Fake News Detection Project Report

# 1. Approach Used

The fake news detection system was developed using machine learning techniques. The main steps included:  
- Data preprocessing: Stopword removal, lemmatization, and cleaning using regular expressions.  
- Feature extraction: TF-IDF Vectorizer was used to convert text into numerical features.  
- Model training: A Random Forest classifier was trained on a labeled dataset of real and fake news articles.  
- Web app: A Streamlit interface was created to allow users to enter news text or select sample news and get predictions along with confidence scores.

# 2. Challenges Faced

- Ensuring the model generalizes well to unseen, real-world articles was challenging.  
- Initial attempts showed the model predicting most news as fake. This was mitigated by rebalancing training data and improving input preprocessing.  
- Integrating article scraping from URLs caused reliability issues and was later disabled for better stability.  
- Handling short or vague text inputs proved difficult, as they lacked enough context for accurate classification.

# 3. Model Performance & Improvements

The model achieved an accuracy of approximately 99.76% on the test set with a nearly perfect confusion matrix and classification report. This indicates a strong ability to differentiate between fake and real news in the provided dataset.  
  
Improvements made:  
- Enhanced text preprocessing with lemmatization.  
- Added model confidence display in the app.  
- Included preloaded sample articles for easy user testing.  
- Developed a user-friendly Streamlit app with explanations and feedback.  
  
Future work may include:  
- Enabling live article scraping with better reliability.  
- Adding support for different languages.  
- Exploring more advanced NLP models like BERT for further improvements.