FAKE NEWS DETECTION
REPORT

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Github Repository: https://github.com/vishnuvardhanreddy2309/CybersecurityAssignment1

FAKE NEWS DETECTION – REPORT

ABSTRACT

Fake news has become a major concern in today's digital era, where misinformation spreads rapidly through online platforms. Such misleading content can influence public opinion, disrupt social harmony, and even cause political or financial damage. This project aims to detect fake news using machine learning techniques. A dataset of real and fake news statements (LIAR dataset) was preprocessed and transformed using TF–IDF vectorization, which converts text into meaningful numerical features. A classification model was then trained to differentiate between real and fake news. The solution was integrated with a Gradio-based interface, enabling users to input any news headline or statement and instantly receive a classification result. This project demonstrates how machine learning can provide a simple, accurate, and user-friendly approach to combating misinformation.

APPROACH

1. The **Problem Definition:** The goal was to detect whether a given news statement is real or fake by analyzing its textual content.

2. **Dataset Preparation:** The LIAR dataset was used, containing thousands of labeled statements from political and public figures, categorized as true, half-true, false, etc. For this project, labels were simplified into *Real* and *Fake*.

3. **Feature Extraction:** Statements were vectorized using **TF–IDF**, which converts words into numerical values while capturing the importance of different terms. For example, words like *"hoax"*, *"conspiracy"*, or sensational claims often appear more in fake news and are given higher weight.

4. **Model Training:** A supervised machine learning model (**Logistic Regression**) was trained on the extracted features to classify news into *Real* or *Fake*.

5. **User Interface (UI):** The trained model was integrated into a **Gradio-based web interface**, allowing real-time interaction. Users can type or paste a news headline/statement, and the system outputs either **"Real"** or **"Fake."**

RESULTS

The Gradio UI made the system easy to use by providing a simple text box for inputs.
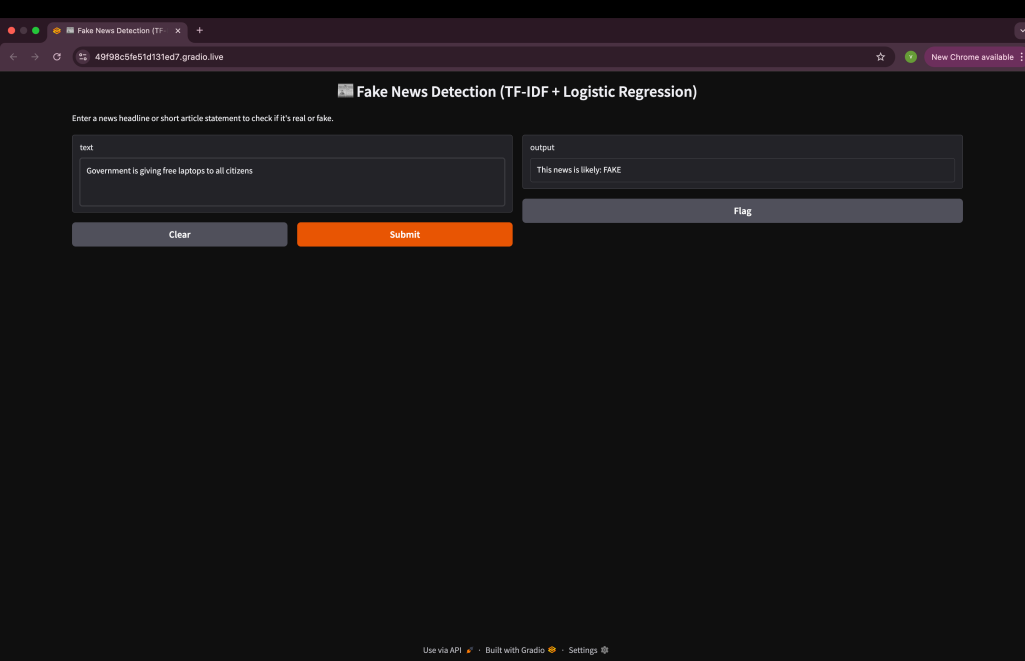
Sample test results:

- *"Government announces free electricity for all citizens starting next month"* → **Fake**
- *"WHO launches new vaccination campaign to prevent flu outbreak in 2025"* → **Real**

This project shows that combining TF–IDF with Logistic Regression can effectively detect misinformation.

The solution emphasizes awareness and prevention, enabling users to verify suspicious claims before believing or sharing them.
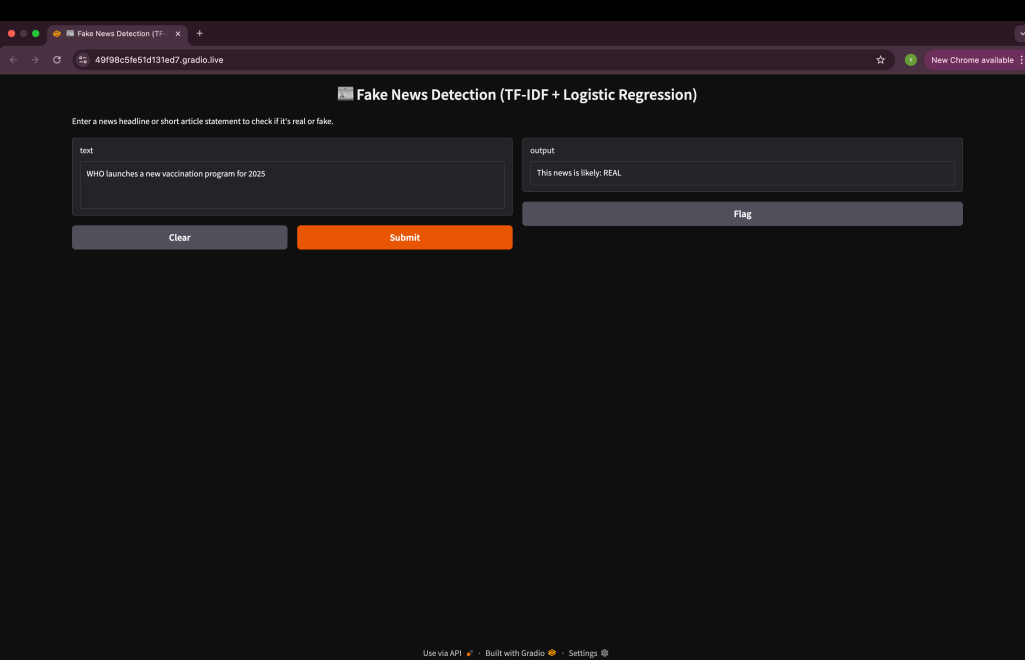
- CASE 1:

