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Fake News Detection Using Machine Learning Techniques

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Abstract: *The rapid growth of social media and online news platforms has increased the spread of fake news and misinformation. Fake news can influence public opinion, create confusion, and negatively affect society. To solve this problem, machine learning and natural language processing techniques are widely used for automatic fake news detection.*

This paper presents a review of fake news detection using machine learning algorithms and NLP techniques. The system preprocesses textual news data by cleaning the text, removing stopwords, tokenization, and lemmatization. TF-IDF Vectorization is used to convert text into numerical form for machine learning processing. A Passive Aggressive Classifier is applied to classify news as Fake or Real. The review also discusses different research papers, methodologies, datasets, and limitations in fake news detection systems. The study concludes that machine learning models combined with NLP techniques provide effective and accurate results for detecting fake news.

Keywords: Fake News, Machine Learning, NLP, TF-IDF, Passive Aggressive Classifier, Flask, Text Classification

I. INTRODUCTION

Fake news refers to false or misleading information spread through websites, social media platforms, and online news portals. Due to the rapid increase in internet usage and digital communication, fake news spreads very quickly and creates confusion among people

Manual verification of online news is difficult because huge amounts of information are uploaded every day. Therefore, researchers are using machine learning and natural language processing techniques to automate fake news detection. Machine learning algorithms can analyze text patterns and classify news articles into fake or real categories. NLP techniques help in text preprocessing, tokenization, stopword removal, and lemmatization. TF-IDF Vectorization converts text into numerical values so that machine learning algorithms can process the data efficiently. This paper reviews different fake news detection techniques and machine learning models used for improving accuracy and performance.

II. OBJECTIVE

- To detect fake and real news automatically
- To reduce the spread of misinformation
- To improve accuracy using machine learning algorithms
- To apply NLP techniques for text processing
- To classify news articles using TF-IDF and Passive Aggressive Classifier
- To develop a web-based fake news detection system using Flask

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III. SYSTEM REQUIREMENT

Software Requirement:

- Operating System: Windows 10/11
- Programming Language: Python 3.x
- Frontend: HTML, CSS, Bootstrap
- Backend: Flask
- Libraries: NLTK, Scikit-learn, Pandas, NumPy
- IDE: VS Code / PyCharm

Hardware Requirement:

- Processor: Intel i3 or higher
- RAM: 4GB minimum
- Storage: 20GB free space
- Internet Connection

IV. RELATED WORK

Sr No	Paper Name	Author	Year	Findings	Limitations
1	Fake News Detection on Social Media	Shu et al.	2017	Improved fake news identification accuracy	Requires large datasets
2	Detecting Fake News with Machine Learning	Ahmed et al.	2018	Passive Aggressive Classifier gave good accuracy	Dataset dependency
3	FakeBERT: Fake News Detection	Kaliyar et al.	2021	Better feature extraction and prediction	High computational cost
4	Fake News Detection Using NLP	Perez-Rosas et al.	2018	Effective text classification	Limited multilingual support

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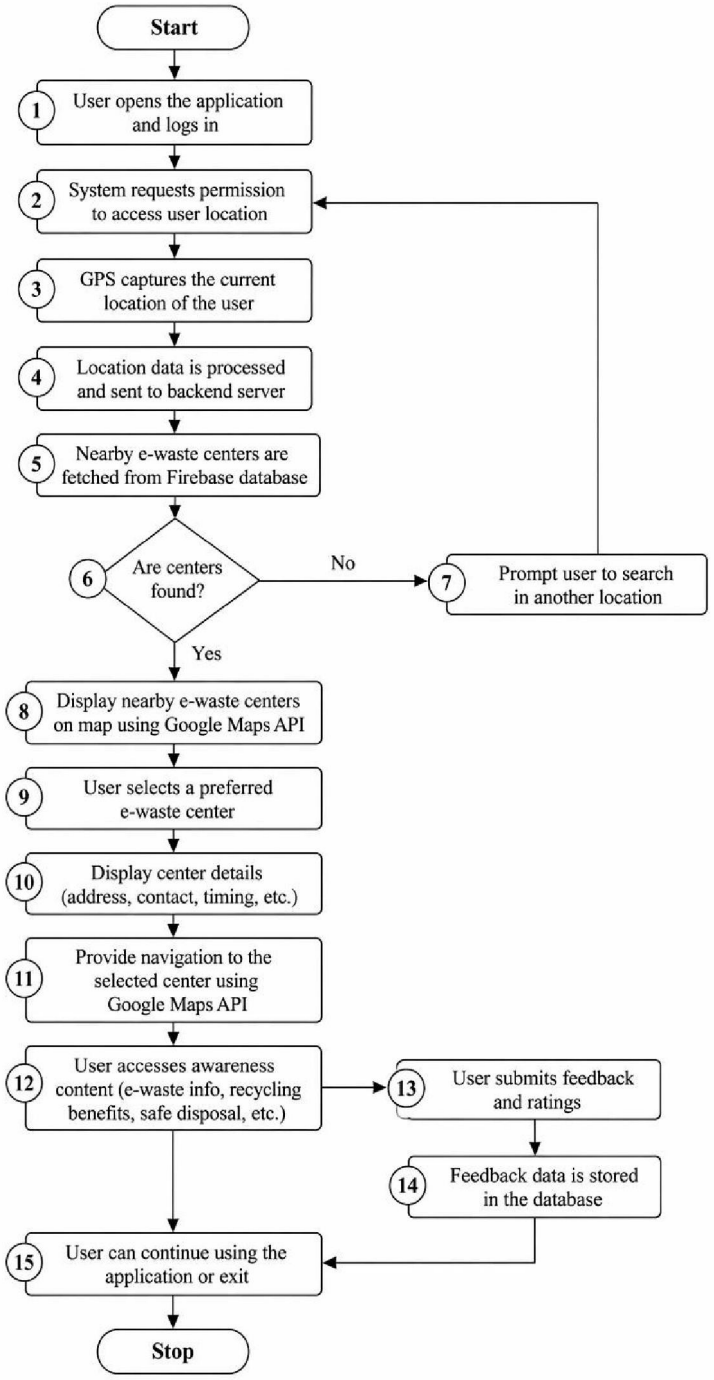
V. FLOWCHART



