HANDS-ON AI I

Jupyter and Packages for Hands-on AI I

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Copyright Statement

PYTHON

Python

- We will use **Python** as our programming language
- Download and install Python from https://www.python.org/downloads/ (version must be ≥ 3.9)

JUPYTER NOTEBOOK/JUPYTERLAB

Jupyter Notebook/JupyterLab

- We will use **Jupyter Notebook** (or the newer **JupyterLab**) for course materials and submissions
- Jupyter Notebook/JupyterLab is a browser-based application that allows for running and documenting Python code
  - Can be locally saved as file
  - Is structured in **cells**
  - Is displayed via your browser (no internet required)
  - Attaches to your local Python installation
- When a cell is executed, the code in the cell is executed and the results (variables) are stored
- You can execute cells individually
- To clear the currently stored variables, you can reset the **kernel**

Jupyter Notebook/JupyterLab – Installation

- You can try out a notebook without installation here: https://jupyter.org/try-jupyter/lab?path=notebooks%2FIntro.ipynb
- Installation can be done via `pip` (https://jupyter.org/install.html): `pip install jupyterlab` (includes Notebook)
- More information: https://jupyter.org/

Jupyter Notebook/JupyterLab – Running a Notebook

- You can start Jupyter Notebook from the terminal/command line via:

  `jupyter notebook`
- Same for JupyterLab:

  `jupyter lab`
- Select a file and follow the instructions after starting Jupyter Notebook/JupyterLab

PACKAGES

matplotlib

- **matplotlib** provides a vast variety of plotting tools in Python
- Its submodule **pyplot** provides the simpler plotting functionalities
- Different backends for plotting (colors and designs might differ slightly between versions/OS)
- Lots of functionalities, details can be tricky
- Installation via pip (`https://matplotlib.org/stable/users/installing/index.html`):

  ```
  pip install matplotlib
  ```
- More information: `https://matplotlib.org/`

pandas

- **pandas** is the go-to library for handling tabular data
- Huge functionality and very powerful, details can be tricky
- Installation via pip (https://pandas.pydata.org/docs/getting_started/install.html):

  ```
  pip install pandas
  ```
- More information: https://pandas.pydata.org/

sklearn

- scikit-learn (**sklearn**) provides simple and efficient tools for ML, data mining and data analysis
- Built on NumPy, SciPy and matplotlib
- Installation via pip (https://scikit-learn.org/stable/install.html):

  ```
  pip install scikit-learn
  ```
- More information: https://scikit-learn.org/

seaborn

- **seaborn** is a visualization library that offers a variety of useful tools and ready-to-use plotting functions
- Built on matplotlib
- Installation via pip (https://seaborn.pydata.org/installing.html):

```
pip install seaborn
```

- More information: https://seaborn.pydata.org/

PyTorch

- **PyTorch** is a powerful machine learning framework for Python
- It will be our go-to framework when building and running our neural network models
- The installation depends on your hardware (GPUs are supported). Follow the instructions detailed here: https://pytorch.org/get-started/locally/
- More information: https://pytorch.org/