

“When Machines learn”



Benmeziane Hadjer

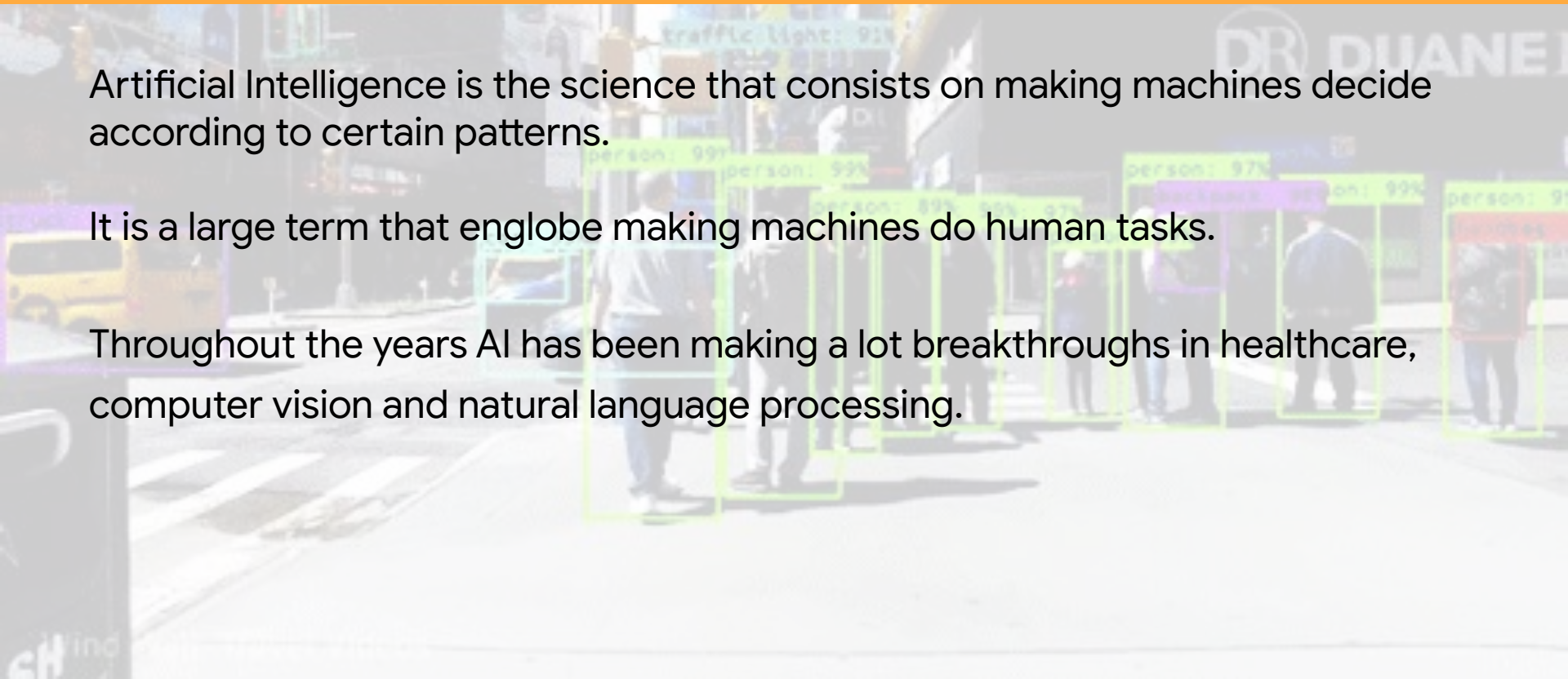
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Artificial Intelligence - The buzz word

Artificial Intelligence is the science that consists on making machines decide according to certain patterns.

It is a large term that englobe making machines do human tasks.

Throughout the years AI has been making a lot breakthroughs in healthcare, computer vision and natural language processing.



Narrow AI

Today implemented systems are called Narrow AI.

Do better than humans in one task only.





Some Examples

Faces

Faces, facial landmarks, emotions



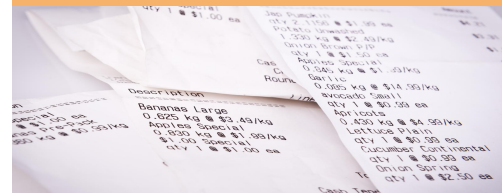
Label

Detect entities from furniture to transportation



OCR

Read and extract text, with support for > 10 languages



Logos

Identify product logos



Special Effects



Generate Fake Human Faces



Machine Learning

“An approach to achieve artificial intelligence through systems that can learn from experience to find patterns in a set of data”

