

Ficha Prática 4

Experimental Setup

1. Consider the Machine Learning “[banknote.csv](#)” dataset, available at the course web page, and taken from the “*UCI: Machine Learning Repository*”, at the University of California



Suppose we are interested in developing a machine learning model, able to distinguish between genuine and forged bank notes.

To do that, experts told us that we would have to measure four features in each note:

- variance of the wavelet transformed image
- skewness of wavelet transformed image
- curtosis of wavelet transformed image
- entropy of the image
- The fifth column gives us the class information, i.e., whether the note is genuine (1) or a fake (0)

- a) Create a simple “[MLP.py](#)” script, that implements a simple multi-layer perceptron network to detect forged notes.
- b) Divide the existing data into Learning, Validation and Test.

- c) Learn an appropriate model, using “patience” as the parameter that controls the number of learning epochs.
- d) Implement your own functions for obtaining the following performance evaluation metrics:
 - a. TPR
 - b. FPR
 - c. ROC plot
 - d. AUC
 - e. Precision (P)
 - f. Recall (R)
 - g. P/R plot
 - h. AP
 - i. mAP
 - j. F1
- e) Use in-built functions available at different Python libraries to obtain the metrics from the previous exercise. Compare the obtained values.