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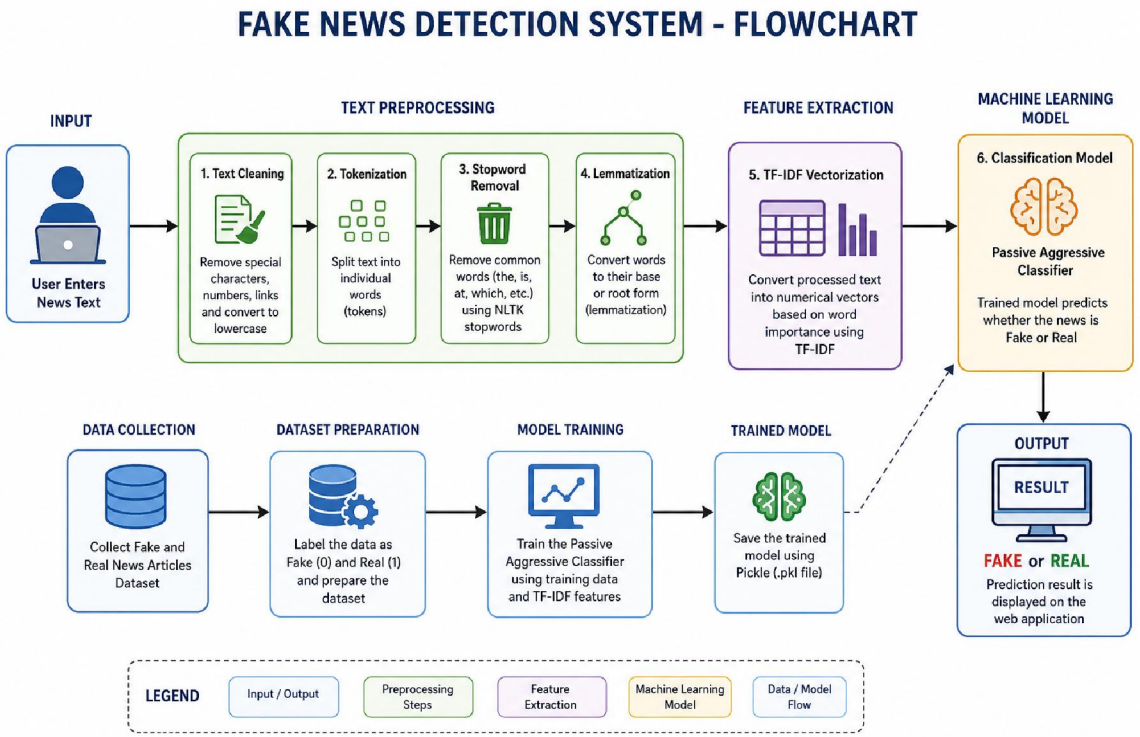
VI. FAKE NEWS DETECTION FLOWCHART



VII. CONCLUSION

Fake news detection has become an important research area because misinformation spreads rapidly through digital platforms and social media. Machine learning and natural language processing techniques provide effective solutions for identifying fake news automatically.

The review shows that algorithms such as Passive Aggressive Classifier, Naive Bayes, Random Forest, and deep learning models can improve fake news detection accuracy. NLP techniques like tokenization, stopword removal, and TF-IDF Vectorization help in efficient text processing and classification.

Future improvements can include deep learning approaches, multilingual fake news detection, and real-time verification systems for social media platforms.

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