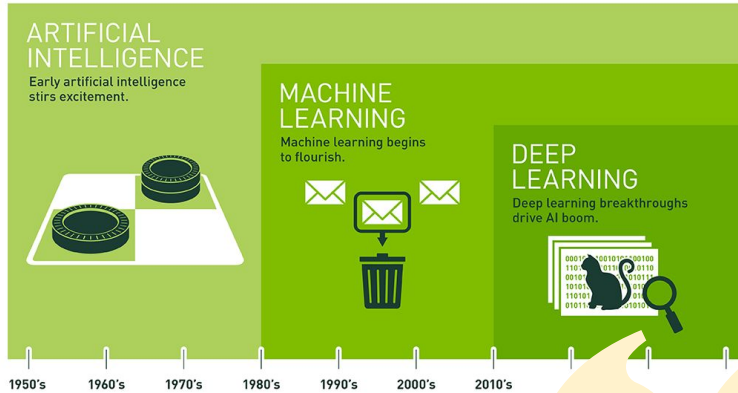
Write a program with
explicit conditions

```
if email contains “FREE” :  
    print “SPAM”  
else :  
    print “IMPORTANT”
```

Write a program that
learns these conditions

```
try to classify some  
emails  
calculate the error  
ajust  
repeat
```

Deep Learning



Since an early flush of optimism in the 1950s, smaller subsets of artificial intelligence – first machine learning, then deep learning, a subset of machine learning – have created ever larger disruptions.



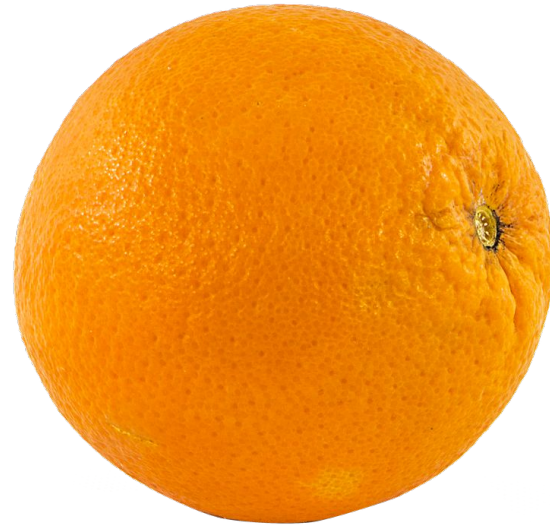
*Je n'ai jamais vu une révolution aussi rapide.
On est passé d'un système un peu obscur à un
système utilisé par des millions de personnes
en seulement deux ans.*

- Yann LeCun

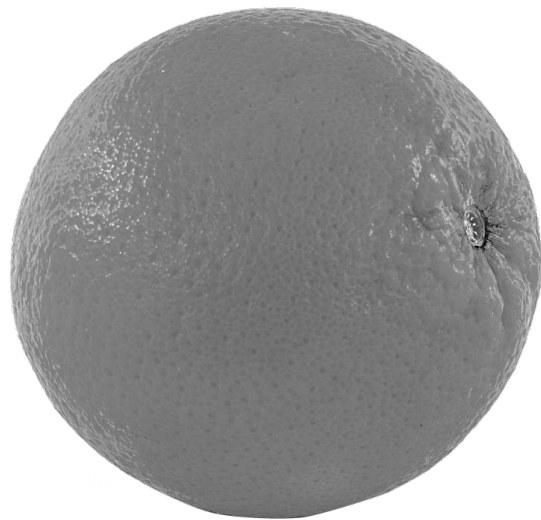
Going deeper



How would you do the difference ?



What if the images are black/white



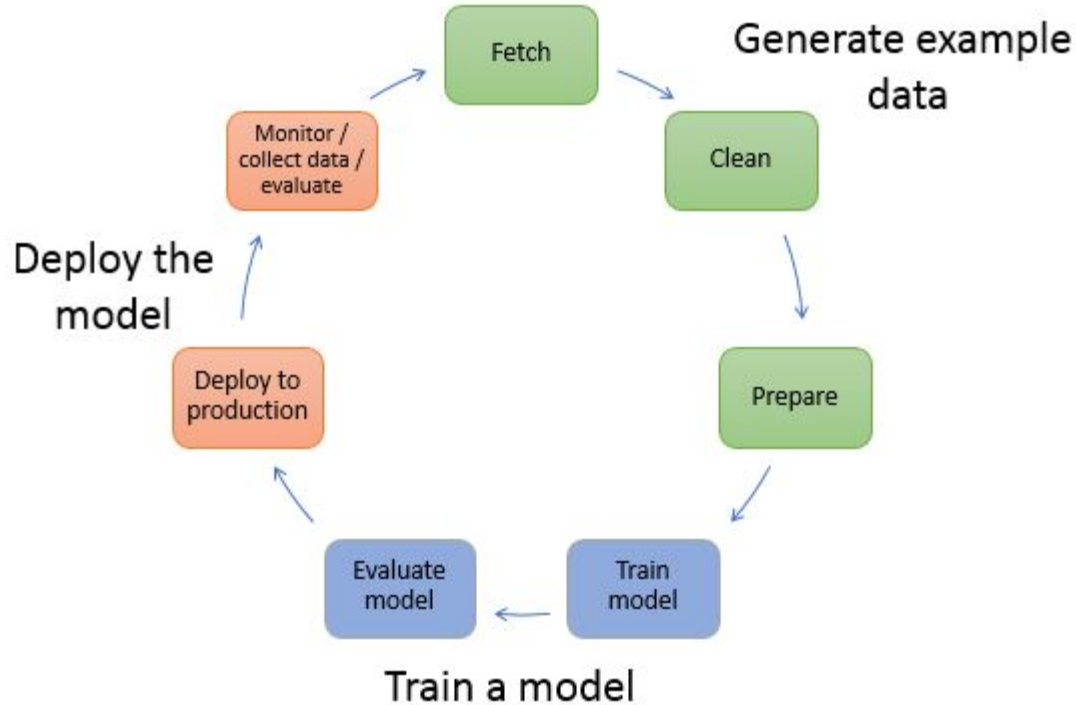
And between these two ?



