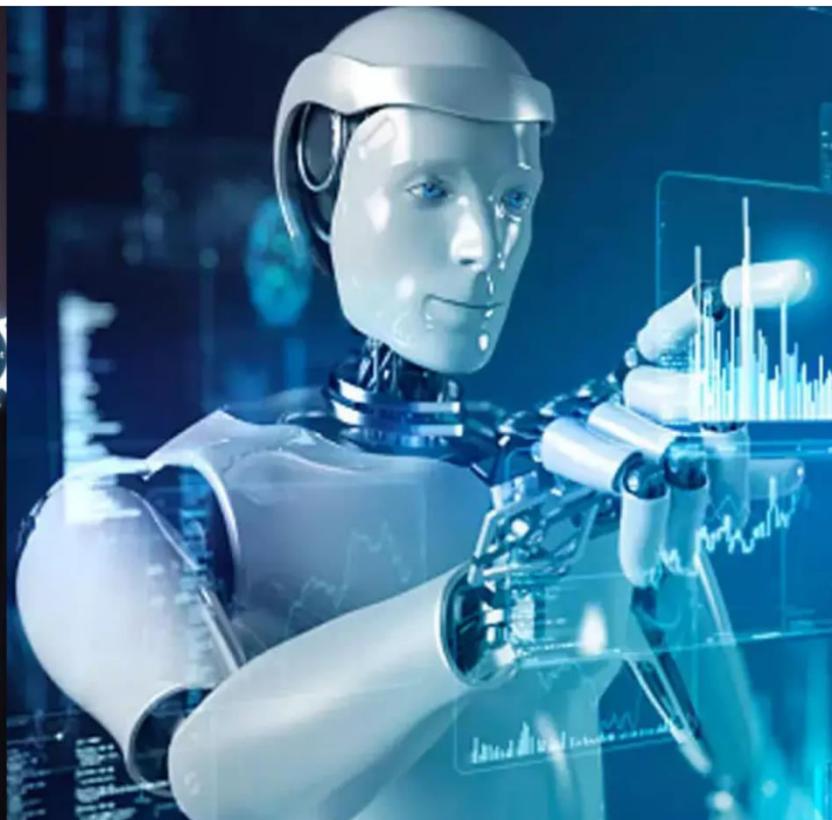




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Fake News Detection using Machine Learning

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ABSTRACT: FakeDetect is a machine learning-based system designed to identify and classify fake news articles automatically. The rapid growth of social media and online platforms has increased the spread of misleading and false information, making manual verification difficult and time-consuming. To address this problem, this research presents the design and implementation of a Fake News Detection System that uses Natural Language Processing (NLP) and Machine Learning algorithms to classify news as real or fake. The system is developed using Python for model training, Flask for backend API services, and a web-based interface for user interaction. The dataset is processed using text preprocessing techniques such as tokenization, stop-word removal, and TF-IDF vectorization. Machine learning models including Logistic Regression, Naive Bayes, and Support Vector Machine are used for classification. Experimental results show that the system can accurately detect fake news and can be used as a scalable solution for online news verification platforms.

KEYWORDS: Fake News Detection, Machine Learning, NLP, Python, Flask, Text Classification, TF-IDF, Logistic Regression, Naive Bayes.

I. INTRODUCTION

In recent years, the use of internet and social media platforms has increased rapidly, allowing information to spread quickly among users. However, this growth has also led to the widespread distribution of fake news, which can mislead people and create serious social problems. Fake news refers to false or misleading information presented as real news, often created to influence public opinion or gain financial benefits.

Traditional methods of verifying news involve manual checking by experts, which is slow and inefficient when large amounts of data are involved. Therefore, automated systems using Machine Learning and Natural Language Processing can help in detecting fake news more efficiently.

This research presents **FakeDetect**, a machine learning-based fake news detection system that analyzes news text and predicts whether the news is real or fake. The system uses text preprocessing, feature extraction, and classification algorithms to perform accurate prediction. The platform provides a simple interface where users can enter news text and receive prediction results instantly.

The proposed system demonstrates how machine learning techniques can improve accuracy and speed in fake news detection.

II. LITERATURE REVIEW

With the increasing use of social media platforms, several studies have focused on detecting fake news using machine learning and natural language processing techniques. Many researchers have used text classification algorithms to analyze news content and identify misleading information.

Previous systems use algorithms such as Naive Bayes, Support Vector Machine, and Logistic Regression for classification of text data. These models provide good accuracy but require proper preprocessing and feature extraction.

Some research also uses deep learning techniques such as LSTM and Neural Networks for better performance, but these methods require high computational power.

Most existing systems focus only on prediction accuracy and do not provide a simple user interface for real-time news verification. Therefore, the proposed system combines machine learning classification with a user-friendly interface to provide an efficient fake news detection platform.

III. METHODOLOGY

The FakeDetect system is implemented using a layered architecture that integrates dataset processing, machine learning model training, backend services, and a user interface for prediction. The system consists of Dataset Layer, Text Processing Layer, Machine Learning Layer, Application Layer, and Database Layer. This architecture ensures proper communication between components and provides accurate fake news detection.

Dataset Layer :

The dataset layer provides the data required to train and test the fake news detection model. The dataset contains real and fake news articles collected from online sources. Each record includes news text and a label indicating whether the news is real or fake. The dataset is stored in CSV format and processed using Python libraries such as Pandas and NumPy. Before training, the dataset is cleaned by removing missing values and duplicate records. The dataset is divided into training data and testing data to evaluate model performance.

Text Processing Layer :

The text processing layer converts raw news text into a format suitable for machine learning. Natural Language Processing techniques such as removing punctuation, removing stop words, converting text to lowercase, and tokenization are applied. After preprocessing, TF-IDF vectorization is used to convert text into numerical values. This helps the model understand important words and improves classification accuracy.

