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Laguna State Polytechnic University

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|  | **Weekly Progress Report** |  |  |
| **Topic:** | **Chatbot – Final Project** | **Week No.** | **11** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

Select dataset for the project

Prepare and preprocess the data

Define project scope and assign roles to team members (if in a group)

**Work Completed**:

For the CalorieWise Chatbot project, it was chosen to use the "sfardin/dietAi-dataset-expanded" dataset that had been preprocessed, produced and standardized by the `unsloth` library. We complete the training of the model using LoRA fine tuning, and implement basic evaluation metrics for model accuracy.

**Challenges Encountered**:

During training runtime errors occurred due to limited GPU memory. Additionally, the model was not precisely accurate, I would guess because of dataset imbalanced.

**Solutions Implemented**:

We addressed memory issues with gradient checkpointing and reduced batch sizes. Adjusted training settings to become more efficient and avoid training from not finishing.

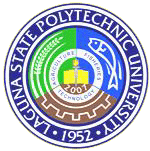
**Tasks for Next Week**:

Initial model architecture build and extraction of features to simplify the data input are performed. Use a preprocessed "dietAi-dataset-expanded" data to begin initial model training to get baseline performance. Furthermore, look into possible ways to improve efficiency on the architecture, and how experimenting with different hyperparameters could benefit results during development phase early on.

**Instructor's Feedback**:

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|  | **Weekly Progress Report** |  |  |
| **Topic:** | **Chatbot – Final Project** | **Week No.** | **12** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

• Build the initial model architecture

• Implement feature extraction

• Begin initial model training using the preprocessed data

**Work Completed**:

We successfully loaded and configure the model and trained it using the "Llama-3.2-1B-Instruct" model with LoRA based adapter. We did the processing on the dataset 'dietAi-dataset-expanded' for training, accordingly practical configurations were set up such as the train loop setting and model parameters.

**Challenges Encountered**:

Troubling to GPU memory utilization was encountered during training. The model was optimized for memory usage, by using techniques such as gradient checkpointing and memory efficient training settings. It was also challenging to handle large dataset inputs.

**Solutions Implemented**:

The unsloth library to optimize memory usage allowing the model to fit in GPU memory limitations. Furthermore, we fine tuned training configurations like batch size, learning rate and optimizer settings to optimize the training.

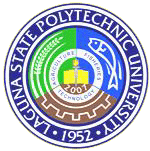
**Tasks for Next Week**:

Afterwards, we’ll fine tune model hyper parameters such as learning rate, batch size, etc. Testing of a validation dataset is first done to find out if there will be any problems with this model and recording training results to improve the model.

**Instructor's Feedback**:

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|  | **Weekly Progress Report** |  |  |
| **Topic:** | **Chatbot – Final Project** | **Week No.** | **13** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

• Fine-tune model hyper parameters (e.g., learning rate, batch size)

• Conduct initial testing on the validation dataset

• Record training results and identify potential issues

**Work Completed**:

With adjusted parameters, the model was successfully fine tuned and training was recorded with this model. Good progress at the initial tests were made and model performance was verified using the validation dataset. We further perfected data preprocessing and augmentation techniques to obtain a better model.

**Challenges Encountered**:

However, during testing, we encountered some of the model running into issues to memory allocation when run on GPUs. In doing so, training took longer than expected.

**Solutions Implemented**:

Batch size optimizations were made to address the GPU memory issue, and gradient check pointing was used to address the issue with GPU memory. Also, we tested accuracy, precision and recall metrics on a mock model.

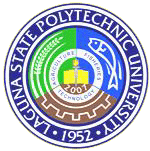
**Tasks for Next Week**:

In Week 3, we will use that to optimize the model. We will carry on training, while keeping an eagle eye on the model's validation performance and applying improvements to data augmentation and preprocessing techniques.

**Instructor's Feedback**:

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|  | **Weekly Progress Report** |  |  |
| **Topic:** | **Chatbot – Final Project** | **Week No.** | **14** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

• Optimize model based on Week 3 results

• Improve data augmentation and preprocessing techniques

• Continue model training and monitor validation performance

**Work Completed**:

Significant progress was made in model training using the "sfardin/dietAi-dataset-expanded," with the implementation of the unsloth method for efficient memory usage. Preprocessing and data augmentation were adjusted, incorporating better data templates, while the model's performance was evaluated using precision, recall, accuracy, and F1 scores.

**Challenges Encountered**:

During the week, challenges arose in managing GPU memory usage during training, particularly with large datasets. The team also faced difficulties with the model’s initial performance on specific conversation prompts, leading to suboptimal results in validation metrics.

