

Artificial Intelligence — Lab Sessions 3-4

Project

ESIR – Université Rennes

2023–2024

The goal of these sessions is to reuse the technique to mitigate overfitting and underfitting you have seen in the previous lab to build your own AI project.

1 Build your own project !

1.1 Part 1 : Choose your project and build a baseline

In this project, you will choose yourself the task you will work on. Feel free to explore different task types (classification, regression, forecasting, etc.) and data types (images, texts, audio, tabular data, etc.). Before diving into the code, you should select your task and validate it with your supervisor.

When your task is validated, you will have to choose the model to train. It can be an RNN or transformer model from scratch like in the previous lab or a pre-trained model (that can be found on [huggingFace](#) for instance) and fine-tune it. Remember that in both cases, you will have to evaluate your model and demonstrate how your model performs on the chosen task.

LLM Warning

If you want to use LLM, remember that they are extremely hardware-consuming. They can be very complicated to run and even more complicated to train.

Once your model is selected, you will have to find data. Many strategies are possible, think about your data engineering class last year. The data pipeline, including data collection and data processing, is very important in a machine learning project and will be part of your evaluation, so do not neglect it !

With a selected model and data, you can train the model to build a baseline. The baseline is built by training a simple model with your data if you build your own model, or by evaluating your pre-trained model with your data if you choose to go with this option. In both cases, you will have to set up an evaluation protocol to demonstrate how your model is performing and compare it later with your optimized model.

1.2 Part2 : Optimization time !

Most of you will see that their models do not perform well, it is not ready for production at all. That is why you should optimize it and find the best possible model for your task with your data.

To accomplish that, you will have to find the best hyperparameters : you can focus on the architecture, the optimizer, the learning rate, etc.

The model training phase can be implemented in many ways, you can build a model from scratch like in the previous lab and use a grid search strategy, genetic algorithms, or any optimization algorithm you know to find the best model.

Hyperparameters in fine-tuning

During fine-tuning, your model is already trained, you cannot touch the architecture. Therefore, you still have hyperparameters options like the learning rate, the batch size, or the optimizer ; be aware that fine-tuning is not just about training the model with your new data.

2 Organization and evaluation

For this project, you will work with [ISTIC GitLab2](#), your project will be located in the IA-ESIR3-2024 group. Once your task is validated, you will get a repository on this namespace.

At the end of the semester, you will be evaluated with an oral presentation and a report. The oral presentation should explain your “journey” and showcase a working demo (no excuses like “I need a specific GPU”). The report should explain each step you have done on the project, the problems you encountered, and how you solved them (or why you were not able to solve them).

Your working process on the GitLab will be evaluated too, your file organization, your commit workflow, etc. Each member of a biome should participate.