Securing Critical Infrastructures In The Financial Sector

Machine and Deep Learning for Cybersecurity and Finance

Machine Learning

- A branch of AI based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention
- A method of data analysis that automates analytical model building

Applications of Machine Learning

- **Web Search:** ranking page based on what you are most likely to click on
- **Finance:** evaluation of risk on credit offers, decision making, creadit card frauds
- **E-commerce**: predicting customer churn
- **Space exploration**: space probes and radio astronomy
- **Robotics**: how to handle uncertainty in new environments, self-driving cars
- **Information extraction**: ask questions over databases across the web

Key elements

- **Representation**: how to represent knowledge, i.e. decision trees, sets of rules, instances, etc.
- **Evaluation or metrics**: the way to evaluate candidate programs, i.e. accuracy, prediction and recall, etc.
- **Optimization**: the way candidate programs are generated, i.e. combinatorial optimization, convex optimization, etc.

Machine Learning

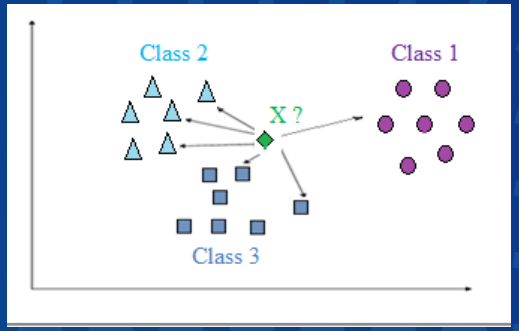
Types of Learning:

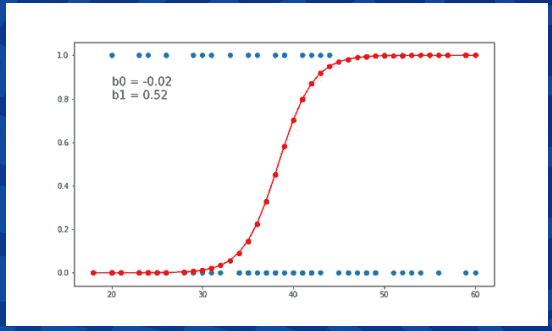
- **Supervised Learning**: where the training data includes desired outputs; the algorithms can recognize what is what since they are trained with this information
- **Unsupervised learning**: when the training data does not include desired outputs; it is hard to tell what is good learning and what is not as we don't have any clue of what is what
- **Semi-supervised learning**: when the training data includes only a few desired outputs; you train, you predict, then add the new predictions to train and then predict the rest, and continue like this till achieved the degree of accuracy you needed

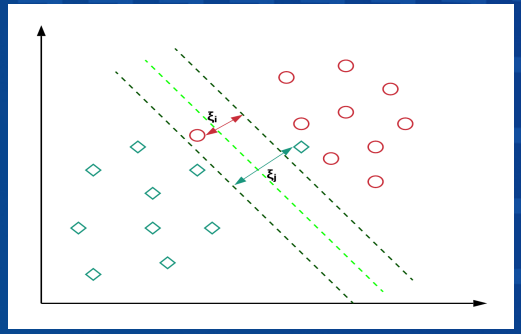
Machine Learning

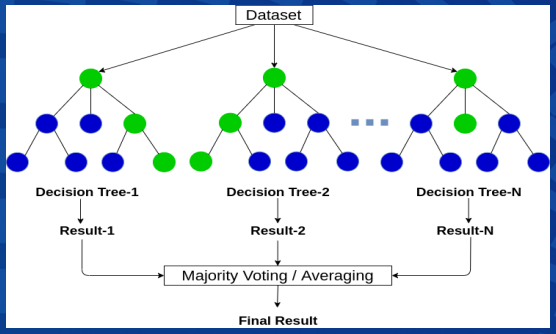
Most common Machine Learning algorithms:

- **Supervised learning:**
  - **KNN**
  - **Logistic Regression**
  - **Support Vector Machines**
  - **Random Forest**





