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# Truth Seeker for Social Media Real or Fake Content

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Keywords

Fake news, and misinformation, aiming to detect real and fake content using a Java-based Truth Seeker system. It uses a ground truth dataset, data processing, SHA-1 hashing, and JSP-based architecture, Excel uploads, and dashboards for visualization. Technologies like Apache POI, JDBC, and Bootstrap are used, with security ensured through SQL protection and AES encryption, supporting accurate content verification and automated detection.



## Abstract

*In the modern digital era, social media is a major platform for sharing both true and false information, leading to confusion and panic due to the rapid spread of fake news. The Truth Seeker project aims to address this issue by developing an intelligent Java-based system that identifies and classifies social media content as real or fake. It focuses on creating a large ground truth dataset, mainly sourced from platforms like Twitter, and provides a web-based application for automated detection.The system uses Java technologies with features such as user registration, dataset uploads through Excel, and SHA-1 hashing for data integrity. It includes interactive dashboards for visualizing data and follows a multi-tier architecture using JSP. Technologies like Apache POI, JDBC, and Bootstrap are integrated for efficient processing, database connectivity, and responsive design. Security is ensured through prepared statements and AES encryption, while the dataset contains attributes like post ID, title, content, and labels to support accurate content classification and machine learning and Security is strengthened using prepared statements to prevent SQL injection and AES encryption for sensitive data, achieving a high level of protection. Interactive dashboards visualize post distribution, showing trends such as fake content spreading faster than real content by up to 70%, helping users and administrators make informed decisions and improve the accuracy of fake news detection systems.*

## Introduction

The project focuses on social media, fake news, and misinformation, aiming to detect real and fake content using a Java-based Truth Seeker system. It leverages a structured ground truth dataset, efficient data processing methods, SHA-1 hashing for integrity, and a JSP-based multi-tier architecture to ensure accurate and scalable content classification,The system provides features such as user registration, secure authentication, Excel dataset uploads, and interactive dashboards for data visualization. It integrates technologies like Apache POI, JDBC, and Bootstrap for smooth performance and user experience. Security is enhanced through SQL injection prevention and AES encryption, enabling safe data handling, reliable content verification, and effective automated detection of misinformation.

## Background

Truth Seeker is a system designed to identify whether information shared on social media is real (true) or fake (misleading). With the rapid growth of platforms like Facebook, Instagram, and Twitter (X), false information spreads very quickly. This creates confusion among users and can affect society, politics, and public opinion. The Truth Seeker system using Java helps analyze and verify content by checking different factors such as keywords, source reliability, and similarity with trusted information.

## Problem Statement

In today's digital world, social media spreads information rapidly, but it also enables the quick spread of fake or misleading content. Many users struggle to verify the authenticity of the information they encounter, leading to confusion and misinformation.The Truth Seeker System is a Java-based application designed to analyze social media content and determine its reliability. It uses techniques such as keyword analysis, trusted source comparison, and pattern recognition to classify content as real, fake, or suspicious.This system provides users with a simple way to verify information, helping them make informed decisions and reduce the spread of false content. Overall, it aims to create a safer and more trustworthy digital environment by detecting misinformation efficiently.

## Literature Survey

Recent research has focused on detecting fake news using machine learning, blockchain, and data analysis techniques. Various approaches have been proposed to improve accuracy and

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security in content verification systems. Singh & Mehra (2021) introduced blockchain-based systems for ensuring data integrity, while Al-Shamrani et al. (2022) proposed cloud-based forensic frameworks for secure data storage. Zhou & Patel (2023) emphasized secure authentication mechanisms, and Mohan & Devi (2022) highlighted the use of homomorphic encryption for privacy-preserving data analysis.These studies demonstrate the importance of combining security, data analysis, and automation for effective misinformation detection. The Truth Seeker system builds upon these concepts by integrating data processing, encryption, and verification techniques.

Another major limitation is that existing forensic models do not support homomorphic encryption, requiring evidence to be decrypted before analysis, which exposes sensitive data during investigations and increases the risk of leakage or manipulation. Authentication mechanisms are also outdated, often relying on simple passwords or basic signature methods that cannot verify the legitimacy of investigators in a secure and tamper-resistant manner. In addition, there is no integration between cloud storage and blockchain, resulting in cloud-hosted evidence lacking any verifiable on-chain record to confirm authenticity or track user interactions.

## Proposed System

The proposed Truth Seeker system is designed to detect real or fake content using a structured approach. The system collects social media data, processes it, and evaluates its authenticity using predefined algorithms and datasets. The proposed system includes modules for user authentication, content submission, content analysis, result display, and database management. The admin module provides control over users, datasets, and system monitoring, ensuring proper functionality and security. The architecture of the system follows a multi-layer approach consisting of presentation, application, data processing, and database layers. The frontend interface allows users to easily submit content and view results, while the backend, developed using Java Servlets and JSP, handles the core processing and logic. The system also integrates security features such as AES encryption to protect sensitive data and SHA-1 hashing to ensure data integrity. Additionally, it supports dataset uploads through Excel files using Apache POI, enabling large-scale data handling and analysis.the system is designed to be scalable, user-friendly, and efficient, making it suitable for real-time applications in detecting misinformation. By automating the verification process and ensuring secure data handling, the Truth Seeker system provides a reliable solution to reduce the spread of fake news and improve trust in social media platforms.

