CPCZurich2019 Tutorials – MACHINE LEARNING to Refine Mental Disorders Installation Guide

Authors of this guide: Dr. Thomas Wolfers & Inês Borges Pereira

One of the major problems in psychiatry is the heterogeneity of mental disorders. This means that individuals with the same diagnosis are quite different in their symptom expressions, biology and the environment they grow up in. Therefore, we introduced an important principle namely the refinement of mental disorders through heterogeneity mapping. After this tutorial you will have gained practical insights in mapping the heterogeneity of mental disorders using normative modeling. Concretely, you will learn to run a simple normative model using NISPAT.

What do you learn during this practical session?

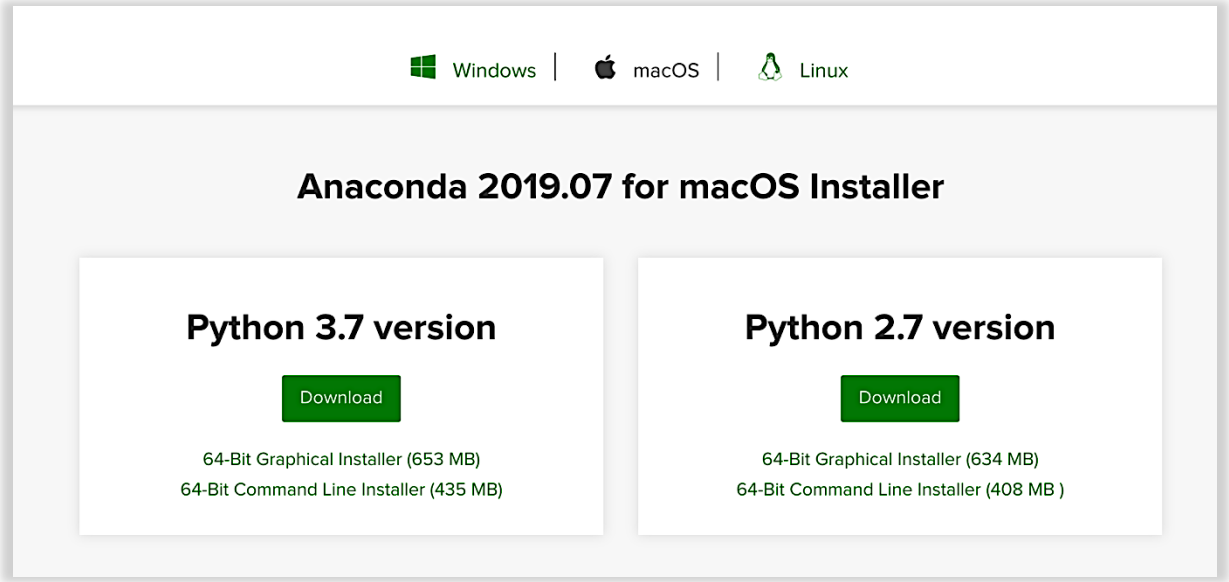
1. Theoretical motivation of normative modeling
2. Basic scripting in Python
3. Run a normative model in Python

Who will benefit the most from this practical session?

1. If you are familiar with standard analysis in neuroimaging but you want to try something novel.
2. If you have a bit of experience in writing python code but you are not an expert. Beginners can also follow.
3. If you are interested in normative modeling.

