



DEEP LEARNING

Introduction to Jupyter Notebook, Anaconda and Python DL Tools



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Scope



- ✓ **Python** – a modern language often used for AI, CI, KE, and DM computing.
- ✓ **Jupyter Notebook** – a modern and intuitive programming environment with linked libraries (like Tensorflow, Keras) that allow to effectively process deep learning algorithms and present results quickly.
- ✓ **Tensorflow and Keras** libraries produced by leading IT companies, like Google, that facilitate and simplify implementation and use of deep learning algorithms and networks.



The Jupyter Notebook:

- is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations, and narrative text;
- includes data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more.



We will use it to demonstrate various algorithms, so you are asked to install it.

Jupyter in your browser

Install a Jupyter Notebook

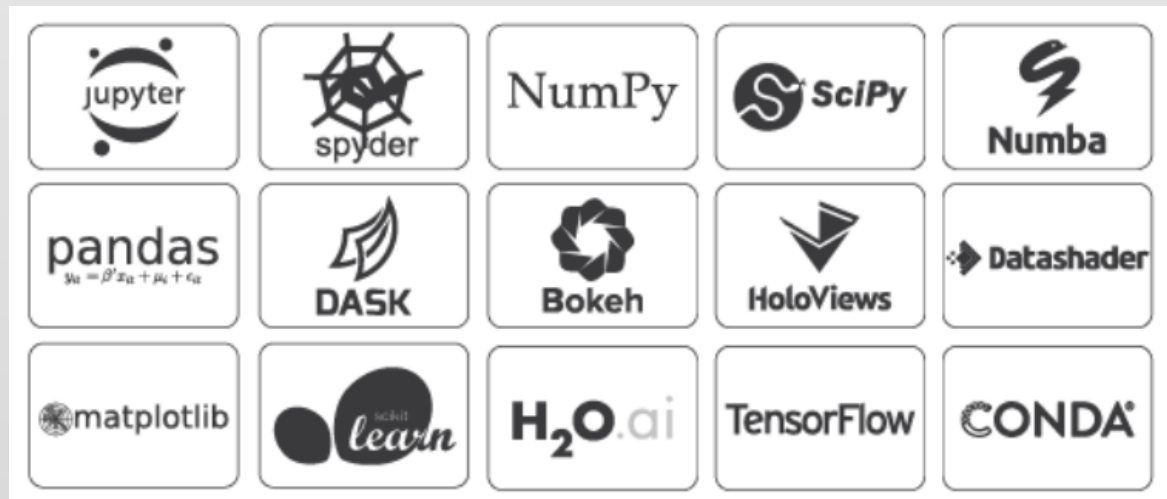


Install Jupyter using [Anaconda](#) with built in Python 3.7+

- It includes many other commonly used packages for scientific computing, data science, machine learning, and computational intelligence libraries.
- It manages libraries, dependencies, and environments with Conda.
- It allows developing and training various machine learning and deep learning models with scikit-learn, TensorFlow, Keras, Theano etc.
- It supplies us with data analysis including scalability and performance with Dask, NumPy, pandas, and Numba.
- It quickly visualizes results with Matplotlib, Bokeh, Datashader, and Holoviews.

And [run it](#) at the Terminal (Mac/Linux) or Command Prompt (Windows):

```
jupyter notebook
```





My Anaconda Landscape

🔍 Packages View all (0)

Get more information on how to [upload a Package](#).

🔍 Notebooks View all (0)

Get more information on how to [upload a Notebook](#).

🔍 Environments View all (0)

Get more information on how to [upload an Environment](#).

🔍 Projects View all (0)

No projects yet, [upload one here](#).

★ Favorites View all (0)

Favorite some packages, notebooks, and environments to get started!

📄 Activity Feed View more

Welcome to Anaconda Cloud! 10 months and 22 hours ago

Anaconda Cloud allows you to create or distribute software packages.

Getting started: [Installing your first package](#)

Getting started: [Distributing your first package](#)



It is recommended to install [PyCharm](#) for Anaconda:



Anaconda3 2019.03 (64-bit)

Anaconda + JetBrains

Anaconda and JetBrains are working together to bring you Anaconda-powered environments tightly integrated in the PyCharm IDE.

