Table of contents (../toc.ipynb)

Additional Packages

This chapter will be a short collection of additional very useful Python packages, so that you know about them.

Speed up Python code

One problem often discussed under more advanced Python users is that Python can be slow compared with compiled languages like C and C++. However, there are multiple options to speed up Python.

- Cython (https://cython.org/) is a packages which can compile Python code into C code. Add to this, the cython language can be used to write C code in a pythonic style.
- ScyPy lectures notes: Interfacing C (http://scipy-lectures.org/advanced/interfacing_with_c/interfacing_with_c.html) explain how to use native Python-C-Api, CTypes, Swig, to include C code in your Python project.
- Dask (https://dask.org/) is a parallel computing package. With Dask, you can scale and distribute Python code on clusters for instance.
    - There is an extensive tutorial on github https://github.com/dask/dask-tutorial (https://github.com/dask/dask-tutorial).
- Numba (https://numba.pydata.org/) translates some part of Python code and numpy code into fast machine code.

Additional machine learning packages

Python is very often used for machine learning tasks. Hence, there are numerous top notch machine learning packages available.

Deep learning

Keras (https://keras.io/) is a user friendly librarie to build neural networks on top of Theano (http://www.deeplearning.net/software/theano/) or TensorFlow (https://www.tensorflow.org/) deeplearning backends.

Probalistic programming

- Bayesian estimation of model parameters, probalistic machine learning, Gaussian processes, ... All these tasks can be conducted with PyMC3 package (https://docs.pymc.io/).
    - Compared with common frequentist approach, Bayesian estimation places a prior distribution on unknown model paremeters and computes the a posteriory distribution of these parameters given some data.
    - Hence, beyond point estimation, a full distribution is result of Bayesian estimation.
    - Probalistic inference is introduced in this tutorial https://docs.pymc.io/notebooks/api_quickstart.html (https://docs.pymc.io/notebooks/api_quickstart.html).

Statistical models

Finally, a great library for statistical modeling is [statsmodels (https://www.statsmodels.org/stable/index.html)](https://www.statsmodels.org/stable/index.html).

Statsmodels provides, linear regression, robust regression, statistical tests, recursive estimators, time series modelling, and much more.