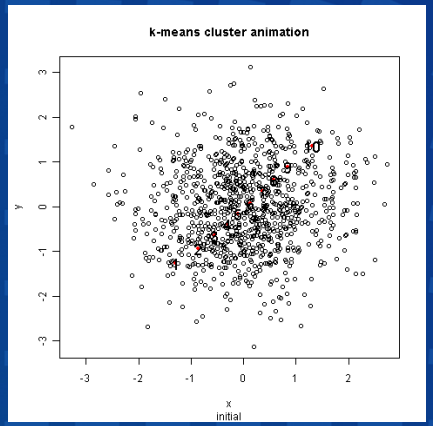


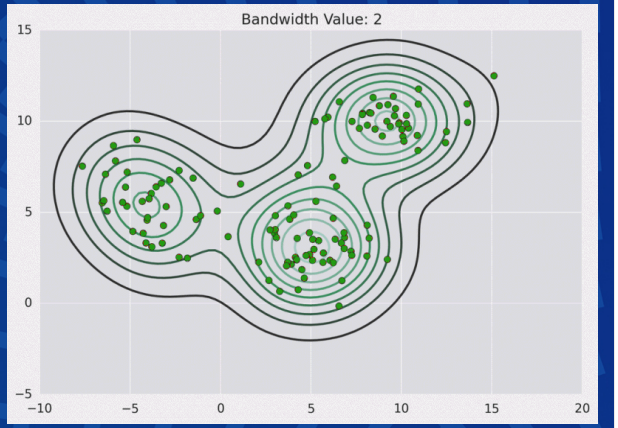


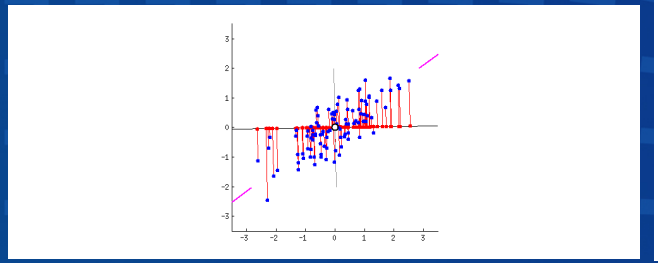
Machine Learning

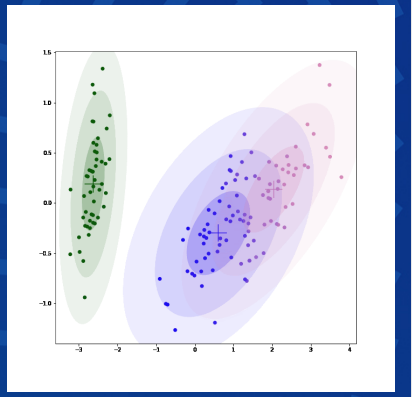
Most common Machine Learning algorithms:

- **Unsupervised learning:**
  - **KMeans**
  - **Mean Shift**
  - **PCA**
  - **Gaussian Mixture**







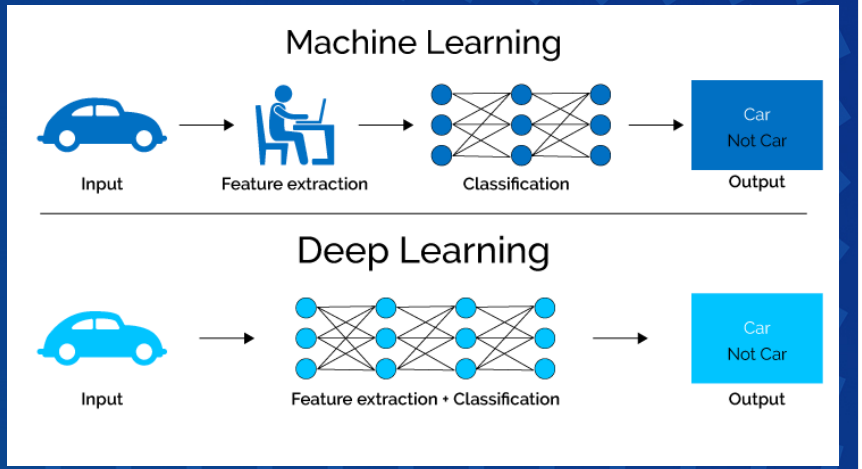


Machine Learning

Deep Learning: it is Machine Learning on "steroids"

- It is part of a broader family of ML methods based on Artificial Neural Networks

- It can be used for supervised, semi-supervised or unsupervised learning
- Most common DL architectures:
  - Deep Neural Networks (ANN, LSTM)
  - Deep Belief Networks (DBN)
  - Recurrent Neural Networks (RNN)
  - Convolutional Neural Networks (CNN)



Thank you for your kind attention

For More Information:

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Also you can Register with: Finsecurity.eu

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