Fake News Detection

Using NLP & Deep Learning to Identify Misinformation

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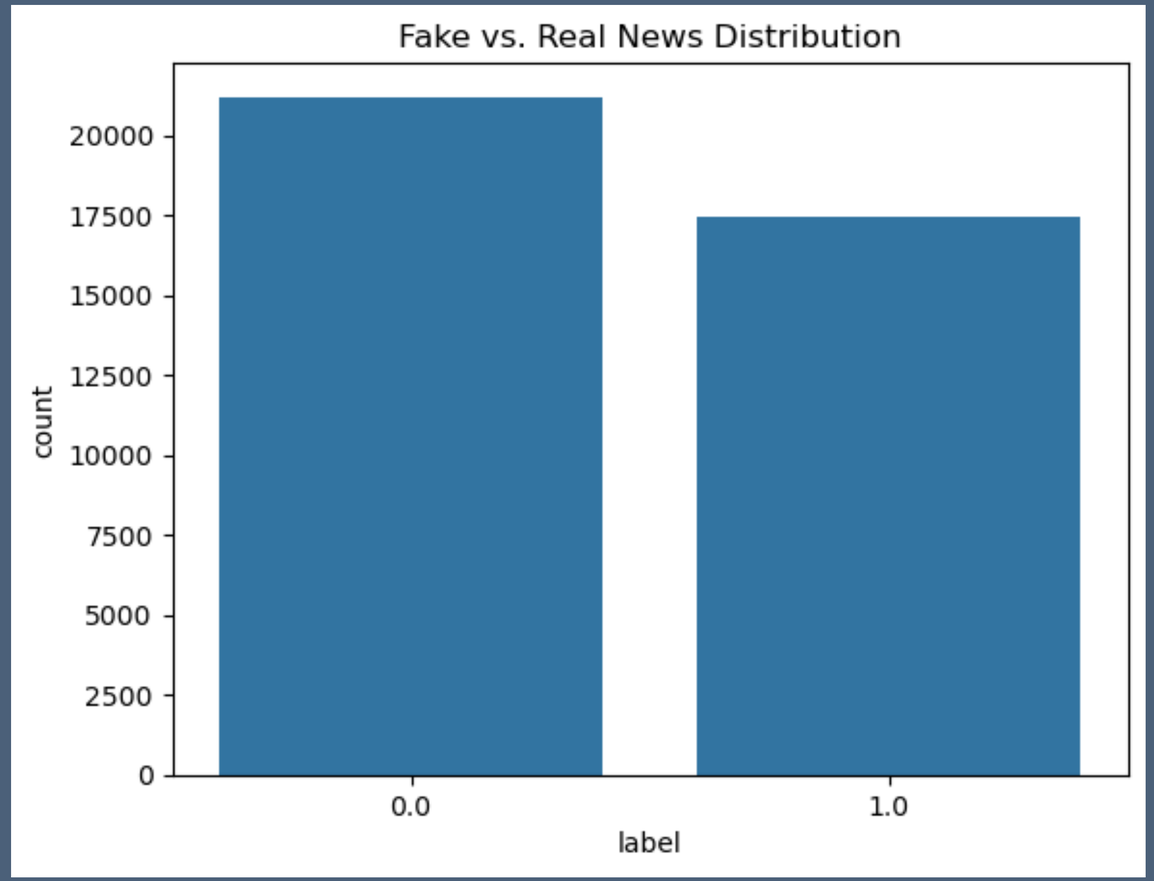
Motivation & Objectives

Business Understanding

- Why?
  - Mitigating the spread of misinformation
  - Assessing the integrity of media institutions
    - Identifying bad actors
  - Flagging suspicious items for fact-checkers

Data Understanding

- Multiple datasets
  - ~40k records
  - Mostly < 1k in length
- Classes:
  - (1) Fake
  - (0) Real



Data Exploration

Insights from the Data

Data Preparation

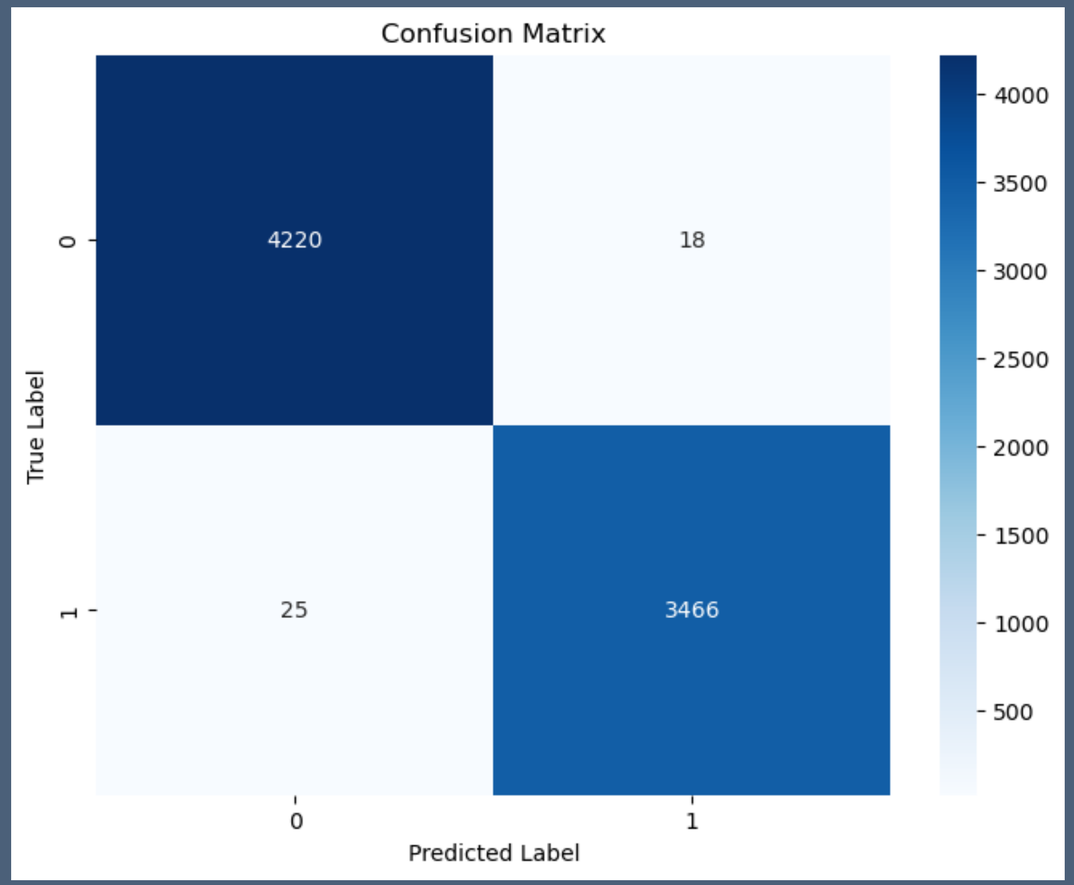
- Sanitizing the text
  - Removed special tokens
  - Lemmatized Text
  - Converted text into Normalized numerical representations with TF-IDF

