Intro to ML

The Hello World of Machine Learning

Who am I?

Who am I?

Backend and Feature Developer for

"Google Analytics for healthcare data"

by Ivbar

Machine Learning and Touch Rugby Enthusiast

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github.com/christinewinter

Lightning talks & study group

Wednesday, June 19, 2019

5:30 PM to 8:30 PM

Foo Café (Hammarby kaj 10D · Stockholm)

www.meetup.com/PyLadiesStockholm/events

Who is listening?

Who knows what machine learning is?

Who programmed in python before?

What is Learning ?

What is Learning ?

The acquisition of knowledge or skills through study, experience, or being taught.

Oxford dictionary

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Understand what's going on with different methods and use this information the next time.

My interpretation

How do we learn ?

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Get instructions from others

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→ **supervised learning**

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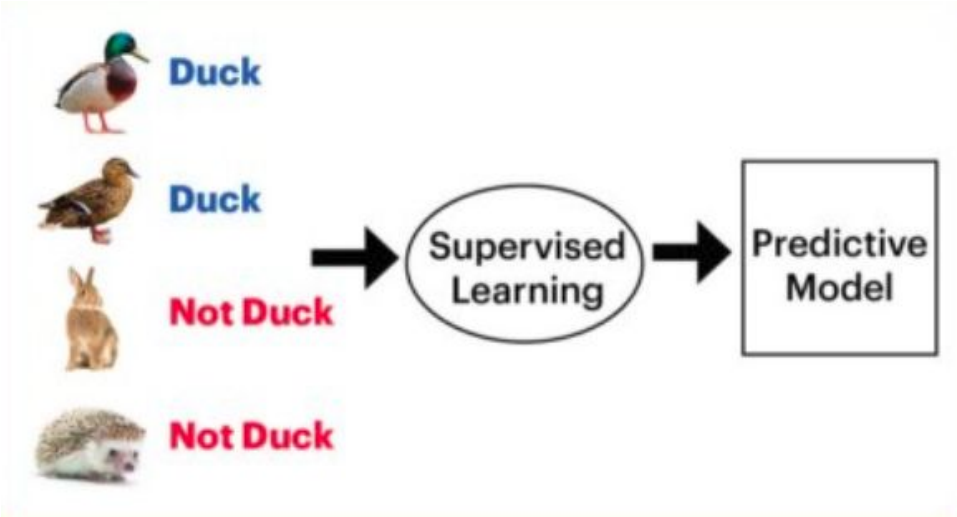
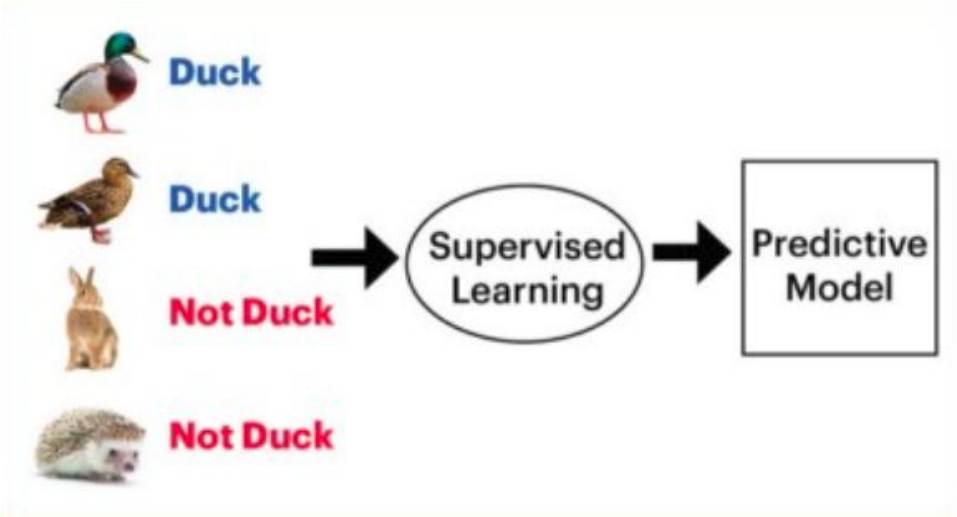
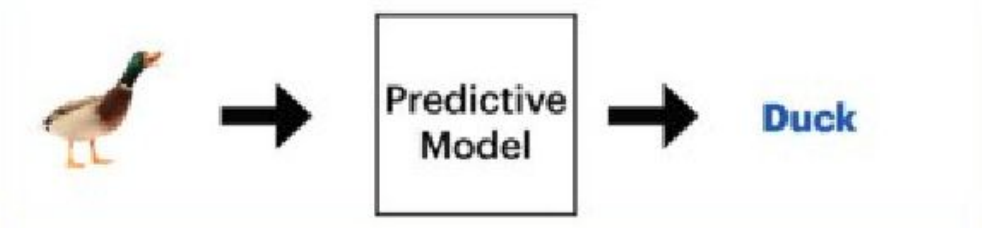
Supervised



