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# Fake Social Media Profile Detection

**B. Pooja, S. Nandhini, K. Pooja Dharshini, S. Karthikeyan, S.Vinothini**

Student, Department of CSE, T.J.S. Engineering College, Chennai, Tamil Nadu, India

Student, Department of CSE, T.J.S. Engineering College, Chennai, Tamil Nadu, India

Student, Department of CSE, T.J.S. Engineering College, Chennai, Tamil Nadu, India

Student, Department of ECE, T.J.S. Engineering College, Chennai, Tamil Nadu, India

Assistant Professor, Department of CSE, T.J.S. Engineering College, Chennai, Tamil Nadu, India

**ABSTRACT:** Fake profiles are often created to spread misinformation, disinformation, and propaganda. Detecting and removing these profiles is crucial to curb the dissemination of false information and maintain the integrity of information shared on social media. In this study, we present an enhanced algorithm for the detection of fake social media profiles, utilizing machine learning techniques such as Gradient Boosting, Random Forest, and Support Vector Machine. The algorithm incorporates a range of profile features, including the presence of a profile picture, characteristics of the username and full name (length, numbers, equality), description length, external URL presence, account privacy, and key metrics like the number of posts, followers, and follows. The primary objective is to address the escalating issue of fraudulent activities and misinformation on social media platforms. The proposed algorithm leverages ensemble learning to improve the accuracy and reliability of identifying deceptive profiles. Additionally, we introduce a Flask-based web application to deploy the Random Forest algorithm, enabling real-time detection and providing a user-friendly interface. To evaluate the algorithm's performance, precision, recall, and F1 score are employed as key metrics. Precision measures the accuracy of positive predictions, recall gauges the algorithm's ability to capture all positive instances, and the F1 score balances precision and recall. Through comprehensive testing and validation, our algorithm aims to contribute to the advancement of online security, fostering user trust and mitigating the impact of fake profiles in the dynamic landscape of social media.

**KEYWORDS:** Fake social media profiles, Machine learning, Detection, Supervised learning, support vector machines, Random forest, Neutral networks, profile metadata.

## I. INTRODUCTION

Fake profiles are commonly used for fraudulent activities and scams. Cybercriminals may impersonate individuals or organizations to deceive users, leading to financial losses, identity theft, or other malicious activities. Identifying and eliminating fake profiles helps protect users from falling victim to scams. Machine learning (ML) plays a crucial role in detecting fake profiles on social media platforms by leveraging patterns and characteristics learned from labeled data. Machine learning algorithms analyze various features extracted from user profiles, posts, and activities. ML models excel at recognizing complex patterns and relationships within data. By training on labeled datasets containing examples of both genuine and fake profiles, these models learn to identify subtle and nuanced characteristics associated with deceptive accounts.

## II. OBJECTIVES

The main objective of the study is to develop and deploy a robust algorithm for detecting fake profiles on social media platforms, leveraging advanced machine learning techniques like Gradient Boosting, Random Forest, and Support Vector Machine.

## III. LITERATURE SURVEY

1. T. Sudhakar, B. C. Gogineni and J. Vijaya, "Fake Profile Identification Using Machine Learning," 2022 IEEE International Women in Engineering (WIE) Conference on Electrical and Computer Engineering (WIECON-ECE), Naya Raipur, India, 2022, pp. 47-52, doi: 10.1109/WIECON-ECE57977.2022.10150753.

