

# Assignment 2: Which is the best-fitting word?

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## 1 Instructions

### DEADLINE

Sunday January 8th, 2023, 23:59

### 1.1 Submission instructions

- you can do this assignment either alone or in group (at most 3 students)
- please submit no more than *one submission* per group
- alongside your code, please submit a *short report* (in .pdf), containing a written description of what you have done, including used methods, results, discussion, conclusions and eventual references
- indicatively, the report should not exceed 3 pages of text (images and tables don't count towards this limit)
- in case of multiple source code files please summarize the content of each .py/.ipynb file in the report
- put both the source code and the report in a .zip file named after your student id: "idstudent.zip" for individual works and "idstudent1\_idstudent2\_idstudent3.zip" for group works (e.g. "012345\_678901.zip" or "012345\_678901\_124311.zip")
- the .zip file must be uploaded to the appropriate folder of the e-Learning page of this course no later than the specified deadline
- any submission that will be submitted after the deadline won't be evaluated.

### 1.2 Source code instructions

- be sure to write your code in Python 3
- you can use the libraries seen in class (pandas, sklearn, numpy, matplotlib...). If you choose to use additional libraries, please mention them in the report and explain why you chose them. The only **constraint** is to use PyTorch (not TensorFlow, Keras, or other alternatives) for the construction and training of the model.
- please comment your code. The code can be presented as either a .py (python source code) or a .ipynb (Jupyter Notebook) file
- if you have more than one source code file please name them so that it is easy to understand what's inside each file and which file contains the code to run your work
- alongside your code, please submit a *requirements.txt* file which specifies the versions of the used libraries (you can use pipreqs <https://github.com/bndr/pipreqs> to automatically create a minimal clean requirements file). Alternatively, make sure that the code can be run on Google Colaboratory.

## 2 Assignment

In this assignment, you will get familiarized with texts, and you will develop a solution for a well-known task in NLP: a cloze test with multiple-choice answers, based on pronoun disambiguation.

Given a dataset of sentences, you will need to implement a model to predict which of the two given words is the best fitting for that sentence.

You will analyze the role and effect of different architectures and parameters of your model, and report the correct evaluation metrics and observations in a report.

In a nutshell, you have to:

- download the dataset on which you will perform your experiments from the e-learning page of the course. The dataset consists of two parts: train and test. Use the training samples to train your model (part of it can be used as a validation set), and the test set to test it and reports its performance
- there exist different ways to tackle this problem so you can try different strategies
- you have to design the architecture of your model. You can use whatever you want, either models built from scratch or pre-trained models (e.g. BERT). If you opt for this last category, we suggest you to use HuggingFace. Please, justify your choice in the report
- you need to select a loss function, and an optimization module, along with a learning rate
- train and test your model using the usual pipeline we have seen during the practical lessons. Please try different architectures and parameters and then, based on the performed experiments, select a final model. **The decisions made and the rationale behind them will be explained in the report.** Please add diagrams of the architectures you designed for this task (we suggest using tools like draw.io for this)
- to measure the performance of the model on the test data. Use the most suitable metric to evaluate your model
- in any case, display some relevant results of correct and/or incorrect predictions
- **formulate your critical reflections about the performed experiment and the lessons learnt.**

Remember: the goal is *not* to achieve state-of-the-art results but to learn how to deal with texts in the Deep Learning world.

**Good luck!**

### 2.1 Contacts

For any problem or doubt about the assignment, you can contact us. Our emails are:

- [scaboro.simone@spes.uniud.it](mailto:scaboro.simone@spes.uniud.it)
- [portelli.beatrice@spes.uniud.it](mailto:portelli.beatrice@spes.uniud.it)