Artificial Intelligence — Lab Sessions 3-8

ESIR – Université Rennes

2023–2024

The goal for this second lab session is to learn familiarize with the use of transformers.

consist of all the materials that you learned, experiments along with the insights. While we expect you to submit the final report after the last practical session, you should start editing the document from the first session on. Your final evaluation will be based on your gitlab (see Exercise 0 from session 1-2) repository and on your report.

Exercise 1 : Explorer the transformers with Keras

You can find the implementation of a transformer block with keras here :
https://github.com/keras-team/keras-io/blob/master/examples/nlp/text_classification_with_transformer.py

- Familiarize yourself with the code.
- Execute the small example and adapt it to realise the same classification task of TP12, on the Ohsumed dataset.
- Compare the performance to LSTM-based classifier. Analyse systematically the impact of changing the hyperparameters (e.g. nr of attention heads, size of embeddings, etc.). The impact can be positive (e.g. improvement in accuracy) or negative (e.g. increase of training time, size, etc.)

Exercise 2 : Explore the Huggingface transformers library

A very powerful library for using the transformers, together with a number of pretrained models is available at Huggingface. For an overview see
https://github.com/huggingface/notebooks/blob/main/transformers_doc/en/quicktour.ipynb

- Familiarize yourself with the code.
- Prepare a small notebook to explore some potential uses of the API.

Exercise 3 : Mini-project

Design your own project.

- The rest of the lab sessions is for a mini-project. The mini-project should demonstrate use a the transformers library and pretrained language models. You can develop your own creative ways to use these tools (e.g. text generation, sentiment analysis, text classification etc.).
- You can use any code written by tiers, you are even encouraged to do so. However you should explicitly give all sources (in your rapport). Also, if you use your own code written in other context (internship, other projects, etc.), you should clearly explain this in your rapport.
- We do not limit you in the use of technologies. Also, you can use any dataset (as long as you do not violate any copyright restrictions).
- You should have a working demo at the end of the semester.

— Also, you should evaluate the bias present in the task realized in the project. For this you should chose an appropriate metrics and design an evaluation strategy. Present the results in your report.
— You should be able to demonstrate it at the end of the semester (no excuses of the type “I need a special GPU/TPU to run my demo”).