Universitat Pompeu Fabra Barcelona

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud

INTERLIED: USER MANUAL

INTRODUCTION

InterLied is a set of python GUI (interface) and python notebook, both designed for computational music analysis. Although it is adapted for analysing vocal pieces only, lieder in particular, a majority of its tools can be useful for other purposes as well. The notebook is appropriate for both, computationally advanced and beginner users. If you assume, you belong to the latter, please go through these instructions first and then open the GUI. The notebook does not require any coding experience; however, you are strongly encouraged to not only utilise the GUI, but also the InterLied notebook. All parameters are described in the notebook itself, thus, in order to get to it, scroll through the following chapters and first install Python3, install all the (missing) prerequisite dependencies and MuseScore or any other software for symbolic notation.

Do not be discouraged by the interaction with the prerequisite installations. This process only needs to be done once and includes the majority of most frequently used packages in (music) programming. The most time-consuming process is installing Python (if you have not already), the rest of installations is a matter of minute as all libraries are already stored in a SINGLE file you need to run.

You can also only install Python and Jupyter notebook, open the provided notebook in Jupyter and the installations can only be done with a single click from there. If you run into any errors, complete the rest manually. (Note: If you decide to download the packages, directly through the notebook just make sure, your pip is working). Another alternative is to download all necessary packages through Anaconda Navigator, however this software will take up quite a lot of free space on your disk (about 400MB) or Miniconda (about 57MB).

When all is installed, open Jupyter notebook or GUI (the interface) as specified in the manual, search for the InterLied notebook, open it and start exploring!

1. INSTALLING PYTHON

First, all types of computers have the capability to operate with Python language as well as can have Jupyter notebook installed. Each system (MAC OS / WINDOWS / LINUX) has its own installation process. Please note, there are many ways on how to install all packages, but only one will be presented. If you feel this process does not fit your needs, feel free to find a workaround online (for example Anaconda Navigator). If you do not wish to install anything, you can open the notebook in Google Colab.

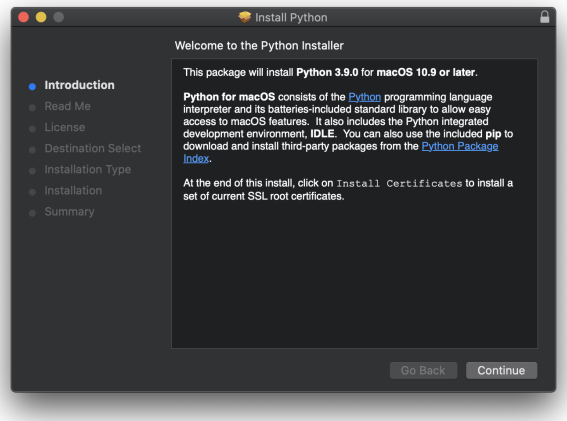
MAC OS

1. **PYTHON** (SOURCE: https://flaviocopes.com/python-installation-macos/)

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud

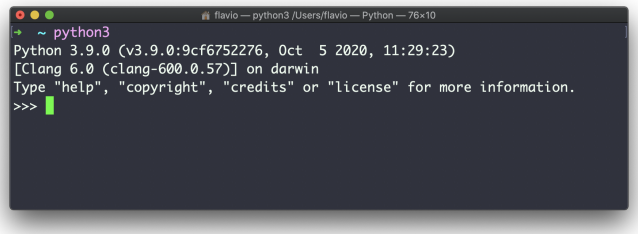
Go to https://www.python.org, choose the Downloads menu, hover “Mac OS X” and a panel with a link to download the official package will appear:

Click that, and run the installer:



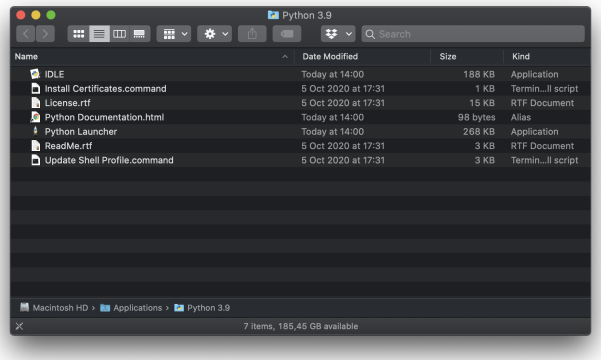
When it’s finally installed, Python is installed as **/usr/bin/python3**.

OPEN **TERMINAL:** Running python3 in the macOS **terminal** opens the Python 3.9 interpreter we just installed:



You will now also find a new folder under “/Applications/Python 3.9” (change that with your exact version number), with some files:

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud



As the instructions said in the last installation panel, you need to run the "**Install Certificates.command**" to install the SSL certificates needed by Python.

This is because Python includes its own private copy of OpenSSL 1.1.1, and we need to install a curated bundle of default root certificates from the third-party certifi package.

Double-click on Install Certificates to run it, and it will to its job quickly.