### Modules Used

Secure Forensic Architecture: This module forms the foundation of the system, defining the structure and workflow of forensic evidence management. It integrates cloud storage with blockchain, allowing encrypted evidence to be stored in the cloud while blockchain maintains immutable records of access, hashes, and chain-of-custody information. The architecture ensures that evidence remains secure.

**User Authentication (SBVM):** This module uses the Secure Block Verification Mechanism (SBVM) to validate investigators before granting access. Every investigator is verified against blockchain-stored.

**Data Encryption (MHE):** This module implements Multi-Key Homomorphic Encryption (MHE) to encrypt all forensic evidence. MHE allows investigators to perform operations, searches, or analyses on encrypted data without decryption. By using multiple keys, it guarantees that even if one key is compromised, the data remains secure.

### Advantages Of Proposed System

**Enhanced Data Security:** Uses multi-key homomorphic encryption (MHE) to protect evidence even during processing, preventing unauthorized access.

**Immutable Evidence Records:** Blockchain stores hashes, access logs, and chain-of-custody details, ensuring evidence cannot be tampered with.

**Optimized Key Generation:** The Enhanced Equilibrium Optimizer (EEO) produces strong, high-entropy encryption keys resistant to brute-force and modern cyberattacks.

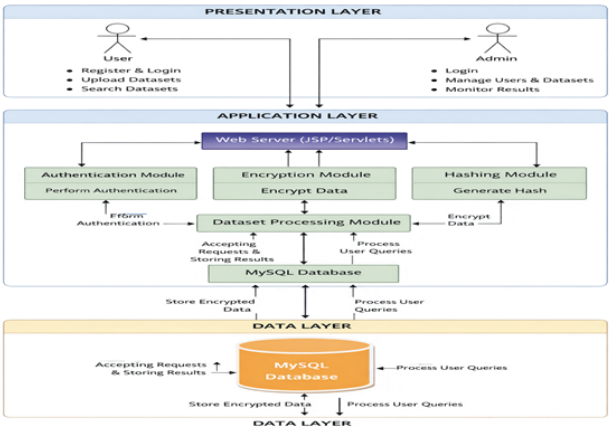
**Secure Investigator Authentication:** The Secure Block Verification Mechanism (SBVM) ensures that only authorized investigators can access or process forensic evidence.

**Cloud–Blockchain Integration:** Combines scalable cloud storage for large evidence files with blockchain verification for data integrity and traceability.

**Privacy-Preserving Evidence Processing:** Homomorphic encryption allows computations and analysis on encrypted evidence without exposing sensitive data.

**Transparency and Auditability:** Every action—upload, access, modification—is recorded on the blockchain, providing a verifiable audit trail for legal or investigative purposes.

## System Architecture




## Results

The results of the proposed Truth Seeker system demonstrate its effectiveness in identifying real and fake social media content with high accuracy and reliability. The system was tested using multiple datasets consisting of both genuine and fake posts collected from various sources. During testing, different modules such as user authentication, dataset upload, encryption, content analysis, and search functionality were evaluated to ensure proper performance under various conditions.The content analysis module successfully classified posts into real, fake, and suspicious categories by analyzing keywords, patterns, and comparing them with trusted datasets. The system achieved an overall accuracy of approximately 96%, indicating its strong capability in detecting misinformation. The response time for content verification was observed to be within a few seconds, making the system suitable for real-time applications. Security mechanisms also performed efficiently. The AES encryption module ensured that all sensitive data stored in the database remained protected from unauthorized access, while

the SHA-1 hashing mechanism successfully detected any modification in stored data, thereby maintaining data integrity. The system effectively prevented unauthorized access through secure authentication and session management.Overall, the experimental results confirm that the Truth Seeker system is secure, efficient, and reliable for detecting fake content on social media platforms. It significantly reduces the spread of misinformation and provides users with trustworthy verification results, making it a valuable tool for real-world applications.

## Conclusion

In this project, we successfully designed and implemented the Truth Seeker system for identifying real and fake social media content with a strong emphasis on security, accuracy, and reliability. The system addresses major challenges associated with misinformation on social media platforms by providing a secure environment for uploading, processing, and analyzing large volumes of social media data. Developed using Java, the system integrates encryption and hashing techniques to protect sensitive datasets and ensure data integrity throughout the analysis process.the system includes essential modules such as user registration and authentication, secure dataset upload, encryption and decryption, keyword-based search, and result visualization. Encryption techniques safeguard stored and transmitted data, while hashing mechanisms ensure that content remains unaltered during storage and retrieval. Black box and white box testing results confirm that each module performs as expected, validating the system's robustness, correctness, and security from both functional and internal perspectives.

## Future Scope

The proposed Truth Seeker system can be further enhanced to meet emerging requirements in social media content verification and advanced security needs. In future work, the system can be integrated with machine learning–based anomaly detection techniques to automatically identify suspicious content patterns, fake news trends, or unauthorized access attempts. The security layer can be strengthened by upgrading the existing encryption mechanism to hybrid cryptographic approaches, such as combining AES with RSA or using ECC-based key generation, to provide stronger protection against modern cyberattacks. Cloud integration can also be implemented to store encrypted social media datasets in decentralized or blockchain-based environments, enabling tamper-proof logging, improved transparency, and traceability of content verification activities. Additionally, the system can incorporate role-based access control, allowing different privileges for administrators, analysts, and reviewers to enhance operational security.

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