Text Classification Report: TF-IDF vs GloVe

1. Dataset and Workflow Overview

This report presents a comparative analysis of two text classification approaches applied to the IMDB Movie Reviews Dataset. The task is binary sentiment classification (positive/negative). The dataset is publicly available via Keras or Kaggle: https://ai.stanford.edu/~amaas/data/sentiment.

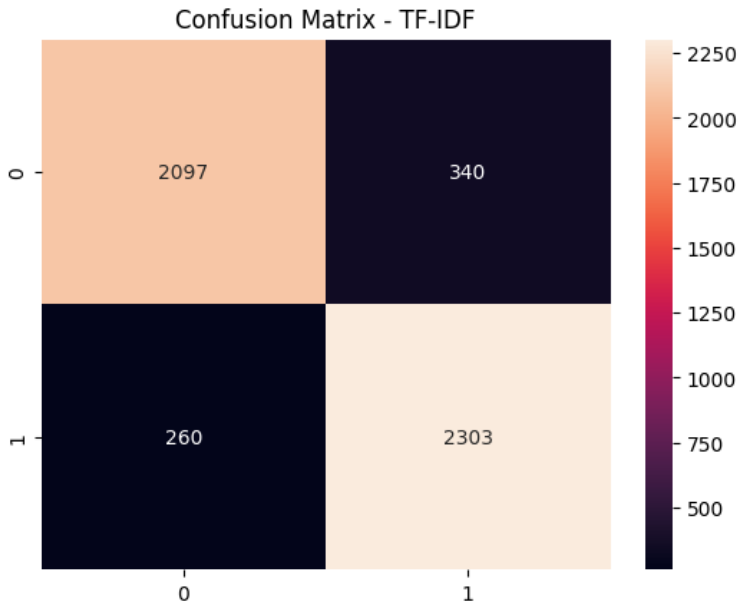
The two approaches compared in this report are:

- TF-IDF with traditional machine learning

- GloVe with embedding-based representation

The goal was to classify movie reviews into positive or negative sentiment categories.

2. Confusion Matrix - TF-IDF



3. Confusion Matrix - GloVe

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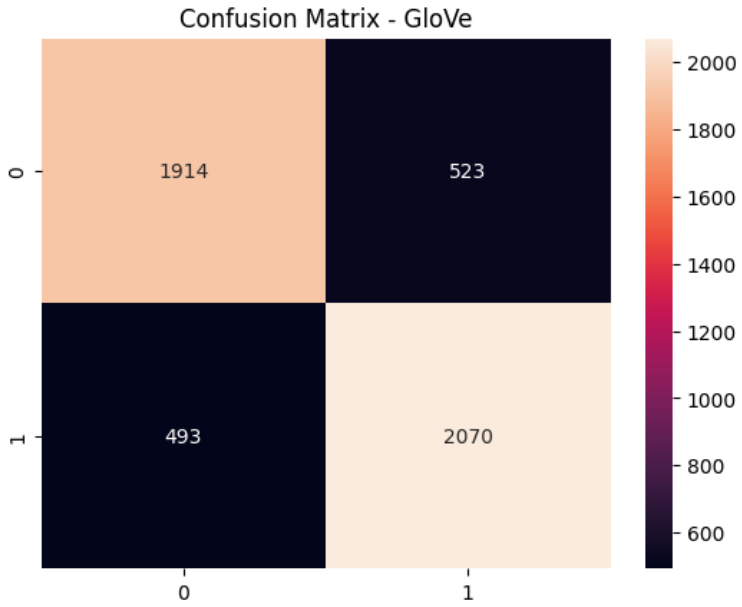

4. Classification Metrics

TF-IDF Classifier:

- Precision: 0.89 (class 0), 0.87 (class 1)

- Recall: 0.86 (class 0), 0.90 (class 1)

- F1-score: 0.87 (class 0), 0.88 (class 1)

- Accuracy: 88%

GloVe Classifier:

- Precision: 0.80 (both classes)

- Recall: 0.79 (class 0), 0.81 (class 1)

- F1-score: 0.79 (class 0), 0.80 (class 1)

- Accuracy: 80%

5. Top Weighted Words (TF-IDF)

Top 10 Positive Words:

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br, movie, film, one, great, good, like, story, time, well

Top 10 Negative Words:

br, movie, film, one, bad, like, even, good, time, would

6. Word Similarity (Cosine)

- Cosine similarity between 'good' and 'excellent': 0.7936
- Cosine similarity between 'bad' and 'terrible': 0.7072

7. Conclusion

TF-IDF outperformed GloVe embeddings in this sentiment classification task based on higher accuracy and F1-scores. While GloVe provides semantic richness via word embeddings, the TF-IDF approach with a traditional classifier demonstrated stronger performance on this dataset.