1) Install ANACONDA3 - Python version 3.7

https://www.anaconda.com/distribution/#download-section



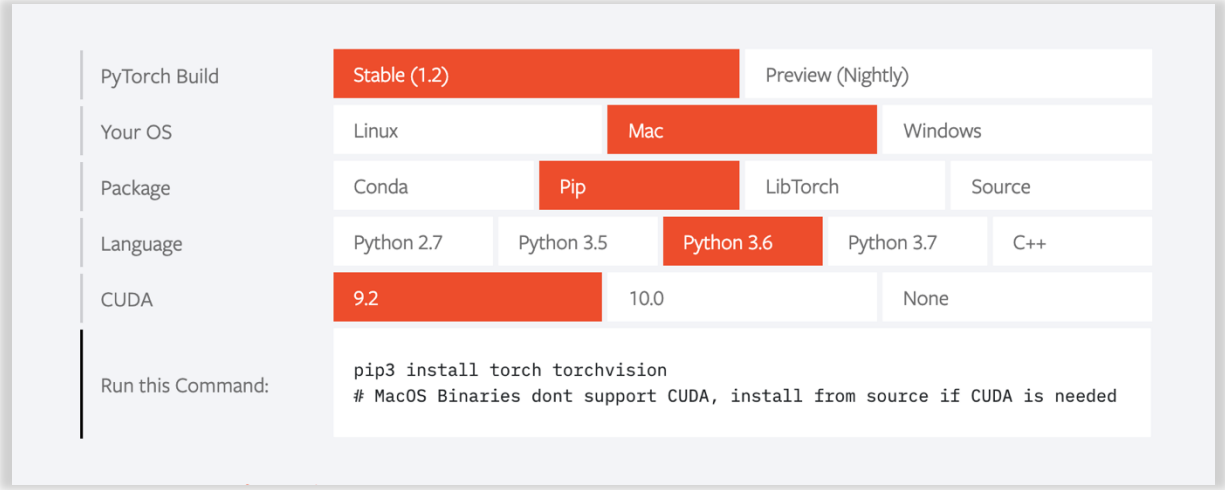
2) Create an environment

1. Some reading (highly recommend if this is your first time handling environments):
   i. What is an environment? (5-10 minutes read) https://docs.conda.io/projects/conda/en/latest/user-guide/concepts/environments.html
   ii. How can I manage my environments? (15-25 minutes read) https://docs.conda.io/projects/conda/en/latest/user-guide/tasks/manage-environments.html

Now that you understand what we are doing and why we are doing it, you are ready to:

2. Open a terminal
   i. **Windows**
      1) Click on the Windows keyboard key and search for "Anaconda Prompt"
      2) Open Anaconda Prompt
   ii. **Mac**
      1) Type: ⌘ + Space
      2) Type "Terminal" and hit return

3. With a terminal open:
   i. Create a new environment by typing:
      `conda create --name normative_modeling`
   ii. Activate environment: `conda activate normative_modeling`
   iii. Install the necessary dependencies before installing NISPAT. For this, you will use both the `conda` and the `pip` commands. Copy and paste the following commands into your Terminal/Anaconda Prompt **and type `y` when asked if you wish to proceed**:
      1) `conda install pip`
      2) `conda install spyder`
      3) `conda install pandas`
      4) `conda install scipy`
      5) `pip install nibabel`
      6) `pip install sklearn`
      7) PyTorch is a bit of a special case: we recommend running the commands suggested on the official website, which discriminate between operating systems: https://pytorch.org/ . This package takes a while to install. Be patient ☺.



