Assignment L6

Sentiment Analysis with LSTM Networks

In this assignment, you will develop a sentiment analysis model using Long Short-Term Memory (LSTM) networks, a type of recurrent neural network capable of learning long-term dependencies. You will use the PyTorch library to build and train your model on a provided dataset of text reviews.
Dataset: The dataset is composed of text reviews, each labeled as either "positive" or "negative". **Tasks for Submission**:

1. Implement an LSTM-based sentiment analysis model in PyTorch.
    - Your model should take sequences of word embeddings as input and output a single scalar representing the sentiment.
    - Use an embedding layer at the beginning of your model to input pre-trained word embeddings.
    - Include at least one LSTM layer followed by a fully connected layer with a sigmoid activation function to output the probability of the positive sentiment.
2. Train your model on the training set.
    - Split the provided dataset into training and testing sets.
    - Use an appropriate loss function and optimizer for binary classification.
    - Train your model and report the accuracy on the testing set.
3. Analyze the results and provide insights.
    - Discuss how your model performs and any potential areas for improvement.
    - Include plots of the training loss and accuracy over time.
    - Provide a confusion matrix of your model's predictions on the testing set.

Submission Format: Your submission should include the following components:

- Source code of your PyTorch LSTM model.
- A report describing your model architecture, training process, and analysis of the results.
- Any visualizations or plots that support your analysis.

Additional Instructions:

- Ensure that your code is well-commented and follows best practices for readability.
- The report should be concise, focusing on the key aspects and findings of your work.