Data Analytics – Exercises

(Week 12)

In these exercises, you will learn:

- how to run and share a Jupyter notebook on Google Colab
- how to use Python and flask to run a simple web application
- how to use plotly and Dash to run a simple web application
- how to create your own simple web app with Python and flask

In the data analytics process model, these exercises cover part of the step "Presenting and Sharing Results" (see figure 1). Results of the exercises must be uploaded as separate files (**no .zip files!**) by each student on Moodle. Details on how to submit the results can be found in the tasks below.

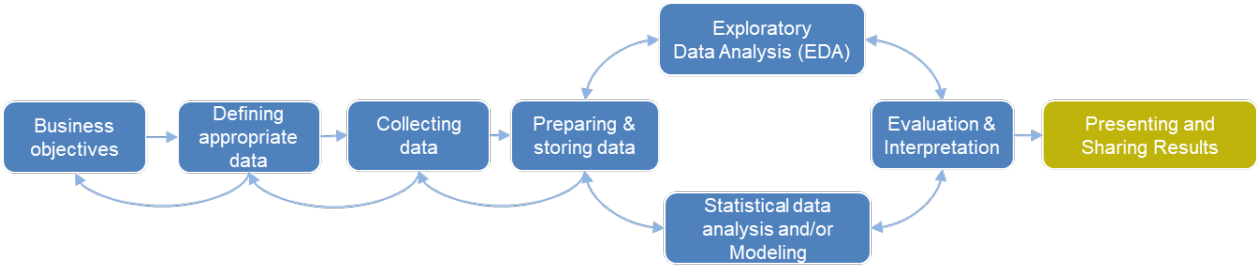

Figure 1: Data analytics process model (see slides of week 01)

Task 1

In this exercise, you will learn to run and share a Jupyter notebook on Google Colab. The tasks are:

a) Create a Google account (or use your existing Google account).
b) Navigate to the Google Colab webpage https://colab.research.google.com.
c) If only available in German, change the language to English.
   (Google Colab -> Main Menu -> Hilfe -> Auf Englisch ansehen)
d) Upload the Jupyter notebook with the titanic example from week 09.
   (Google Colab -> Main Menu -> File -> Upload Notebook)
e) Upload the two files 'titanic.csv' and 'img.jpg' from week 09 (see Figure 1 below).
   (Google Colab -> Left sided Menu -> Folder Symbol -> Upload to session storage)

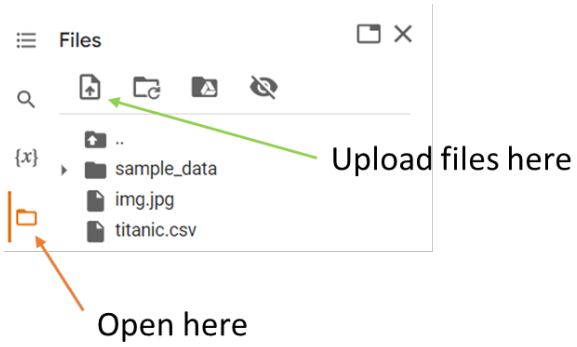

Figure 1: Upload files on Google Colab

f) Run the 'titanic' Jupyter notebook on Google Colab.
(Google Colab -> Main Menu -> Runtime -> Run all)
g) Create a Shared-Link to the Google Colab Jupyter notebook and save it.
(Google Colab -> Upper Right Menu -> Share)

To be submitted on Moodle:

- The Shared-Link (URL) to your 'titanic' Jupyter notebook on Google Colab.

Task 2

In this exercise, you will learn to use Python and flask to run web applications to create graphics and deploy a simple Machine-Learning (ML) model. In addition, you will learn how plotly and Dash can be used to create a simple web application showing interactive graphics.

The tasks are:

a) On GitHub Codespaces, open a terminal. Note that you don't need a Jupyter notebook for the following exercises.
b) In the following folders (provided on GitHub) you can find README.txt – files with short instructions how to run the flask and plotly/Dash web applications. Use the terminal to run the web applications in the following order:

1. flask_simple_application
2. flask_matplotlib_example
3. flask_iris_model_example
4. flask_dash_example

Note that CTRL + C in the terminal stops the web service.

c) Create screenshots of each web application running in your web browser.

To be submitted on Moodle:

- A screenshot of the 1st web application named 'flask_simple_application.png'
- A screenshot of the 2nd web application named 'flask_matplotlib_example.png'
- A screenshot of the 3rd web application named 'flask_iris_model_example.png'
- A screenshot of the 4th web application named 'flask_dash_example.png'

Task 3

In this exercise, you will learn to create your own web application with Python and flask.

The tasks are:

a) Create the following folder structure in your repository:

```
project_folder/
    app.py
    templates/
        upload.html
    uploads/my_image.jpeg
```

b) Copy the files 'app.py' and 'upload.html' (provided on GitHub) to the respective folders.

c) Search for a .jpeg file (e.g. from Google image search) and copy it to the uploads folder.

d) Run the web app by typing the following code in the terminal window:

```
python app.py
```

e) Upload the .jpeg image

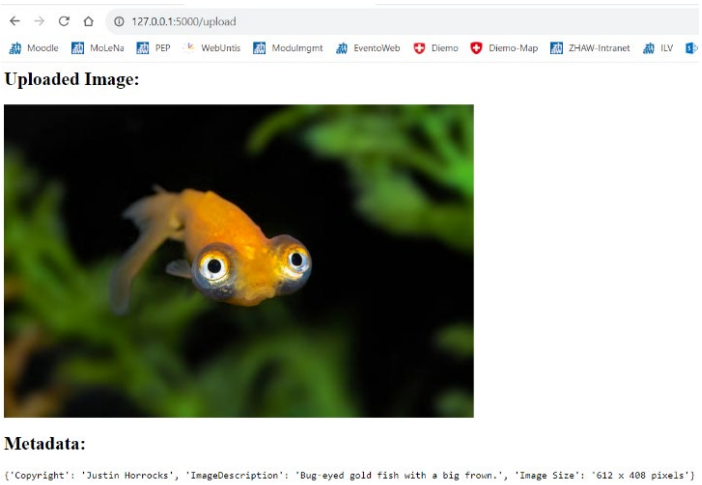

Figure 2: Web app with uploaded image and metadata (example)

To be submitted on Moodle:

- A screenshot of your app running in a web browser with an uploaded image.