

LoRA Fine-Tuning Results Report

1. Model Used

We used the **Google/flan-t5-small** model — a lightweight, instruction-tuned version of T5. It is well-suited for sequence-to-sequence tasks and ideal for few-shot or parameter-efficient fine-tuning like LoRA.

Here is the notebook used: [🔗 NLP group activity.ipynb](#)

2. Dataset Used

We simulated instruction tuning using the publicly available **Stanford Alpaca Dataset**, which contains **52,000 instruction-output pairs** generated using OpenAI's **text-davinci-003**.

- **Dataset Source:** [yahma/alpaca-cleaned](#)

This is a cleaned version of the Stanford Alpaca dataset, consisting of **52,000 instruction-output pairs** in a structured JSON format, suitable for supervised fine-tuning and LoRA-based instruction-tuned models.

This dataset is widely used for fine-tuning and evaluating instruction-following language models.

3. LoRA Configuration

We used the **PEFT** library with the following LoRA configuration:

- **Base Model:** **google/flan-t5-small**
- **LoRA Rank (**r**):** 8

- **LoRA Alpha:** 16
- **Dropout:** 0.1
- **Task Type:** SEQ_2_SEQ_LM
- **Target Modules:** q, v in T5 blocks

Training was done using the `transformers` + `peft` + `trl` stack.
Adapter checkpoints were saved locally in the `lora-model` directory.

4. Sample Inputs & Model Outputs

After loading the fine-tuned LoRA adapter and merging with the base model, the following prompts were tested:

Prompt	Generated Response
What is the function of the Price Control Department?	The Price Control Department monitors and regulates prices of essential commodities to protect consumers from unfair pricing.
Explain why essential commodities are regulated by the government.	To ensure affordability and availability for the general public, especially during inflation or supply disruptions.
What are the benefits of price monitoring for citizens?	Citizens benefit from price stability, protection from hoarding, and transparency in the market.
Describe the goals of commodity management policies.	Commodity management policies aim to ensure food security, control inflation, and maintain equitable distribution.
How can data analytics help in price control?	Data analytics enables real-time monitoring, trend analysis, and predictive insights for better price regulation.

5. Challenges Faced

- **Dataset Preparation:** Formatting the dataset in proper instruction format was time-consuming.
- **Model Loading Error:** Faced `adapter_config.json` errors when specifying incorrect LoRA path.
- **Colab GPU Limits:** Slower training due to Colab's limited compute time.
- **Exporting Results:** CSV download in Colab required use of `files.download()`

Attachments

- [responses.csv](#): Includes all prompts and generated outputs.

Summary

In this project, I fine-tuned the `google/flan-t5-small` model using the LoRA (Low-Rank Adaptation) technique on a simulated instruction-following task. Although I used the publicly available **Yahma/alpaca-cleaned** dataset—which contains 52k general-purpose instructions—I evaluated the model on custom prompts relevant to the Price Control & Commodities Management Department (PCCMD) to simulate domain-specific application. This approach demonstrated how instruction-tuned models, even when trained on general datasets, can be directed to generate useful outputs for specialized domains through careful prompt engineering. Despite constraints such as limited computational resources and the absence of direct PCCMD datasets, the project effectively showcased the potential of lightweight fine-tuning using LoRA for public policy applications.