Exercise guide

1. Introduction

The exercise sheets will be written in the form of Jupyter Notebooks and handed out as .ipynb files. The Jupyter Notebook interface is a web application for authoring documents that combine live-code with narrative text, equations and visualizations, well suited for solving and presenting problems of the following exercises.

2. Install Python and Conda (once)

Python is an interpreted, high-level programming language that is most common in data science and machine learning. You will use Python in all exercises to answer the problems and hand in your solutions. There are different ways to work with Python, including editors, web-based notebooks like Jupyter or integrated development environments (IDEs) like PyCharm or Spyder. What you want to use is up to you. However, since the solutions have to be prepared as Jupyter Notebooks, we give a short installation tutorial for Jupyter. First, you have to download and install the package manager Conda. The fastest (and recommended) way to obtain Conda is to install Miniconda. Miniconda is available for common operating systems such as Windows, Mac OS and many Linux distributions. Optionally, if you want, you could alternatively install the much larger Anaconda which additionally includes over 7500 open-source packages.

As a next step you have to generate a virtual environment to which additional packages can be installed. To set up your conda environment, download the `environment.yml` file we provided on Ilias in the download folder (unzip it first) and run the following commands (in the terminal in Linux and Mac, or the Conda Prompt in Windows, which you can find in the start-menu under e.g. Anaconda3 (64-bit)). You have to navigate in the terminal to the downloaded `environment.yml` file or supply a full path `<path>/environment.yml` in the command `conda env create -f environment.yml`.

```
# create the conda environment
conda env create -f environment.yml

# add nbgrader extensions needed to validate your results locally
conda run -n aimat jupyter nbextension install --sys-prefix --py nbgrader
--overwrite
conda run -n aimat jupyter nbextension enable --sys-prefix --py nbgrader
conda run -n aimat jupyter serverextension enable --sys-prefix --py
nbgrader
```

3. Activate the Conda environment and work on the exercise (every week)

Download the Jupyter Notebook (.ipynb) file from Ilias and place it in a directory of your choice.

```
# activate the conda environment. Otherwise your previously installed
# packages won't be accessible
conda activate aimat
```

You can start your Jupyter Notebook by running the following command from the directory where you downloaded the exercise notebook:

```
jupyter notebook Exercise01.ipynb
```

You can then access the exercise sheet in your browser (if it does not open automatically, copy and paste the link that appears in your terminal to the browser).

4. Submission of the results (every week)

Validate your solution: Assignment notebooks have inline tests (they are special cells in blue with assert statements and must not be changed) which allow you to validate your submission locally prior to submission. These tests are not part of the grading process and are there to give you an easy way to check whether your submission is working correctly on unseen data. Hence, passing the validation is not directly equivalent to receiving points during grading, but it is a necessary requirement, because code that does not pass the validation will also not pass the final grading.

Upload your solution: Once you have finished your solution, upload the .ipynb notebook to Ilias. Do **not** use the ZIP upload but **upload exactly one .ipynb file** which is the Jupyter Notebook containing your solution. **Do not change the file name** as `nbgrader` expects a particular structure. If you change the file's name, `nbgrader` will not be able to grade your submission. All exercise sheets will follow the same naming convention (Exercise01.ipynb to Exercise14.ipynb). You can upload your submission as many times as you want as long as in the end there is exactly one file uploaded (i.e., delete your older submissions). After the submission is closed (on Mondays), we will download all solutions, grade them, and tell you your grades on Ilias.