

Detection of Deceptive in Online Reviews in E-Commerce

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ABSTRACT: Fake reviews have become a major problem for e-commerce sites like Amazon and Flipkart, tricking buyers and damaging product credibility. The project is a web-based application on detection of deceptive online reviews in e-commerce by application of Natural Language Processing (NLP) and Machine Learning (ML) methods. The system classifies reviews as Fake or Genuine using Multinomial Naive Bayes algorithm with TF-IDF vectorization. Also, it has advanced components like Spam Reviewer Detection, Fake Review Attack Detection and a calculation of a Reviewer Trust Score. It assists users and administrators to identify suspicious activities and helps to maintain confidence in online platforms.

I. INTRODUCTION

The rapid development of e-commerce platforms has changed how people shop online. Customers heavily rely on product reviews and ratings before they make their purchasing decisions. Online reviews help users to understand the quality, performance and reliability of products. However, the increase in online shopping has also led to an increase in fake or deceptive reviews. These fake reviews are created to mislead consumers, either by promoting products unfairly or by damaging them.

Reviews may be deceptive and posted by paid reviewers, competitors, or automated bots. Fake positive reviews promote the popularity of the product and fake negative reviews damage the reputation of competing products. This affects customer trust and can lead to wrong buying decisions. Hence, detecting fake reviews has become an important challenge for e-commerce platforms.

This project “Detection of Deceptive Online Reviews in E-Commerce” is focused on detecting fake reviews using Natural Language Processing (NLP) and Machine Learning (ML) techniques. The system checks the review text and classifies reviews as genuine or fake.

It also provides some features like spam reviewer detection, fake review attack detection and reviewer trust score calculation to improve accuracy and reliability. The main aim of this project is to improve transparency, build customer trust and provide a reliable review system for e-commerce platforms. The system provides several advantages for customers and e-commerce platforms. It guarantees that reviews are genuine and trustworthy, making it easier for customers to make informed buying choices. It protects honest sellers from unfair competition and enhances the credibility of online marketplaces. Moreover, the automated process of review analysis reduces the manual efforts of monitoring and increases system efficiency.

The main goal of this project is to provide e-commerce platforms with a secure and reliable review system, as well as to increase customer trust and improve transparency. The system helps to promote fair business practices and preserve the integrity of digital marketplaces by effectively identifying fake reviews. The rapid rise of online shopping has made intelligent fake review detection systems essential for ensuring customer satisfaction and trust in e-commerce platforms.

II. EXISTING SYSTEM

The existing system for managing online reviews has several disadvantages. Most e-commerce platforms use basic filtering methods or manual moderation, which are not effective in detecting deceptive reviews accurately. These systems lack advanced Machine Learning (ML) and Natural Language Processing (NLP) techniques, allowing many fake reviews to remain undetected and mislead customers. Additionally, the system cannot properly analyze reviewer behavior, such as repeated reviews or unusual activity. It also fails to identify coordinated fake review attacks by groups of users. Furthermore, there is no trust score mechanism to measure reviewer credibility. Due to low accuracy, lack of automation, and inability to detect complex fraudulent patterns, the existing system is unreliable and less efficient.

DISADVANTAGES

- Cannot accurately detect fake or deceptive reviews
- Relies on manual checking and basic filtering methods
- No analysis of reviewer behavior or trust score system
- Low accuracy and inefficient review detection process

III. PROPOSED SYSTEM

The proposed system, “Detection of Deceptive Online Reviews in E-Commerce,” uses Natural Language Processing (NLP) and Machine Learning (ML) to identify deceptive and genuine reviews accurately. The system applies the Multinomial Naive Bayes algorithm along with text preprocessing and TF-IDF feature extraction for effective classification. It also performs behavioral analysis to detect spam reviewers based on repeated activity, duplicate reviews, and unusual patterns. In addition, the system identifies coordinated fake review attacks and calculates reviewer trust scores to measure user credibility. An interactive dashboard provides visual reports and monitoring features. Overall, the system offers an automated, reliable, and efficient solution for improving trust in e-commerce review platforms.

