News Topic Classifier Using BERT

Summary:

Objective:

Fine-tune a BERT transformer model to classify news headlines from the AG News dataset into one of four categories: *World*, *Sports*, *Business*, *Sci/Tech*.

Steps Taken:

- **Dataset Loading**
  - Used the AG News dataset via Hugging Face Datasets.

- **Text Preprocessing**
  - Tokenized headlines using bert-base-uncased tokenizer.
  - Applied padding and truncation to standardize input length.

- **Model Fine-Tuning**
  - Fine-tuned the BERT model using Hugging Face's Trainer API.
  - Trained over 3 epochs with a learning rate of 2e-5.

- **Evaluation Metrics**
  - Evaluated performance using Accuracy and F1-score.
  - Used weighted F1 to handle class distribution fairly.

- **Model Deployment**
  - Deployed a real-time interface using Gradio for live prediction.
  - Users can enter headlines and receive instant topic classification.

What I Learned:

- **Transfer Learning:**
  Leveraging pre-trained BERT for a new classification task saves time and improves results.

- **Transformer Tokenization:**
  Mastered how to preprocess and prepare text inputs for transformer-based models.

- **Performance Evaluation:**
  Gained understanding of why F1-score is critical alongside accuracy in classification tasks.

- **Training with Trainer API:**
  Learned how to customize training loops, log metrics, and handle datasets efficiently.

- **Gradio for Deployment:**
  Successfully built and deployed a lightweight, interactive UI for live user interaction.

Final Result:

An end-to-end pipeline for news topic classification using BERT, with solid performance and real-world usability from raw text to live predictions.