https://medium.com/datadriveninvestor/differences-between-ai-and-machine-learning-and-why-it-matters-1255b182fc6

Supervised





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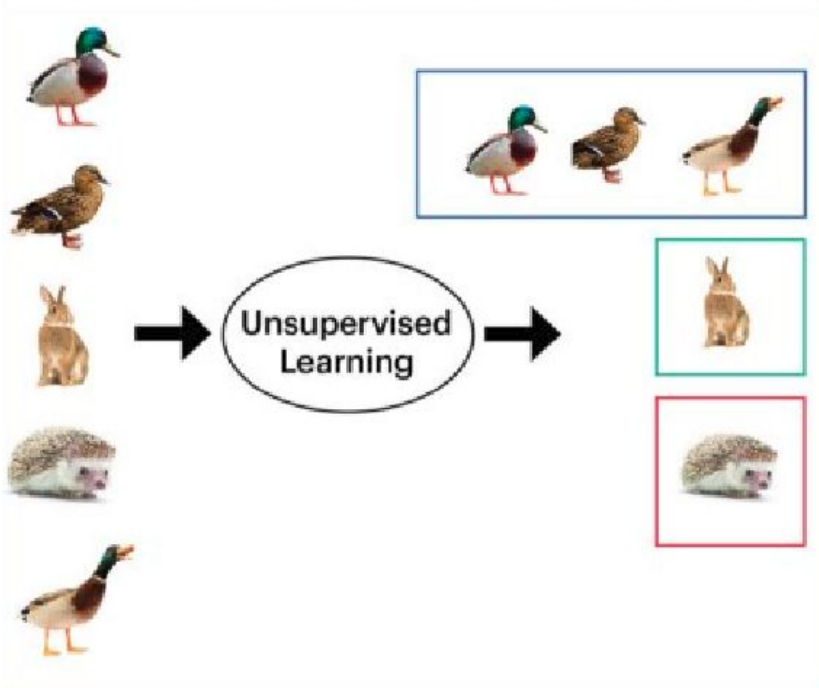
Unsupervised



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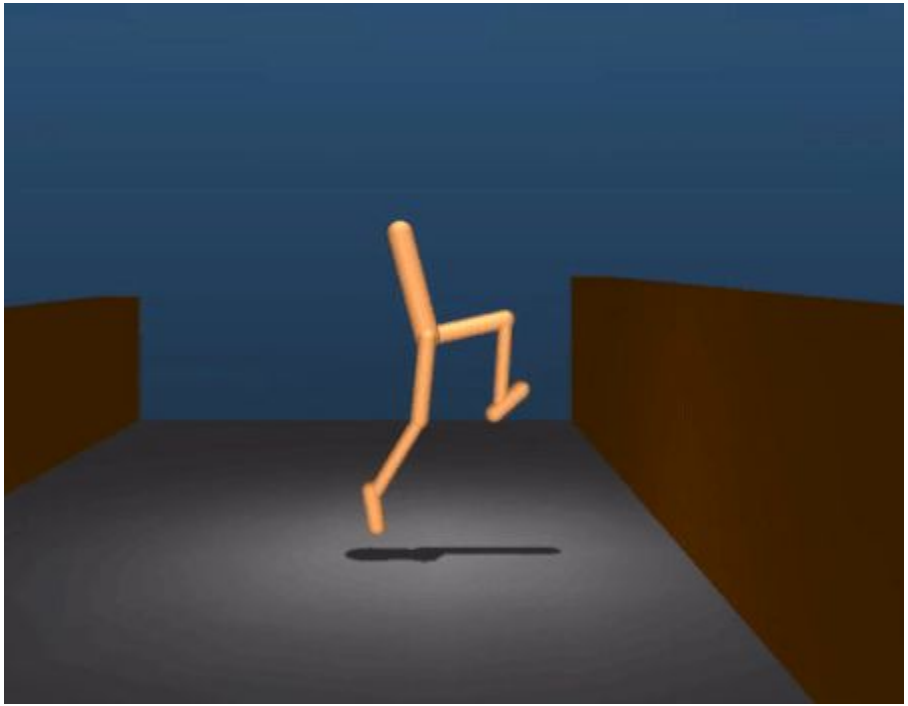
→ **reinforcement learning**

