

AI-Based Fake News Detection System Using Machine Learning and Full Stack Development

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Abstract— Fake news is a problem on social media and online platforms. It can change what people think and cause confusion. This can really hurt society. The Fake News Detection System is a project that uses intelligence to figure out if news is fake or real. It uses computer programs and techniques to understand what people are saying and writing. The system has an interface that people can use. They can paste a news article into the system. It will tell them if it is fake or real. It will also give them a score that shows how sure it is. The people who made this system used computer tools like Flask and React.js to build it. They also used something called TF-IDF to turn words into numbers that the computer can understand. This project shows that artificial intelligence can be used to stop news and make sure people get the right information. The Fake News Detection System is an example of how artificial intelligence and computers can help us deal with fake news. It is a tool, for people who want to know if a news article is fake or real. The Fake News Detection System can help us make sure that fake news does not spread and hurt people.

Index Terms— Artificial Intelligence, fake news detection, Flask, Logistic Regression, Machine Learning, React.js

I. INTRODUCTION

The internet and social media platforms are where people get their news nowadays. People read news online every day. With more people talking online fake news and wrong information are also spreading fast. Fake news is when someone shares information and says it is true. This can cause a lot of problems like scaring people changing how they think about politics and making them not trust things.

It is hard for people to check if the news they read online is true because there is too much information on the internet. That is why we need systems that can automatically find news and these systems use

Artificial Intelligence and Machine Learning. Machine Learning can look at how words are used in news articles and figure out if they are fake or real.

This project is about a website that can detect news. We made this website using Flask, React.js and Machine Learning algorithms. The website looks at a news article. Says if it is probably fake or real and it also says how sure it is, about its answer. The Fake News Detection System is what we call this website. The Fake News Detection System is important because it helps people know if the news they read is fake or real.

II. OBJECTIVES

The goals of this project are:

- We want to make a system that uses Machine Learning to find news.
- We need to sort news articles into two groups: Fake. Real news.
- To do this project we have a thing we want to accomplish.
- We are going to build a web application using Flask and React.js.
- The fake news detection system will give users a score that shows how confident it is in its prediction.
- We also want to make sure the system looks nice and is easy for people to use so we will design a user-friendly interface, for the fake news detection system.

III. LITERATURE REVIEW

Lots of people are working on finding ways to detect news. They are using Machine Learning and Natural Language Processing to do this. Machine Learning is

really good at helping us figure out if something is real or not. Logistic Regression is a choice for classifying text because it is easy to understand and it works well. We use something called TF-IDF vectorization to turn words into numbers that Machine Learning models can understand. There are also algorithms like Passive Aggressive that're great for learning online. Machine Learning models like LSTM and BERT are really good at detecting news but they need a lot of data and powerful computers to work properly.

Other people who have studied this before have found that cleaning up the data and making sure it is quality is really important for getting accurate results, with Machine Learning and Natural Language Processing and Machine Learning.

IV. PROPOSED SYSTEM

The system is a web-based application that people can use to check the news. The system uses Machine Learning techniques to do this.

1. Frontend Module

We made the frontend using React.js. This is where users can paste news articles to check if they are true or not. There is a text area where you can paste the article.

2. Backend Module

The backend was made using Flask in Python. It takes care of what the user asks for and talks to the Machine Learning model. The backend is very important for our system.

3. Machine Learning Module

We use Logistic Regression to figure out if a news article's Fake or Real. The Machine Learning model is a part of our system. It helps us make sure the news is real.

4. NLP Processing Module

We use TF-IDF to turn text into numbers that the Machine Learning model can understand. This step is necessary, for the prediction.

5. Result Module

When you use our system, you will see the following things:

- The prediction result, which says if the news is Fake or Real

- The confidence percentage, which tells you how sure we are
- A nice result page that is easy to look at. The result page shows you everything you need to know about the news article.

V. METHODOLOGY

Methodology The Fake News Detection System uses a Machine Learning approach to classify news articles as Fake or Real. This approach includes steps: collecting data, cleaning and preparing the data extracting important features training a model making predictions and showing the results.

A. Data Collection

The dataset for training the model includes fake and real news articles from public sources. The dataset has the following information:

- News title
- Author name
- Article content
- Labels indicating Fake or Real news

B. Data Preprocessing

Before training the model we preprocess the text data to improve prediction accuracy. The steps are:

- Convert text to lowercase
- Remove punctuation marks
- Remove characters
- Clean up unnecessary spaces

This helps reduce errors in the dataset and improves the model performance.

C. Feature Extraction

We use TF-IDF to convert text data into numbers that the model can understand. TF-IDF helps identify words in news articles and gives them weights based on how important they are.

This process helps the model understand patterns in the text.

D. Model Training

We use Logistic Regression to train the news detection model. Logistic Regression is good for classification problems and works well with text classification tasks.

The dataset is split into:

- Training dataset
- Testing dataset

The model learns patterns from the training data. Predicts whether news articles are fake or real.

E. Prediction Process

When a user enters a news article through the React.js frontend:

- The article is sent to the Flask backend.
- The backend. Prepares the text.
- TF-IDF transforms the text into vectors.
- The trained Logistic Regression model makes a prediction.
- The prediction and confidence score are sent back, to the frontend.

