

Python Assessment and Homework

Prof. Dr. Mauricio Reyes
University of Bern

TAs: Amith Kamath, Shelley Shu

20.09.2023, Medical Image Analysis Lab

Python Assessment

- > Not graded! Just to get you know better such that we can fine-tune the course!
- > Need to answer each question
- > Some questions may be hard but do not panic and keep calm 😊

PYTHON ASSESSMENT

<https://forms.office.com/e/S803gyAhQU> or

<https://tinyurl.com/MIApy2023>



CODE INTRODUCTION

HOMEWORK

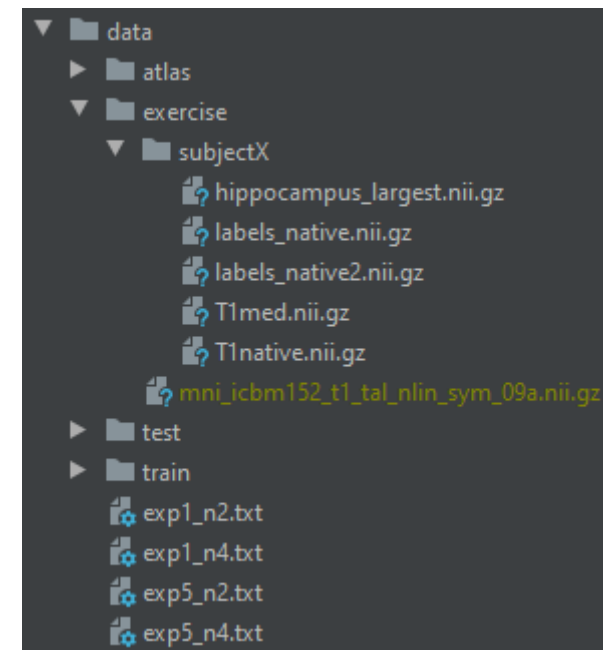
Homework for the next three weeks

- > **Due Week 2 (27.09): Python libraries (`exercises/exercise_simpleitk.py`)**
- > **Due Week 3 (10.04): Pipeline code (`exercises/exercise_pipeline.py`)**
- > **Due Week 4 (11.10): Random forest classifier (`exercises/exercise_rf.py`)**

- > Discussion end of next three lectures -
 - Support via e-mail or Slack.
 - Write down your questions and ask them next session.
 - Solving these is optional, but has previously shown to help with project work!

Python Libraries & Pipeline Code Exercise

- > Complete single functions
 - See “TODO” comments
 - Read the hints carefully
 - 1-2 lines of code
- > Exercise Python libraries before exercise pipeline code
- > Solve from top to bottom
- > Exercise data is on ILIAS and needs to be copied to the correct directory
- > Hand in the completed scripts with your name on ILIAS
 - `exercises/exercise_simpleitk_<your_name>.py`



CODING PITFALLS

SimpleITK & numpy I

- > Size of SimpleITK images and numpy arrays are reversed
 - `img = sitk.Image((10, 20, 3), sitk.sitkUInt8)`
 - `img_array = sitk.GetArrayFromImage(img)`
 - `print(img_array.shape) # (3, 20, 10)`

SimpleITK & numpy II

- > numpy data type as SimpleITK parameter raises error
 - `size = np.array((10, 20, 3))`
 - `print(type(size))` # `<class 'numpy.ndarray'>`
 - `img = sitk.Image(size, sitk.sitkUInt8)` # `NotImplementedError`
- > Let's convert to Python list
 - `size_as_list = list(size)`
 - `print(type(size_as_list[0]))` # `<class 'numpy.int32'>`
 - `img = sitk.Image(size, sitk.sitkUInt8)` # `NotImplementedError`
- > Let's convert to Python list with Python data type
 - `size = size.tolist()` # `numpy.ndarray.tolist` converts to Python type
 - `print(type(size[0]))` # `<class 'int'>`
 - `img = sitk.Image(size, sitk.sitkUInt8)` # woohoo, it works! 😊

CODING HINTS

General Hints for Homeworks & Project

- > Use JetBrains PyCharm Community for coding (It's free for you as a student!)
- > Use the debugger and set breakpoints on unclear points
- > In PyCharm use Ctrl + B to go to the definition
- > Be aware that methods can be passed as an argument to another method
- > Be aware that enums exist in Python too
- > Use the documentation of the libraries to solve your problems
- > SimpleITK filter classes (the one with "Filter" in the name) contain an execute method to process the data → look into the documentation (also ITK if unclear)
- > Search on the internet for solutions if unclear. For example on Stackoverflow
- > There are much more hints... 😊

Pre-course Quiz results/statistics

- > Open the results/statistics for the pre-course quiz.