

# **MACHINE LEARNING FOR INTERACTION DESIGNERS**

NODE INSTITUTE - 30/04/2021

# **MACHINE LEARNING?**

## NETFLIX RECOMMENDATION SYSTEM

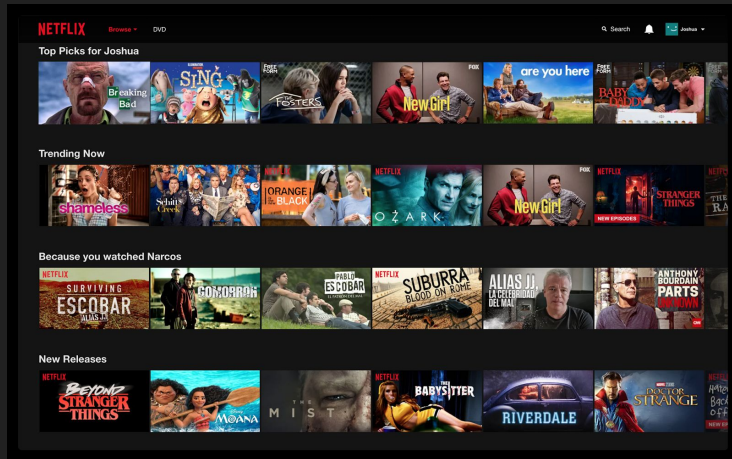


Image : towardsdatascience.com

## SPAM DETECTION

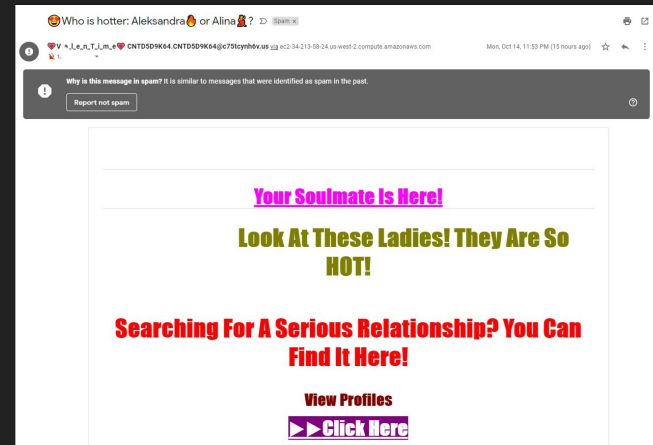


Image : avast.com

## SIRI : VOICE SYNTH. AND RECOGNITION



Image : apple.com

## GOOGLE MAPS TRAFFIC PREDICTION

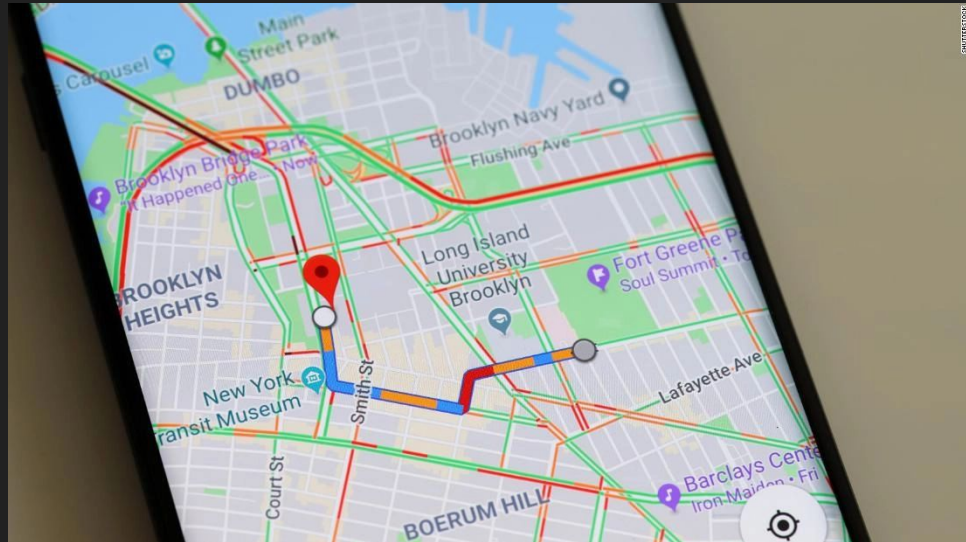


Image : cnn.com

# ARTIFICIAL INTELLIGENCE

## MACHINE LEARNING

### SUPERVISED LEARNING

#### CLASSIFICATION

NAIVE

BAYES

SVM

RANDOM  
FOREST

...

