

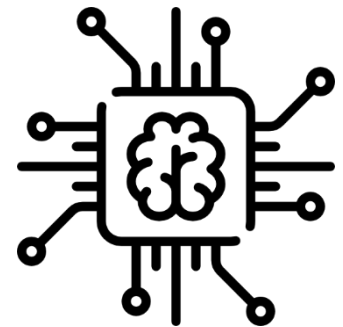
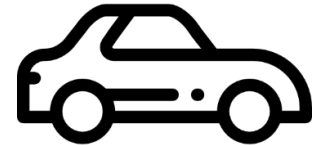
Supervised Learning: Classification

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Agenda

1. Exercise
 1. Task: Tools
 2. Task: Comparison of regression algorithms
 3. Task: Real world data analysis



Tools - Scikit – Learn – Example for a Python ML Library

- Actively developed machine learning library for python
- Extension to scipy
- Widely used and well documented algorithms for
 - Classification
 - Regression
 - Clustering
 - Model selection
 - Data preprocessing
- <http://scikit-learn.org/stable/documentation.html>



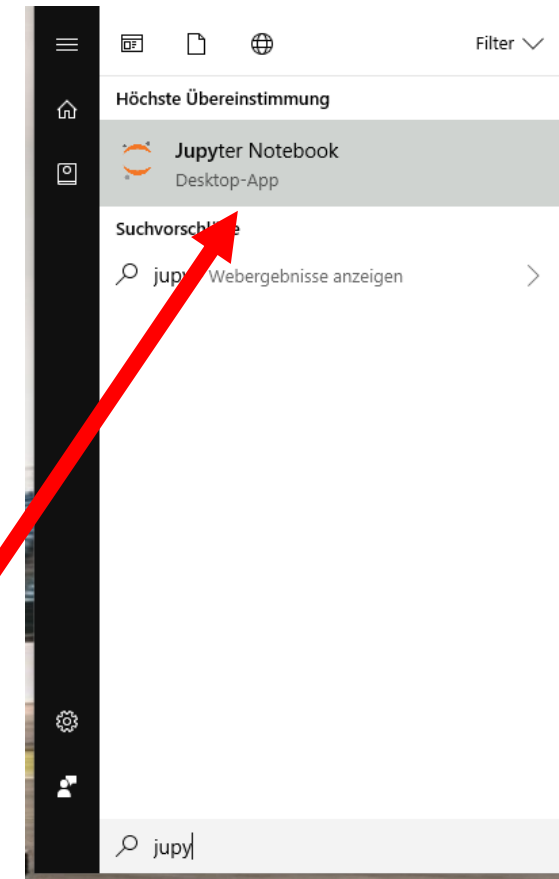
Tools - Jupyter Notebook

- Lightweight tool to develop python code
- Creates so called ‚Notebooks‘, which store
 - Code
 - Results
 - Plots
 - Documentation in Markdown
- Ideal for small to medium sized projects, especially student thesis
- Can be downloaded and installed via the tutorial:
 - <http://jupyter.org/install>
- Docs are available here: <https://jupyter-notebook.readthedocs.io/en/stable/>
- **There will be example code for the homework available via jupyter notebooks at moodle!**

