

Laboratory on Neural Networks

TensorFlow

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Setup



Download and extract the lecture material from:

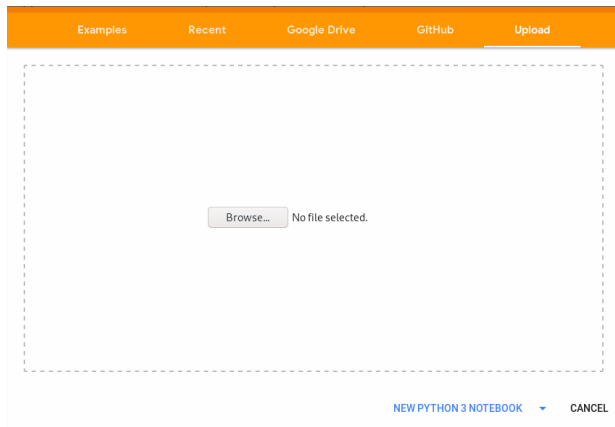
<http://disi.unitn.it/~passerini/teaching/2020-2021/MachineLearning/>

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



The screenshot shows the file upload interface in Google Colab. At the top, there is an orange navigation bar with five tabs: "Examples", "Recent", "Google Drive", "GitHub", and "Upload". The "Upload" tab is currently selected. Below the navigation bar is a large dashed rectangular area representing the file selection zone. In the center of this area, there is a grey button labeled "Browse..." and the text "No file selected." to its right. At the bottom right of the dashed area, there are two links: "NEW PYTHON 3 NOTEBOOK" with a dropdown arrow and "CANCEL".

Exercise

As exercise, you will solve a classification task using **TensorFlow** over the OCR dataset. The dataset is already split into training and test sets. The task is to train a deep neural network with **at least 3** convolutional layers on the training set and predict the labels on the test set. Additionally, you can perform **model selection** (optimize at least one hyperparameter) and test your algorithm over a validation set.

Exercise | Material

Download the Exercise material:

<http://disi.unitn.it/~passerini/teaching/2020-2021/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. Perform 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;