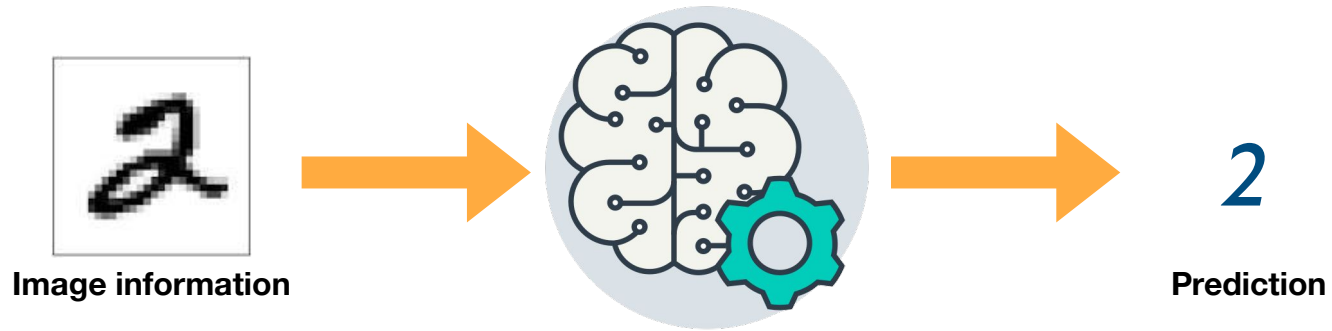
Not so fast ...



Machine learning workflow



A Model ... Quoi ?



Types de models

Supervised

A supervised model is when the data provided on the training phase are labeled; the result of the model on the training data is known

Unsupervised

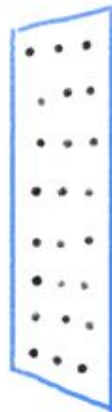
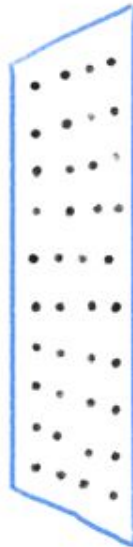
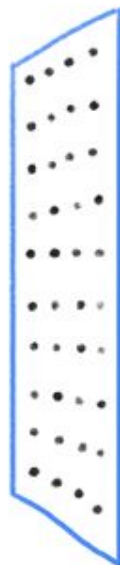
An unsupervised model is when the data provided on the training phase are unlabeled; the result of the model on the training data is unknown

CAT



(LBELED
PHOTOS)

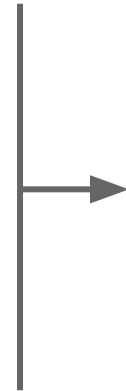
DOG



OUTPUT

Description: Luke Skywalker joins forces with a Jedi Knight, a cocky pilot, a Wookiee and two droids to save the galaxy from the Empire's world-destroying battle station, while also attempting to rescue Princess Leia from the mysterious Darth Vader.

Description from IMDB.com

- 
- Action
 - Adventure
 - Comedy
 - Crime
 - Documentary
 - Horror
 - Romance
 - Science Fiction
 - Thriller

kaggle

Search kaggle



Competitions

Datasets

Kernels

Discussion

Learn

...



Reviewed Dataset

The Movies Dataset

Metadata on over 45,000 movies. 26 million ratings from over 270,000 users.



Rounak Banik · last updated 8 months ago

429
voters

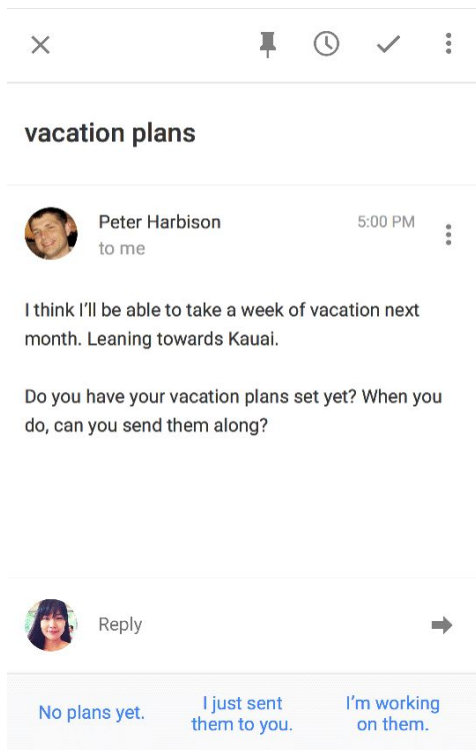
Types de models

Classification

A classification model is when the training data are labeled and the output of our model is discrete