Baseline Model Architecture

- Approach
  - TF-IDF feature extraction
  - Logistic Regression classifier for simplicity and interpretability
  - Grid Search for Tuning

Baseline Evaluation

- Near perfect results
- Minimal misclassification
- ~99% Recall — identifying fake news as fake
- ~99% Precision — Identifying fake from real



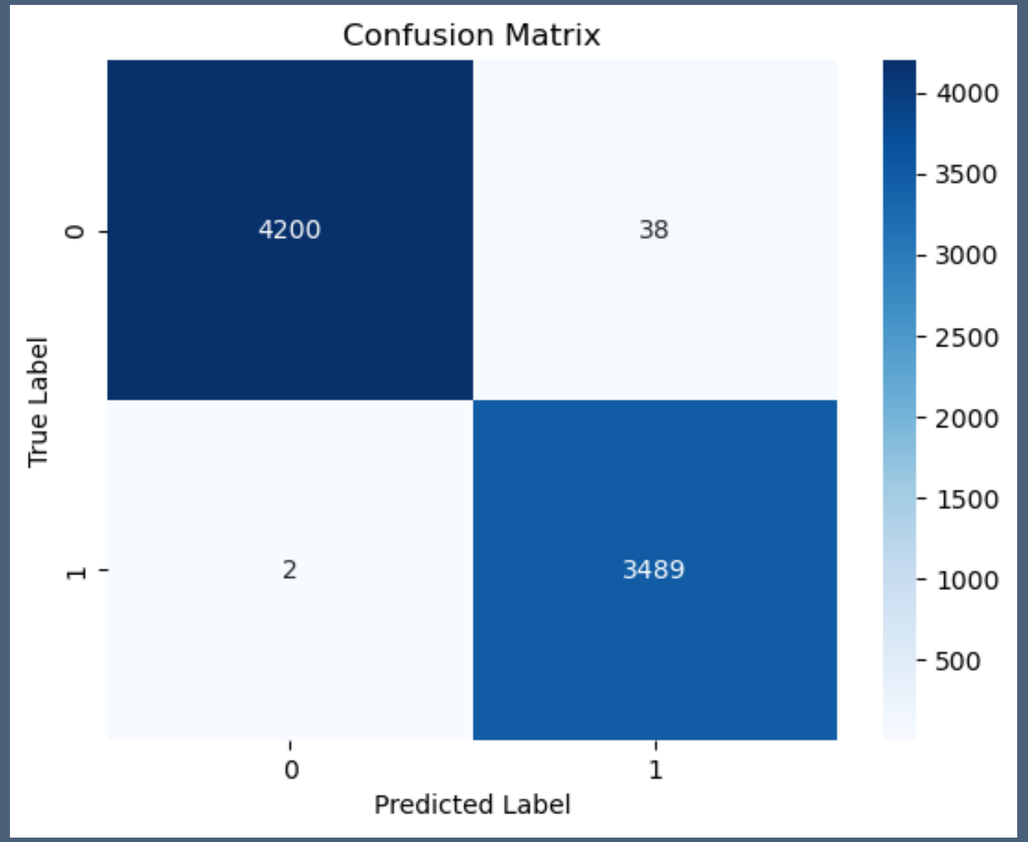
Deep Learning Architecture

Long Short Term Model with Word Embeddings

- Long Short-Term Memory:
  - Sequence sensitive
  - Context Aware
- Embedding Layer (Word2Vec)
  - Captures semantic relationships
  - Trained on Google News Vectors

Deep Learning Evaluation

- Still near perfect results
- Marginally worse Precision
  - ~0.96 Precision
- Almost NO misclassified fake news
  - ~1.00 Recall
  - This is ideal



Model Comparison

- Observations:
  - Baseline sightly outperforms on precision and overall accuracy
  - LSTM model excels in recall, with near perfect recall
- Recommendation:
  - Continue to use Logistic Regression as a sensible baseline
  - Use LSTM as data grows, domains change, language evolves

Recommendations

- Social Media Platforms:
  - Integrate into moderation systems (eg. Community notes) to flag content
- Fact Checking Automation
  - Provide a middleware mechanism between the media and consumer
- Policy & Governance:
  - Assist government agencies in tracking misinformation trends

Next Steps & Deployment

- Steps:
  - Integrate model with existing news platforms for immediate classification (eg. Ground)
  - Continue to collect more data
- Thank you — Questions?