ADVANTAGES

- Uses Machine Learning for accurate fake review detection
- Automatically identifies deceptive and genuine reviews
- Uses NLP for effective text analysis
- Detects spam reviewers and coordinated fake review attacks
- Provides reviewer trust score for better credibility evaluation

IV. SYSTEM ARCHITECTURE

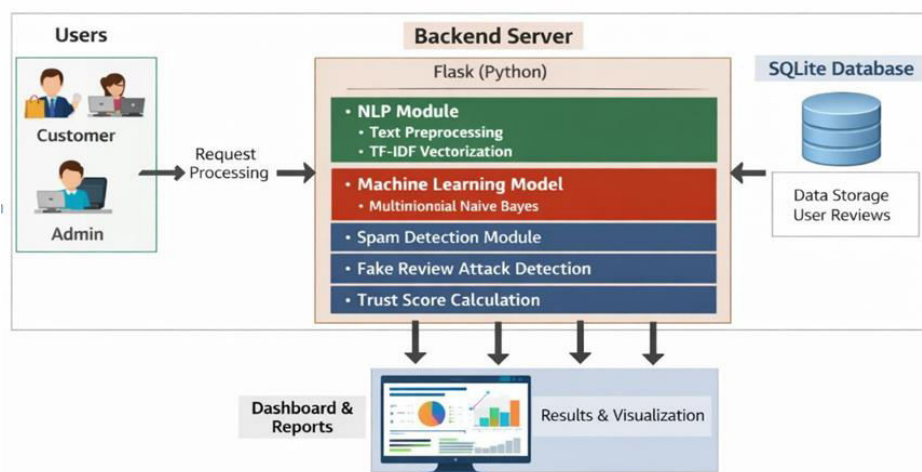


Fig No: 4.1

V. MODULE DESCRIPTIONS**1. User Authentication Module**

The User Authentication Module is responsible for managing secure access to the system. It allows new users to create accounts through the registration process and enables existing users to log in using their username and password. This module ensures that only authorized users can access the application and perform specific operations. It also supports both user and admin roles, where users can submit and view reviews, while administrators can monitor review activities, manage users, and analyze detection results. By maintaining secure authentication, the module protects user information and improves system reliability.

2. Review Collection Module

The Review Collection Module is designed to collect and store product reviews submitted by users. Through this module, customers can provide their feedback, product ratings, and review comments based on their shopping experience. The system stores important details such as product name, review text, reviewer information, and rating values in the database. This collected review data serves as the primary input for further analysis and fake review detection. The module ensures proper organization and management of review data within the system.

3. Text Preprocessing Module

The Text Preprocessing Module plays an important role in preparing review data for analysis. Since raw review text may contain unwanted symbols, numbers, punctuation marks, and irrelevant words, preprocessing helps clean and standardize the data. The module performs operations such as tokenization, stop-word removal, stemming, and lemmatization. Tokenization splits the review into individual words, while stop-word removal eliminates commonly used words such as "is," "the," and "are." Stemming and lemmatization convert words into their root form for better analysis. These preprocessing techniques improve the efficiency and accuracy of the machine learning model.

4. Fake Review Detection Module

The Fake Review Detection Module is the core component of the system. This module uses Machine Learning algorithms, particularly the Naïve Bayes classifier, to analyze review content and classify reviews as fake or genuine. The algorithm is trained using review datasets containing both genuine and deceptive reviews. By analyzing textual patterns, review behavior, and sentiment information, the system predicts whether a review is trustworthy or misleading. This automated detection process helps reduce manual effort and improves the accuracy of fake review identification.

5. Spam Reviewer Detection Module

The Spam Reviewer Detection Module focuses on identifying suspicious users who frequently post deceptive reviews. Some users may repeatedly submit fake reviews for multiple products within a short period. This module analyzes reviewer activities, review frequency, repeated comments, and unusual behavior patterns to detect spam reviewers. By identifying suspicious accounts, the system helps prevent manipulation of product ratings and improves the reliability of the review platform.

6. Fake Review Attack Detection Module

The Fake Review Attack Detection Module is designed to identify coordinated fake review activities performed by groups of users. In many cases, fake reviews are posted in large numbers within a short time to artificially increase or decrease product ratings. This module analyzes sudden spikes in review counts, repeated review patterns, and abnormal reviewer behavior to detect such attacks. By recognizing coordinated review manipulation, the system helps maintain fairness and transparency in the e-commerce platform.

7. Reviewer Trust Score Module

The Reviewer Trust Score Module evaluates the credibility and reliability of each reviewer in the system. A trust score ranging from 0 to 100 is assigned to users based on their review quality, consistency, and behavior history. Users who regularly post genuine and meaningful reviews receive higher trust scores, while suspicious or spam reviewers receive lower scores. This module helps customers identify trustworthy reviewers and supports more reliable review analysis.