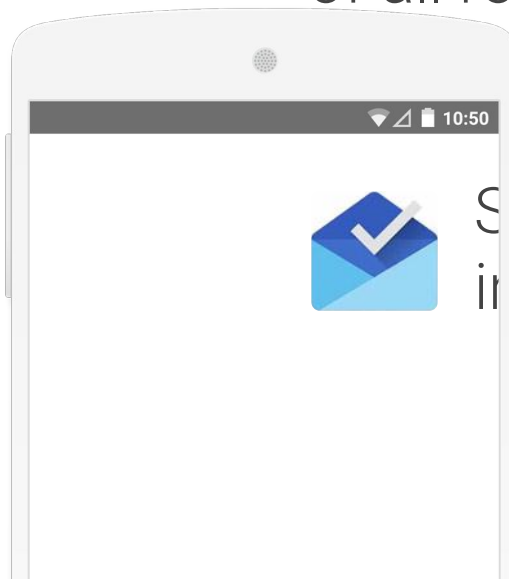
Regression

A regression model is when the training data are labeled and the output of our model is continuous



12%

of all responses
mobile



Smart reply
in Gmail

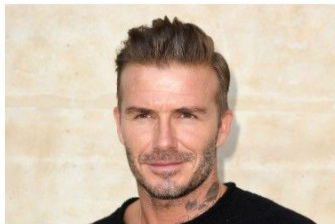
Predicting age of a person from an image

AGE PREDICTOR

Predicting Age Using Artificial Intelligence

UPLOAD IMAGE

david1.jpg



Analyze

Model Prediction = 40 Years

Types de models

Clustering

A clustering model is when we want to group a bunch of data in such a way that objects in the same group

Association rules

Association is a type of model that finds interesting associations (relationships, dependencies) in large sets of data items.

A pizza chain wants to open its delivery centres across a city. They need to figure out the locations for the pizza stores within all these areas in order to keep the distance between the store and delivery points minimum.