#### REGRESSION

LINEAR

POLYNOMIAL

...

### UNSUPERVISED LEARNING

#### CLUSTERING

K-MEANS

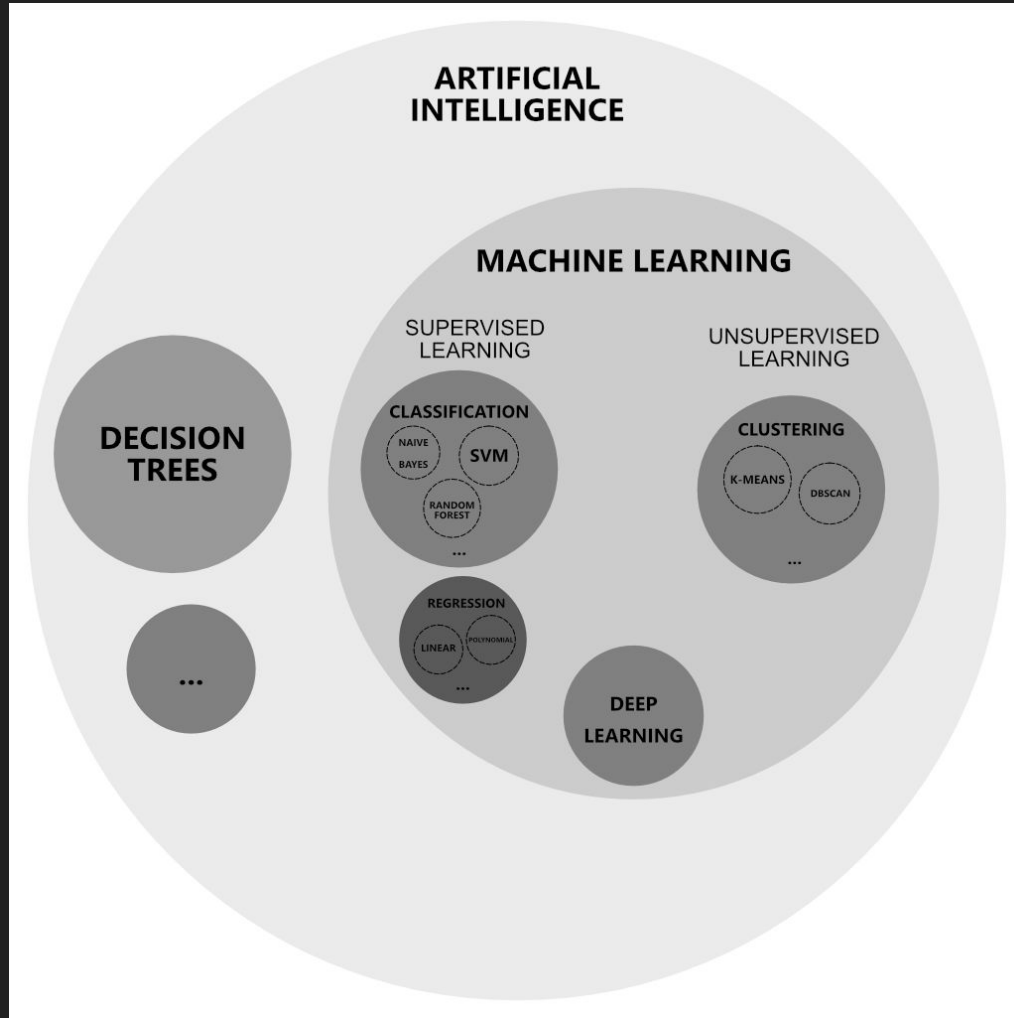
DBSCAN

...

DECISION  
TREES

...

DEEP  
LEARNING



# ARTIFICIAL INTELLIGENCE

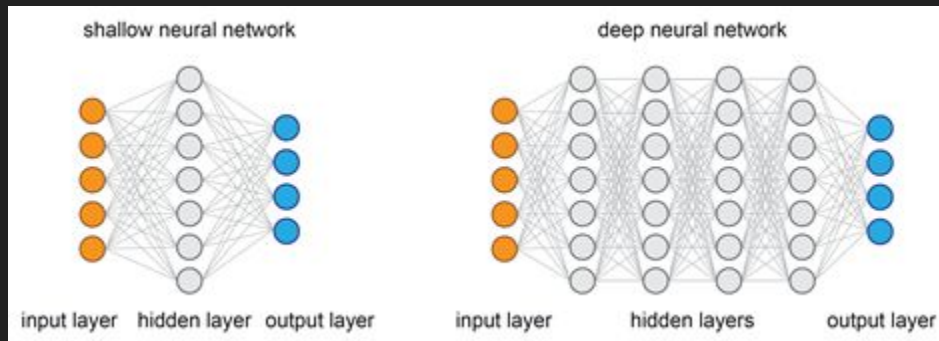
- Ability for a computer to simulate human behaviors
- A decision tree can be considered AI!
- Goes back to the 40's, with a paper called *A logical calculus of the ideas immanent in nervous activity*, by Warren McCulloch and Walter Pitts, which proposes a very simplified model of the brain in which **perceptrons** are connected to each other to perform complex tasks.