Reinforcement



https://www.theverge.com/tldr/2017/7/10/15946542/deepmind-parkour-agent-reinforcement-learning

So, what will we do?

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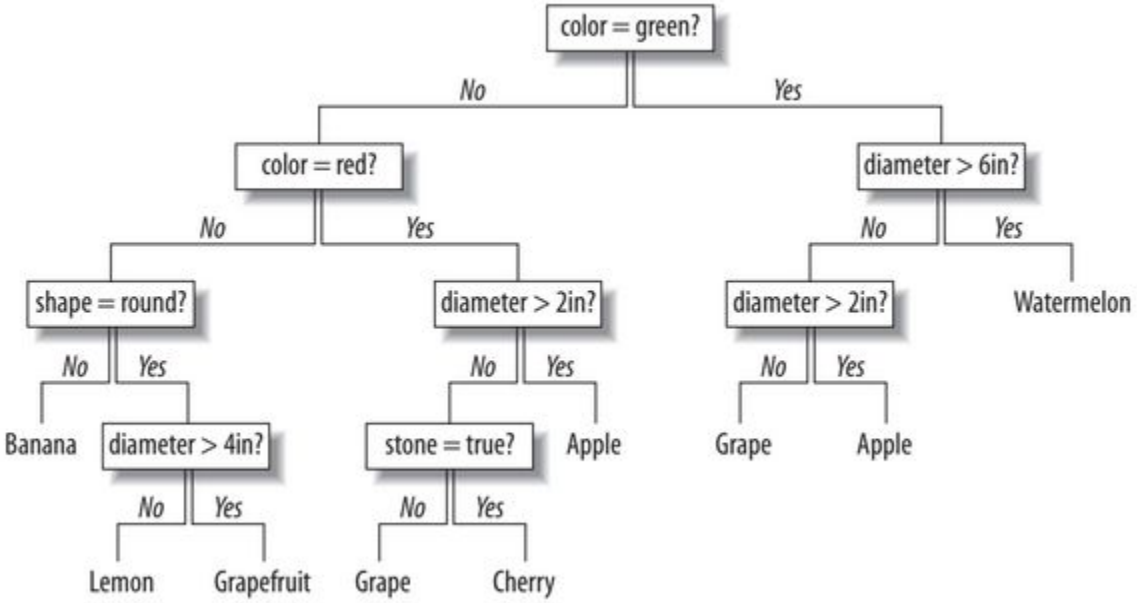

