

# ASSIGNMENT 3: TRAIN YOUR OWN LLMs

**Xidong Wang, Juhao Liang, Shunian Chen, Benyou Wang\***

The teaching team of Large Language Models, the Chinese University of Hong Kong, Shenzhen  
Shenzhen, China

xidongwang1@link.cuhk.edu.cn, wangbenyou@cuhk.edu.cn

## 1 INTRODUCTION

Since the introduction of OpenAI’s ChatGPT series, the field of large-scale language models (LLMs) has gained significant attention. Within this realm of research, there remain numerous unexplored avenues related to the fine-tuning of these models. We encourage you to leverage this assignment to delve into topics that intrigue you within the scope of LLM research.

In our previous lectures, we have introduced the common recipe of training your own LLM from scratch. This assignment builds upon that knowledge and focuses on fine-tuning an existing pre-trained LLM and evaluating its performance on a downstream task. You are encouraged to exercise creativity and adapt the training process to engage in interesting explorations, especially during the instruction fine-tuning process.

## 2 TASK DESCRIPTION

### OVERVIEW

1. Select a downstream task and collect the relevant training data.
2. Fine-tune a pre-trained large language model for the chosen downstream task.
3. Evaluate the performance of the trained model using a suitable metric, comparing it with baseline models.
4. Complete an experimental report along with the implementation code for the assignment.

In this assignment, you are expected to submit a report and accompanying code, and the specific guidelines for submission are detailed in Section 3.

### 2.1 DOWNSTREAM TASKS

You can pick a research topic concerning the fine-tuning of LLMs above six training tasks. The given tasks are across two languages and three domains, as presented in Table 1. While we provide predefined research topics for inspiration, you also have the freedom to choose your own research topic if you have a specific interest.

Language	Domain	Dataset Description	Huggingface Dataset Link
English	Law	Legal instructions dataset	Lawyer-Instruct
	Medical	Medical QA dataset	MedQuad-MedicalQnADataset
	Financial	Financial QA dataset	finance-alpaca
Chinese	Law	Chinese legal dataset	DISC-Law-SFT
	Medical	Chinese medical dialogue dataset	Huatuo26M-Lite
	Financial	Chinese financial evaluation dataset	FinGPT-fineval

Table 1: Examples of language Model training tasks.

---

\*Benyou Wang is the instructor.

## 2.2 CODE IMPLEMENTATION

You have the flexibility to conduct your experiments on a platform of your choice. Regardless of your selection, the final submission for this assignment should be in the form of a python code.

- **Local:** If you have access to local GPU resources available, you can choose to run the experiment locally.
- **Colab<sup>1</sup>:** You can run your experiments on Google Colab, which provides a T4 GPU for free computing.

Tutorial 5<sup>2</sup> contains code explanations and resource to help you complete the task better.

What you should pay attention is like:

1. **Data Engineering:** The quality of your training data significantly impacts your model's performance. Consider exploring different data engineering techniques to generate high-quality training data. You can use various methods, including leveraging tools like Chat-GPT, DeepSeek, or other accessible LLMs.
2. **Backbone Model Selection:** Choosing a suitable backbone model can provide a robust foundation for your training process. While the provided notebook suggests a baseline approach using a 7B Qwen model, we encourage you to exercise your creativity, experiment with a variety of models, and compare their performance in the context of specific tasks to gain valuable insights.
3. **Training Techniques:** While the provided baseline notebook utilizes the QLoRA technique for training the 7B model, you have the freedom to explore alternative training methodologies beyond QLoRA. Conducting experiments with various approaches can yield valuable insights and potentially improve the performance of your model.

## 2.3 EVALUATION

You can choose a popular benchmark of the multiple-choice question type to evaluate your LLM, or you can use AI as the evaluator using the techniques you learned in Assignment 2.

## 3 SUBMISSION FORMAT

In your submission, you are expected to provide a experiment report that with the following section

- **Research Topic:** Clearly state the research topic you have chosen to investigate.
- **Experiment design:** Describe the design of your experiments, including the methodology and approach you employed.
- **Code implementation:** Present your code implementation, demonstrating how you translated your ideas into code.
- **Result analysis:** Collect and present the results obtained from your experiments, along with an analysis of the insights gained.
- **Conclusion:** Conclude your report by summarizing the key findings and outcomes of your research.

**Template** Please refer to Link <sup>3</sup> for Assignment 3 Template.

---

<sup>1</sup>[https://colab.research.google.com/drive/1AP5kIzo\\_BKqfmmY8pl412kkNec8zkMoh?usp=sharing](https://colab.research.google.com/drive/1AP5kIzo_BKqfmmY8pl412kkNec8zkMoh?usp=sharing)

<sup>2</sup><https://docs.google.com/presentation/d/1v9p3N0Qn6g0LcaGeUjQwLRp-eqoy8ZPH/edit?usp=sharing&ouid=113331331728657385705&rtpof=true&sd=true>

<sup>3</sup><https://www.overleaf.com/read/ztbwbqgsnysw#19e80d>

## 4 GRADING CRITERIA

The grading for this assignment is based on the following criteria:

- **[25 marks]** Code Quality: Evaluation of the quality of your code.
- **[75 marks]** Report Quality: Among these 75 marks, 25 are allocated for the clarity of your report, 25 for the quality of your experimental results (completeness, experimental rigor, and technical innovation), and 25 for your experimental analysis, which includes case studies, sensitivity analysis of individual experiment components, ablation studies, and any other interesting discussions.
- **[5 mark Bonus]** This bonus mark is awarded if you tackle a significant task not listed in Section 2. We encourage innovative and meaningful endeavors, but the significance is subject to evaluation.
- **[5 mark Bonus]** An additional bonus mark is awarded for exceptionally clean and clear code. This bonus may not be granted if you attach your code as supplementary materials. Code clarity is crucial for this bonus.

## 5 LAST TIP

Please do not submit too looooooog reports. Be concise and say something that matters.

## ACKNOWLEDGMENT

Please acknowledge this course if you publish any materials based on this assignment.