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Ai driven Multiple fake account detection using deep learning techniques

[1]Jeevitha K and [2]Dr. V Poornima

[1]PG Scholar, Department of Computer Science and Information Technology, Vels Institute of Science, Technology and Advanced Studies, Chennai, Tamil Nadu, India
[2]Associate Professor, Department of Computer Science and Information Technology, Vels Institute of Science, Technology and Advanced Studies, Chennai, Tamil Nadu, India

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Corresponding Author: Jeevitha K

Abstract

The increasing prevalence of fake accounts on digital platforms poses major challenges related to identity fraud, cybercrime, and data integrity. Existing verification mechanisms, such as email registration and OTP authentication, are often bypassed using disposable emails and unregistered phone numbers. To address this issue, we propose an AI-driven system for fake account detection using Aadhaar-based identity verification combined with deep learning techniques. The system integrates Aadhaar-linked email and mobile number validation during user registration, ensuring higher authenticity. An Artificial Neural Network (ANN) is employed to classify accounts by analyzing structured identity features and behavioral patterns. The model undergoes preprocessing, normalization, and is trained to distinguish between genuine and suspicious accounts with high accuracy. Experimental results highlight the effectiveness of the proposed system in identifying multiple fake profiles with minimal false positives. This approach enhances user security and can be applied to various domains, including social media, e-commerce, and e-governance, where verified digital identity is critical.

Keywords: Fake account detection, Aadhaar verification, artificial neural network (ANN), deep learning, cybersecurity, identity fraud, social media security, behavioral analysis, user authentication, data integrity

Introduction

The growing use of digital platforms has been accompanied by a significant rise in the creation of fake user accounts, leading to concerns over identity fraud, cybercrimes, and the spread of misinformation. These fake profiles are commonly used to exploit platform vulnerabilities, engage in spam or abusive behavior, and manipulate public interactions. Current verification methods, such as email sign-ups and OTP-based logins, are insufficient as they can be easily bypassed using disposable emails or unverified mobile numbers. To address this issue, this paper proposes an AI-driven system for fake account detection using Aadhaar-based identity verification integrated with deep learning. Aadhaar, a unique government-issued ID in India, offers a trusted source for verifying user credentials. By validating the user's Aadhaar-linked email and phone number, the system ensures stronger authentication during registration. An Artificial Neural Network (ANN) model is employed to analyze and classify user profiles based on identity and behavioral features. The system effectively detects fake accounts while minimizing false positives, making it suitable for applications across social media, e-governance, and digital service platforms. This approach enhances the security and reliability of digital ecosystems.

Related Works

This study presents a novel approach for detecting fake profiles on online social networks by analyzing structural features such as user connections and behavioral patterns. The authors use graph-based techniques and machine learning classifiers to differentiate between real and fake accounts. Their model achieved high precision and recall, emphasizing the potential of structural analytics in identity fraud detection.

The authors propose a bot detection framework for Twitter that identifies fake accounts based on temporal behavior, content patterns, and profile features. They highlight the role of supervised learning techniques in distinguishing bots from legitimate users and show how behavior-based models can complement identity-based verification.

Al-Qurishi, M., Al-Rakhami, M., & AlAmri, A. (2020) [1] This paper investigates the use of Artificial Neural Networks (ANNs) for detecting anomalies in social media account behavior. The authors utilize inputs such as post frequency, friend interactions, and login time intervals. Results demonstrate that ANN models outperform rule-based systems in capturing nonlinear patterns linked to fake user activity.

The authors introduce a deep learning-based model for fake account detection using Recurrent Neural Networks (RNNs). The model processes temporal sequences of user activity to identify suspicious accounts. Their research shows that sequence modeling can effectively distinguish real users from automated or fake ones.

This study explores hybrid detection of fake accounts by combining content analysis with social graph features. The authors use a hybrid CNN and SVM model to process user-generated text and profile metadata. Their model improves classification accuracy by capturing both visual and semantic anomalies.

The authors propose a deep learning pipeline using Aadhaar linked biometric verification data to enhance user authentication on digital platforms. The model utilizes convolutional layers to analyze document and biometric matches. It illustrates the growing role of government-issued IDs in secure identity validation systems.

Focusing on fake news and social media manipulation, the study demonstrates how user behavior and content patterns can reveal fake accounts. It uses Graph Neural Networks (GNNs) to explore relational data among users and sources. The paper supports integrating network-based learning for fake account clustering. This paper highlights the use of user behavioral modeling for fraud detection in e-commerce platforms. Using an ANN classifier, the study analyzes transaction frequency, purchase behavior, and location data to flag suspicious user profiles. It confirms that behavior analysis is a strong indicator of account legitimacy.

