

# Deep Learning Fundamentals

*Rome, 11<sup>th</sup> of April (Polo Didattico)*

## Table of contents

The content of the workshop is organized around five interactive notebooks (see below for instruction on how to launch them):

<b>9:00 – 10:00</b>	Introduction to the workshop, machine learning / deep learning, and the Python scientific computing ecosystem.
<b>10:00 – 11:00</b>	Tutorial on handling numerical data with NumPy, Matplotlib and SciPy.
<b>11:00 – 13:00</b>	Machine learning workflow using scikit-learn.
<b>13:00 – 14:00</b>	Lunch break.
<b>14:00 – 16:00</b>	From machine learning to deep learning with TensorFlow's Estimators.
<b>16:00 – 18:00</b>	Convolutional neural networks and defining custom estimators in TensorFlow.

## Python installation

In order to have a working installation of Python for scientific computing, follow the installation instructions for the Anaconda distribution or a similar full-stack solution:

<https://docs.continuum.io/anaconda/install>

Remember to install the version corresponding to **Python 3.x**, not **Python 2.x**.

You can start the Jupyter engine for visualizing the notebooks by typing the following instruction in the Anaconda prompt after installation:

```
>> jupyter notebook
```

## TensorFlow installation

Follow the official installation guide at:

<https://www.tensorflow.org/install/>

The CPU version is sufficient for the purpose of the workshop. **TensorFlow version 1.5 (at least) is required for running the two TensorFlow notebooks.**

## Google Colaboratory

If you are not able to install Anaconda or TensorFlow on your laptop computer, it is possible to follow the workshop using the cloud-based Google Colab service:

<https://colab.research.google.com/>

Colab allows you to run Jupyter notebooks in the cloud with only a Google account. More instructions will be provided during the workshop itself.

## Datasets information

For the scikit-learn notebook, we will make use of the following dataset:

- **Credit card dataset:** originally released on Kaggle ([Default of Credit Card Clients Dataset](#)), we will use both the raw version and a preprocessed version available at:

[http://ispac.diet.uniroma1.it/scardapane/credit\\_card\\_data.mat](http://ispac.diet.uniroma1.it/scardapane/credit_card_data.mat)

It is advised to download the dataset before the workshop.