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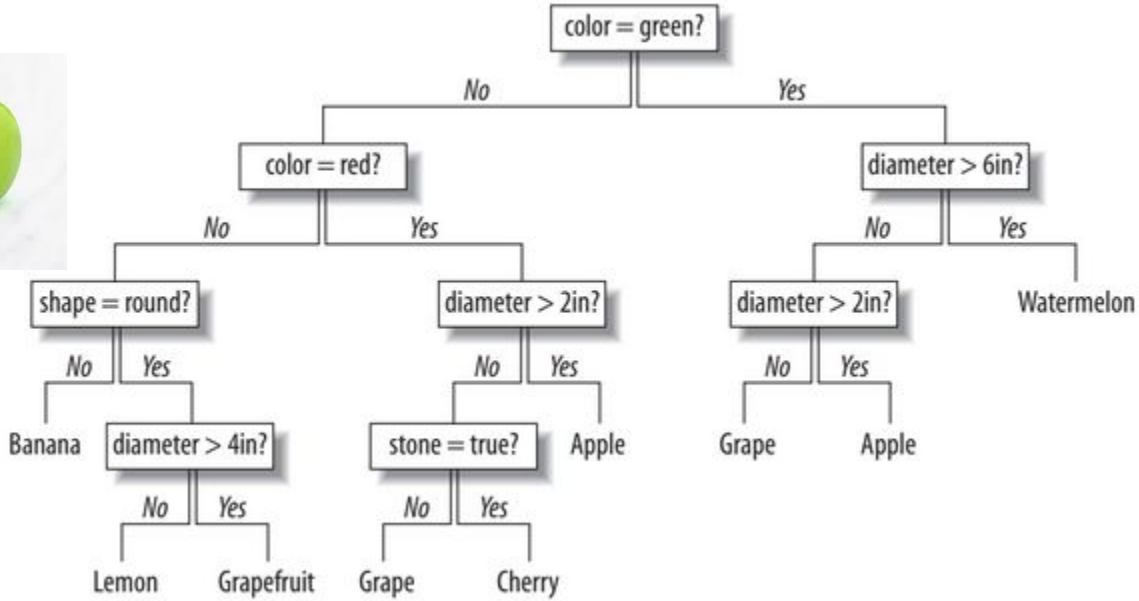

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The Data

- Breast Cancer Wisconsin (Diagnostic) Data Set acquired by researchers University of Wisconsin (Dr. W.H. Wolberg, N. Street, O.L. Mangasarian)

- Features computed from a digitized image of a fine needle aspirate (FNA) of a breast mass

- Describe characteristics of cell nuclei present in the image

https://archive.ics.uci.edu/ml/datasets/Breast+Cancer+Wisconsin+(Diagnostic)
https://www.kaggle.com/uciml/breast-cancer-wisconsin-data

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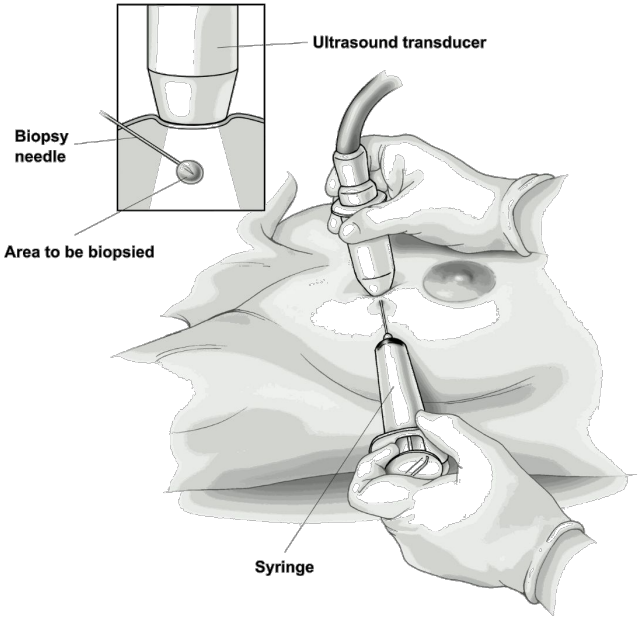
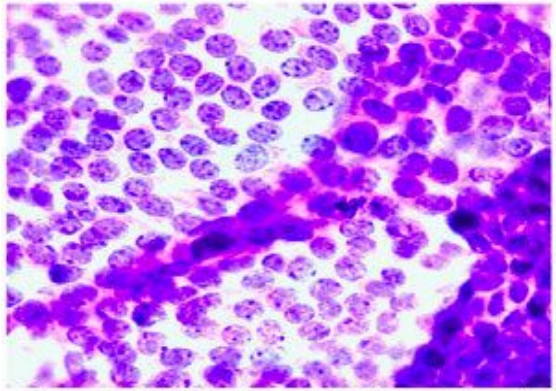
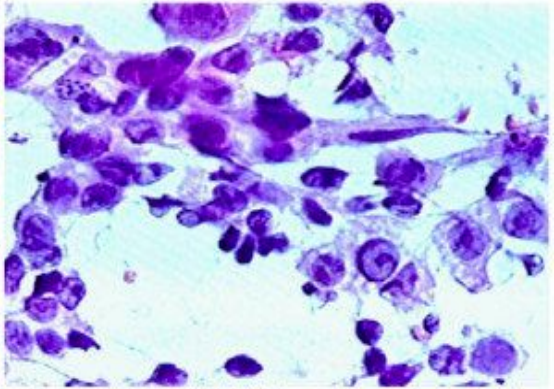