Shop faster and smarter



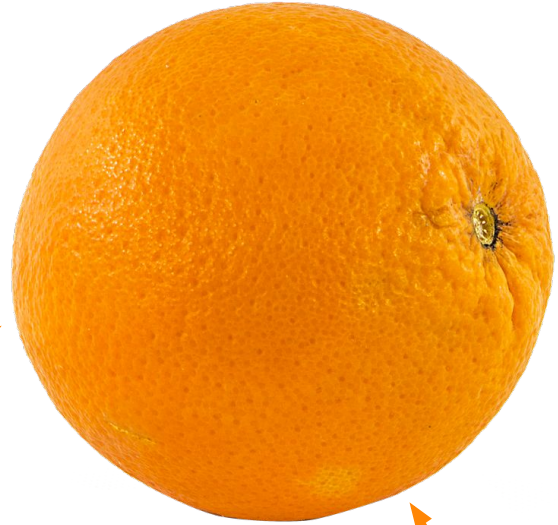
Reinforcement learning



Attributs

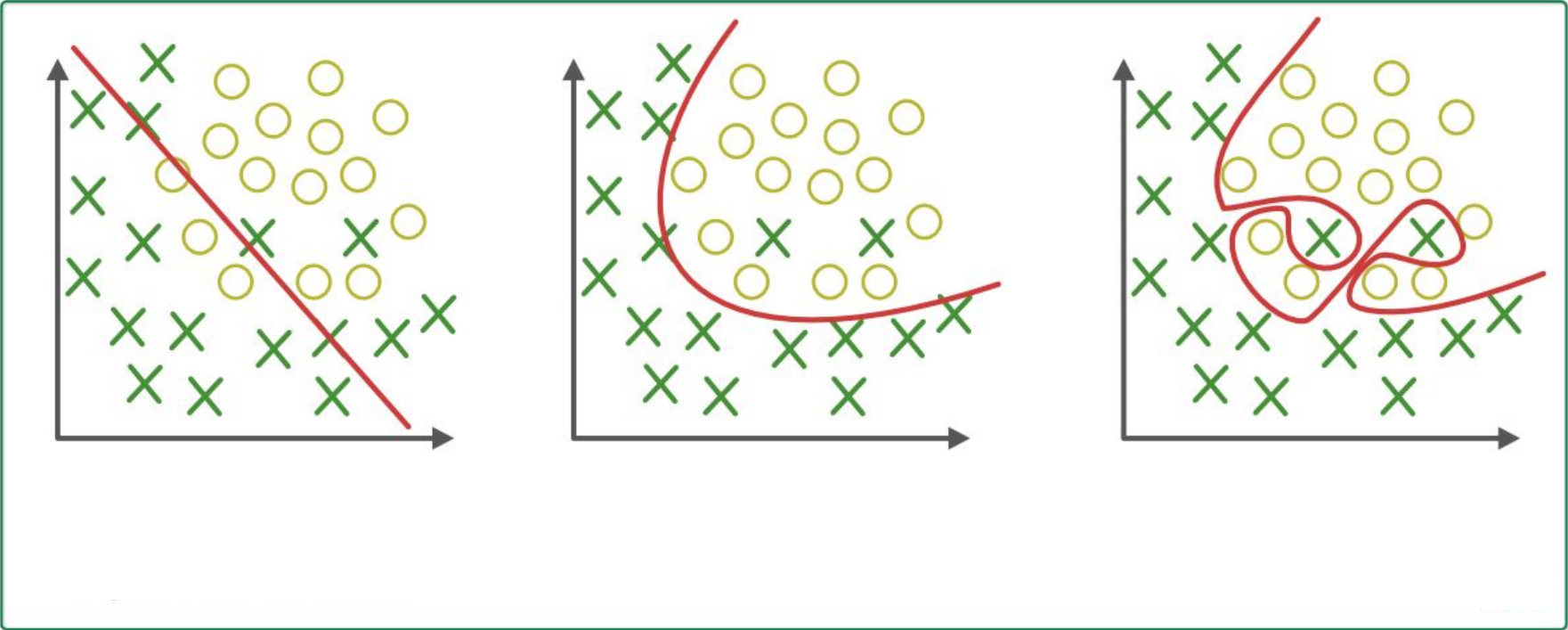
Les attributs sont utilisés pour entraîner un système machine learning. C'est les propriétés des objets qu'on essaie d'apprendre.

Couleur = Orange



Poids = 320g

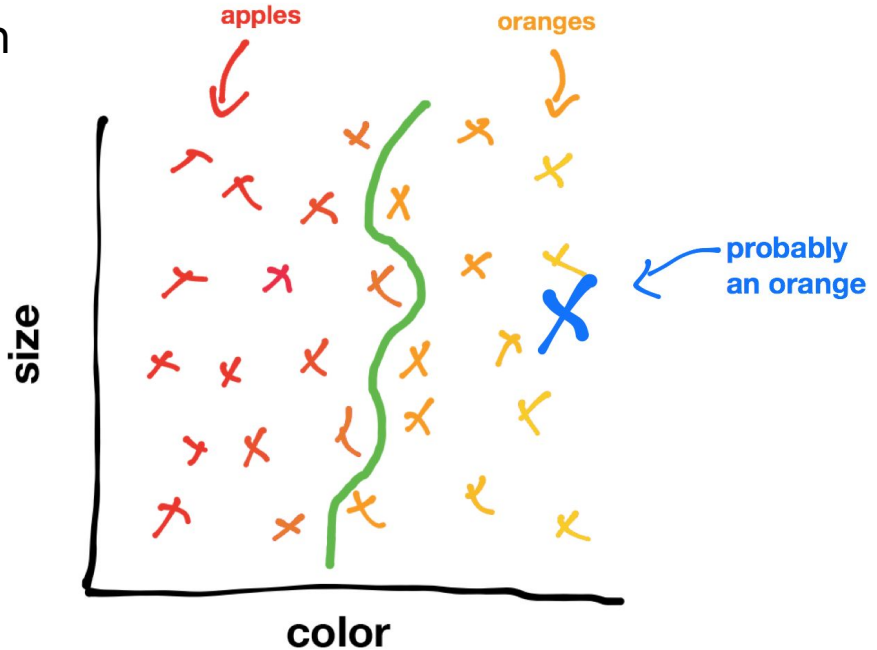
Overfitting (Le surapprentissage)



Attributs

Si les attributs sont numériques, on peut représenter notre système par un graphe.

