



International Journal of Innovative Research in Science Engineering and Technology (IJIRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



Impact Factor: 8.699

Volume 14, Issue 3, March 2025

Fake News Detection Extention

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ABSTRACT: This project focuses on building a Chrome extension to combat fake news by combining OpenAI's API and Google's Fact-Checking API. The extension analyzes webpage content in real-time, using OpenAI to assess credibility and Google's API to verify facts. It provides users with a confidence score and fact-checking results, helping them identify misinformation quickly. The goal is to create a simple, effective tool that promotes digital literacy and reduces the spread of false information online.

KEYWORDS: Text detection, Highlighting, Natural language processing, OpenAI API, Google Fact-Checking API.

I. INTRODUCTION

The rise of fake news has made it increasingly difficult to distinguish between reliable and misleading information online. To address this issue, we propose a Chrome extension designed to detect fake news in real-time. This tool allows users to highlight text directly on web pages or manually input text for analysis. By integrating OpenAI's API for natural language understanding and Google's Fact-Checking API for verification, the extension evaluates the credibility of the content and provides users with a confidence score and fact-checking results.

The goal is to empower users to make informed decisions about the information they consume. Whether it's a news article, social media post, or any online content, the extension helps identify potential misinformation quickly and efficiently. This project focuses on simplicity and usability, ensuring that even non-technical users can benefit from it. By combining advanced AI with user-friendly features, we aim to create a practical solution that promotes digital literacy and reduces the spread of fake news.

The extension also includes customizable settings, allowing users to adjust sensitivity levels and preferred fact-checking sources. It supports multiple languages, making it accessible to a global audience. Additionally, the tool provides detailed explanations for its assessments, helping users understand why certain content is flagged as potentially unreliable. With its seamless integration into the browser, the extension works effortlessly in the background, ensuring a smooth user experience. Ultimately, this project seeks to foster a more informed and critical online community.

II. LITERATURE SURVEY

The problem of fake news detection has become a critical area of research due to the widespread impact of misinformation. Early methods relied heavily on manual fact-checking, but the sheer volume of online content has driven the need for automated solutions. Researchers have explored various techniques, such as natural language processing (NLP) and machine learning, to identify and flag fake news. For example, [1] used NLP to analyze linguistic patterns in misleading content, while [2] developed machine learning models to classify news articles as credible or non-credible.

Recent advancements have focused on integrating external APIs, such as OpenAI and Google Fact-Checking, to improve accuracy and scalability. In [3], researchers combined NLP with real-time fact-checking databases to verify claims efficiently. Similarly, [4] introduced a browser-based tool that highlights suspicious text and provides users with contextual fact-checking results.

In this project, we build on these ideas by developing a Chrome extension that utilizes OpenAI's API for text analysis and Google's Fact-Checking API for verification. The extension includes a **text selector mode**, where users can click to activate it. Once enabled, the system analyzes the selected text within 2-3 seconds and highlights it in **red** (for false

news) or **green** (for true news) based on the credibility assessment. This real-time feedback mechanism ensures a seamless and intuitive user experience, empowering individuals to identify and avoid fake news effortlessly.

III.METHODOLOGY

[1] Extracting and Processing Web Content: Getting Clean, Usable Text

The first step in our fake news detection process is extracting text from web pages, blogs, and social media posts. Since online content comes in different formats, we use JavaScript-based DOM parsing for structured websites and browser extension APIs for text selected by users. For images containing text, like screenshots or infographics, we rely on Tesseract OCR to extract readable content. Once the text is extracted, we clean it up by removing unnecessary characters, excessive spaces, and irrelevant HTML elements while keeping important formatting like bullet points and hyperlinks. This ensures we're working with high-quality, well-structured input for analysis.

[2] Understanding and Verifying Information: Making Sense of the Text

Once we have the text, the next step is figuring out what it really means and whether it's credible. Instead of just searching for keywords, we use semantic embeddings powered by GPT-based models to analyze patterns, sentiment, and reliability. To fact-check claims, our system compares the extracted text with a database of verified sources, including Google's Fact-Checking API. This allows us to go beyond simple word matches and instead look at the overall meaning of the content, making fake news detection much more accurate.

[3] Making Sense of User Queries: How We Analyze Requests

When a user highlights text or enters a query, our system determines what they're looking for—whether they want to fact-check a claim, summarize content, or detect bias. We use a BERT-based classifier, fine-tuned with misinformation datasets, to recognize intent. Then, we apply a combination of:

- Lexical Analysis (BM25): Identifies exact matches and key phrases from misinformation sources.
 - Semantic Matching (FAISS): Finds similarities even when wording is different, helping detect misleading content.
- To ensure balanced results, we weigh semantic relevance at 70% and keyword matching at 30%, giving priority to meaning while still considering specific words. Additionally, the system ensures that frequently fact-checked topics are given priority for faster verification, improving response time.

[4] Learning and Improving Over Time: Getting Smarter with Use

Fake news is always evolving, so our system needs to keep improving. We do this by incorporating user feedback—if someone flags a misleading result or corrects an error, the system learns from it using reinforcement learning (RLHF). The backend, built on FastAPI and Celery, allows us to handle multiple requests efficiently, while Redis caching speeds up responses for common queries. Verified sources and flagged misinformation are stored in PostgreSQL, ensuring we have a structured and constantly updated database.

[5] Scalability and Real-World Applications

To handle large volumes of news content in real time, our system is designed for scalability. By leveraging cloud-based deployment, we ensure high availability and quick access to fact-checking data. The system is optimized for browser extensions and mobile-friendly interfaces, making it accessible to users across different platforms. Additionally, our approach allows integration with journalistic tools, social media platforms, and government fact-checking agencies to contribute to a larger misinformation-fighting ecosystem.