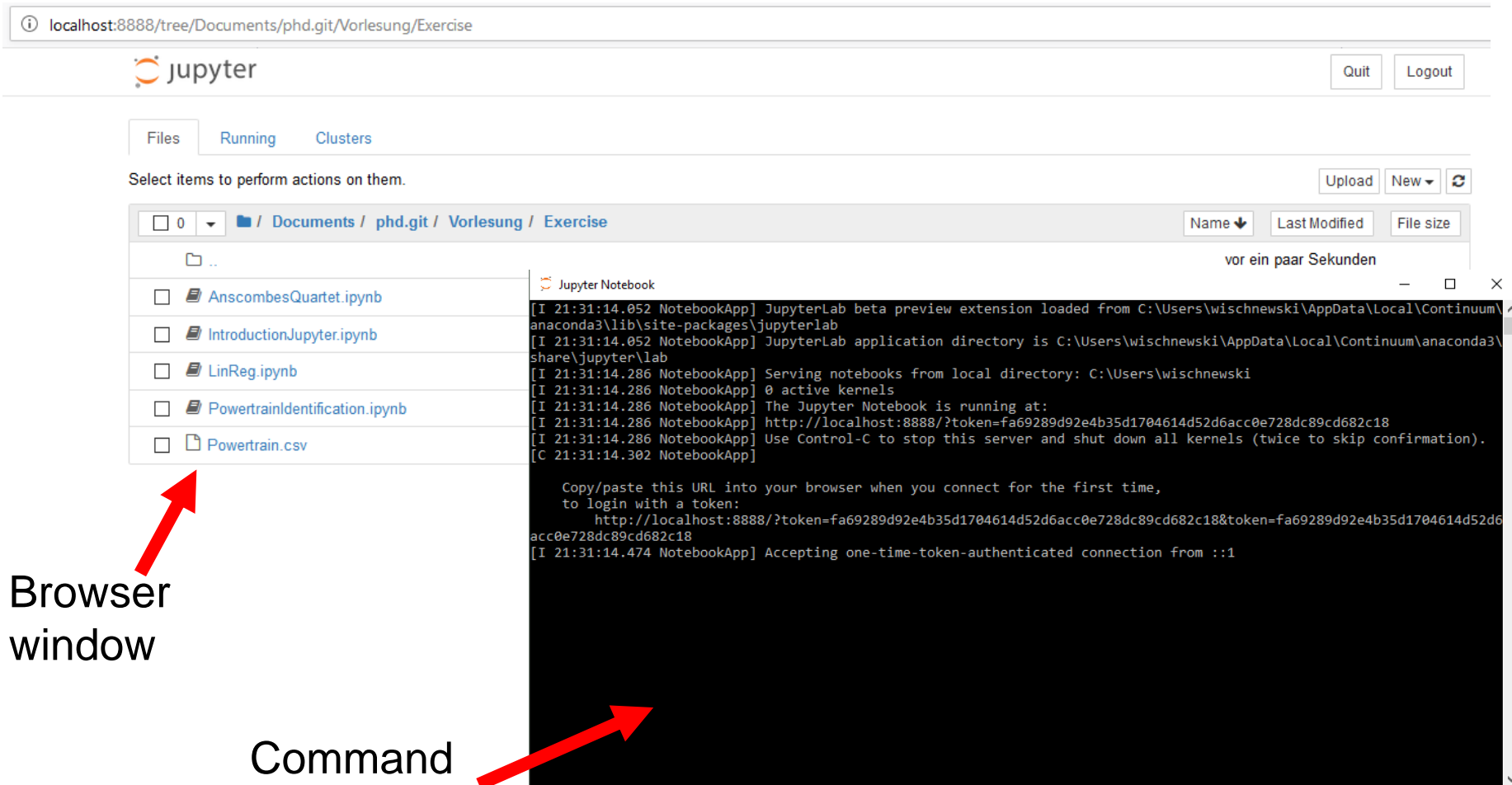


Tools - Use the jupyter notebooks

- Install Jupyter according to the tutorial <http://jupyter.org/install> using the **Anaconda Distribution for python3!**
- Download the Notebooks and Datasets from Moodle
- Create a new folder within your *Documents* folder
- Copy everything into this folder
- Start Jupyter Notebook by pressing the start button, type Jupyter and execute *Jupyter Notebook*
- This opens a **command prompt** and a **browser window**. Both have to stay open during your work!



Tools - Use the jupyter notebooks



localhost:8888/tree/Documents/phd.git/Vorlesung/Exercise

jupyter

Quit Logout

Files Running Clusters

Select items to perform actions on them.

Upload New ↺

0 / Documents / phd.git / Vorlesung / Exercise

Name Last Modified File size

..