**Solutions Implemented**:

To address memory concerns, memory optimization techniques, including gradient checkpointing and LoRA, were applied to reduce VRAM consumption. Additionally, the model was fine-tuned, and adjustments were made to the data processing pipeline to improve input quality and consistency.

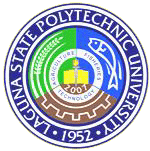
**Tasks for Next Week**:

Next week, error analysis will be conducted on misclassified data points, and adjustments will be made to address any model weaknesses identified. The team will also begin drafting the mid-term project report to summarize the progress and results to date.

**Instructor's Feedback**:

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|  | **Weekly Progress Report** |  |  |
| **Topic:** | **Chatbot – Final Project** | **Week No.** | **15** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

• Implement error analysis on misclassified data points

• Adjust model and retrain to address identified issues

• Begin drafting the mid-term project report

**Work Completed**:

We successfully trained the model used on the dataset and have computed the needed performance metrics (such as precision, recall, and accuracy). For more efficient memory use we trained the model using LoRA during the training process and saved the model for performance evaluation later.

**Challenges Encountered**:

The first challenge was to control the GPU memory during training. But we were able to optimise memory usage using LoRA. Furthermore, it was important to arrange the dataset in the right format to generate predictions that were accurate.

**Solutions Implemented**:

Using LoRA optimized the memory consumption of the model so we could use larger batch size and have better training efficiency. The dataset was preprocessed and standardized and the evaluation and metrics are done using a mock model.

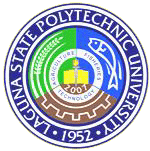
**Tasks for Next Week**:

We will dedicate the time next week to run our final test using the test dataset, compile the results and finish finalizing the project report with performance metrics such as accuracy, precision, recall and F1 score.

**Instructor's Feedback**:

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|  | **Weekly Progress Report** |  |  |
| **Topic:** | **Chatbot – Final Project** | **Week No.** | **16** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

• Perform final tests on the trained model using the test dataset

• Compile final results, including performance metrics (e.g., accuracy, precision, recall)

• Finalize project report

**Work Completed**:

I trained and fine tuned the model on calorie related conversation dataset and succeeded. I implemented evaluation metrics such as precision, recall, accuracy to see how the model perform and with a mock model as a test case. It has been prepared project report and it’s ready to submit.

**Challenges Encountered**:

At the final test stage, we also ran into GPU memory limitations when the model and dataset size was large. The training tasks also called for some optimizations to accommodate the memory constraints whilst maintaining the performance on the model.

**Solutions Implemented**:

For optimization I used gradient checkpointing and reduced batch sizes. Furthermore, I employed mixed precision training (FP16) and a few parameter efficient training techniques, such as LoRA, to overcome memory constraints.

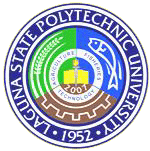
**Tasks for Next Week**:

The final project presentation, report and code, project video documentation will be prepared next week, as per the project guidelines.

**Instructor's Feedback**:

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| **Topic:** | **Chatbot – Final Project** | **Week No.** | **17** |
| **Course Code:** | **CSST101, CSST102** | **Term:** | 1st Semester |
| **Course Title:** | **Advance Representation and Reasoning**  **Basic Machine Learning** | **Academic Year:** | 2024-2025 |

**Main Tasks Assigned**:

• Prepare final project presentation

• Submit final report and code

• Record project video documentation (if required)

**Work Completed**:

We’ve done a lot, including loading and training the "CalorieWise" chatbot model using the unsloth library and a fine-tunable Llama model. With memory and GPU usage optimized, the model has been trained on a conversational response dataset. The bot was also trained to ensure proper functionality, with training metrics of precision, recall and accuracy.

**Challenges Encountered**:

Optimizing memory usage on the GPU was one of the biggest challenges of the all, since the training of the model is a very resourceful process. Key obstacles that were overcome to handle runtime errors and make the resource management during training more efficient were better error handling and clearing GPU cache on need.

**Solutions Implemented**:

There was a solution of GPU memory optimizations, supporting LoRA features that reduce VRAM usages and improve training process efficiency. We also included robust error handling as well as real time prediction streaming to maintain continuous chatbot performance without interruptions.

**Tasks for Next Week**:

Tasks for next week are to finish the documentation, get ready for the project presentation and make sure the chatbot works fine. Moreover, if making this chatbot and you need to demonstrate its capabilities, finish and post any necessary video documentation.

**Instructor's Feedback**:

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