Statistical Learning and Neural Networks

Image classification with a CNN

Lab duration: 3h

Download the starting notebook from Portale della didattica (lab1.ipynb) and upload it to Google Colab.

Exercise – Handwritten digit recognition

The MNIST dataset is composed of images of handwritten digits. There are 60000 training images and 10000 testing images. The images are grayscale with size 28 x 28. Labels identifying the true digit are also provided.
A loader function is already provided. It returns the following tensors as numpy arrays:

- x_train: images to be used for training
- y_train: labels to be used for training (integers from 0 to 9)
- x_test: images to be used for testing
- y_test: labels to be used for testing (integers from 0 to 9)

Fill the empty code cells of the notebook following the instructions. The final goal is to build a CNN that given a digit image predicts its value.
The CNN is to be implemented as a Keras Model using the Sequential Model.
The loss function is a softmax cross-entropy.