



Fake Profile Detection on Instagram Using Machine Learning

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Abstract: Social media has become an essential part of modern communication, allowing people to connect, share, and express themselves. However, the growing presence of fake accounts on platforms like Instagram has become a serious issue, leading to the spread of misinformation, scams, and privacy risks. This project aims to detect fake Instagram profiles using machine learning techniques. Three algorithms—Support Vector Machine (SVM), Random Forest, and Decision Tree—are used to classify accounts as real or fake. The dataset includes user activity details, engagement patterns, and content-based features. The models are trained and compared based on their accuracy and efficiency. The results show that machine learning methods can effectively identify fake profiles and improve safety and trust on social media. Future work can involve integrating deep learning models and extending the system to other social platforms.

Keywords: Fake Accounts, Machine Learning, Instagram, SVM, Random Forest, Decision Tree, Social Media Security, User Behavior.

I. INTRODUCTION

Social media plays a vital role in people's daily lives, enabling communication, entertainment, and information sharing. Among various platforms, Instagram has gained immense popularity, with over a billion active users worldwide. This popularity has also led to the rise of social media influencers and online marketing opportunities. Unfortunately, the same popularity has also encouraged malicious activities such as the creation of fake profiles. These accounts are often used for scams, spreading misinformation, or manipulating engagement metrics. Such activities negatively impact user trust and platform integrity.

To address this problem, our project proposes a machine learning-based system that automatically detects fake Instagram profiles. The system analyzes profile-related data such as followers, post activity, engagement rate, and bio content. We use three algorithms—Support Vector Machine (SVM), Random Forest, and Decision Tree—to identify patterns and classify profiles as real or fake.

II. RELATED WORK

Several researchers have explored the issue of fake account detection on social media. Earlier approaches used simple classification algorithms like Logistic Regression, Decision Tree, and SVM to identify fake profiles based on user statistics such as follower-following ratios, post frequency, and engagement levels. Some studies also included Natural Language Processing (NLP) techniques to analyze profile bios, captions, and comments to detect suspicious patterns. Other researchers have used network-based features to examine user interactions and detect automated or bot-like behavior.

III. METHODOLOGY

The proposed system follows a structured machine learning process consisting of the following steps:

1. Data Collection
2. Data Preprocessing
3. Feature Extraction
4. Model Development
5. Performance Evaluation

IV. ALGORITHM USED

A. Support Vector Machine (SVM): SVM finds the optimal boundary to separate data points into two categories. In this project, it classifies Instagram profiles as real or fake.



B. Random Forest (RF): Builds multiple decision trees and combines their results to improve accuracy. Random Forest performed best in our experiments.

C. Decision Tree (DT): Uses feature-based splits to classify data. It provides clear visual logic for fake detection.

V. DATABASE DESIGN

The system uses an SQLite database for securely storing user data. Sensitive data such as passwords are encrypted to ensure privacy. The database maintains records of user registration and account features

VI. SYSTEM ARCHITECTURE

The system architecture consists of modules such as User Interface, Data Processing, Machine Learning Model, Prediction Module, and Database Layer. These components work together for fake account detection.

VII. RESULT AND ANALYSIS

The models were tested, and Random Forest achieved the highest accuracy compared to SVM and Decision Tree.

Accuracy Results:

SVM: 86%

Decision Tree: 83%

Random Forest: 91%

VIII. FUTURE SCOPE

- Deep Learning Models: Use advanced models like BERT or LSTM.
- Real-Time Detection: Implement APIs for continuous fake account monitoring.
- Cross-Platform Application: Extend detection to platforms like Twitter and Facebook

IX. CONCLUSION

This project presents a machine learning-based approach to detect fake profiles on Instagram. Among the tested algorithms, Random Forest provided the best accuracy and reliability. The system can help improve social media safety and user trust. Future improvements include integrating deep learning and real-time detection.

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