Shows **"Fake"** because the statement resembles misleading patterns learned from the dataset.

CASE 2:

Shows **"Real"** because the statement is aligned with credible patterns from the dataset.

EXISTING TOOLS EXPLORED

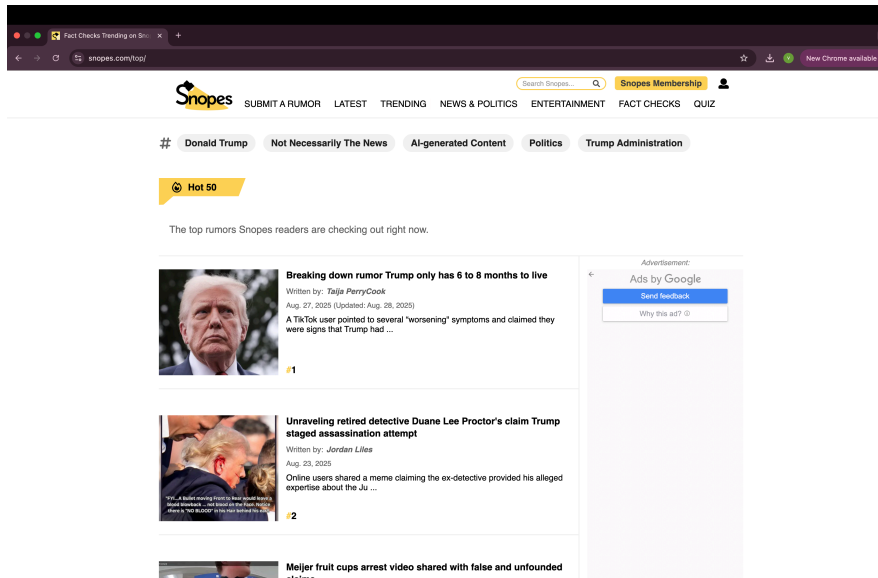During this project, two widely used fact-checking platforms were explored to compare with the developed system:

- **Google Fact Check Tools** – Aggregates fact-checks from trusted organizations and allows users to search for specific claims.
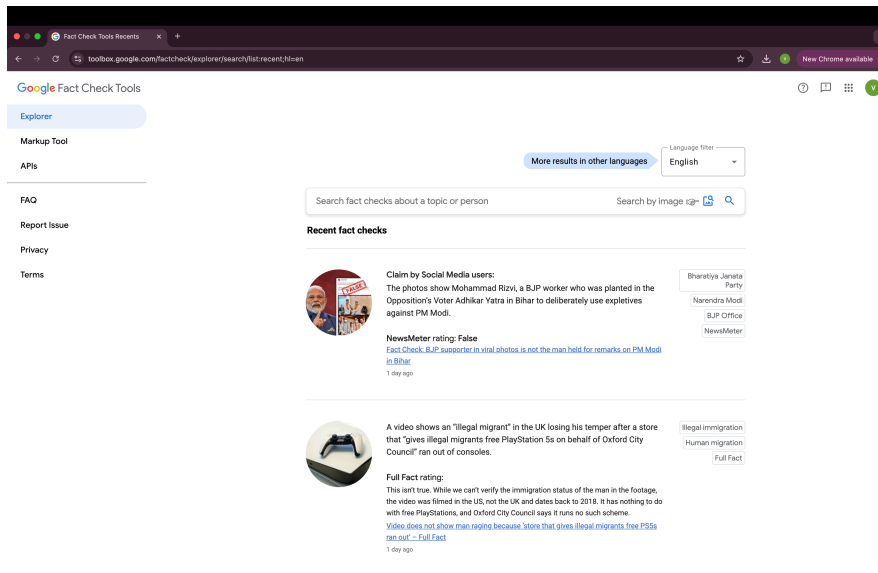
- **Snopes** – A popular fact-checking site that verifies viral news, social media rumors, and misinformation.

These tools provided valuable insights and served as benchmarks for evaluating the proposed solution.

CONCLUSION

This project successfully demonstrated how machine learning, combined with natural language processing, can help detect fake news. By leveraging the LIAR dataset, applying TF–IDF for feature extraction, training a Logistic Regression classifier, and integrating the model with Gradio for a user-friendly interface, the solution achieved effective results in classifying news statements as real or fake. This approach highlights how AI can support digital literacy and combat misinformation in online media.