Fine needle aspiration using ultrasound



Smear with BENIGN diagnosis – uniform nucleus of cells, symmetrical, homogeneous, with areas within normal size



Smear with MALIGNANT diagnosis – nucleus of cells without uniformity, asymmetrical, not homogeneous (multiple sizes) and with areas above normal size

https://www.researchgate.net/figure/Captured-images-of-layers-of-glass-with-smears-of-breast-mass-obtained-by-FNA-the-parts_fig3_232811011
https://www.cancer.org/cancer/breast-cancer/screening-tests-and-early-detection/breast-biopsy/fine-needle-aspiration-biopsy-of-the-breast.html

Lets Go !

Setting up

Local: clone repo, install requirements.txt

https://github.com/christinewinter/intro_ml_bc

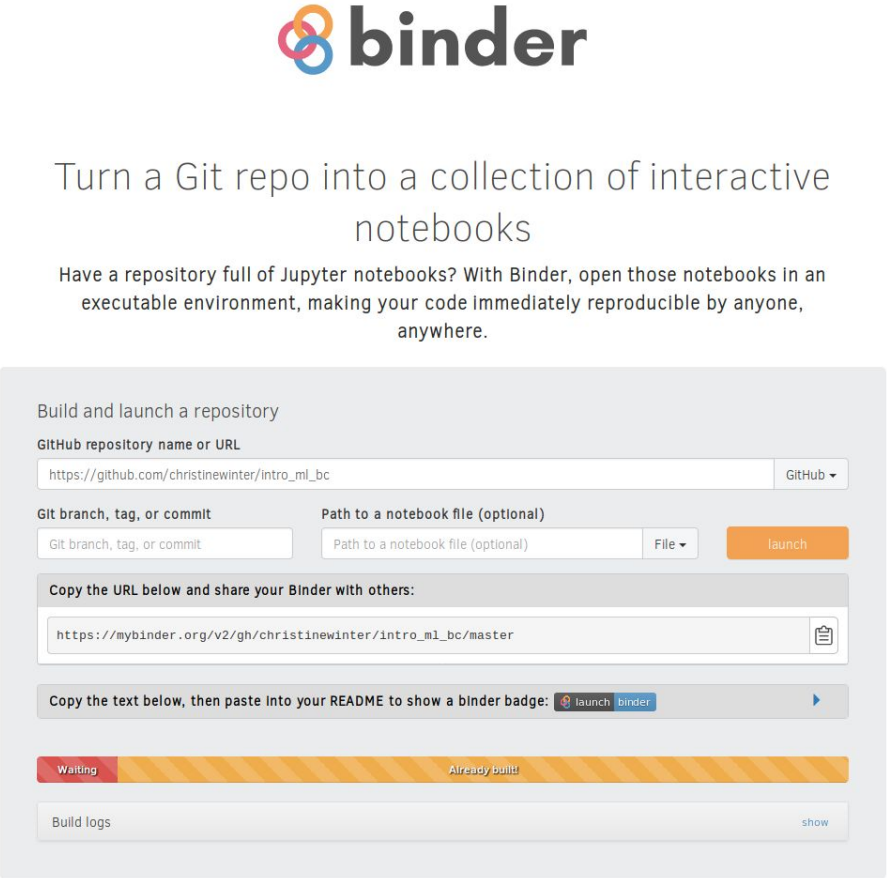
Remote:

