AiAp 2022 Graded Miniproject 2: Tools & Libraries

Your AI-Applications grade will be composed of 3 grades:

- 15% weight: Miniproj 1
- **35% weight: Miniproj 2**
- 50% weight: written Exam

This document specifies miniproject 2.

1. Important Dates:

Start: Monday, May 2nd 2022
Deadline: Thursday, June 2nd 2022 (upload your report before 23:59)

2. Teamwork!

Work in teams of two people. Larger teams are not allowed. Working alone is possible but not recommended! Both team members will get the same grade.

3. Description of the Miniproject 2

In this miniproject you **explore a machine learning tool or library of your choice**. The goal is to get familiar with the tool, use it for a minimal demo, and describe it in a report that can be shared with your colleagues. You will have to give a short presentation about the tool/library.

3.1. Tasks

a) Find an interesting tool or library on the internet.
Below is a list of possible projects.
Note: I did not test all examples. Make sure the tool you choose can be used with a free evaluation plan. Furthermore, do not evaluate a stand-alone product, but something you can integrate as a component into your own project (for example, the Neural-Filters in Photoshop are not a suitable choice). I highly recommend to spend some time on the internet and find something you are interested in. If you have a doubt whether your choice is eligible, send me an email.

- Visualization Toolkit: Tensorboard
  https://www.tensorflow.org/tensorboard
  https://neptune.ai/blog/tensorboard-tutorial
- Reinforcement Learning: RLlib
  https://docs.ray.io/en/master/rllib/index.html
- Stable Baselines Reinforcement Learning:
  https://stable-baselines.readthedocs.io/en/master/guide/examples.html
- OpenAI GTP3
  https://beta.openai.com/overview
  https://beta.openai.com/examples
- ML Ops: Weight & Biases
  https://wandb.ai/site

- Audio Transcription with Google Magenta
  https://magenta.tensorflow.org/demos/colab/
  https://colab.research.google.com/github/magenta/mt3/blob/main/mt3/colab/music_transcription_with_transformers.ipynb

- Piano Music generation with Google Magenta
  https://magenta.tensorflow.org/piano-transformer

- Image Style Transfer
  https://www.tensorflow.org/tutorials/generative/style_transfer
  https://towardsdatascience.com/fast-neural-style-transfer-in-5-minutes-with-tensorflow-hub-magenta-110b60431dcc

- NLP:
  https://www.nltk.org
  https://monkeylearn.com/api/v3/#introduction

b) Download and install/integrate the tool.
c) Use the tool/library for a **minimal working example.** Many libraries have a "getting started" or "QuickStart" guide. Use it, if possible.
d) "Play around" with your tool. Try a few features. Maybe you have a simple use-case in mind. Try to implement it.
e) Document your experiences. One possibility is to write the report **in the style of a review**. Do not just copy the installation instructions. Here are some questions to address in your report:
   - What is the tool/library used for? What are the possible applications?
   - How difficult is it to get started? Is the installation straight forward or tricky?
   - What is the cost plan for commercial use?
   - Is the component a niche-product or has it a broad community.
   - Include a code snippet only if it demonstrates something interesting (e.g. only two lines of code to solve this or that)
   - What are your conclusions? Ask yourself: would you like to use the tool in a semester or bachelor project? Describe what kind of project idea that would be?
   - Anything else you find worth mentioning.

3.2. Deliverables

- **Report (PDF)**: Describe your experiences in a 3 to 5 pages (including a title page) report.
- Do NOT upload any other files (No data, no code).

4. How to submit your miniproject

There will be an assignment called "Project 2, Submission" on Moodle. If you work in a team, both team members will have to upload the same PDF.

5. Grading

Grading will be based on your **report** (PDF) and a short **presentation** (8 to max 10 minutes) followed by a **Q&A** (5 min).
The presentation will be held during the last week of the semester (Tuesday June 7th to Friday June 10th). A few time-slots are available one week earlier/later.
Note: The Q&A can include questions about Miniproject 1.

For a grade 4, the minimal requirements are:

- Download and install a tool/library of your choice.

- Implement a minimal working example (some tools come with a "getting started" example. That's sufficient).
- Describe and discuss the tool and your minimal working example
- Hand in your report in time.
- Present your evaluation.

To get a grade 5 to 6, add some interesting extras.
Suggestions (not all work for all tools):

- Play around with the tool, show something beyond the "Hello World" example.
- Integrate the library into your own demo-application.
- Discuss possible use-cases (without implementing)
- Try to find evaluations on the internet. What do people on (for example) reddit say?
- ...

6. Manage your resources!

This project is worth 35% of your final grade. Manage your resources accordingly.
The specification quite open which carries a certain risk of investing too much time. Do not hesitate to describe your ideas/progress on the forum and get a feedback whether you are on track. You can also ask me during the exercise sessions.
You don't have to do a deep dive, nor to implement something very complex, nor to write a lengthy report!

7. Respect the deadline

If you do not hand-in a PDF report by the deadline, or if you do not show up for the presentation, we have to give you a grade 1.0. If you are unable to meet the deadline for important reason (illness, military service, etc.), the deadline can be discussed. Contact us as early as possible!