Pre-exercises for lab on Machine Learning

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DER FORSCHUNG | DER LEHRE | DER BILDUNG

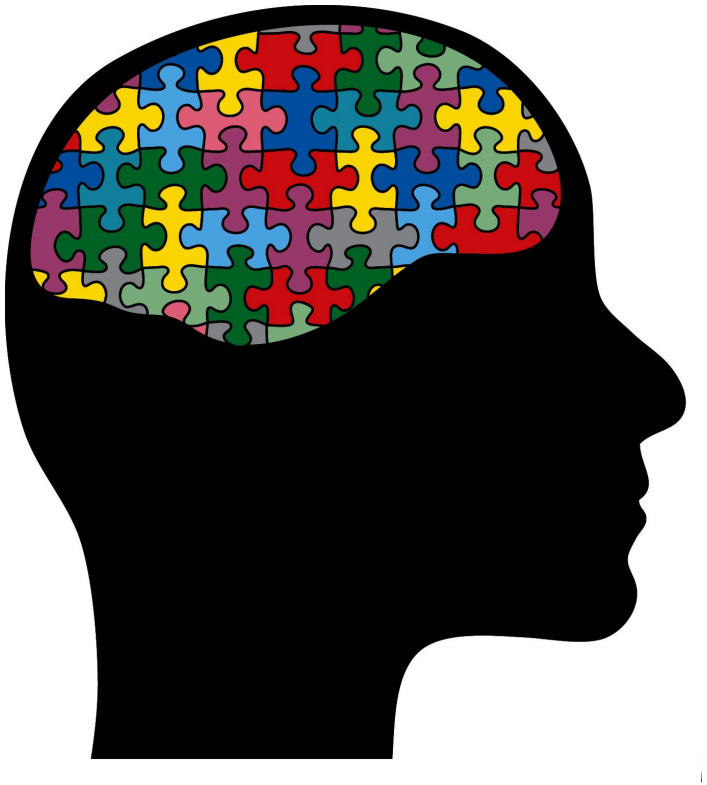
DESY.

Introduction

Introduction

Outline

For the lab itself,
you *do not need*
to install any software.



In the preparation

- No machine learning yet!
- Introduction to the environment in which we will evolve, namely *Jupyter notebooks*, if you are not yet familiar with it
- In addition, some exercises if you want to get familiar with *useful libraries*

In the lab

- Day 1: general introduction to Deep Learning with *Keras & TensorFlow*
- Day 2: advanced exercise in the context of physics at the LHC, namely top-tagging

There is another *advanced* lab
on Deep Learning
by Lara LLORET IGLESIAS!

Introduction

Outline

Jupyter notebooks

- Run code from browser
- Standard environment for teaching machine learning
- Get familiar with Python programming language

In order to go through the preparation exercises, you may need to **set up the environment**:
- either you install it on a local machine,
- or you can use on-line services.

Please find **instructions in the following slides**.

NB: for the lab at HUST,
we will provide a ready-to-use environment.

NumPy, MatLib & Pandas

- Three standard and powerful libraries, not only for machine learning
- You don't need to be an expert with any of these libraries, but going through the pre-exercises will help you get familiar with them

Setting up the environment

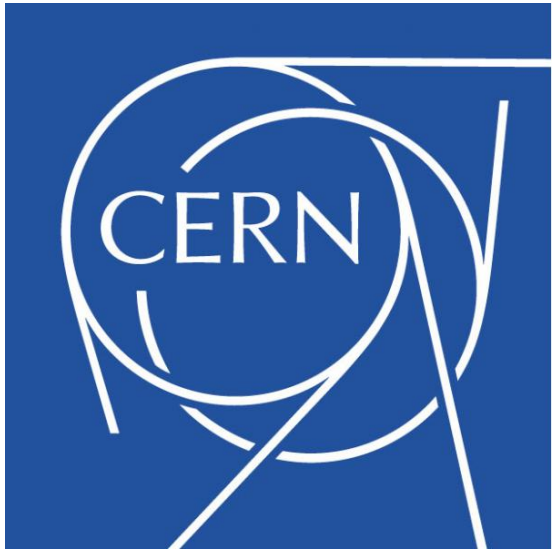
Setting up the environment

First alternative: SWAN

Follow instructions on

`https://swan.web.cern.ch/`

It works out of the box, provided you have a good connection, since you don't need to install anything, but this is unfortunately only accessible for CERN users...



Only available for CERN users...

Setting up the environment

Second alternative: Google Colab

Follow instructions on

`https://colab.research.google.com`

It works out of the box, provided you have a good connection, since you don't need to install anything, but this is unfortunately only accessible outside of China...

Only available outside of China...

Setting up the environment

Third alternative: using Anaconda

1. Install Anaconda (available for Linux, Mac OS X, and Windows 7, 8, 10)

   https://www.anaconda.com/distribution/

2. Just execute the wizard
   - may take up to half an hour
   - on Linux
     - make the file executable
     - you may need super-user permissions to install it
     - be aware that the wizard will write into the .bashrc to start anaconda environment

3. Then run Anaconda and visit the browser at:

   http://127.0.0.1:8888

Recommended for Windows, Linux & Mac OS X

Setting up the environment

Fourth alternative: using Docker image

1. Install docker (available for Linux, Mac OS X and Windows 10):

   https://docs.docker.com/

2. Install docker image from terminal (you may need to run it with super-user rights):

```
> docker pull floydhub/dl-docker:cpu
```