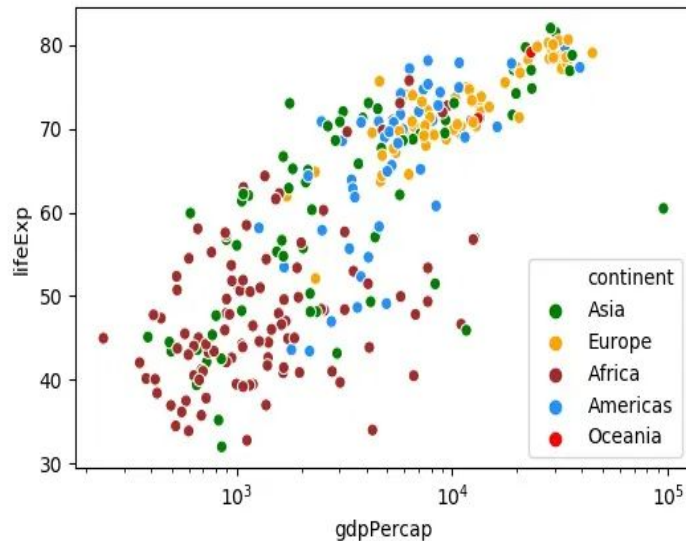
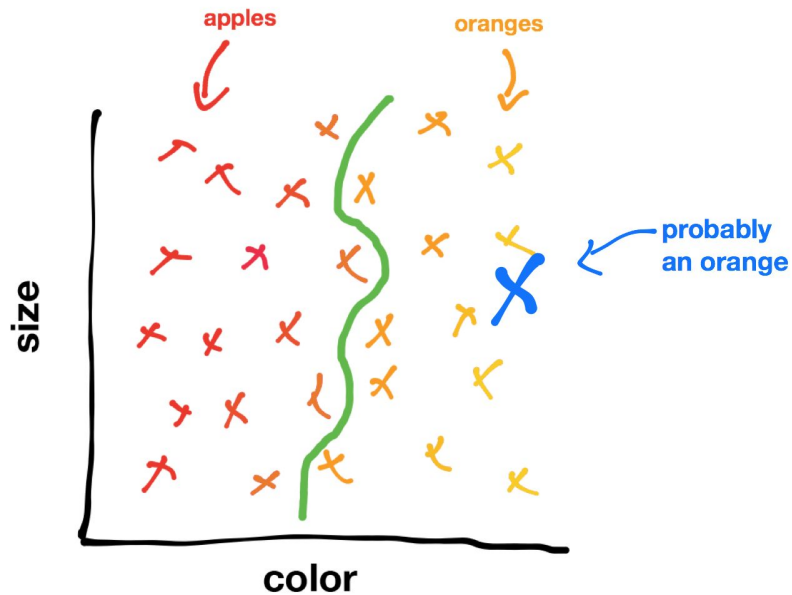
Dans ce graphe, on visualise la fonction que notre système est en train d'apprendre.



Attributs

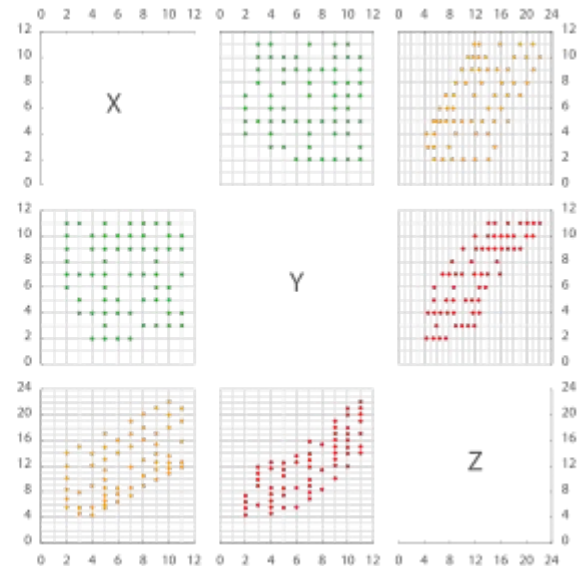
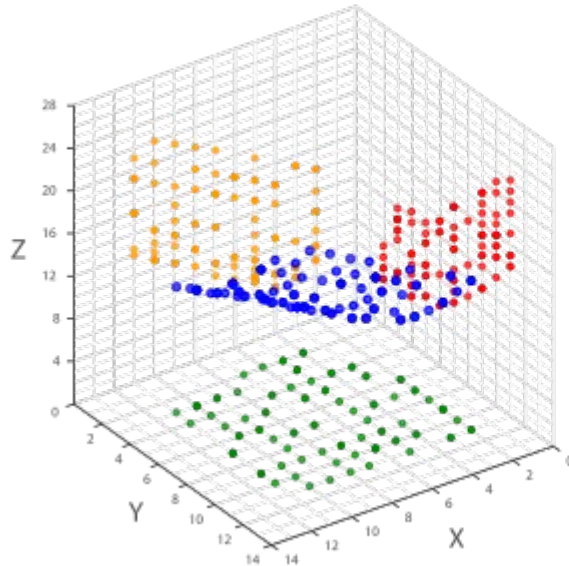
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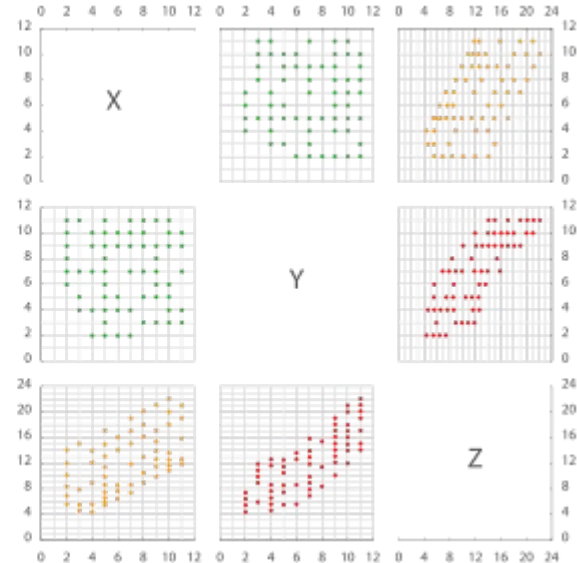
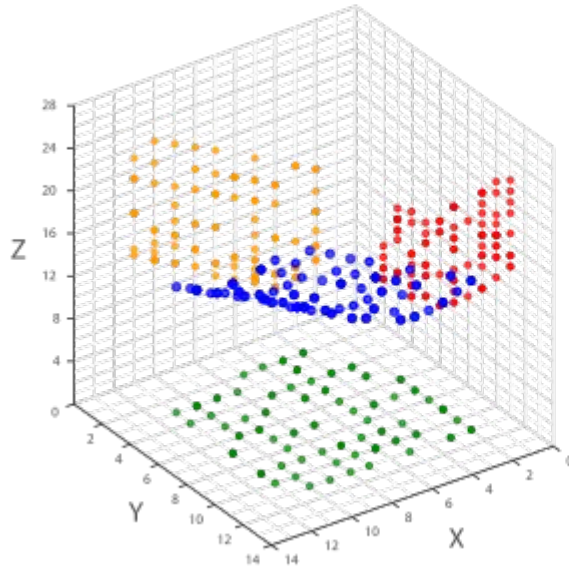
Non trivial Data