OPEN TERMINAL AGAIN:

With Zsh, you need to add the alias to the .zshrc file in your home folder:

```
alias python="python3"
```

With Bash, you need to add the alias to the .bashrc file in your home folder:

```
alias python="python3"
```

Now you can run python and it will point to the Python 3 version you just installed.

I found that the easiest way to run pip (the Python package manager) is to use python -m pip <COMMAND> rather than pip <COMMAND>, for example:

python -m pip install django

And you should always use a virtual environment with venv when doing so.

(If you run into trouble, visit: https://installpython3.com/mac/)

WINDOWS

PYTHON INSTALLATION (Recommended): https://bit.ly/3azpEH1 ("The Microsoft Store package is an easily installable Python interpreter that is intended mainly for interactive use, for example, by students.")

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud

PYTHON INSTALLATION (Use Command Prompt): https://docs.python.org/3/using/windows.html

How to operate with Command Prompt: https://www.howtogeek.com/235101/10-ways-to-open-the-command-prompt-in-windows-10/

Useful guide on how to modify the PATH in Windows 10: https://bit.ly/3tNOSsJLINUX

LINUX

PYTHON INSTALLATION: https://docs.python-guide.org/starting/install3/linux/

GOOGLE COLAB

The difference here is that nothing needs to be downloaded onto your computer. But, in order to use it with your data, you need to connect your Google Colab with your Google Drive where you should store all of the scores to be analysed (as indicated in the notebook instructions). Google Colab can run a bit slower in comparison to running the code locally on your computer with Jupyter Notebook and can unexpectedly restart, so it is less appropriate for longer processes. Make sure to download any file you produce and then upload it permanently to your drive. Otherwise, you will have to repeat the process from the beginning everytime.

Google Colab InterLied Notebook can be accessed here:
https://drive.google.com/file/d/1NmNI8WIZQvMalCkNEtOeHNw4dLjQ_dJh/view?usp=sharing

2. JUPYTER NOTEBOOK

JUPYTER NOTEBOOK: https://test-jupyter.readthedocs.io/en/latest/install.html

YouTube Tutorial: https://bit.ly/3dLY772

Install with **pip** in Terminal (MAC OS) / Command Prompt (WINDOWS) and write one line at the time:

1. **Jupyter Lab:**

```
pip install jupyterlab
```

If installing using pip install --user, you must add the user-level bin directory to your PATH environment variable in order to launch jupyter lab. If you are using a Unix derivative (FreeBSD, GNU / Linux, OS X), you can achieve this by using export PATH="$HOME/.local/bin:$PATH" command.

```
run JupyterLab
```

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud

Once installed, launch JupyterLab with:

```
jupyter-lab
```

2. Classic **Jupyter Notebook:**

```
pip install notebook
```

Congratulations, you have installed Jupyter Notebook! To run the notebook, run the following command (copy the text below to the terminal/command prompt window) at the Terminal (Mac/Linux) or Command Prompt (Windows):

```
jupyter notebook
```

3. MANUALLY INSTALLING PREREQUISIT DEPENDENCIES

PIP DOWNLOADS FOR ALL OPERATING SYSTEMS

This is one of the ways to install the dependencies. Alternatively, you can ONLY execute one pre-prepared cell in provided notebook, OR use Anaconda Navigator.

EXAMPLE (for python – csv)

```
pip install python-csv
```

»IF YOU WISH TO AVOID MANUAL INSTALLATIONS:

1. **Copy the two commands below (ONE BY ONE), replacing the first part of random path with the path to the folder where you stored InterLied:**

MAC:

```
cd username/randomfolders/morefolders/InterLied_1.0
```

```
python interlied_dependencies.py
```

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud

WINDOWS:

```
cd C:\home\username\randomfolders\InterLied_1.0
```

```
python interlied_dependencies.py
```

4. RUN JUPYTER NOTEBOOK OR GUI

Jupyter notebook:

When your dependencies are installed, only run the command »`jupyter notebook`«, find the InterLied notebook, open and start exploring.

GUI (interface):

When your dependencies are installed, run these two commands, wait for the interface to open and start exploring. If you exit the interface and want to start it up again (without closing the terminal/promp command beforehand), only run the second one, otherwise repeat this process.

NOTE: All files that are produced by the algorithms will be stored to the same directory, e.g. interface folder, so go there if you want to see the results.

MAC:

```
cd username/randomfolders/InterLied_1.0/interface
```

```
python interlied_interface.py
```

WINDOWS:

```
cd username\randomfolders\InterLied_1.0\interface
```

```
python interlied_interface.py
```

Vanessa Nina Borsan
vanessanina.borsan01@estudiant.upf.eud

5. INSTALLING MUSESCORE

MAC OS: Download any of these - https://ftp.osuosl.org/pub/musescore-nightlies/macos/2x/.

WINDOWS: Download any of these - https://ftp.osuosl.org/pub/musescore-nightlies/windows/2x/.

NOTE: This is the version which is by default supported by music21. If you wish to use your preferred software, please visit music21 and follow the instructions on how to change this setting.

6. ACCESSING ALL OF THE DATA ONLINE

The notebook and other information will be frequently updated. The newest version will be accessible through this link:

https://github.com/vnborsan/interlied