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L06 AWS Mod 2

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Lab-06: AWS Machine Learning University Module 2 Lab 05 Fine Tuning Bert Objective

Introduction

I will reflect on my experience with AWS Fine Tuning BERT objective lab. I will cover my learning insights, challenges and struggles, personal growth and provide a critical reflection.

Learning Insights

What fundamental machine learning concepts did you discover?

In this lab, I explored how transformer models like BERT process text data, specifically for sentiment analysis using a reviews dataset. I learned about the importance of loading and formatting text data correctly, leveraging a pretrained BERT model, and fine-tuning it for classification tasks.

How do the labs connect to broader machine learning principles?

This lab reinforced key concepts in deep learning and NLP, particularly how transfer learning allows us to use powerful pretrained models instead of building models from scratch. Additionally, it highlighted the importance of proper data preprocessing, tokenization, and sequence handling when working with text data.

Which moments of learning were most impactful for you?

The most impactful moment was seeing how BERT, through bidirectional context understanding, can analyze sentiment in reviews more accurately than traditional models. Working with a pretrained model and fine-tuning it for a specific task demonstrated the power of transformers in NLP.

Challenges and Struggles

What technical or conceptual challenges did you encounter?

One of the main challenges was understanding how BERT processes review text differently from earlier models like Bag-of-Words or TF-IDF. Unlike these simpler models, BERT captures context more effectively by considering the meaning of words in relation to surrounding words. Understanding the role of tokenization, attention mechanisms, and embeddings in BERT took time.

How did you approach and overcome these challenges?

To address this, I spent time reviewing how BERT tokenizes text using WordPiece tokenization and how it represents words in high-dimensional space. I also experimented with different preprocessing steps to see how they affected model performance.

What strategies did you develop for problem-solving?

Breaking down BERT's architecture to understand its self-attention mechanism. Running experiments with different dataset sizes and training configurations. Using visualizations and debugging tools to analyze model predictions.

Personal Growth

How has your understanding of machine learning evolved?

My understanding of NLP has significantly improved, particularly in recognizing how deep learning models can capture context more effectively than traditional approaches. I now have a stronger grasp of how transformers work and why they are the current state-of-the-art in NLP.

What surprised you about the learning process?

I was surprised by how much preprocessing affects model performance. Even minor changes in tokenization or dataset formatting could impact how well BERT understood and classified reviews.

How might these skills apply to your future academic or professional goals?

These skills are valuable for various applications, including sentiment analysis, chatbot development, and automated text summarization. Understanding transformers like BERT is crucial for anyone working with advanced NLP techniques in academia or industry.

Critical Reflection

What would you do differently if you could repeat these labs?

Spend more time understanding the data before jumping into model training. Experiment with different preprocessing techniques to see their impact on model performance.

What additional questions or areas of exploration have emerged?

How does BERT compare to newer models like GPT or T5 for text classification? How can fine-tuning be optimized for small datasets? What are the limitations of transformer models in real-world applications?

How do these labs fit into the broader landscape of machine learning?

This lab demonstrated how transformers have revolutionized NLP by improving context understanding. It reinforced the shift from traditional ML techniques to deep learning-based models, highlighting the power of transfer learning in modern AI applications.