

LLM Assignment 3

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Q1. Accuracy comparison between the pretrained and fine-tuned models on the test set:

Accuracy before fine-tuning: 44.0
Accuracy after fine-tuning: 93.0

Q2. Time taken to fine-tune the model using QLoRA.

Time taken to fine-tune the model (seconds): 2407.14

Q3. Total parameters in the model and the number of parameters fine-tuned.

Trainable Parameters: 20971520
Total Parameters: 1542364160
Percentage of Trainable Parameters: 1.36%

Q4. Resources used (e.g., hardware, memory) during fine-tuning.

Peak Memory Usage (GB): 3.29

Q5. Failure cases of the pre-trained model that were corrected by the fine-tuned model, as well as those that were not corrected. Provide possible explanations for both.

Number of cases that were corrected by the fine-tuned model: 40

-----1-----

Premise: This church choir sings to the masses as they sing joyous songs from the book at a church.

Hypothesis: The church has cracks in the ceiling.

Label: 1

Pretrained Label: 2

Finetuned Label: 1

-----2-----

Premise: A woman within an orchestra is playing a violin.

Hypothesis: A woman is playing the violin.

Label: 0

Pretrained Label: 1

Finetuned Label: 0

-----3-----

Premise: Two men climbing on a wooden scaffold.

Hypothesis: Two sad men climbing on a wooden scaffold.

Label: 1

Pretrained Label: 0

Finetuned Label: 1

-----4-----

Premise: many children play in the water.

Hypothesis: The children are playing mini golf.

Label: 2

Pretrained Label: 0

Finetuned Label: 2

-----5-----

Premise: A group of people stand near and on a large black square on the ground with some yellow writing on it.

Hypothesis: a group of people wait

Label: 1

Pretrained Label: 0

Finetuned Label: 1

Number of cases that were not corrected by the fine-tuned model: 5

-----1-----

Premise: Children bathe in water from large drums.

Hypothesis: The kids are wet.

Label: 0

Pretrained Label: 1

Finetuned Label: 1

-----2-----

Premise: A woman is standing near three stores, two have beautiful artwork and the other store has Largo written on it.

Hypothesis: A woman standing on a street corner outside beside three different stores, two of which contain beautiful artwork and one with a Largo sign.

Label: 0

Pretrained Label: 1

Finetuned Label: 1

-----3-----

Premise: An Ambulance is passing a man wearing a bandanna and girl.

Hypothesis: The man in the bandana is running after the ambulance

Label: 2

Pretrained Label: 1

Finetuned Label: 1

-----4-----

Premise: An older gentleman wearing a hat is walking on crutches next to a busy street.

Hypothesis: A man with a walking stick is next to the street.

Label: 2

Pretrained Label: 1

Finetuned Label: 1

-----5-----

Premise: Two middle-aged police officers watch over a parking lot, at night.

Hypothesis: The officers are actually security guards.

Label: 2

Pretrained Label: 0

Finetuned Label: 1

References:

<https://dassum.medium.com/fine-tune-large-language-model-llm-on-a-custom-dataset-with-qlora-fb60abdeba07>,

<https://www.kaggle.com/code/hari31416/downloading-file-and-directory-from-kaggle>