Make a prediction
let prediction = classifier.predict(img, gotResults);

// Step 4: Do something with the results!
function gotResults(err, results) {
  console.log(results);
  // all the amazing things you'll add
}
```


SHOULD I PUT SOLAR PANELS ON IT?
DOES IT MOVE AROUND?
YES
NO
DOES IT HAVE REGULAR CHANCES TO RECHARGE OR SWAP BATTERIES?
NO
YES
IS THERE EMPTY SPACE NEARBY WHERE IT WOULD BE EASIER TO PUT THEM?
YES
NO
WHEN RUNNING, IS IT HOT TO THE TOUCH?
NO
YES
PROBABLY NOT
SURE
MAYBE
HAHA GOOD LUCK


Tensors
are amazing
CHANGE MY MIND


API
Keras Model
TensorFlow SavedModel
Layers API
Ops API (Eager)
Browser
WebGL
Runtime


```
pip install tensorflowjs
```

```
// Procedure 1


# bash

tensorflowjs_converter --input_format keras \
                       path/to/my_model.h5 \
                       path/to/tfjs_target_dir
```

```
// Procedure 2


# Python

import tensorflowjs as tfjs

def train(...):
    model = keras.models.Sequential()   # for example
    ...
    model.compile(...)
    model.fit(...)
    tfjs.converters.save_keras_model(model,
tfjs_target_dir)
```