# MACHINE LEARNING

- Machine learning is one of the tools that allow to achieve AI
- It's, according to Arthur Samuel, the ability for a computer to "learn things without being explicitly programmed".
  - Arthur Samuel is a pioneer of AI : he created in 1959 a program that learned how to play checkers

# DEEP LEARNING

- Deep Learning is really just a subset of machine learning
- Traditional machine learning makes use of neural networks that are usually very shallow. Deep learning takes this concepts and puts it on steroids : it makes use of neural networks that have hundreds and hundreds of layers, allowing to perform incredibly complex tasks

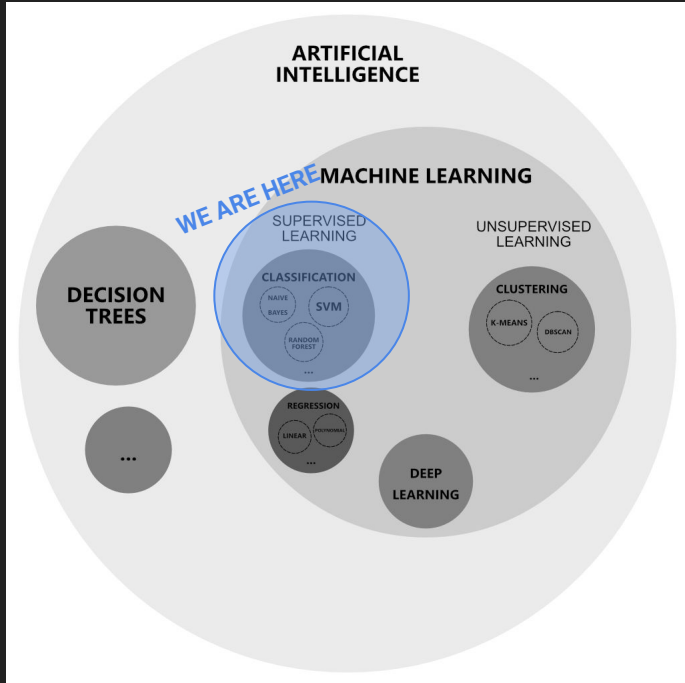


**WHAT DOES IT MEAN FOR A COMPUTER TO LEARN  
“WITHOUT BEING EXPLICITLY PROGRAMMED” ?**

# **HANDS ON!**

**\$Q Recognizer**

# THAT WAS CLASSIFICATION



What did we just do? We gave the computer examples of what we wanted it to recognize, and it told us if samples it had not seen layed in one category or the other. This is what classification does : it classifies an input.

Now think for a second : how would you have done it yourself, without machine learning? What does it mean to recognize an “A”? What if someone draws an “A” in a different way than what you programmed your computer to recognize? This is endless and painful.

**Rather than telling the computer how to find the solution to our problem, we give it the solution and let it figure out itself what's necessary to solve the problem.**

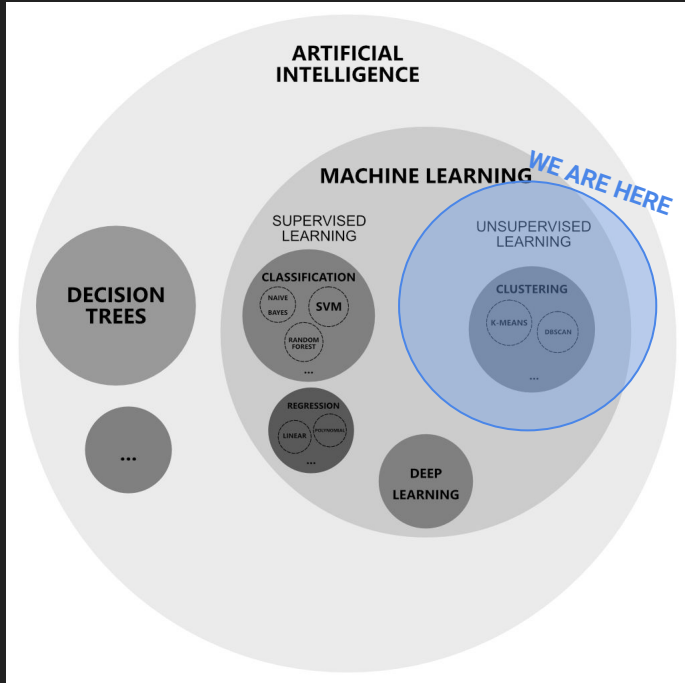
Think of a child learning how to recognize animals by looking at pictures in a book!