AnscombesQuartet.ipynb

IntroductionJupyter.ipynb

LinReg.ipynb

PowertrainIdentification.ipynb

Powertrain.csv

Jupyter Notebook

```
[I 21:31:14.052 NotebookApp] JupyterLab beta preview extension loaded from C:\Users\wischnewski\AppData\Local\Continuum\anaconda3\lib\site-packages\jupyterlab
[I 21:31:14.052 NotebookApp] JupyterLab application directory is C:\Users\wischnewski\AppData\Local\Continuum\anaconda3\share\jupyter\lab
[I 21:31:14.286 NotebookApp] Serving notebooks from local directory: C:\Users\wischnewski
[I 21:31:14.286 NotebookApp] 0 active kernels
[I 21:31:14.286 NotebookApp] The Jupyter Notebook is running at:
[I 21:31:14.286 NotebookApp] http://localhost:8888/?token=fa69289d92e4b35d1704614d52d6acc0e728dc89cd682c18
[I 21:31:14.286 NotebookApp] Use Control-C to stop this server and shut down all kernels (twice to skip confirmation).
[C 21:31:14.302 NotebookApp]

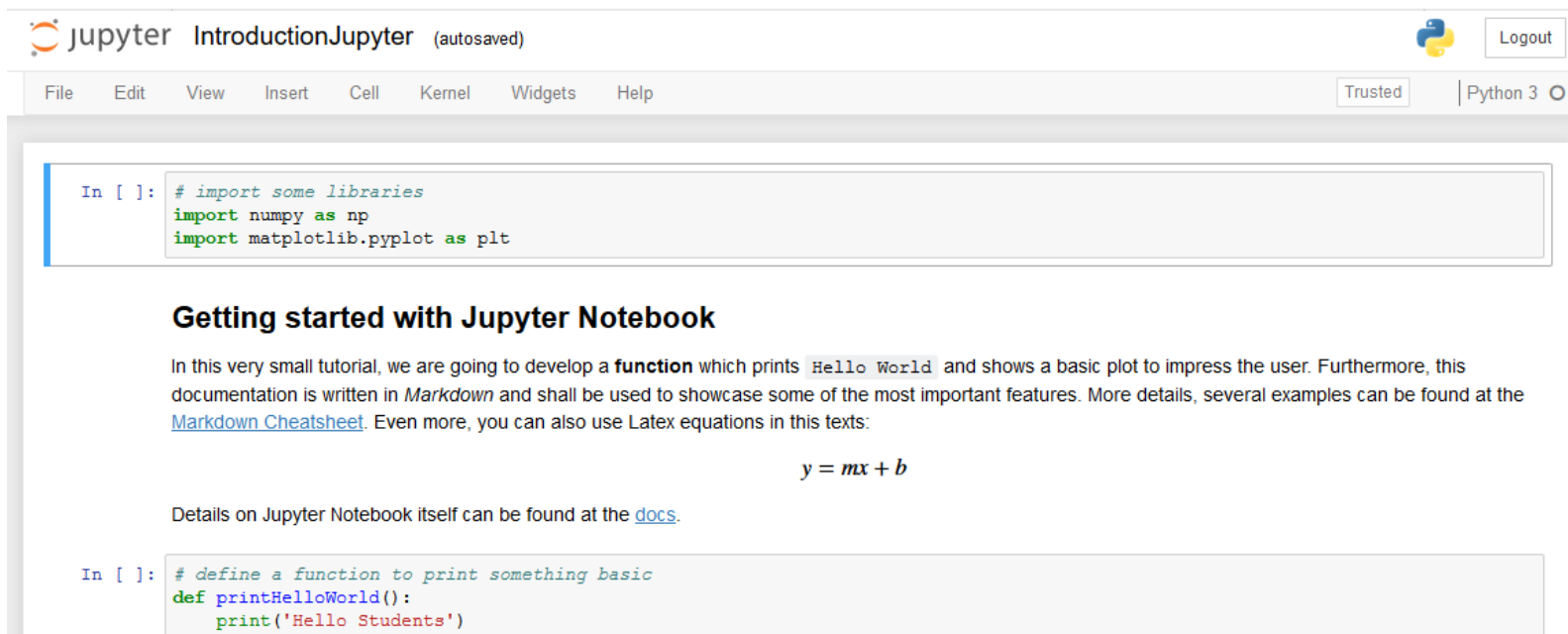
Copy/paste this URL into your browser when you connect for the first time,
to login with a token:
http://localhost:8888/?token=fa69289d92e4b35d1704614d52d6acc0e728dc89cd682c18&token=fa69289d92e4b35d1704614d52d6acc0e728dc89cd682c18
[I 21:31:14.474 NotebookApp] Accepting one-time-token-authenticated connection from ::1
```

Browser
window

Command
line prompt

Tools - Use the jupyter notebooks

- Open one of the notebooks by clicking on the name
- Run each cell separately by clicking into it and press *Strg+Enter* (Take care of the order! Things needed later have to be run first)
- Or run the whole notebook by clicking Kernel → Restart & Run all → Restart and Run all Cells



The screenshot shows a Jupyter Notebook interface. At the top, there's a header bar with the Jupyter logo, the text "jupyter IntroductionJupyter (autosaved)", a Python logo, and a "Logout" button. Below this is a menu bar with "File", "Edit", "View", "Insert", "Cell", "Kernel", "Widgets", and "Help". On the right of the menu bar, there are buttons for "Trusted" and "Python 3". The main area contains two cells. The first cell is a code cell with the following text:

```
In [ ]: # import some libraries
import numpy as np
import matplotlib.pyplot as plt
```

 The second cell is a markdown cell with the following content:

Getting started with Jupyter Notebook

In this very small tutorial, we are going to develop a **function** which prints `Hello World` and shows a basic plot to impress the user. Furthermore, this documentation is written in *Markdown* and shall be used to showcase some of the most important features. More details, several examples can be found at the [Markdown Cheatsheet](#). Even more, you can also use Latex equations in this texts:

$$y = mx + b$$

Details on Jupyter Notebook itself can be found at the [docs](#).