PyCharm for Anaconda is available at:

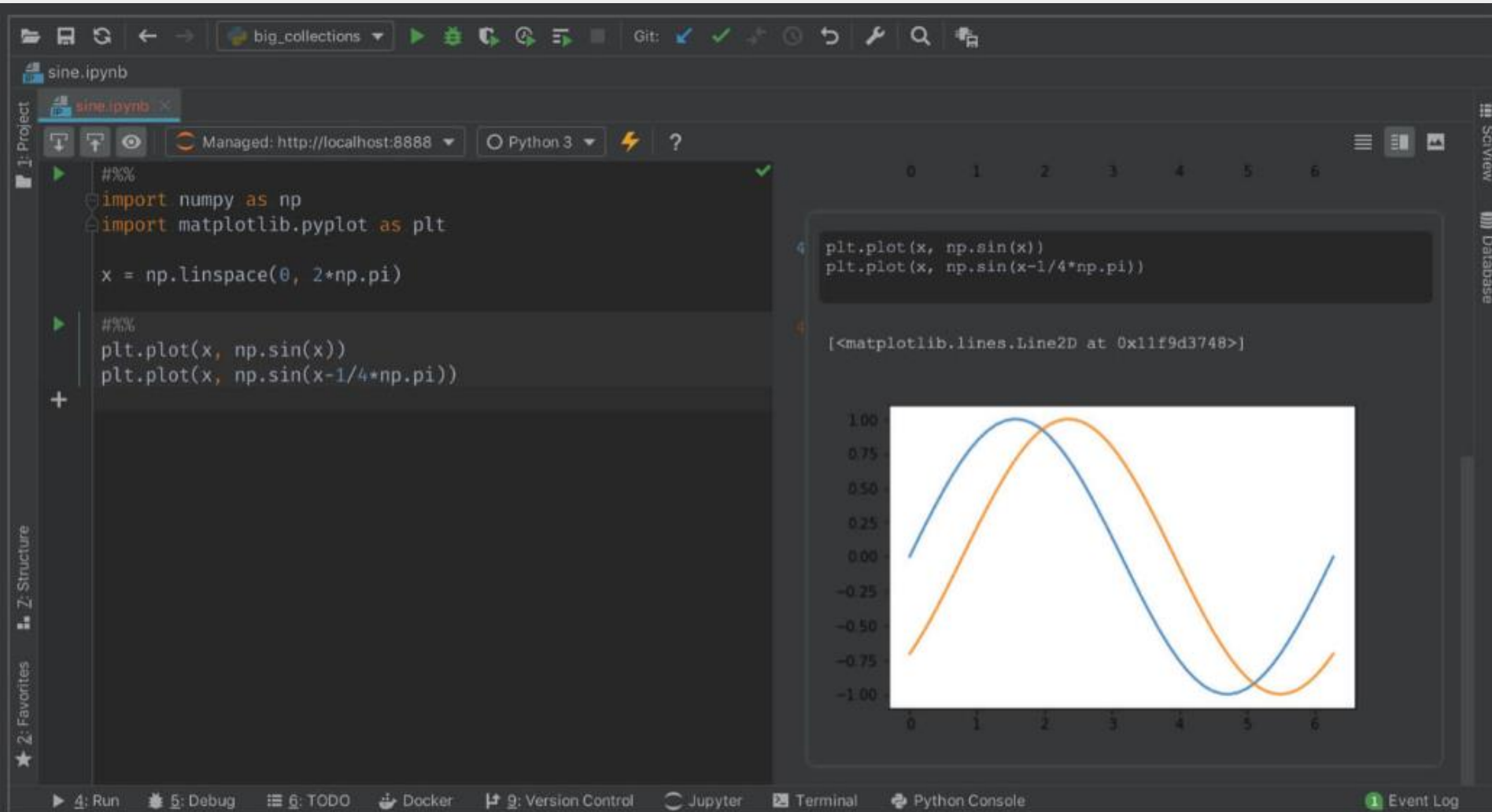
<https://www.anaconda.com/pycharm>





PyCharm is a python IDE for Professional Developers

- It includes scientific mode to interactively analyze your data.



The screenshot shows the PyCharm IDE interface with a Jupyter Notebook open. The notebook contains the following code:

```
import numpy as np
import matplotlib.pyplot as plt

x = np.linspace(0, 2*np.pi)

plt.plot(x, np.sin(x))
plt.plot(x, np.sin(x-1/4*np.pi))
```

The plot displays two sine waves: a blue curve representing $\sin(x)$ and an orange curve representing $\sin(x - \pi/4)$. The x-axis ranges from 0 to 6, and the y-axis ranges from -1.00 to 1.00. The orange curve is phase-shifted relative to the blue curve.