# SUPERVISED LEARNING?

Machine learning can be divided into two categories : supervised and unsupervised learning. This workshop will focus more supervised learning.

SUPERVISED LEARNING	UNSUPERVISED LEARNING
We give the computer labelled examples of what it has to learn, telling it for each data sample what it is.	We just give raw data to the computer and it figures out classes itself.

# UNSUPERVISED LEARNING?



Unlike supervised learning, we don't give labelled samples to the computer, we just give it raw data and let it figure out classes itself. A simple example is the DBSCAN algorithm, that's used to reveal clusters of points in a point cloud

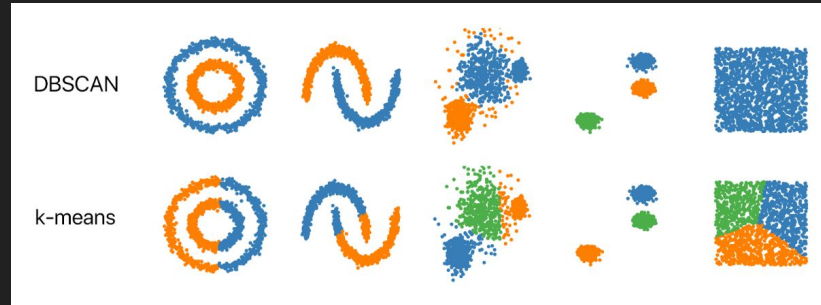


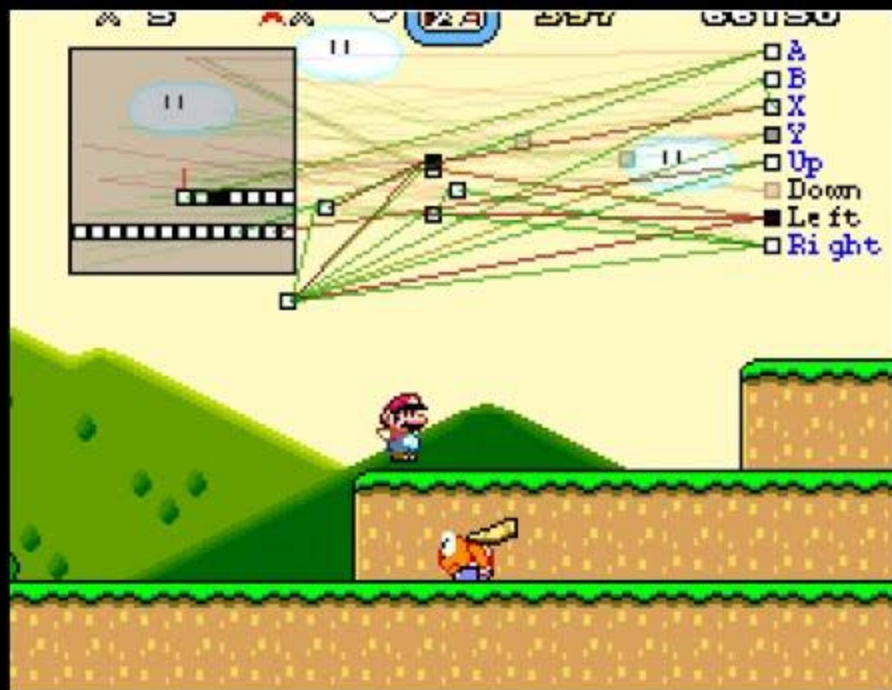
Image : [towardsdatascience.com](https://towardsdatascience.com)