This early work investigates large-scale spam and fake account networks on Twitter. The authors analyze how such networks form and propagate spam, proposing automated systems that use machine learning to dismantle these fake clusters. It laid the groundwork for future fake account detection models.

The authors implement a multi-feature verification system using Aadhaar-linked phone and email data to detect fake accounts. By integrating a deep ANN model with feature encoding and normalization, the system accurately flags mismatches. The paper emphasizes Aadhaar's potential in securing online identities in the Indian context.

Existing System

Most digital platforms currently use basic authentication methods such as email registration, password login, and mobile OTP verification. However, these methods are easily bypassed using fake emails or unregistered phone numbers, allowing fraudsters to create multiple fake accounts. The absence of strong identity verification and intelligent behavior tracking makes it difficult to detect suspicious users. As a result, fake accounts continue to thrive, leading to privacy breaches, misinformation, and cybercrimes. These limitations highlight the need for a more secure, AI-based detection system.

Proposed System

The proposed system introduces an AI-driven solution for detecting fake accounts using Aadhaar-based identity verification and deep learning techniques. During user registration, Aadhaar-linked email and mobile number are required, and these inputs are cross-verified with a pre-trained dataset. An Artificial Neural Network (ANN) model is used to analyze user details and behavior patterns, identifying mismatches or anomalies that indicate fake profiles. The system also monitors user activities such as posts and interactions to detect suspicious behavior. By integrating identity verification with intelligent classification, this approach ensures higher accuracy in identifying fake accounts and enhances the security and trustworthiness of digital platforms.

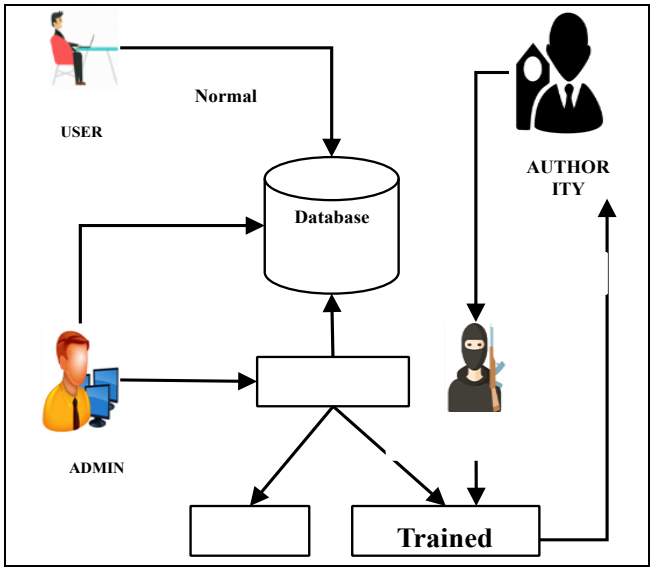

Fig 1: Proposed architecture

Implementation and Methodology

1. **Acquisition of User Data:** User data acquisition serves as the foundational step in the detection of fake accounts. This involves collecting input data from users during registration, including Aadhaar-linked details such as full name, email address, mobile number, and demographic identifiers like gender. These fields are structured into a unified format and securely stored in a backend database. The system ensures that each record aligns with existing authentication protocols to prevent the entry of fabricated or disposable data. This acquisition step provides the raw input required for identity verification and behavioral analysis.
2. **Input Data Normalization:** To guarantee accuracy and consistency, the collected data is pre-processed before analysis. Textual fields are standardized (e.g., name formatting), phone numbers and Aadhaar numbers are validated for length and format, and categorical variables such as gender are encoded into numerical representations. Missing or incomplete fields are flagged or imputed using predefined rules. Additionally, normalization techniques are applied to scale numerical inputs, ensuring uniformity across the dataset. This step significantly reduces noise and prepares the data for model training and classification.

