Learning with Artificial Neural Networks

Practical Work 02 – Artificial Neural Networks

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Goals:

- Getting to know the basic components and the underlying mechanisms of neural networks.
- Seeing how neural networks learn and how difficult it would be to find a good model (e.g., the weights) by hand.

1. **Notebooks**

Download the notebook material from the Cyberlearn platform

2. **The Perceptron and the Delta rule**

Read each notebook material (see list below), follow the instructions, play with the code, program the solutions to the proposed problems and answer the questions.

List of notebooks associated with this exercise:

- 1_activation_function.ipynb # observe the shape, the derivative, the range of output values, the non-linearity
- 2_perceptron.ipynb # observe the effect of each weight and the bias; understand its implementation and how it linearly separates the input space; try it with different activation functions
- 3_delta_rule.ipynb # try to match the equations to the Python code; understand what it does to minimize the loss/cost/error function

Known issue (If your run the code outside of Colab): “MovieWriter ffmeg unavailable”
Solution: install ffmpeg by using the command: conda install -c conda-forge ffmpeg

Report

There is no report but doing this practical work is important as it will allow you to better understand the concepts and get an intuition of the working of a Perceptron (e.g., an artificial neuron), the Delta-rule (e.g., the basic learning algorithm), …