Python programming

Deep learning for media technology (TNM112), lab 0

Abstract

Lab 0 is a non-mandatory introduction to Python programming, especially using NumPy and Matplotlib for data handling and plotting, respectively. If you are new to Python, we recommend that you perform the different exercises, as this will make it easier to focus on the important things in the upcoming labs (Lab 1-3).

1 Introduction

The exercises in this lab are directly related to what is needed for the upcoming labs, especially for getting started with Lab 1. Thus, if you have limited previous experience with Python, it is recommended that you walk through the different exercises as this will save you time when you start working on Lab 1.

The lab exercises are described in the lab notebook (*lab00.ipynb*). This is self-contained, so you will not need this lab text when everything is installed and running, which is the focus of the following text.

2 Setting up

Since the lab exercises are provided in the lab notebook, we only briefly cover setting up the environment here. You will need to have Python installed, as well as some libraries for Python: Jupyter, NumPy, Matplotlib, and Keras (we will not be using Keras in this lab, but we might as well install it for the upcoming labs).

2.1 Python

If you use OSX or Linux, Python should be pre-installed by default, otherwise it is available through the package manager. In Windows, you might have to install Python yourself through Windows Store[1]. Make sure you can run Python by opening a terminal/command window and start Python:

```
python3
```

Usually, the *python3* command is a symbolic link to the specific Python version, such as Python 3.8, 3.9, or similar. Or there might be a symbolic link *python* that you can use. If you have different Python versions installed you can select the specific version to run:

```
python3.8
```

The Python command will start an interactive session in the terminal window, where you can start coding similar to a Matlab command window. You can exit this by typing:

```
exit()
```

You can also run code that is available in some Python script:

```
python3 some_script.py
```

However, we will be using Jupyter notebooks for the labs, which we will cover next.

2.2 Pip

Python has its own package manager, called *pip*[2]. You can list the installed packages through:

```
pip3 list
```

We will be using the Jupyter, Numpy, Matplotlib, and Keras packages for the labs. You can install these by:

```
pip3 install notebook numpy matplotlib
  keras
```

The package manager will also install all the required dependencies for the packages, such as Tensorflow which is required by Keras.

[1] https://learn.microsoft.com/en-us/windows/python/beginners

[2] https://pip.pypa.io/en/stable/getting-started/

2.3 Jupyter

Jupyter provides an interactive web interface for Python coding and execution, where you can create different cells for running different parts of your code. Additionally, there is the JupyterLab environment which is a convenient tool for Python development. It provides a more comprehensive web-based environment for coding (multiple notebooks, browser, editor, preview, terminal, etc.). You can also install JupyterLab through pip[3]:

```
pip3 install jupyterlab
```

For more information about Jupyter and JupyterLab, please see the online information and documentation[4]. You can start the Jupyter server through the command line:

```
jupyter notebook
```

Or similarly for JupyterLab:

```
jupyter lab
```

Or in some environments you might have to use:

```
python3 -m jupyterlab
```

When you start Jupyter or JupyterLab, a window should open in your default browser. The root directory will be the current directory, so you will need to cd to your desired directory (e.g. the lab folder) before you start the server.

3 Assignments

To start with the lab exercises, start Jupyter through the command line and open the lab notebook, *lab00.ipynb*. All the information is available in this notebook.

Good luck!

[3] https://jupyter.org/install

[4] https://docs.jupyter.org/en/latest/start/index.html