Activity 1

Prediction with Back-Propagation and Linear Regression

- **Git Repository**

  https://github.com/YoussefEzz/Prediction-BP-and-LR

- **Part 1 : Selecting and analyzing the datasets**

  Since we do not want to give a priori more importance to some of the input variables w.r.t. the others, we should scale all of them to the same range of variation.

  The scaling of the output variables has an additional requirement: since the output of a sigmoid lays in the range (0.0, 1.0), the desired output values must strictly fall within these limits. For predictions tasks (e.g. A1), where the output variable takes values in a certain [min, max] range, a convenient choice is its linear scaling to a range like [0.1, 0.9]

  Preprocess A1-synthetic.txt and A1-turbine.txt

  1. read data from "Data\A1-synthetic.txt" and "Data\A1-turbine.txt"
  2. separate linear scaling of each input variable v1 to v9 for A1-synthetic - v3 and v8 are already between [0.0, 1.0] – and [height_over_sea_level fall net_fall flow] for A1-turbine from its [min, max] range to [0.0, 1.0] .
  3. separate linear scaling of each output variable to [0.1, 0.9] since the output of a sigmoid lies in the range (0.0, 1.0) .
  4. write normalized data to "Normalized Data\A1-synthetic_normalized.txt" and "Normalized Data\A1-turbine_normalized.txt"

- **Part 2 : Implementation of BP**

  Activation functions