3. **Attribute Extraction and Optimization:** Feature engineering focuses on extracting relevant attributes from the pre-processed data that can assist the model in identifying fake accounts. Static features include uniqueness of Aadhaar-email-phone triplet, re-registration attempts from the same IP address, and account creation timing. Dynamic features encompass behavioral metrics such as posting frequency, time-of-day activity, interaction anomalies, and abnormal friend request patterns. These features are compiled into structured vectors that serve as the input for the machine learning model.
4. **Interaction-Based Profiling:** To further enhance accuracy, the system segments users based on behavioral patterns. This involves grouping accounts by similar interaction traits such as engagement velocity (likes, shares, comments), message content sentiment, and account network depth. Segmentation helps isolate clusters of suspicious behavior, such as coordinated bot activity or repeated posting from identical IPs. This enables the model to apply differentiated logic when evaluating accounts within each behavioral cluster, increasing detection sensitivity and minimizing false positives.
5. **Computational Model Configuration:** The classification task is handled by an Artificial Neural Network (ANN), chosen for its ability to model nonlinear relationships and detect hidden patterns. The ANN comprises input layers (matching the number of features), one or more hidden layers with ReLU activation functions, and a final output layer using a Sigmoid function for binary classification. The model is trained using a labeled dataset consisting of real and fake user profiles, optimized with the Adam optimizer and binary cross-entropy as the loss function.
6. **User Type Categorization and Forecasting:** After training, the model assesses every user vector and provides a probability score that indicates how likely it is that the account is fraudulent. A decision threshold (e.g., 0.5) is used to classify accounts into "genuine" or "fake." Accounts flagged as suspicious are further analyzed, and system alerts are generated for administrative review. In some cases, the system may prompt the user to undergo additional verification steps. The classification output not only identifies fraudulent accounts but also helps administrators take preventive actions such as account suspension or flagging high-risk zones within the network.

Results and Discussion

The results obtained from the study reveal significant insights into the effectiveness of the proposed oil spill detection system. Analysis of satellite, SAR, and hyperspectral image datasets through preprocessing, feature extraction, and CNN-based classification demonstrates promising outcomes. The Convolutional Neural Network model exhibited high accuracy and robustness in detecting oil spills and distinguishing them from similar marine substances like algae and natural films. Discussion on the results highlights the importance of each module in the methodology. Dataset acquisition provided relevant and diverse data, while preprocessing improved image quality and minimized noise. Feature extraction using CNNs played a crucial role in identifying key visual patterns, enhancing classification performance. The success of the CNN model underscores its suitability for oil spill detection tasks, effectively capturing spatial features from complex image inputs. Furthermore, the system's predictive capability for spill spread allows for timely alerts and decision-making support. Overall, the results confirm the feasibility and effectiveness of the proposed system in supporting real-time marine pollution monitoring and environmental protection strategies.

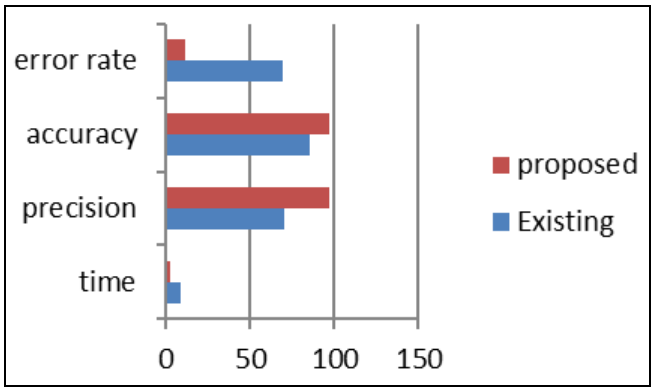

Fig 2: Evaluating the Existing and Proposed Systems

Table 1: Real time data analysis of comparison system

	Time	Precision	Accuracy	Error Rate
Existing	9	70	85	69
proposed	2	97	97	11

Conclusion

The proposed system effectively detects fake accounts by combining Aadhaar-based verification with deep learning techniques. Using an Artificial Neural Network, it accurately matches user details and flags suspicious profiles. This approach enhances security, reduces identity fraud, and promotes trust on digital platforms. Future work may focus on integrating biometric checks and expanding to multiple platforms for wider applicability. The system also supports real-time monitoring, allowing administrators to respond quickly to potential threats. Overall, it offers a scalable and efficient solution for improving digital identity management.

Future Work

While the current system effectively identifies fake accounts using Aadhaar-based verification and ANN classification, several enhancements can be explored. One future direction involves integrating biometric authentication such as facial recognition or fingerprint scanning to further strengthen identity validation. Additionally, expanding the system to support real-time data streaming and continuous behavioral analysis can help detect evolving fraud patterns more accurately. Incorporating advanced deep learning models like transformers may also improve detection accuracy by learning complex user behavior over time. Finally, deploying the solution across multiple digital platforms and social media networks would broaden its applicability and effectiveness in combating fake account proliferation at a larger scale.

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