



Truth or Trickery Detection of Fake Reviews

By: Ismail Peracha & Helen Truong



Background & Introduction

Online reviews heavily influence consumer decisions in today's digital marketplace. Unfortunately, fake reviews are on the rise — written to unfairly promote or discredit products and services. These deceptive reviews erode trust, mislead buyers, and hurt platform credibility.

This project uses machine learning and NLP to detect and classify reviews as real or fake, helping platforms maintain authenticity. Fake reviews are often written to mimic natural language, making them hard to detect with traditional keyword filters. Natural Language Processing (NLP) lets us break down and analyze text data — turning raw reviews into structured input for machine learning.

Dataset After Preprocessing



TF-IDF

We used this to help us focus on meaningful words. Each review was converted into a high-dimensional vector of word importance.



Truncated SVD

The purpose was to help reduce dimensionality. We reduced vectors from 1,000 to 100 components for faster model training.



Mutual Info

We used this to aid with our feature selection, selecting the most important features to reduce overfitting.

We trained and compared 4 ML models (Random Forest, SVM, Naive Bayes, Decision Tree, XGBoost) on both full and reduced feature sets using TF-IDF, dimensionality reduction, and feature selection to classify reviews as fake or real.

XGBoost

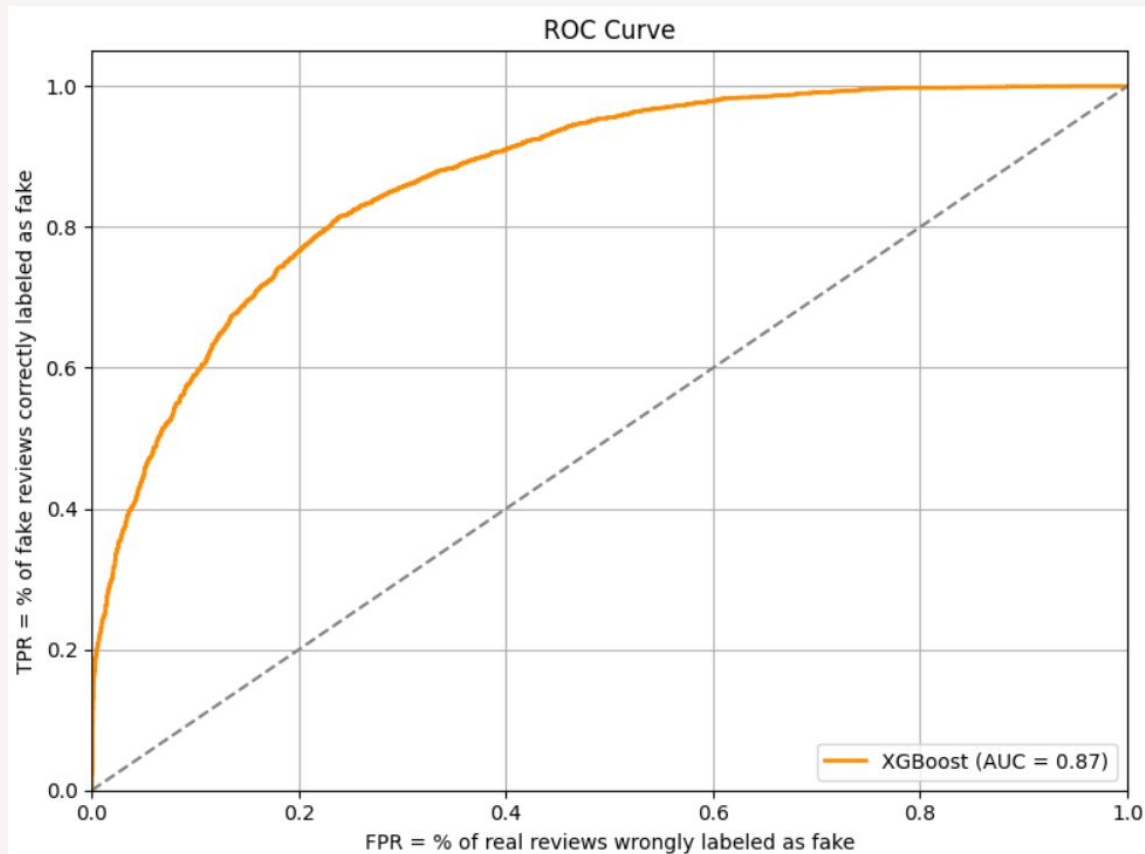
Accuracy: ~79%

Precision: ~77%

Recall: ~80%

F1 Score: ~80%

ROC-AUC: ~87%



Logistic Regression

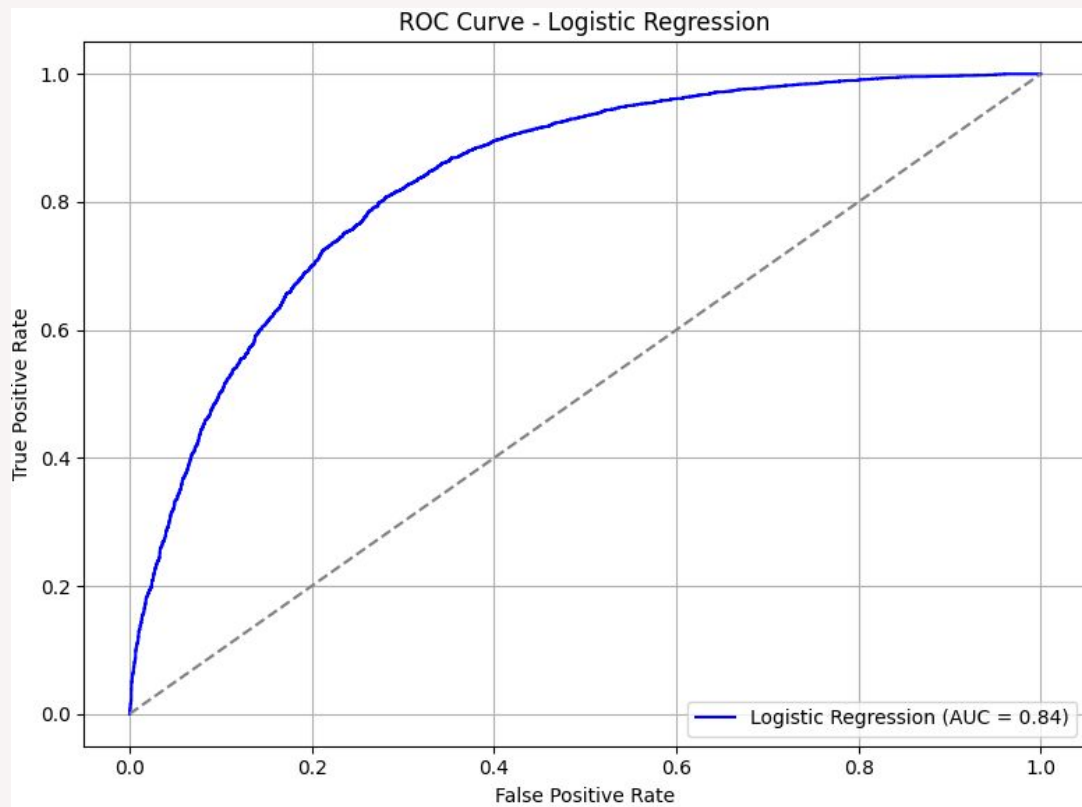
Accuracy: ~76%

Precision: ~74%

Recall: ~80%

F1 Score: ~76%

ROC-AUC: ~83%



Random Forest

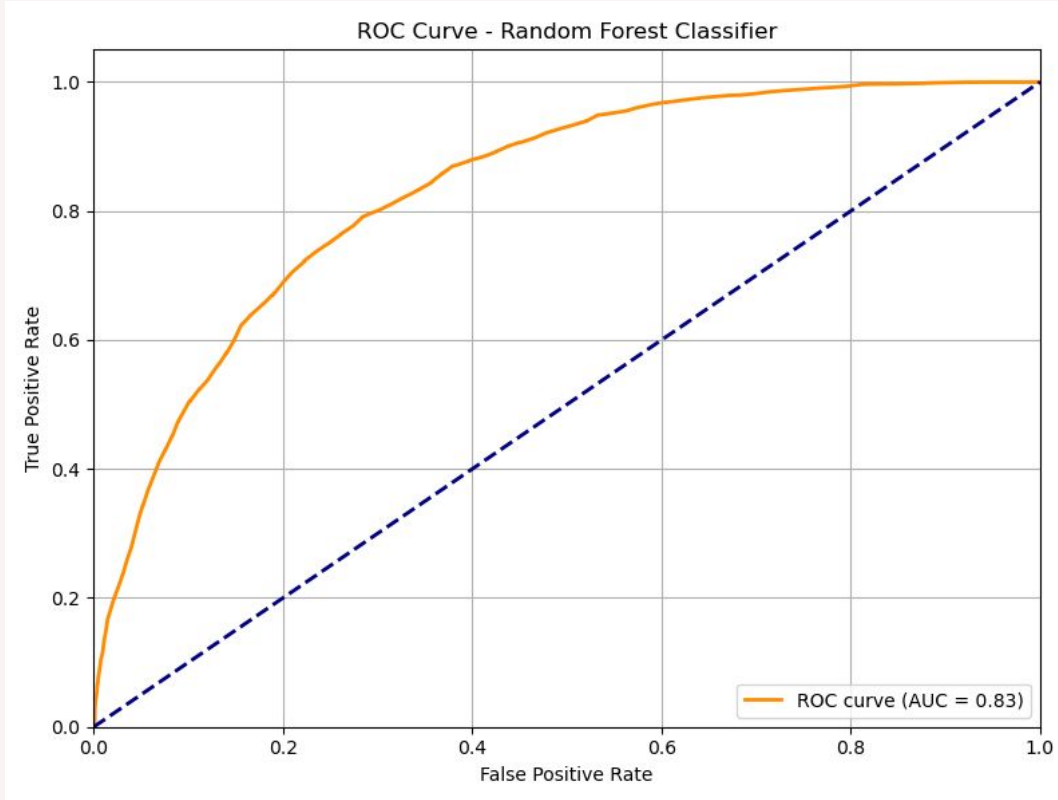
Accuracy: ~77%

Precision: ~77%

Recall: ~80%

F1 Score: ~80%

ROC-AUC: ~87%



Support Vector Machine (SVM)