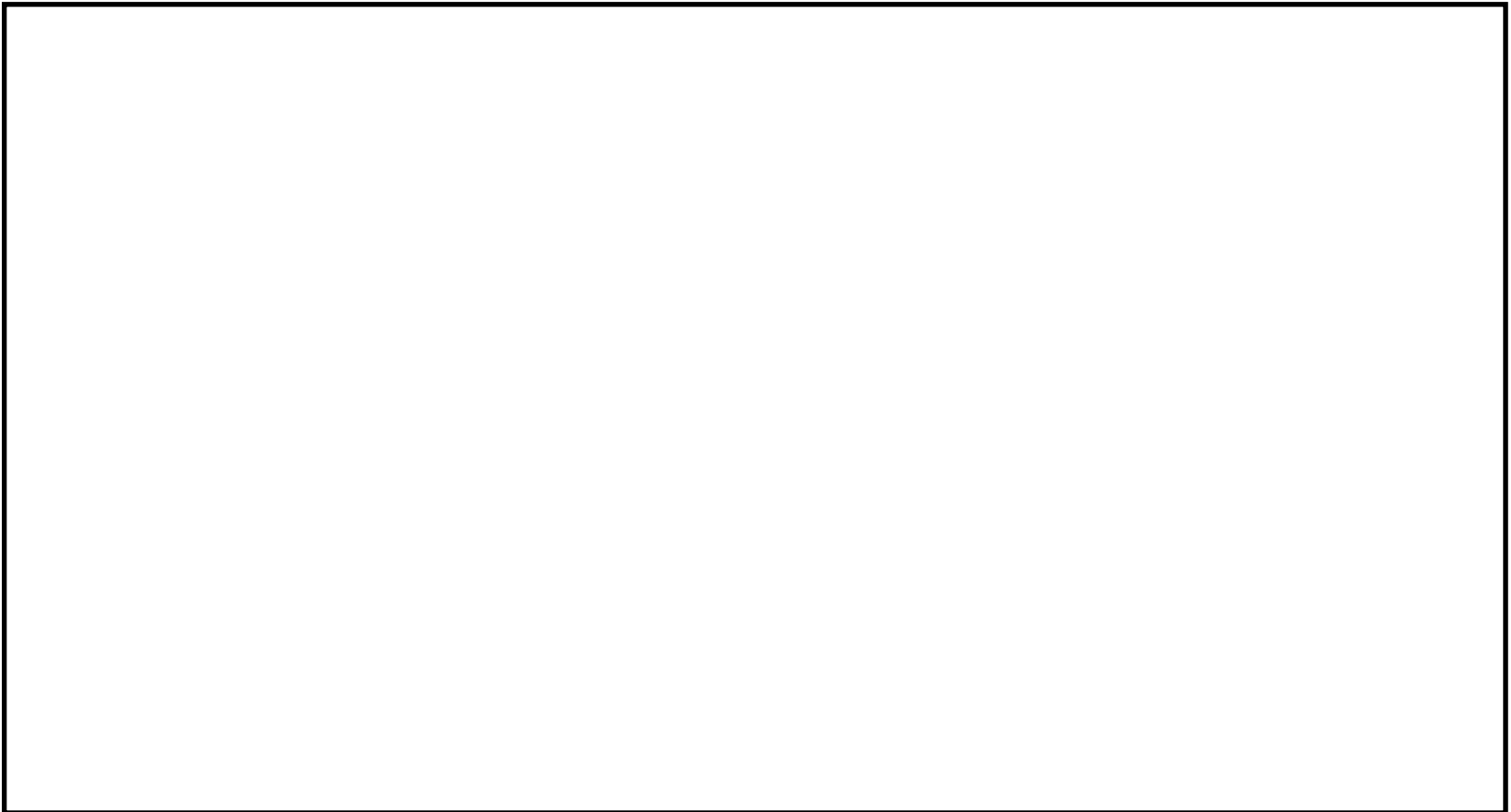
The third cell is another code cell with the following text:

```
In [ ]: # define a function to print something basic
def printHelloWorld():
    print('Hello Students')
```

Excercises

- Explanation

9. Discussion/ Improvements/ Questions



Evaluation

- In this lecture we are doing in regularly evaluation of each lecture
- We want **your** feedback for every **individual** lecture
- We evaluate the lecture each week
- We give feedback based on the evaluation the week after