La plupart des problèmes machine learning, ne traite pas que 2 attributs. On tend plus à aller vers du 20D ou des millions d'attributs quand on parle de image recognition.

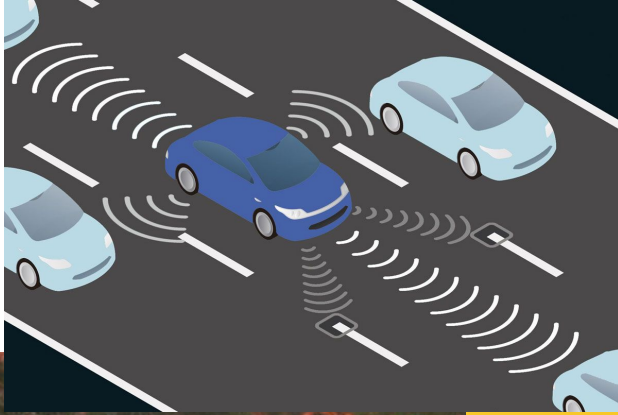


Non trivial Data

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Un exemple ...



Cutting Edge Research



Robotics

A humanoid robot with a metallic, silver-colored body is positioned in a workshop or factory setting. The robot is standing on a yellow lift or platform. The background shows industrial equipment, including a red machine and various tools on shelves. The lighting is bright, typical of an indoor industrial environment.

[Watch this video!](#)

A whole tonne of stuff going on in robotics right now. Just take a look at [Boston Dynamics YT channel](#) for some mind blowing research, aided by various ML techniques.

Westworld

WESTWORLD

Westworld

@WestworldHBO

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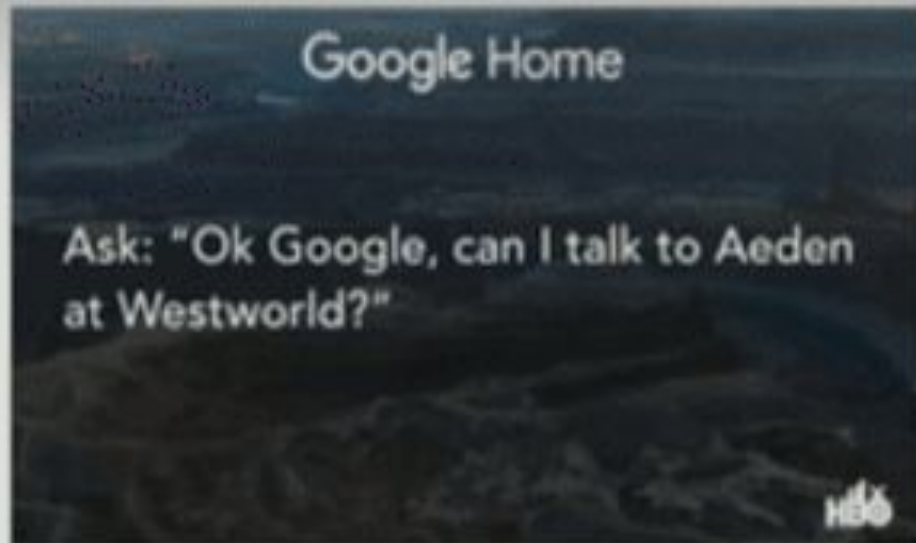
About

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Westworld

January 18 · 45

Dinos has always been pushing the boundaries of what's possible. Ask Google Home to talk to Aeden at Westworld today.



Watch Video

TV Show

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"Westworld" is a dark odyssey about artificial consciousness and the future.