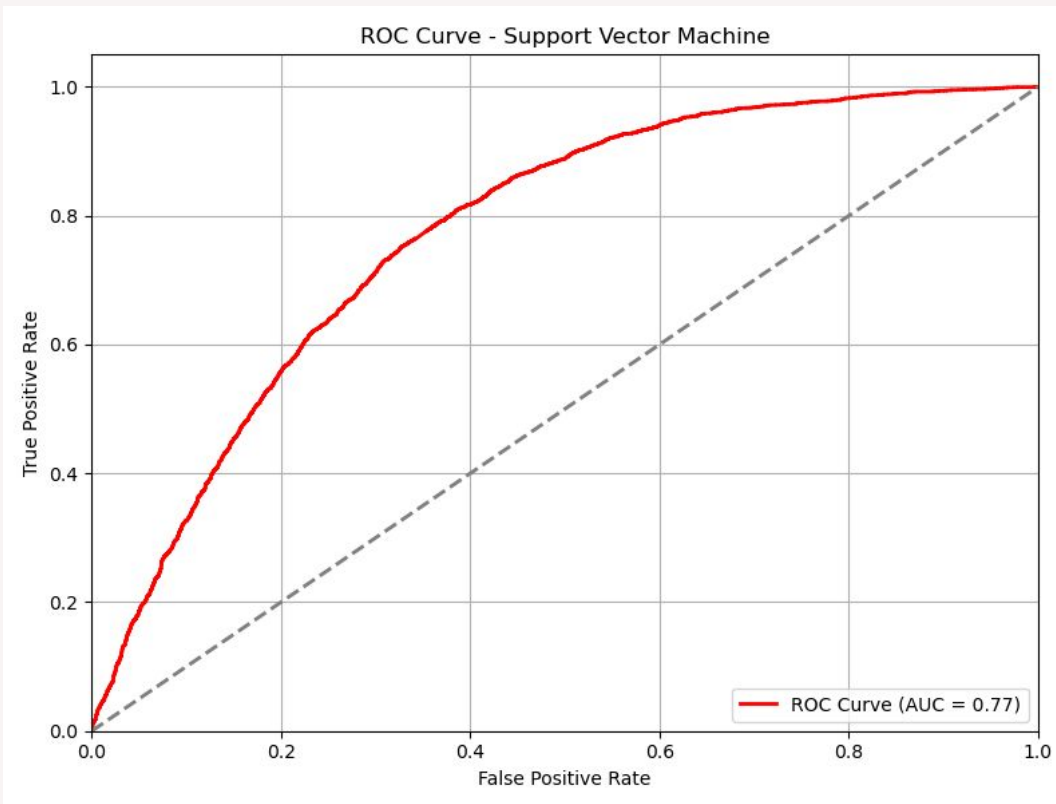
Accuracy: ~71%

Precision: ~67%

Recall: ~81%

F1 Score: ~73%

ROC-AUC: ~77%



Naive Bayes

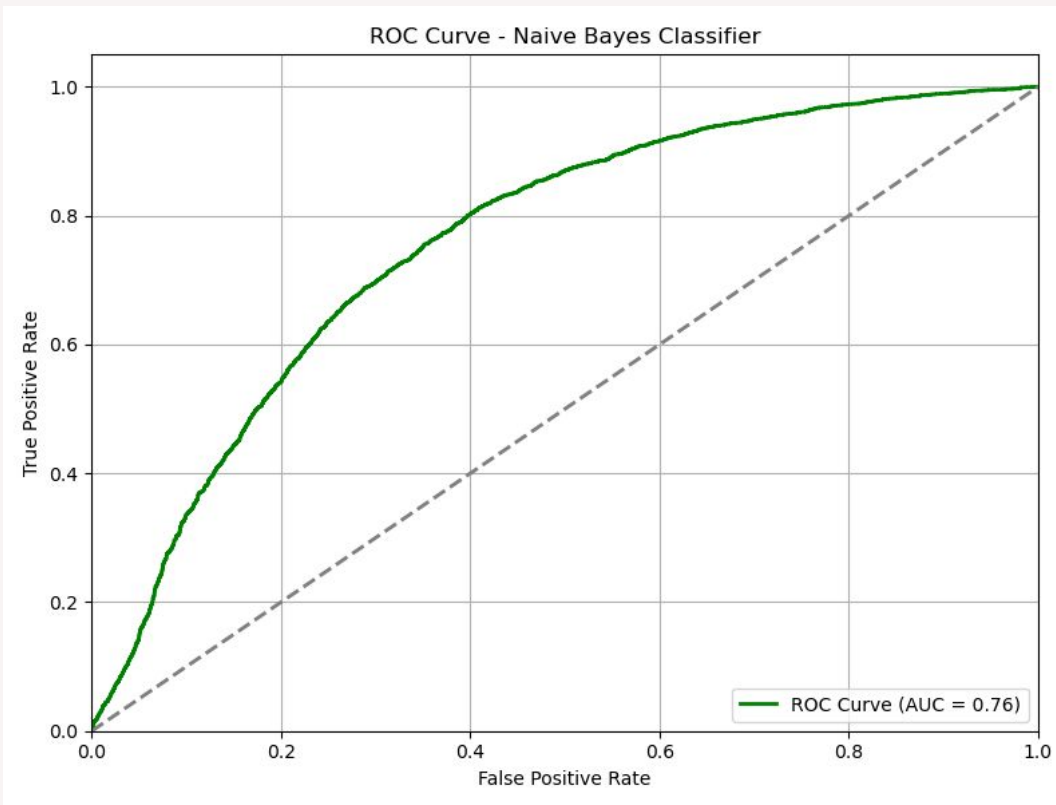
Accuracy: ~70%

Precision: ~69%

Recall: ~73%

F1 Score: ~71%

ROC-AUC: ~76%



Decision Tree

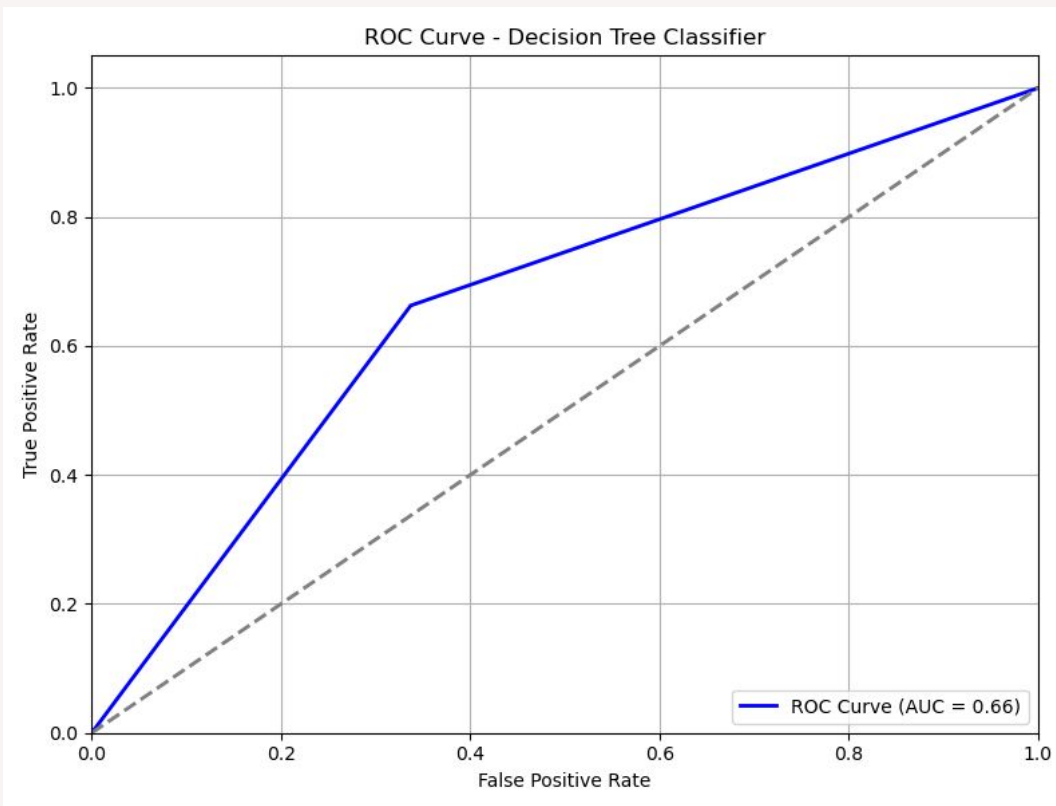
Accuracy: ~66%

Precision: ~66%

