

# Pre-exercises for lab on Machine Learning

INFIERI19

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# Introduction

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## Outline

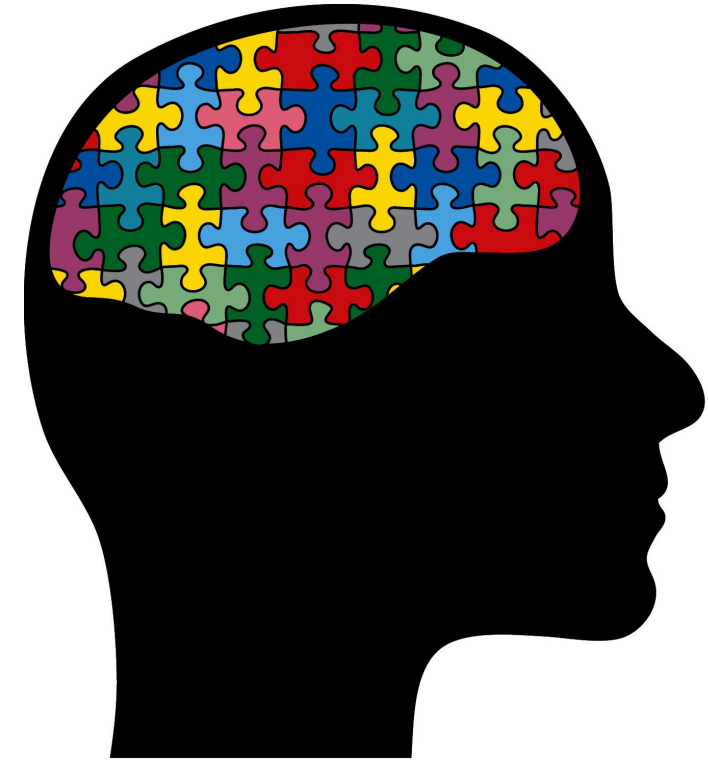
### In the preparation

- 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

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



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

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## 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
```

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>

**Not available for Windows 7 & 8**

**Only if anaconda  
did not work**

# Setting up the environment

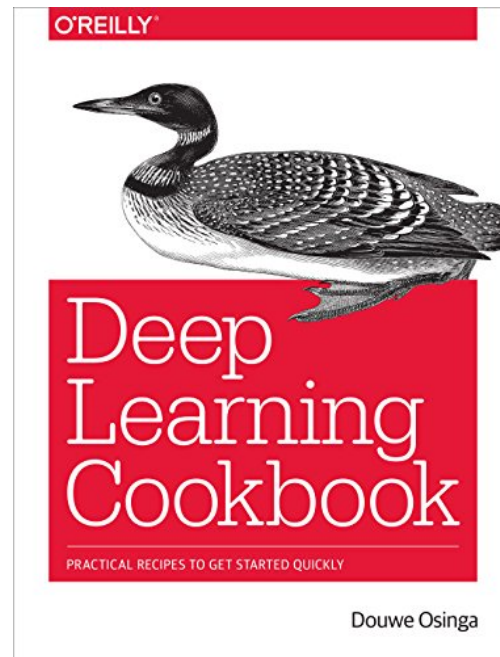
## Fifth alternative: native installation (Unix-like systems only)

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

`https://github.com/D0singa/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.

The screenshot shows the JupyterLab file browser interface. At the top, there are tabs for 'Files', 'Running', and 'IPython Clusters'. Below the tabs, there is a text prompt 'Select items to perform actions on them.' and a toolbar with 'Upload', 'New', and a refresh icon. The main area displays a list of files and directories in the 'wuhan' directory. The list includes a '..' directory, a redacted directory, and four notebooks: 'Intro\_Numpy.ipynb', 'Intro\_Pandas.ipynb', 'IPython\_and\_Jupyter.ipynb', and 'Matplotlib\_Cheatsheet.ipynb'. The 'Intro\_Numpy.ipynb' notebook is highlighted with a blue box and an arrow pointing to it with the text 'Start with this one!'. The 'Upload' button is also highlighted with a blue box and an arrow pointing to it with the text 'Click here to upload notebooks'.

Logout Control Panel

Click here to upload notebooks

Select items to perform actions on them.

0 / wuhan

Name	Last Modified	File size
..	seconds ago	
[Redacted]	6 hours ago	
[Redacted]	6 hours ago	93.8 kB
[Redacted]	6 hours ago	248 kB
<input type="checkbox"/> Intro_Numpy.ipynb	6 hours ago	168 kB
<input type="checkbox"/> Intro_Pandas.ipynb	6 hours ago	62.6 kB
<input type="checkbox"/> IPython_and_Jupyter.ipynb	6 hours ago	25.9 kB
<input type="checkbox"/> Matplotlib_Cheatsheet.ipynb	6 hours ago	2.58 MB
[Redacted]	Running 5 hours ago	102 kB
[Redacted]	6 hours ago	154 kB

Start with this one!

See you in Wuhan