F. Result Visualization

The frontend shows:

- Real prediction
- Confidence score
- A user-friendly result interface

The system provides an experience for users to verify news articles.

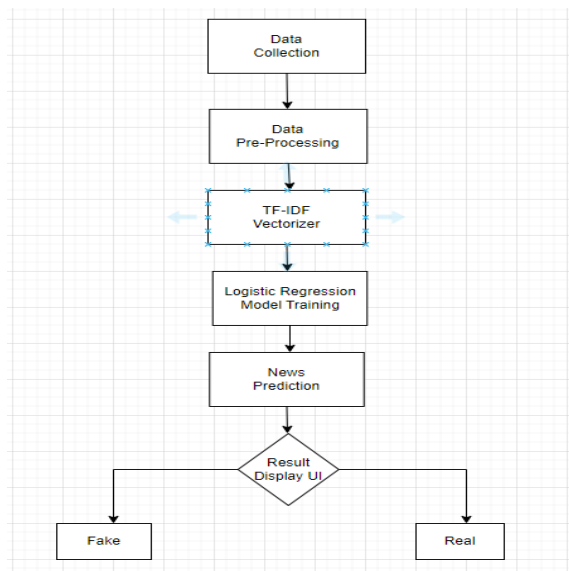


Fig 5.1 Workflow diagram

VI. HARDWARE AND SOFTWARE REQUIREMENTS

A. Hardware Requirements

- Processor: Intel Core i3 or higher
- RAM: 4 GB minimum
- Storage: 20 GB free space
- System Type: 64-bit Operating System

- Internet Connection: Required for package installation

B. Software Requirements

- Operating System: Windows 10/11
- Programming Language: Python 3.x
- Backend Framework: Flask
- Frontend Framework: React.js
- Machine Learning Library: Scikit-learn
- Numerical Library: NumPy
- Data Processing Library: Pandas
- Frontend Technologies: HTML, CSS, JavaScript
- Runtime Environment: Node.js
- Code Editor: Visual Studio Code
- Version Control Tool: Git

VII. RESULT

The Fake News Detection System was. Tested using Machine Learning and Full Stack technologies. It takes news articles from users. Tells them if the news is Fake or Real. The frontend was made with React.js. It is easy to use and interactive. Users can enter news articles there. The Flask backend handles user input. It talks to the trained Machine Learning model to make predictions. The Logistic Regression model was trained with TF-IDF vectorization. It works well in classifying news content based on what the text says. The system also shows confidence scores with prediction results. This helps users understand the results better.

Here are some key features:

1. Fake and Real news prediction
2. Confidence score generation
3. A looking result page
4. Loading animation during prediction
5. Frontend and backend integration
6. Text. Cleaning
7. Result Analysis

This system works well with long news articles. It gives predictions. Data preprocessing and TF-IDF vectorization made the model perform better. They also reduced noise in the dataset.

The frontend is attractive. It makes the application easy to use. This project shows how Machine Learning techniques can help reduce news, on digital platforms. The Fake News Detection System is useful. It can help

users identify news. Machine Learning is key here. The system uses Machine Learning to make predictions.

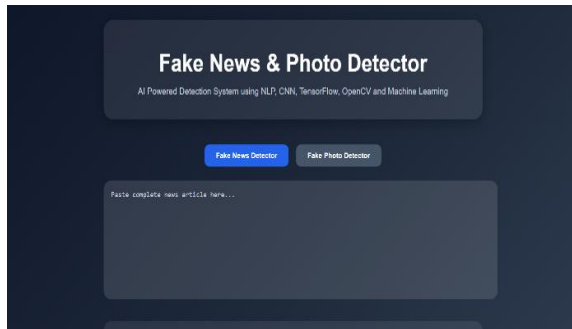


Fig 9.1: main page



Fig 9.2: Input page

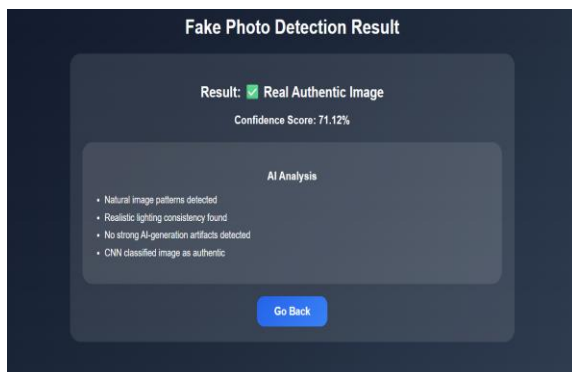


Fig: 9.3 Result

VIII. CONCLUSION

The Fake News Detection System shows how Machine Learning and Full Stack Development can be used to identify news. The system was built using Flask, React.js, TF-IDF vectorization and Logistic Regression to classify news articles as Fake or Real.

The application gives prediction results with confidence scores through an easy-to-use interface. The Fake News Detection System provides these results to help users. Text preprocessing and feature extraction made the Machine Learning model efficient and improved prediction performance. The Fake News Detection System uses these techniques to work. The project highlights the importance of Artificial Intelligence in stopping the spread of misinformation on platforms. The Fake News Detection System is a tool but it is not 100% accurate.

Future improvements such as using Deep Learning models adding support, for languages verifying URLs and fact-checking in real-time can make the Fake News Detection System more accurate and reliable. These improvements can help the Fake News Detection System work better.

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