8. Dashboard and Reporting Module

The Dashboard and Reporting Module provides a visual representation of system results and review analysis. It displays important information such as the number of fake and genuine reviews, spam reviewer details, trust scores,

and review statistics using charts, graphs, and reports. The admin can monitor system performance and review activities through an interactive dashboard. This module improves data visualization, simplifies monitoring, and helps administrators make better decisions regarding review management and fraud detection.

9. Live Review Fetcher Module

The Live Review Fetcher Module is used to collect real-time product reviews from popular e-commerce platforms such as Amazon, Flipkart, and Meesho. This module automatically fetches the latest reviews using web scraping and API integration techniques. The collected reviews are then sent to the fake review detection system for analysis.

The main purpose of this module is to reduce manual data entry and provide real-time review analysis. It helps the system continuously monitor newly posted reviews and identify fake or deceptive reviews instantly. The module improves system efficiency by collecting large amounts of review data automatically from different platforms.

This module also supports faster detection of spam reviews, coordinated fake review attacks, and suspicious reviewer behavior. By providing live review data, the system becomes more accurate, dynamic, and reliable for e-commerce review monitoring.

VI. RESULT

1. DASH BOARD

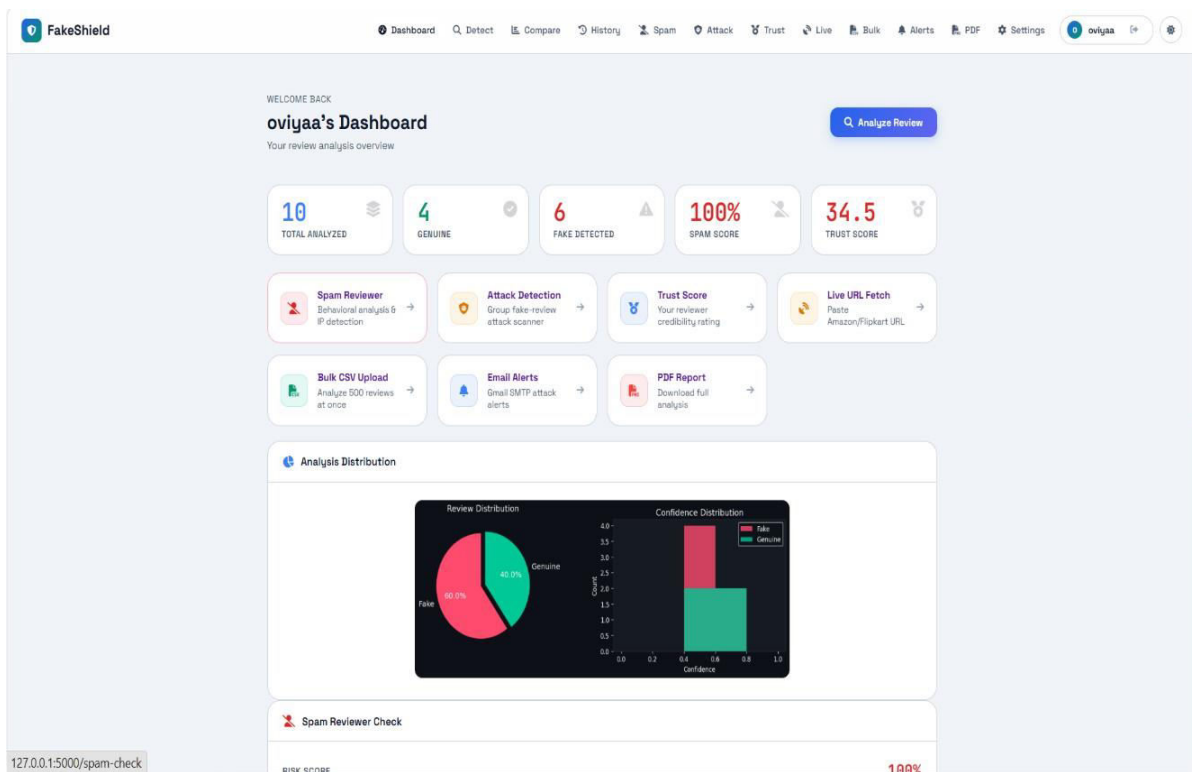


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2. LIVE REVIEW FETCHER

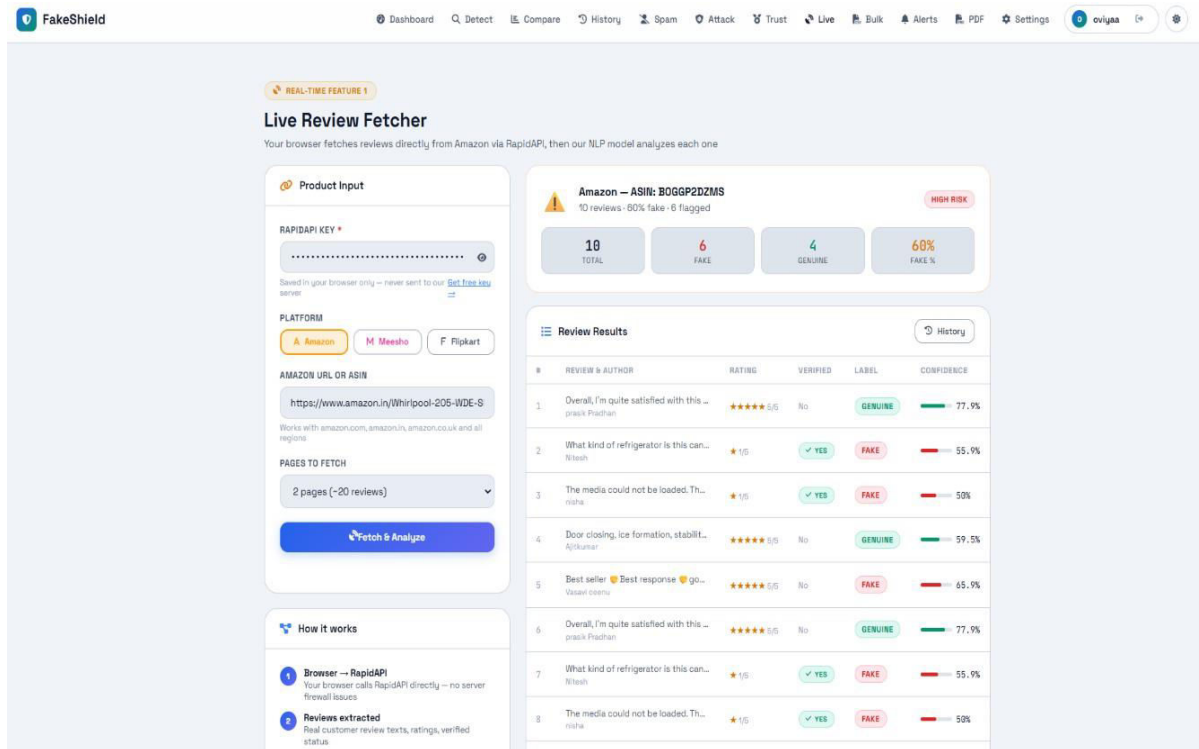


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3. REVIEW SCORE

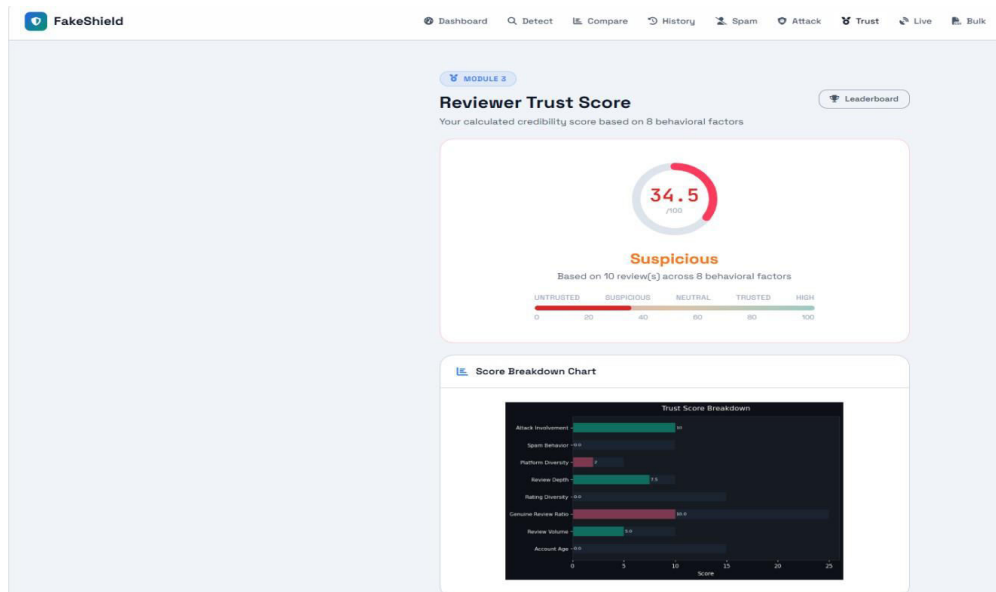


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4. EXPORT PDF

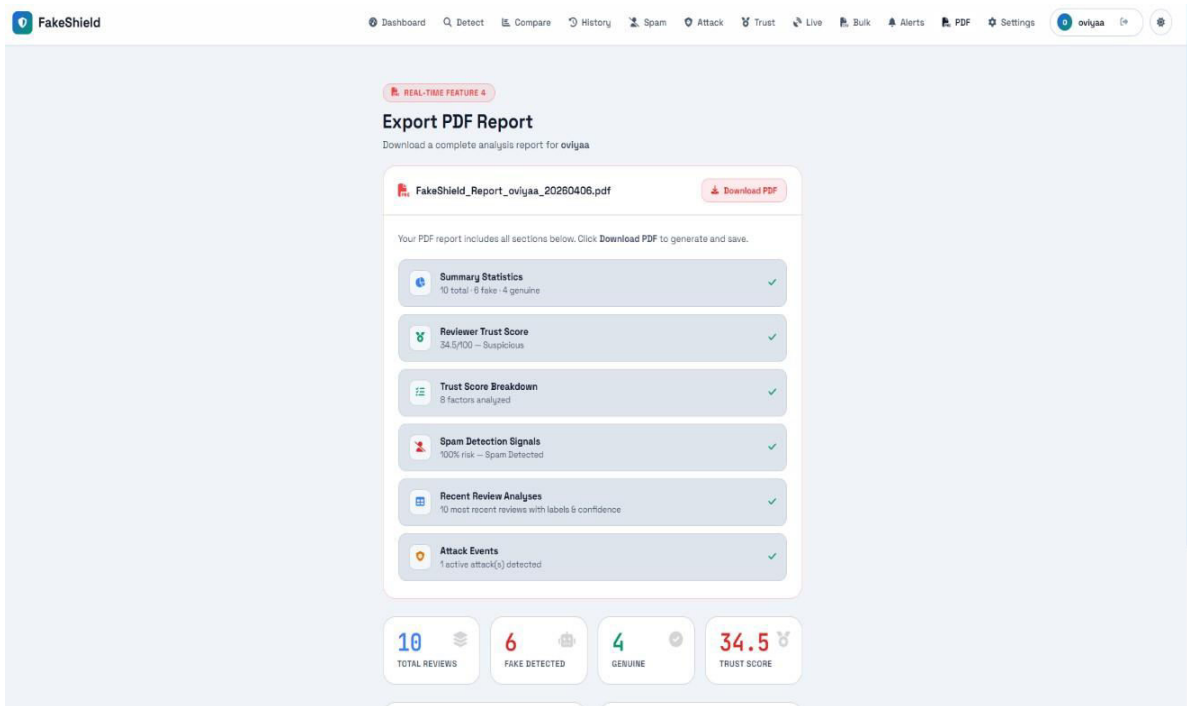


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VII. CONCLUSION

The project “Detection of Deceptive Online Reviews in E-Commerce” provides an effective solution to identify fake and misleading reviews using advanced technologies like Natural Language Processing (NLP) and Machine Learning (ML). The system successfully analyzes review content and user behavior to classify reviews as deceptive or genuine with good accuracy. It also includes important features such as spam reviewer detection, fake review attack detection, and reviewer trust score calculation, which improve the reliability of the system.

By automating the detection process, the system reduces manual effort and helps users make better purchasing decisions. It also increases transparency and trust in e-commerce platforms. Overall, this project demonstrates how modern technologies can be applied to solve real-world problems efficiently and can be further enhanced with advanced models and real-time integration in the future.

VIII. FUTURE ENCHANCEMENTS

The project “Detection of Deceptive Online Reviews in E-Commerce” can be further improved by incorporating advanced technologies and additional features. In the future, deep learning models such as LSTM and BERT can be used to increase the accuracy of fake review detection. The system can be integrated with real-time e-commerce platforms like Amazon or Flipkart to analyze reviews instantly.

A mobile application can also be developed to make the system more accessible to users. Additionally, multi-language support can be added to detect fake reviews in different languages. The system can be enhanced with real-time notifications to alert administrators about suspicious activities. Advanced behavioral analysis using IP tracking and geolocation can further improve spam detection. Moreover, continuous model training with updated datasets can help the system

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