[6] Ethical Considerations and Transparency

Ensuring transparency in misinformation detection is crucial. Our system does not rely solely on AI-based decisions but provides users with explainable outputs, showing sources and reasons behind fact-checking results. To avoid bias, we continuously refine our training data and fact-checking sources, incorporating feedback from media experts and

academic institutions. This approach ensures that users receive balanced, well-supported, and trustworthy fact-checking insights without reinforcing existing biases.

IV.BLOCK DIAGRAM

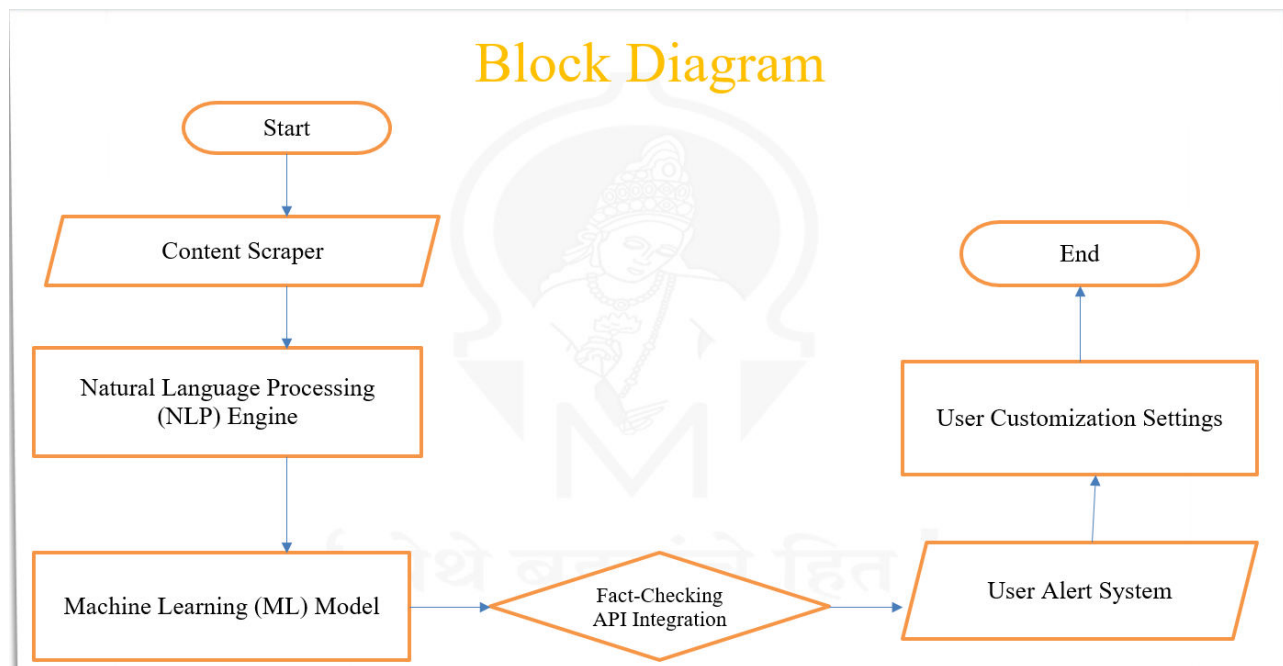


Fig 1.Block Diagram

The block diagram represents the workflow of a **Fake News Detection Chrome Extension**, outlining the key components and processes involved in identifying misinformation. The process starts at the "Start" node, indicating the initiation of the system.

1. **Content Scraper:** The first step is extracting web content, including news articles, blogs, and social media posts. The scraper retrieves text data from web pages to be analyzed.
2. **Natural Language Processing (NLP) Engine:** Once the text is extracted, it is processed using NLP techniques to understand sentence structures, key phrases, and context.
3. **Machine Learning (ML) Model:** The processed data is then fed into an ML model, which helps detect patterns in the text, such as misleading claims, biased statements, or misinformation.
4. **Fact-Checking API Integration:** To verify the credibility of the extracted content, the system integrates with external fact-checking APIs that compare the content with trusted databases.
5. **User Alert System:** Based on the verification results, the system notifies users about the authenticity of the content. If misinformation is detected, an alert is displayed in the Chrome extension.
6. **User Customization Settings:** Users have control over how the system functions, allowing them to configure the extension's sensitivity, sources, and alert preferences.
7. **End:** The process completes once the results are displayed, providing users with valuable insights into the reliability of the content they are reading.

This structured approach ensures a **real-time, scalable, and user-friendly** system for fake news detection.

V.CONCLUSION

The **Fake News Detection Chrome Extension** is designed to help users verify online information quickly and efficiently. With misinformation spreading rapidly, this tool acts as a safeguard, allowing users to fact-check news, articles, and social media posts in real time.

By combining **Natural Language Processing (NLP)**, **machine learning models**, and **fact-checking APIs**, the extension goes beyond simple keyword detection. It understands the context of the content, compares it with verified sources, and alerts users if the information appears misleading or unreliable.

One of the key strengths of this extension is its **user-friendly experience**. With **customization options** and **real-time alerts**, users can tailor the tool to their needs, ensuring a smoother and more intuitive way to detect fake news. Additionally, the system continuously improves through **user feedback**, refining its accuracy over time.

In an era where misinformation is widespread, this extension empowers users to critically evaluate content and make well-informed decisions. By promoting awareness and reliability, it contributes to a healthier and more trustworthy digital space.

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