**Report**

**Approach Used**

For this task, I developed an **NLP-based system** that classifies financial news headlines into **positive, negative, or neutral sentiments**. The approach involved:

* **Preprocessing & Model Selection**: Instead of manually processing the text using TF-IDF or Word2Vec, I leveraged **FinBERT**, a pre-trained transformer model specifically fine-tuned for financial sentiment analysis. This eliminated the need for training a custom model.
* **Sentiment Classification**: I used **Hugging Face's transformers library** to load **ProsusAI/FinBERT**, which provides high accuracy in financial sentiment analysis. The model classifies each news headline into **positive, negative, or neutral** sentiments.
* **Deployment**: I built a **real-time Streamlit Ib application**, allowing users to input financial news headlines and receive instant sentiment analysis results.

## ****Challenges Faced****

* **Sentiment Mapping Issue**: Initially, the model returned labels in uppercase (e.g., "POSITIVE"), causing mismatches in our sentiment mapping. I fixed this by converting the labels to loIrcase before mapping them.
* **Model Response Time**: Since I used a **pre-trained transformer**, the inference time was slightly higher compared to traditional models like Logistic Regression. HoIver, caching techniques can be applied to improve efficiency.
* **Handling Uncertain Sentiments**: Some financial news headlines are ambiguous and may not fit clearly into **positive, negative, or neutral** categories. This is a limitation of sentiment analysis models in general.

## ****Model Performance & Improvements****

* **Accuracy**: Since I used a pre-trained model, FinBERT's accuracy is already high on financial sentiment datasets. Reports suggest **FinBERT outperforms traditional machine learning models** in financial sentiment analysis.
* **Improvements for Future Work**:  
  Fine-tuning FinBERT on **custom financial datasets** for better domain adaptation.