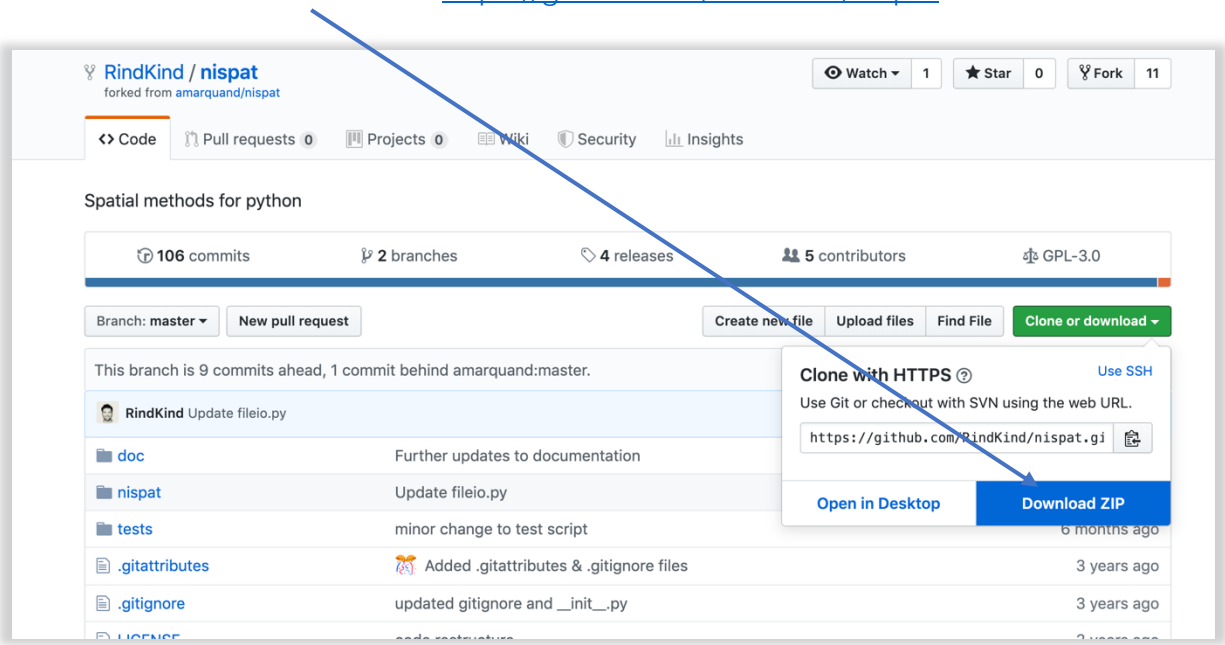
8) `pip install glob3`

Tips:

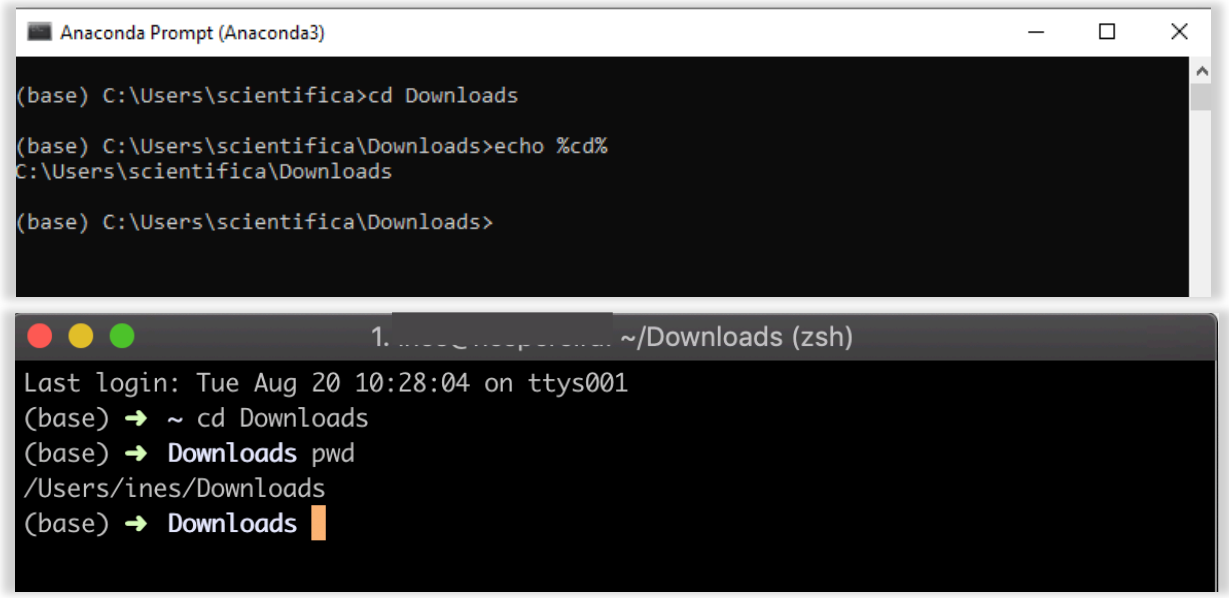
- If a command with `conda` does not work, try using `pip`. If `pip` does not work, try `conda`. The only thing you need to do is to substitute `conda` with `pip` or *vice versa*.
- If `pip3` does not work, try substituting `pip3` with `pip`.