Go to: https://mybinder.org/

Insert:

https://github.com/christinewinter/intro_ml_bc

Will take ~ 5 minutes

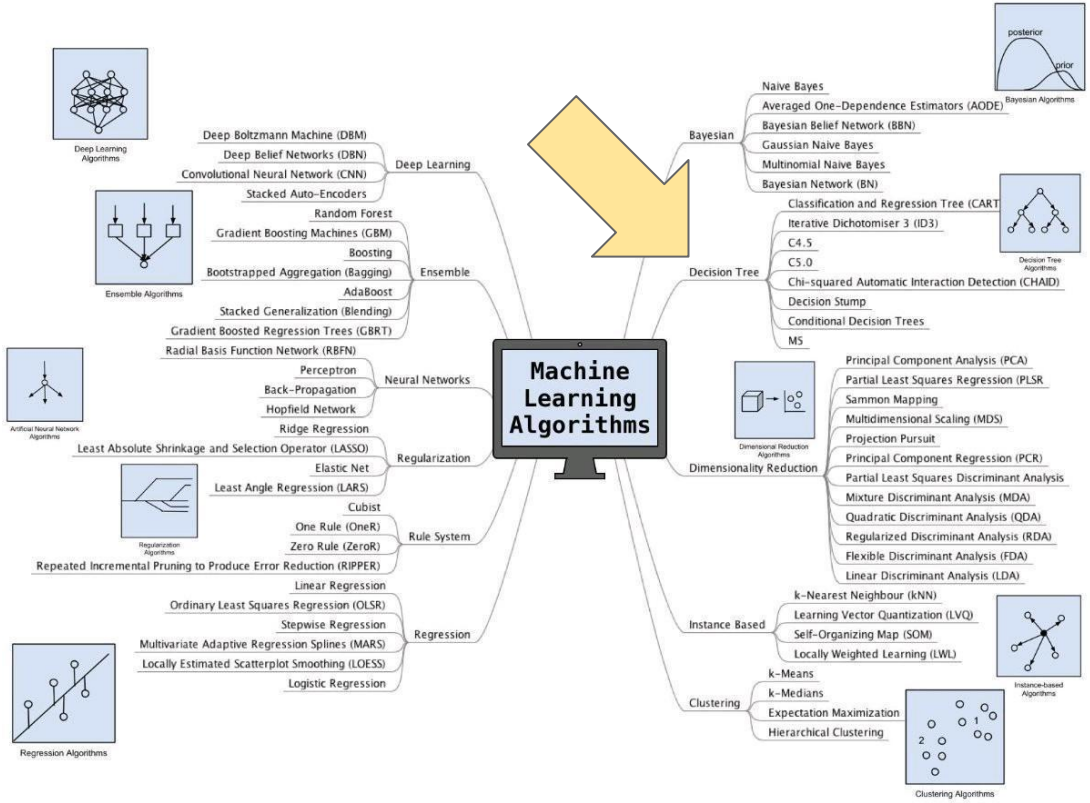


The actual machine Learning part

```
model = DecisionTreeClassifier()
model.fit(X_train, y_train)
y_pred = model.predict(X_test)
metrics.accuracy_score(y_test, y_pred)
y_pred = model.predict(X_unknown)
```

scikit-learn.org

Decision trees are just one way to learn



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  - Relevance, correlations
- ★ Iteration & architecture
  - Implementation, backup

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What you learned today:

- ★ Types of learning:
  - supervised, unsupervised, reinforcement
- ★ One machine learning model:
  - Decision trees
- ★ Data is the key component
  - Clean up is 80 % of the work
- ★ Implementation
  - Python, jupyter, Scikit learn

Buzzword Bingo :

Artificial Neural Network

Machine Learning - ML

Artificial Intelligence - AI

Cloud AI

Data Mining

Deep Learning - DL

DNN

ANN

CNN

AIOps - automated DevOps

BIG data

Data driven

Tensorflow

Keras

AI in IoT

Artificial Neocortex

Questions ?

Gini Impurity

Gini impurity is the expected error rate if one of the results from a set is randomly applied to one of the items in the set.

If every item in the set is in the same category, the guess will always be correct, so the error rate is 0. If there are four possible results evenly divided in the group, there's a 75 percent chance that the guess would be incorrect, so the error rate is 0.75.

This function calculates the probability of each possible outcome by dividing the number of times that outcome occurs by the total number of rows in the set. It then adds up the products of all these probabilities. This gives the overall chance that a row would be randomly assigned to the wrong outcome.

The higher this probability, the worse the split. A probability of zero is great because it tells you that everything is already in the right set.

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