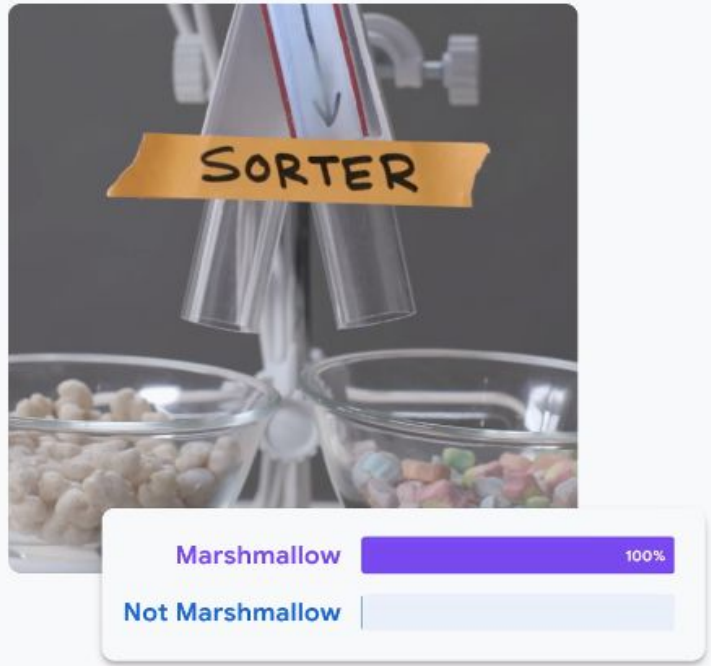
```
// Procedure 3
```

Teachable Machine

Train a computer to recognize your own images, sounds, & poses.

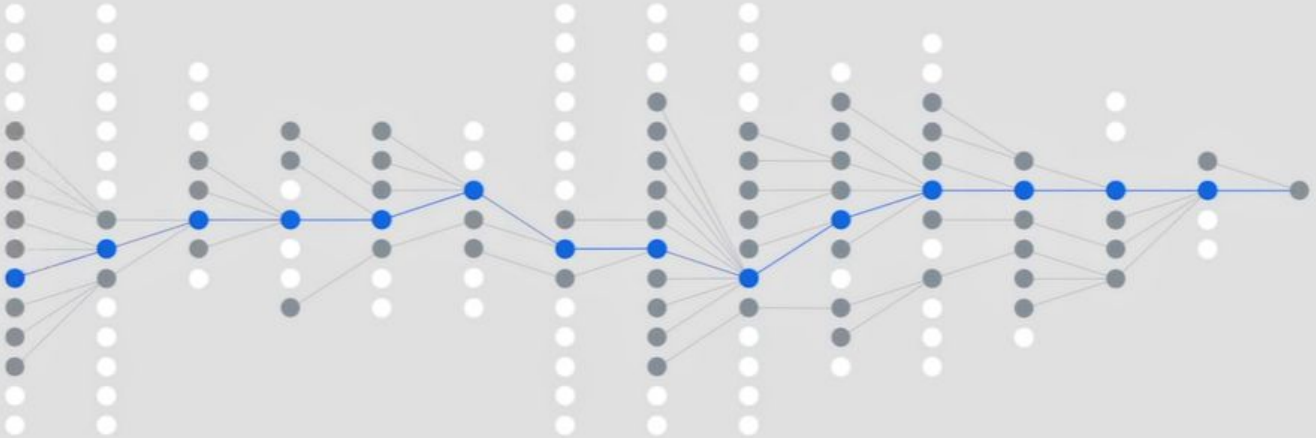
A fast, easy way to create machine learning models for your sites, apps, and more – no expertise or coding required.

Get Started




ONE CANNOT
NOT USE TRANSFER LEARNING
imgflip.com

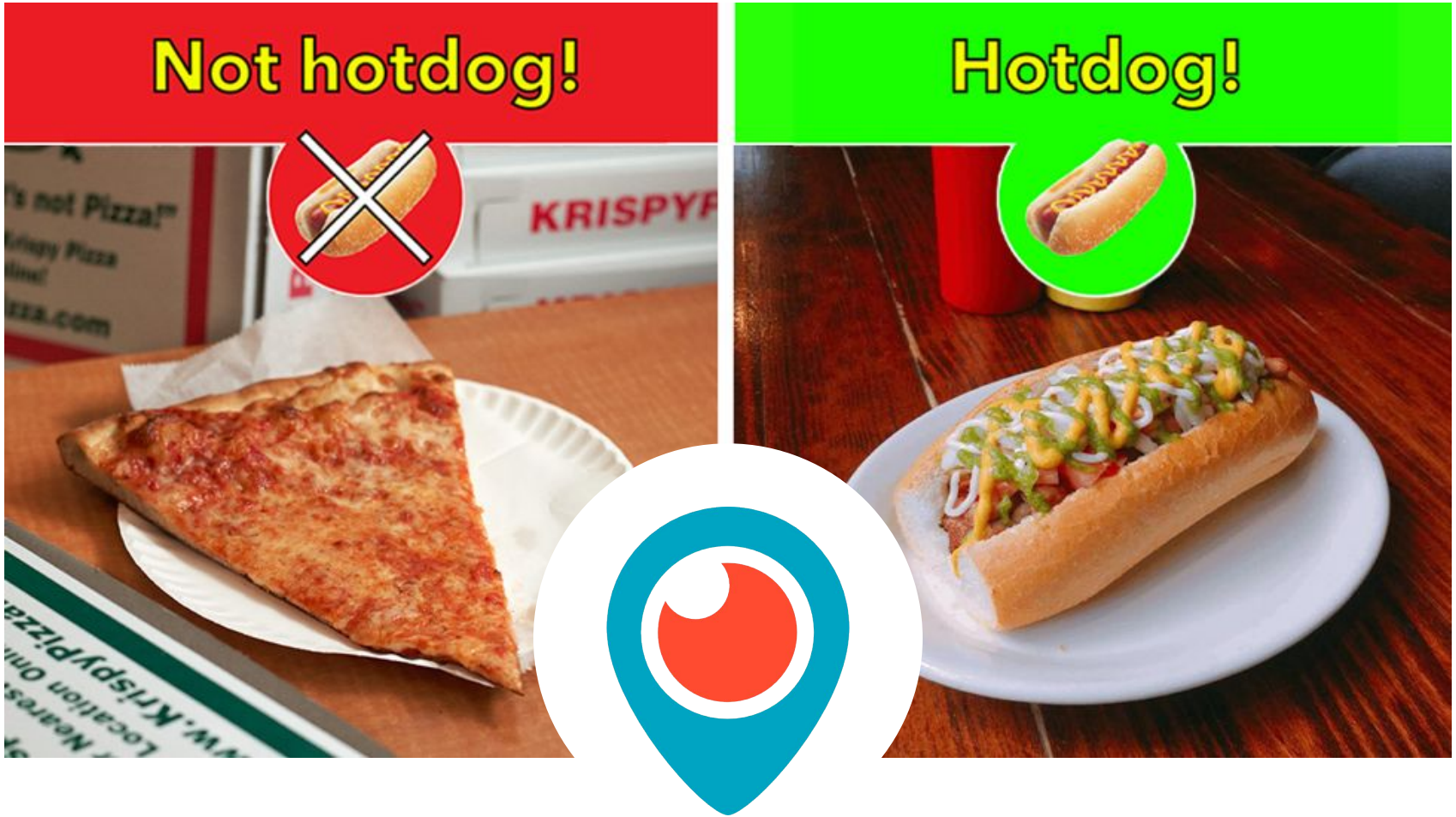

LIGHTYEAR
LAYERS EVERYWHERE
imgflip.com



Layers

New Layers added

Layers chopped!!!


Not hotdog!
Hotdog!

Resources

http://bit.ly/teachablemachines

http://bit.ly/opencv_face_detect

http://bit.ly/tfjs_get_started

https://teachablemachine.withgoogle.com/

https://ml5js.org/

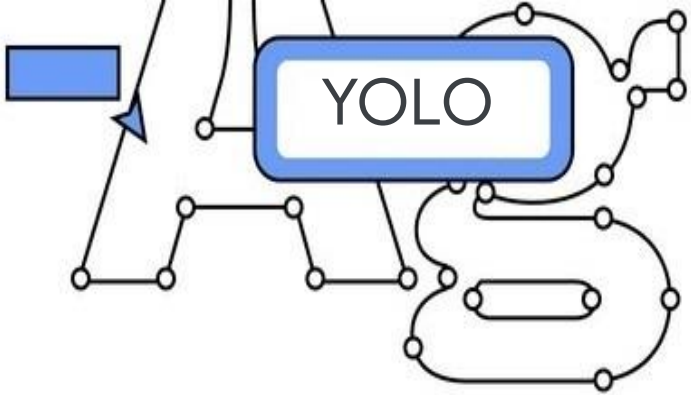
What I mean when I say "information architect"

Engineer is an identity,
a way of approaching the world,
an affinity your friends and
neighbors won't let you forget.

Photo credit: https://coronalabs.com/dilbert/

Keep it alive

Socialize, discuss, get feedback, iterate & **maintain**.



danke!

Twitter @shuvam360

Medium @shuvam.manna

Github @geekboysupreme