Laboratory on Neural Networks
TensorFlow

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Setup

Download and extract the lecture material from:
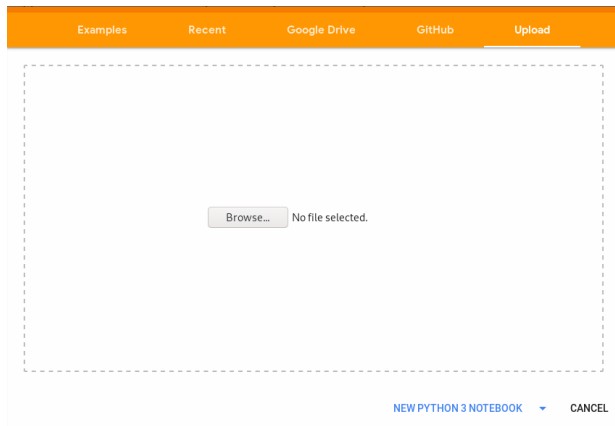`http://disi.unitn.it/~passerini/teaching/2021-2022/MachineLearning/`

Open Google colab on your web browser and login (with your unitn account or a personal one):
`https://colab.research.google.com`

Setup

Upload the file `tensorflow-lab.ipynb`

Exercise

Try to solve a classification task using **TensorFlow** over the OCR dataset. The dataset is already split into training and test sets. Your task is to train a deep neural network with convolutional layers on the training set and predict the labels on the test set. Your network should classify the examples in the test set with higher accuracy than the reference baseline for the dataset.

Additionally, you should perform **model selection** (optimize at least one hyperparameter) and test your algorithm over a validation set.

Exercise — Material

Download the assignment material:

http://disi.unitn.it/~passerini/teaching/2021-2022/MachineLearning/

The material contains:

- The training set examples;
- The training set labels;
- The test set examples;
- The test set labels;
- A README containing info about the dataset.
  this file also contains the reference baseline accuracy;

Exercise
Step-by-step

1. Build a neural network (at least 3 convolutional layers);
2. **Do model selection** (optimizing hyperparameters or testing different architectures, performing validation by splitting the train set);
3. Train your network over the full training set;
4. Use the network to predict the examples in the test set.