Jupyter Notebook Dashboard



Running a Jupyter Notebook in your browser:

- When the Jupyter Notebook opens in your browser, you will see the Jupyter Notebook Dashboard, which will show you a list of the notebooks, files, and subdirectories in the directory where the notebook server was started by the command line „jupyter notebook”.
- Most of the time, you will wish to start a notebook server in the highest level directory containing notebooks. Often this will be your home directory.

The screenshot shows the Jupyter Notebook Dashboard interface. At the top, there is a 'jupyter' logo and two buttons: 'Quit' and 'Logout'. Below the logo, there are three tabs: 'Files', 'Running', and 'Clusters'. The 'Files' tab is active, showing a file browser view. The interface includes a search bar, an 'Upload' button, a 'New' dropdown menu, and a refresh icon. The file list is organized into columns: 'Name', 'Last Modified', and 'File size'. The list contains various folders and files, including notebooks in the 'Running' state.

Name	Last Modified	File size
0		
3D Objects	5 miesięcy temu	
Apple	rok temu	
Contacts	5 miesięcy temu	
Desktop	miesiąc temu	
Documents	4 miesiące temu	
Downloads	18 godzin temu	
Dropbox	19 dni temu	
Exhibeon	3 miesiące temu	
Favorites	5 miesięcy temu	
Links	5 miesięcy temu	
miniconda3	3 dni temu	
Music	4 miesiące temu	
OneDrive	19 dni temu	
OpenVPN	2 lata temu	
Pictures	2 miesiące temu	
PycharmProjects	3 dni temu	
Saved Games	5 miesięcy temu	
Searches	5 miesięcy temu	
source	9 miesięcy temu	
Tracing	rok temu	
Videos	2 miesiące temu	
Comparison of for-looped and vectorized efficiency of computations-Copy1.ipynb	Running 2 dni temu	7.72 KB
Comparison of for-looped and vectorized efficiency of computations-Copy2.ipynb	Running 2 dni temu	7.72 KB
Comparison of for-looped and vectorized efficiency of computations.ipynb	Running 12 godzin temu	19 KB
Python+Basics+With+Numpy+v3-Copy1 modified for lectures.ipynb	Running 2 dni temu	41.9 KB
Python+Basics+With+Numpy+v3.ipynb	Running 2 dni temu	41.3 KB
Untitled.ipynb	3 dni temu	1.15 KB



Starting a new Python notebook



Start a new Python notebook:

- Clicking New → Python 3

The screenshot shows the Jupyter web interface in a browser. The address bar displays 'localhost:8888/tree'. The page title is 'jupyter'. There are 'Quit' and 'Logout' buttons in the top right. Below the title bar, there are tabs for 'Files', 'Running', and 'Clusters'. The 'Files' tab is active. Below the tabs, there is a message: 'Select items to perform actions on them.' In the bottom right corner, there are 'Upload', 'New', and a refresh icon. The 'New' button is highlighted with a red rectangle.

- And a new Python project in the Jupyter Notebook will be started:

The screenshot shows the Jupyter Notebook interface. The title bar displays 'jupyter Untitled Last Checkpoint: 4 minuty temu (autosaved)'. There is a 'Logout' button in the top right. Below the title bar, there is a menu bar with 'File', 'Edit', 'View', 'Insert', 'Cell', 'Kernel', 'Widgets', and 'Help'. The 'Kernel' menu is open, showing 'Trusted' and 'Python 3'. Below the menu bar, there is a toolbar with various icons for file operations, navigation, and execution. The main area shows a code cell with the prompt 'In []:'.



In the next assignments and examples, we will use the following packages:

- [numpy](#) is the fundamental package for scientific computing with Python.
- [h5py](#) is a common package to interact with a dataset that is stored on an H5 file.
- [matplotlib](#) is a famous library to plot graphs in Python.
- [PIL](#) and [scipy](#) are used here to test your model with your own picture at the end.

They must be imported:

```
In [2]: import numpy as np
import matplotlib.pyplot as plt
import h5py
import scipy
from PIL import Image
from scipy import ndimage
from lr_utils import load_dataset

%matplotlib inline
```



Let's start with powerful computations!



- ✓ Questions?
- ✓ Remarks?
- ✓ Suggestions?
- ✓ Wishes?



Bibliography and Literature

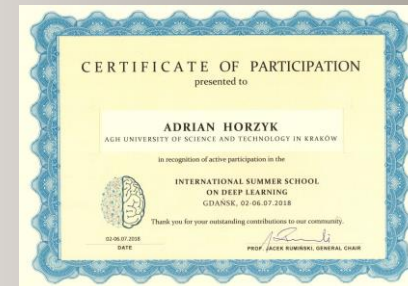
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