Deep Learning

# Course per Week

1. **Intro to Neural Networks and Deep Learning**

**Objectives**

* 1. Describe the applications of deep learning and explain why it is rellaz rewarding to learn deep learning.
  2. Explain neural networks and how most of the deep learning algorithms are inspired by the way the brain function and neurons process data.
  3. Summarize how neural networks feed data forward through a network.
  4. Build a neural network and see how it performs predictions using fast forward propagation.

**Lessons**

* + 1. Intro to deep learning
    2. Neurons and Neural Networks
    3. Artificial Neural Networks

1. **Artificial Neural Networks**

**Objectives**

* 1. Describe the **gradient descent** algorithm and how variables are optimized with respect to a defined function.
  2. Define **back propagation** and how neural networks learn and update their weights and biases.
  3. Explain the **vanishing gradient problem.**
  4. Define **activation functions.**

**Lessons**

* + 1. Gradient Descent
    2. Backpropagation
    3. Vanishing Gradient
    4. Activation Functions

1. **Keras and Deep Learning Libraries**

**Objectives**

* 1. Compare and contrast the different deep learning Librarbies (PyTorch, Tensorflow, Keras)
  2. Build a regression model using the Keras Library
  3. Build a classification model using the Keras Library

**Lessons**

* + 1. Deep Learning Libraries
    2. Regression with Keras
    3. Classification with Keras

1. **Deep Learning Models**

**Learning Objectives**

* 1. Identify the difference between the shallow and deep neural networks.
  2. Describe **convolutional neural networks**.
  3. Build CNNs using the Keras Library
  4. Define **Recurrent Neural Networks** (RNN)
  5. Describe Unsupervised learning, **Autoencoders** and their functions.

**Lessons**

* + 1. Shallow vs. Deep Neural Networks
    2. Convolutional Neural Networks
    3. Recurrent Neural Networks

1. **Build a Deep Learning Model (Graded Assessment)**