Machine Learning Layer :

The machine learning layer trains the model to classify news as real or fake. Algorithms such as Logistic Regression, Naive Bayes, and Support Vector Machine are used. The model is trained using training data and tested using testing data. The trained model is saved and used for real-time prediction without retraining every time.

Application Layer :

The application layer allows users to interact with the system. The backend is developed using Flask, which provides API services for prediction. Users enter news text in the interface, the server processes the text, and the machine learning model predicts whether the news is real or fake. The result is displayed to the user.

Database Layer :

The database layer stores user inputs and prediction results. A local database such as SQLite or MongoDB can be used. Storing data helps in analyzing system performance and improving the model in the future.

System Architecture Overview

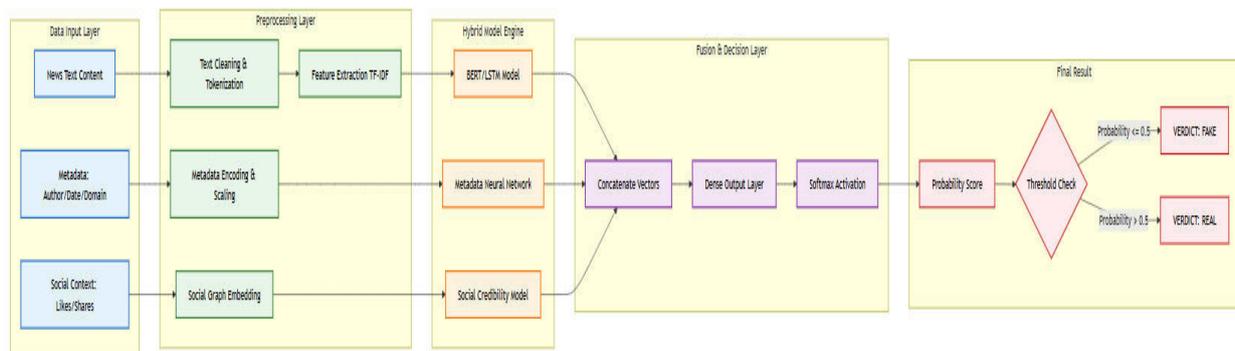


Fig.1 System Architecture

IV. EXPERIMENTAL RESULTS

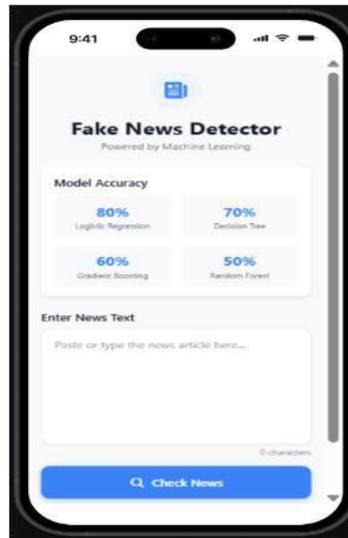


Fig. 2 Detector Screen

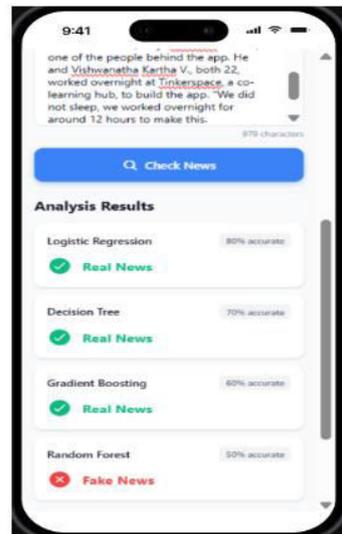


Fig. 3 Result Screen

The experimental implementation confirms that the FakeDetect system successfully detects fake and real news using multiple machine learning algorithms. The developed interface allows users to enter news text and check prediction results instantly. The system shows accuracy of different models and displays classification results clearly. **Fig. 1 Home Screen** shows the main interface of the Fake News Detector application. The screen displays model accuracy values for Logistic Regression, Decision Tree, Gradient Boosting, and Random Forest algorithms. Users can enter news text in the input box and press the check button to analyze the news using machine learning models. **Fig. 2 Result Screen** shows the prediction results generated by the system after analyzing the entered news text. The system displays the output of different machine learning models along with their accuracy. Each model predicts whether the news is real or fake, and the result is shown using status indicators, making it easy for the user to understand the prediction. The developed FakeDetect system demonstrates that machine learning algorithms can be effectively used for automatic fake news detection. The interface is simple and allows fast verification of news content, which improves reliability and reduces manual checking effort.

V. CONCLUSION

This research presented **FakeDetect**, a machine learning-based fake news detection system designed to automatically classify news articles as real or fake. The system uses text preprocessing, TF-IDF feature extraction, and multiple machine learning algorithms to perform accurate classification of news content. The developed model analyzes the given text and predicts whether the news is genuine or misleading.

The implementation using Python, Flask, and machine learning libraries provides an efficient and scalable solution for fake news detection. The user interface allows users to enter news text easily and receive prediction results instantly. Experimental results show that the system provides good accuracy using algorithms such as Logistic Regression, Decision Tree, Gradient Boosting, and Random Forest. The use of multiple models helps in comparing performance and improving reliability of prediction.

The developed FakeDetect system reduces the time required for manual verification of news and helps in controlling the spread of false information on digital platforms. The layered architecture makes the system simple, flexible, and suitable for further improvements.

Future improvements may include the use of deep learning models, larger training datasets, real-time news analysis, and integration with social media platforms for automatic fake news detection on a large scale.

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