

Installation instructions

The following instructions should be quite detailed and easy to follow. If you nevertheless encounter a problem which you cannot solve for yourself, please write an email to [Thomas Foesel](#).

Note: the monospaced text in this section are commands which have to be executed in a terminal.

- for **Linux/Mac**: The terminal is simply the system shell. The "#" at the start of the line indicates that root privileges are required (so log in as root via `su`, or use `sudo` if this is configured suitably), whereas the commands starting with "\$" can be executed as a normal user.
- for **Windows**: Type the commands into the Conda terminal which is part of the Miniconda installation (see below).

Installing Python, Theano, Keras, Matplotlib and Jupyter

In the following, we show how to install these packages on the three common operating systems. There might be alternative ways to do so; if you prefer another one that works for you, this is also fine, of course.

- Linux
 - Debian/Mint/Ubuntu/...
 1. `# apt-get install python3 python3-dev python3-matplotlib python3-nose python3-numpy python3-pip`
 2. `# pip3 install jupyter keras Theano`
 - openSUSE
 1. `# zypper in python3 python3-devel python3-jupyter_notebook python3-matplotlib python3-nose python3-numpy-devel`
 2. `# pip3 install Theano keras`
- Mac
 2. Download the installation script for the [Miniconda collection](#) (make sure to select Python 3.x, the upper row). In the terminal, go into the directory of this file (`$ cd ...`) and run `# bash Miniconda3-latest-MacOSX-x86_64.sh`.
 3. Because there are more recent Conda versions than on the website, update it via `conda update conda`.
 4. Create a Conda environment with `$ conda create --name neuralnets python=3.5` (note that keras does not run on python 3.6 yet) and activate it via `$ source activate neuralnets`.
 5. `$ conda install numpy scipy mkl nose sphinx theano pygpu yaml hdf5 h5py jupyter matplotlib`
 6. `$ pip install keras`
- Windows
 7. Download and install the [Miniconda collection](#) (make sure to select Python 3.x, the upper row).
 8. Because there are more recent Conda versions than on the website, update it via `conda update conda`.
 9. Create a Conda environment with `conda create --name neuralnets python=3.5` (note that keras does not run on python 3.6 yet) and activate it via `activate neuralnets`.

10. `conda install jupyter h5py hdf5 libpython m2w64-toolchain matplotlib mkl-service nose nose-parameterized numpy scipy sphinx theano yaml`
11. `pip install keras`

Configuration: protecting Jupyter

Important: If you intend to run Jupyter on a multi-user system (like the CIP pool), it is **absolutely necessary** to protect it against arbitrary code execution by other users. The instructions can be found [here](#).

Configuration: tell Keras to use the Theano backend

1. Load Keras into Python (this command will probably fail as it tries to load TensorFlow, but this is OK. Its purpose is to initialize the ".keras" folder):
 - on Linux: `$ python3 -c "import keras"`
 - on Mac: `$ source activate neuralnets; python -c "import keras"`
 - on Windows:


```
activate neuralnets
python -c "import keras"
```
2. edit file ".keras/keras.json" in your home directory: replace "tensorflow" with "theano". To do that,
 - on Linux/Mac: open file "~/.keras/keras.json" in your home directory with your preferred text editor (either with command line editors like `$ vi ~/.keras/keras.json`, `$ emacs ~/.keras/keras.json` and `$ nano ~/.keras/keras.json`, or any graphical text editor)
 - on Windows:


```
cd %USERPROFILE%
notepad .keras/keras.json
```

Minimal examples

After the previous steps, the following scripts should work for you :

[Minimal example for Matplotlib](#)

[Minimal example for Theano](#)

[Minimal example for Keras](#)

To check this, download the scripts, rename the file extension from ".txt" to ".py", and execute them

- on Linux: `$ python3 <script.py>`, e.g. `$ python3 theano_minimal.py`
- on Mac (with Miniconda):
 1. `$ source activate neuralnets` (has to be done once in each new shell session)
 2. `$ python <script.py>`, e.g. `$ python theano_minimal.py`
- on Windows (with Miniconda):
 1. `activate neuralnets` (has to be done once in each new shell session)
 2. `python.exe <script.py>`, e.g. `$ python.exe theano_minimal.py` (in the Conda shell, also `python <script.py>` should work)

In the same way, you should also be able to execute your own Python scripts. If you call `$ python3/$ python/python.exe` without an argument, an interactive session is started, i.e. you can directly enter Python commands into the terminal.

In addition, you should be able to start a Jupyter notebook via `$ jupyter notebook` (will automatically open a browser tab where you can work).