📰 Fake News Classification using NLP – Report

Introduction

With the rapid spread of digital information, fake news has become a significant challenge for society, often leading to misinformation and confusion. This project intends to identify news articles as FAKE or REAL based on Natural Language Processing (NLP) and Machine Learning. By developing an automatic system, we decrease human effort in content verification and help readers and organizations identify authentic information.

Abstract

The project utilizes a supervised machine learning method for detecting fake news. Based on labeled datasets of real and fake news articles, text preprocessing methods like stopword removal, lemmatization, and TF-IDF vectorization were employed. Logistic Regression was trained as the base model, and its performance was tested on unseen data. Streamlit web app was created that enables users to copy any news article and immediately get a prediction if it is FAKE or REAL. The system is highly accurate and showcases the power of NLP in the fight against misinformation.

Tools Used:-

1) Programming Language: Python

2) Libraries: Pandas, NumPy, Scikit-Learn, NLTK, Joblib, Matplotlib

3) Framework: Streamlit (for web interface)

4) Environment: Visual Studio Code (with virtual environment .venv)

Steps Involved in Building the Project:-

1. Dataset Collection – Labeled datasets (Fake.csv, True.csv) containing fake and real news articles were prepared.

2. Data Preprocessing – Text cleaning was performed: lowercasing, URL & punctuation removal, stopword filtering, and lemmatization.

3. Feature Extraction – Articles were converted into numerical features using TF-IDF (Term Frequency–Inverse Document Frequency).

4. Model Training – Logistic Regression was trained on processed data. A Naïve Bayes model was also tested for comparison.

5. Evaluation – Accuracy and classification reports were generated, along with a confusion matrix for performance visualization.

6. Model Saving – The trained model and TF-IDF vectorizer were stored using joblib.

7. Web Application – A Streamlit app was built to take user input (news article text), process it, and predict whether it is FAKE or REAL with confidence scores.

Conclusion

This project successfully demonstrates how NLP and machine learning can be applied to detect fake news with good accuracy. The system is lightweight, scalable, and user-friendly, providing instant predictions through a web interface. In the future, the model can be improved with larger datasets and advanced transformer-based models eg: BERT. This project not only strengthens understanding of NLP and ML workflows but also has practical applications in media monitoring, social platforms, and digital journalism.