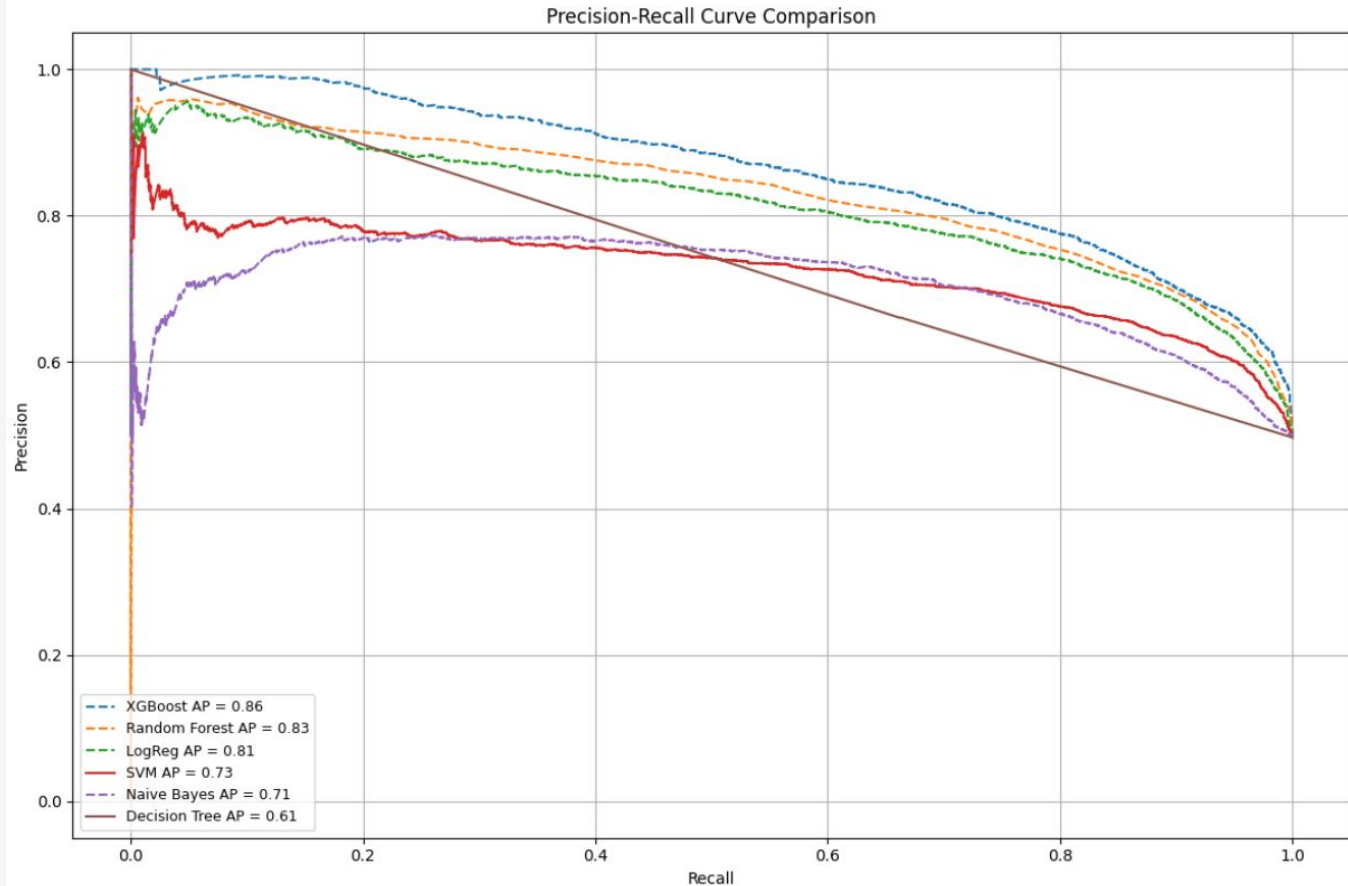
Recall: ~66%

F1 Score: ~66%

ROC-AUC: ~66%



Precision-Recall Curve



Improvements

- We could have played around more with code to have better accuracy.
- Our dataset was generalized to some extent.
- Make the dataset into a web extension to employ for greater use.
- Should have looked more into deep learning models for even more performance improvement.
- Could have had more features.



THANKS!

Do you have any questions?

Special thanks to Professor Dr. Sood for her guidance and support throughout this project.

CREDITS: This presentation template was created by [Slidesgo](#), and includes icons by [Flaticon](#), and infographics & images by [Freepik](#)