851,276 Likes

Mia Capalan and 3 other friends

About


Typically replies instantly
Message Now

www.hbo.com/westworld

TV Show

Created a digital version of Aeden, a character in Westworld to whom you could talk with in a natural way. Thousands of unique conversations, and even won an Emmy award.

Disney: Book ears

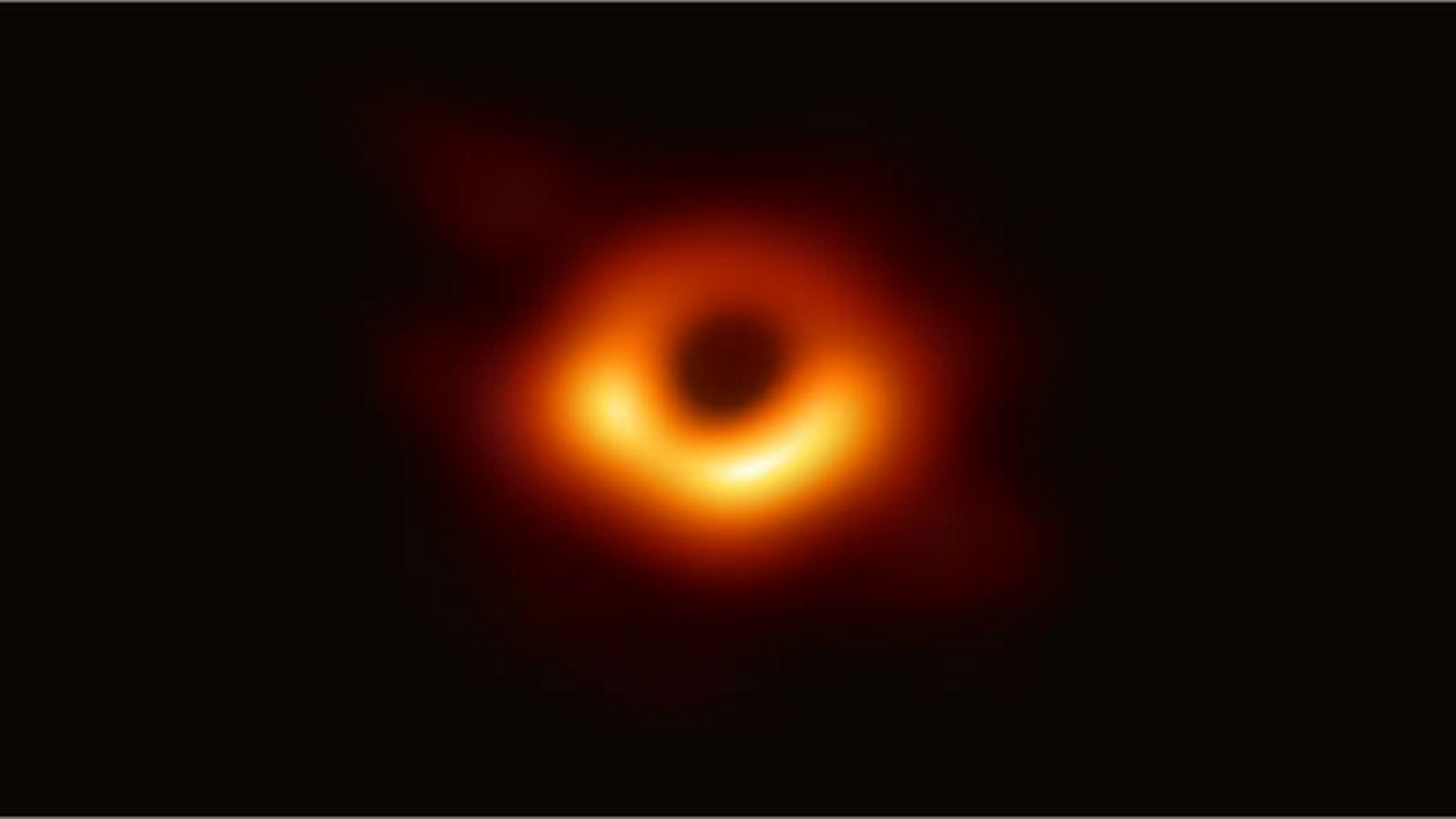
A person with blonde hair, wearing a blue and white striped shirt, is reading a book. The book is open, showing a page with a yellow background and a blue dress. The person is holding the book, and their hands are visible. The background is dark, and there are some wooden chairs visible. The text "Disney: Book ears" is overlaid in the top left corner. The text "Augment the Disney book experience by playing sounds for specific voice cues using the Google Speech API." is overlaid at the bottom.

Augment the Disney book experience by playing sounds for specific voice cues using the Google Speech API.

Soli



Soli is a small chip you can embed into devices which uses radar like features to detect gestures so you can control the device. No need to look at screen anymore.



AI pour les non developeurs



L'IA n'est pas que pour les informaticiens ...

Cloud ML APIs

Pre-trained,
easy to use



Cloud AutoML

Customizable,
easy to use



Cloud ML Engine /TensorFlow

Scalable and flexible ML
for data scientists

