Report for Assignment 3

1. Preprocessing Techniques:

● The input text is preprocessed using a tokenizer, which converts the raw text into

numerical tokens that the model can understand.

● Padding and truncation are applied to make sure all input sequences have the same length

● The tokenizer returns PyTorch tensors as input representations.

2. Model Architecture:

● The code uses a pre-trained BERT-based model, specifically the "prajjwal1/bert-small"

model, which is loaded and adapted for the sentiment analysis task.

● The original pre-trained model's classifier (head) is replaced with a new linear layer that

takes the output of the last hidden state as input and outputs the sentiment labels.

3. Hyperparameter Tuning:

● The learning rate for the optimizer is set to 0.001.

● The model is trained for a specified number of epochs (10 in this case).

● The cross-entropy loss function and the Adam optimizer are used.

4. Model Evaluation Results:

● After training, the code includes a testing loop to evaluate the model's performance on the

test data.

● Accuracy is calculated by comparing the predicted labels with the ground truth labels,

and the test accuracy is printed.

Deep Learning vs. Traditional ML Models:

- Deep learning models, like the one implemented in the code, have the advantage of automatically learning hierarchical features from raw text data, allowing them to capture complex patterns and dependencies.
- Traditional ML models such as logistic regression or Naive Bayes rely on specific features and make assumptions about the independence of features.

Performance Comparison:

- Results are not printing as of right now

Advantages and Limitations of Deep Learning Models for Sentiment Analysis:

Advantages:

- Deep learning models can automatically learn features from raw text data, eliminating the need for manual feature engineering.
- They can capture complex patterns and dependencies in the data, leading to potentially higher accuracy.
- Deep learning models can handle large datasets effectively.

Limitations:

- Deep learning models require a large amount of amounts of training data to perform well.
- They are computationally expensive and require high-performance hardware.

Using textbook and prior assignments to come conclusions in reports.