ML.js Crash Course

Crashing Machine Learning w/ JavaScript

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What is machine learning?

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Artificial intelligence,
Machine learning,
Data science,
Big data

??

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About me

Developer

Vim

Data-science

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Worth mentioning...

1. Preach JavaScript
2. #ALCinTanzania
3. Community Ninja
4. Marathoner

seedspace DAR ES SALAAM

Andela

Dar JS

forloop

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https://medium.com/@forlooptanzania_99946/forloop-tanzania-major-updates-7ba32ebe3190

#ALCwithforLoop

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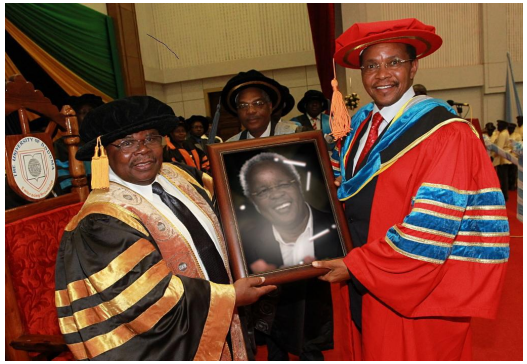
Can Digital Images Talk? How can ML & JS Help?



https://github.com/joshuamabina/claws

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What is machine learning??

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Machine learning...

Machine learning (ML) is the **study of algorithms** and **mathematical models** that computer systems use to **progressively improve their performance on a specific task.**

~ Wikipedia

Machine learning...

Machine learning algorithms **build a mathematical model of sample data**, known as "training data", in order to **make predictions or decisions without being explicitly programmed** to perform the task.

~ Wikipedia

Simply put,

1. It is a subfield of Artificial intelligence (AI)
2. It is a study of algorithms that learn from examples and experience
3. It is a study of algorithms that help computers learn without being explicitly programmed to do so
4. It is a study of algorithms that help computers predict correct answers & execute instructions without your explicit directions

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What are the common machine learning problems?

Supervised learning, a type of machine learning, can be approached through classification.

Classification is a process in which a **computer learns to identify to which class the given input belongs to** by **learning from labelled data**.

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What is the connection between artificial intelligence, machine learning, deep learning, data-science and big-data?

#foodForThought

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Head First
Machine learning

Problem: Is it a Mouse or Rat?! 🤔

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The steps

1. Import your data set
2. Train your model
3. Predict the correct answer

The rodents data...

Weight (units)	Location	Label
140	Town (0)	Mouse (0)
120	Town (0)	Mouse (0)
700	Country (1)	Rat (1)
500	Country (1)	Rat (1)
900	Country (1)	Rat(1)
100	Town (0)	Mouse (0)

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Importing the data:

features = [[140, 0], [120, 0], ..., [500, 1] [900, 1]]

labels = [0, 0, 1, 1, 1, 0]

Training the classifier:

```
classifier = tree.DecisionTreeClassifier()

classifier = classifier.fit(features,label)
```

Predict the rodent:

```
print classifier.predict([[300, 0]])
```

```
from sklearn import tree

# 1. import the data
features = [[140, 0], [120, 0], [700, 1], [500, 1], [900, 1], [100, 0]]
label = [0, 0, 1, 1, 1, 0]

# 2. train the classifier
classifier = tree.DecisionTreeClassifier()
classifier = classifier.fit(features,label)

# 3. predict
print classifier.predict([[300, 0]])
```

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How accurate will the classifier be when used on rodents not in the training data?

One way to evaluate an algorithm is by partitioning it into two: (1) the training set, on which we learn some properties; (2) the testing set, on which we test the learned properties.

```
from sklearn import tree

# 1. import the data
testing_features = [[140, 0], [700, 1]]
testing_labels = [0, 1]

training_features = [[120, 0], [500, 1], [900, 1], [100, 0]]
training_labels = [0, 1, 1, 0]

# 2. train the classifier
classifier = tree.DecisionTreeClassifier()
classifier = classifier.fit(training_features, training_labels)

# 3. predict
print classifier.predict(testing_features)
print testing_labels
```

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It’s JavaScript

https://github.com/getify/You-Dont-Know-JS

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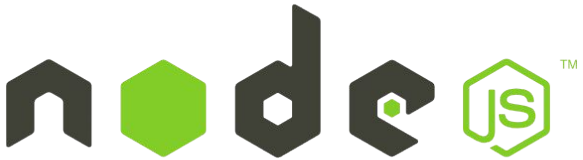
JavaScript Ecosystem?

1. Node, npm, nvm
2. ES6 & Babel
3. Webpack



https://github.com/creationix/nvm

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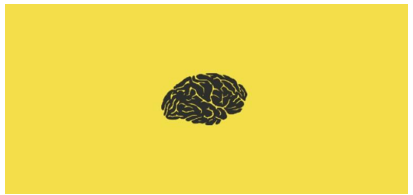
JavaScript ML Ecosystem?

1. brain.js (Neural Networks)
2. Synaptic (Neural Networks)
3. Natural (Natural Language Processing)
4. ConvNetJS (Convolutional Neural Networks)
5. **mljs (A set of sub-libraries with a variety of functions)**
6. Neataptic (Neural Networks)
7. Webdnn (Deep Learning)
8. Tensorflow.js (Deep Learning)



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ml.js

Report abuse

Machine learning and numerical analysis tools in JavaScript for Node.js and the Browser !

Repositories 85 | People 7 | Projects 1

Pinned repositories

ml
Machine learning tools in JavaScript
JavaScript ★ 1.3k 136

matrix
Matrix manipulation and computation library
JavaScript ★ 108 16

pca
Principal component analysis
JavaScript ★ 50 11

knn
A k-nearest neighboor classifier algorithm.
JavaScript ★ 59 10

feedforward-neural-networks
A implementation of feedforward neural networks based on wildml implementation
JavaScript ★ 17 3

libsvm
LIBSVM for the browser and nodejs
JavaScript ★ 37 7

https://github.com/mljs

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Importing the data:

```
let trainingSet = [[140, 0], [120, 0], [700, 1], [500, 1], [900, 1], [100, 0]]
let trainingLabels = [0, 0, 1, 1, 1, 0];
```

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Training the classifier:

```
let classifier = new DTClassifier();
classifier.train(trainingSet, trainingLabels);
```

```
import { DecisionTreeClassifier as DTClassifier } from 'ml-cart';

// 1. import the data
let trainingSet = [[140, 0], [120, 0], [700, 1], [500, 1], [900, 1], [100, 0]]
let trainingLabels = [0, 0, 1, 1, 1, 0];

// 2. train the classifier
let classifier = new DTClassifier();
classifier.train(trainingSet, trainingLabels);

// 3. predict
console.log(classifier.predict([[300, 0]]));
```

Recap / Q&A

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