Not available for Windows 7 & 8

3. Run image from terminal (id.):

```
> docker run -it -p 8888:8888 -p 6006:6006 -v \
/var/run/docker.sock:/var/run/docker.sock floydhub/dl-docker:cpu bash
```

4. Run the notebook:

```
> jupyter notebook
```

5. Open a browser and enter following URL to open the notebook:

   http://127.0.0.1:8888

Only if anaconda did not work

Setting up the environment

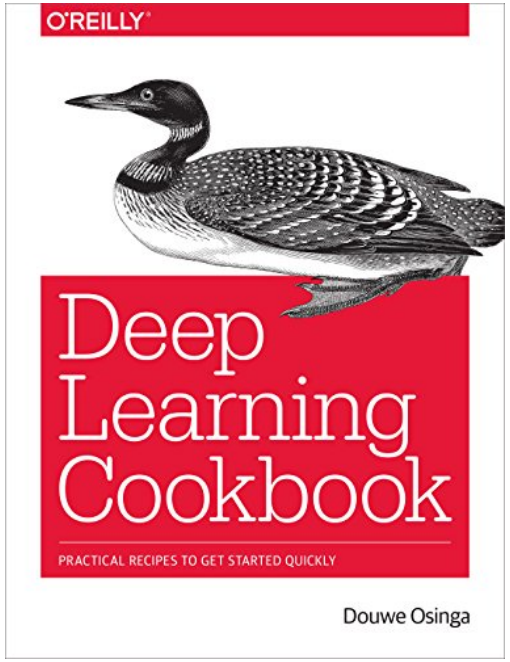
Fifth alternative: native installation (Unix-like systems only)

Just follow instructions from GitHub page (may not be accessible from China)

```
https://github.com/DOsinga/deep_learning_cookbook
```

This affects directly the system of your computer. If you are not sure of what you are doing, be careful and check what you are doing!

Reference:



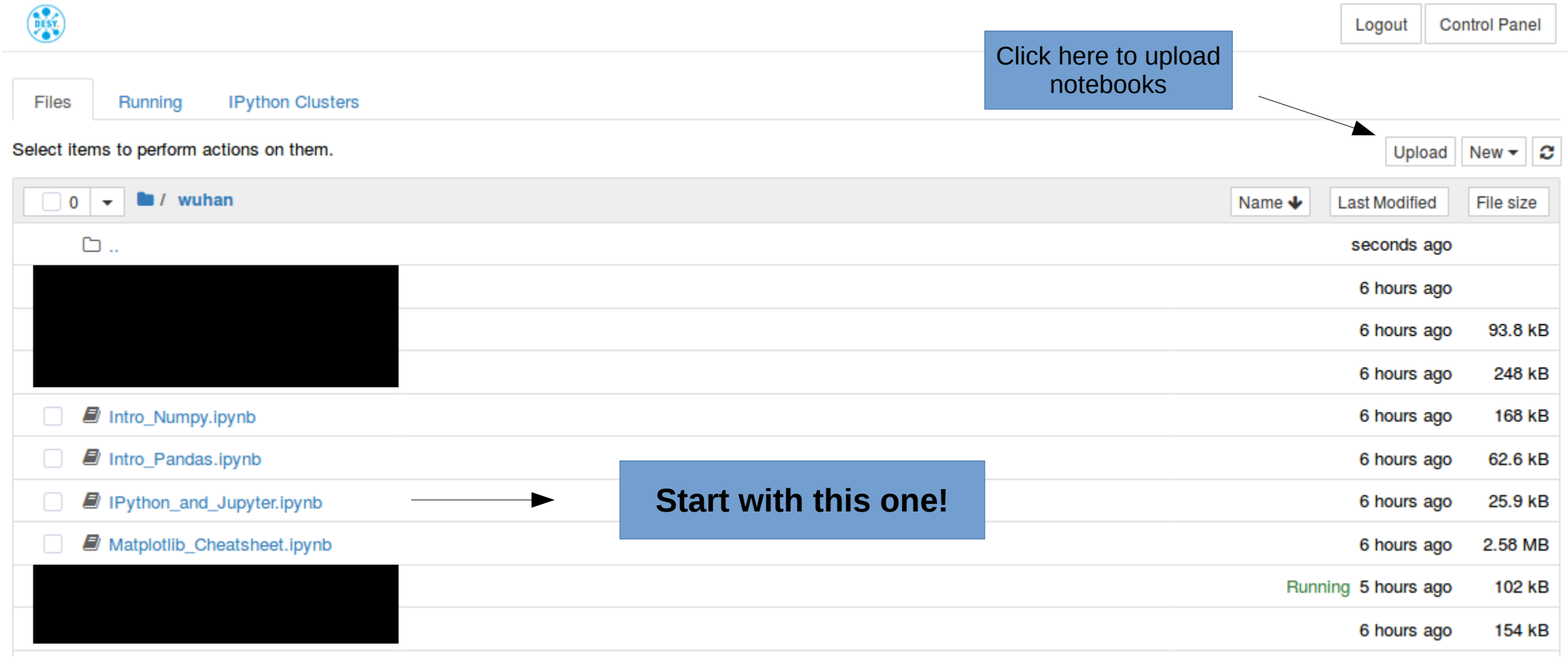
Only if no other method has worked

Short instructions to get started

(Very) short instructions

Get started with Jupyter notebooks

The four notebooks are self explicit and pedagogical.
Please start with the introduction to Jupyter and Ipython.
Then the order does not matter much.



See you in Wuhan