3) Installing NISPAT

1. Download NISPAT from https://github.com/RindKind/nispat



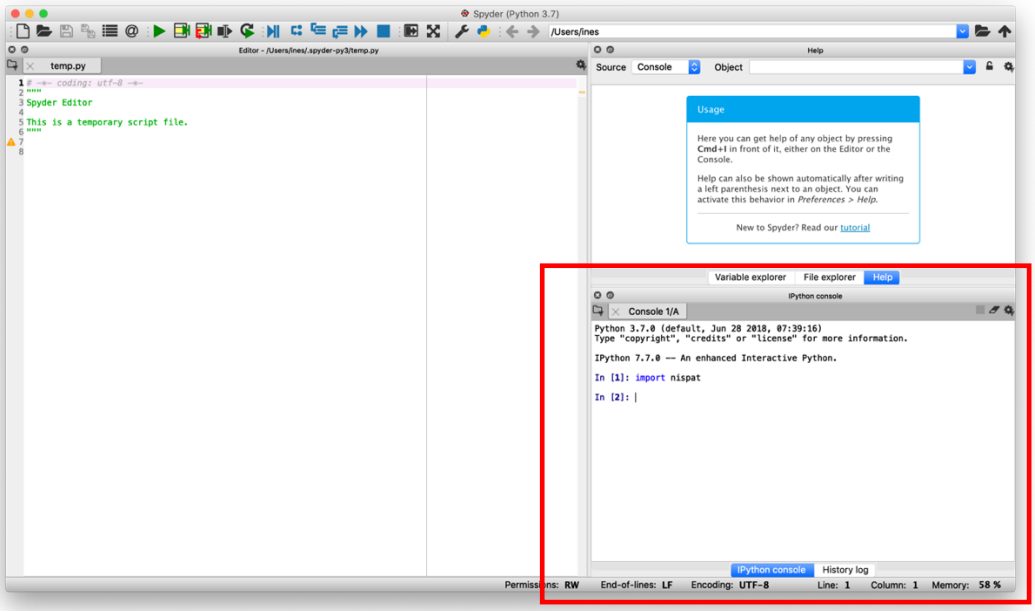
This works because, when you open a terminal, you land by default in your home directory.



As a plus: you can check in which folder (aka directory) you are by typing `echo %cd%` in Windows and `pwd` (*print working directory*) in Mac or Linux.
Note the pattern in the output. You basically get: /Users/<username>/Downloads.

Note the different slashes depending on your operating system and compare the two commands in the following step.

4. Now that you are in your Downloads folder, copy/paste the following command in your terminal:
    i. Windows: `pip install nispat-master\`
    ii. Mac: `pip install nispat-master/`
5. Once that is done, type `spyder` in your terminal. Opening Spyder from your terminal is a simple way to guarantee you open Spyder with the correct environment ☺.
6. With Spyder open, go to your iPython console and type: `import nispat` and press Enter/Return.



You should be all set now!
If you get an error, this is usually related to some dependency not being installed correctly. **Please read the error message carefully** to identify which package was not installed properly and then check out the tips in the section on installing dependencies.

If you need to open a new terminal, don't forget to always activate the environment you created by typing: `conda activate normative_modeling`
Otherwise, you will be installing dependencies in the default base environment.

As an aside: Spyder is what is called an IDE. If you are used to working with other tools, such as PyCharm or Visual Studio Code, be sure you know how to select the proper environment.

If you have trouble getting to this point before the Practical Tutorial Session please contact Dr. Thomas Wolfers during the course or Inês Borges Pereira via mail (inesb@student.ethz.ch) or during the course. **In person assistance is preferred and will be provided during the Tuesday and Wednesday lunch breaks.** Please find Inês at the entrance of the lecture hall after the morning talks are finished. She will wait there for ca. 10 minutes.