**LET'S SEE**

**DBSCAN IN ACTION**

# **REINFORCEMENT LEARNING**

**MAR.10**



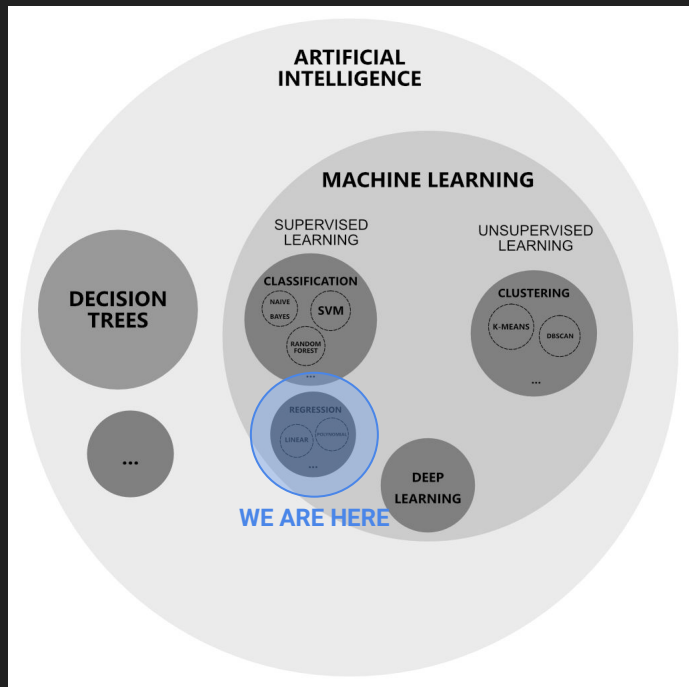
# **HANDS ON!**

## **CLASSIFICATION IN WEKINATOR**

# **HANDS ON!**

## **REGRESSION IN WEKINATOR**

# WHAT IS REGRESSION?



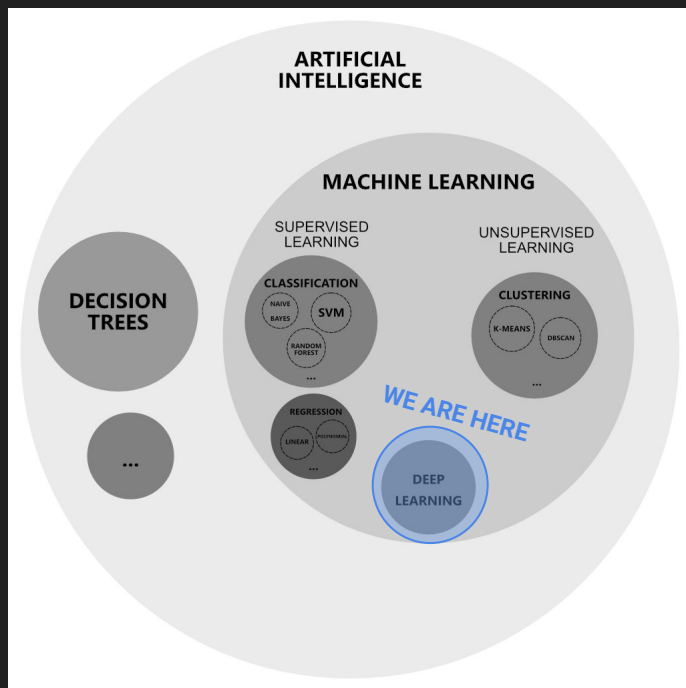
Regression on the other hand does not tell if something fits in category A or B : it rather tries to predict a value, based on some data it learned.

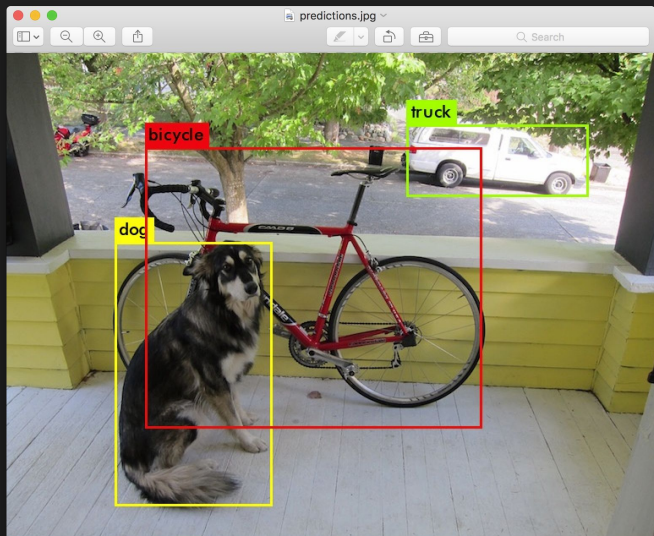
This is what we just did here : we told the computer which color we wanted for two/three positions, and it extrapolated the rest for us.

Now we could further teach it new positions to make it more accurate to what we want.

Again, machine learning algorithms take care of doing stuff for us : here we did not have to come up with our own algorithm to decide which color the renderer should have.

# NOW LET'S TALK ABOUT DEEP LEARNING





# **HANDS ON!**

**IMAGE RECOGNITION WITH LOBE**

# **HANDS ON!**

**EXPLORING RUNWAYML**

**THANK YOU!**