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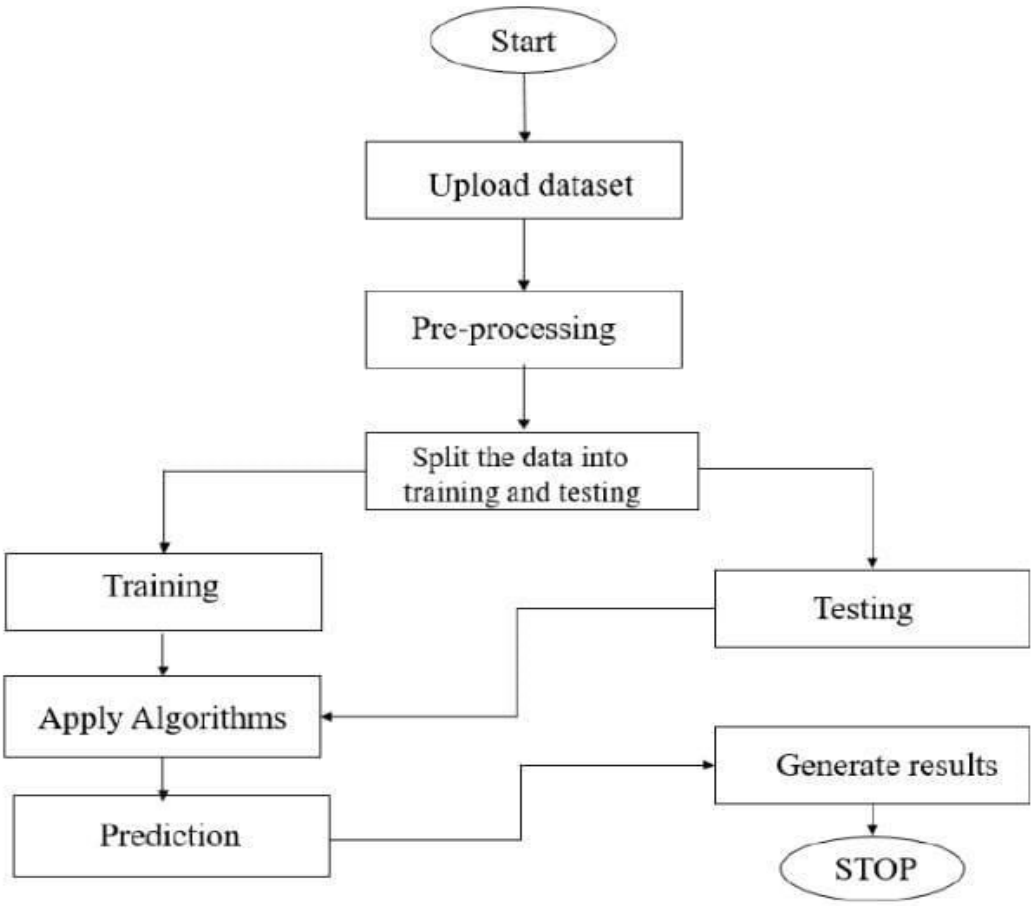
2. K. Patel, S. Agrahari and S. Srivastava, "Survey on Fake Profile Detection on Social Sites by Using Machine Learning Algorithm," 2020 8th International Conference on Reliability, Infocom Technologies and Optimization (Trends and Future Directions) (ICRITO), Noida, India, 2020, pp. 1236-1240, doi: 10.1109/ICRITO48877.2020.9197935.
3. L. P, S. V, V. Sasikala, J. Arunarasi, A. R. Rajini and N. Nithiya, "Fake Profile Identification in Social Network using Machine Learning and NLP," 2022 International Conference on Communication, Computing and Internet of Things (IC3IoT), Chennai, India, 2022, pp. 1-4, doi: 10.1109/IC3IOT53935.2022.9767958
4. R. Bhambulkar, S. Choudhary and A. Pimpalkar, "Detecting Fake Profiles on Social Networks: A Systematic Investigation," 2023 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS), Bhopal, India, 2023, pp. 1-6, doi: 10.1109/SCEECS57921.2023.10063046.

## IV. BLOCK DIAGRAM




## V. IMPLEMENTATION

Gather a dataset containing both real and fake social media profiles. This dataset should include various features such as profile information, activity, network characteristics, and content posted.Feature Engineering*: Extract relevant features from the collected data. These features can include profile metadata (e.g., number of friends/followers, profile picture quality), activity patterns (e.g., frequency of posts, likes, comments), and textual features (e.g., language, sentiment).Annotate the dataset with labels indicating whether each profile is real or fake. This can be done manually by experts or through automated methods if labeled data is scarce.Train a machine learning model on the labeled dataset. Commonly used algorithms for this task include decision trees, random forests, support vector machines

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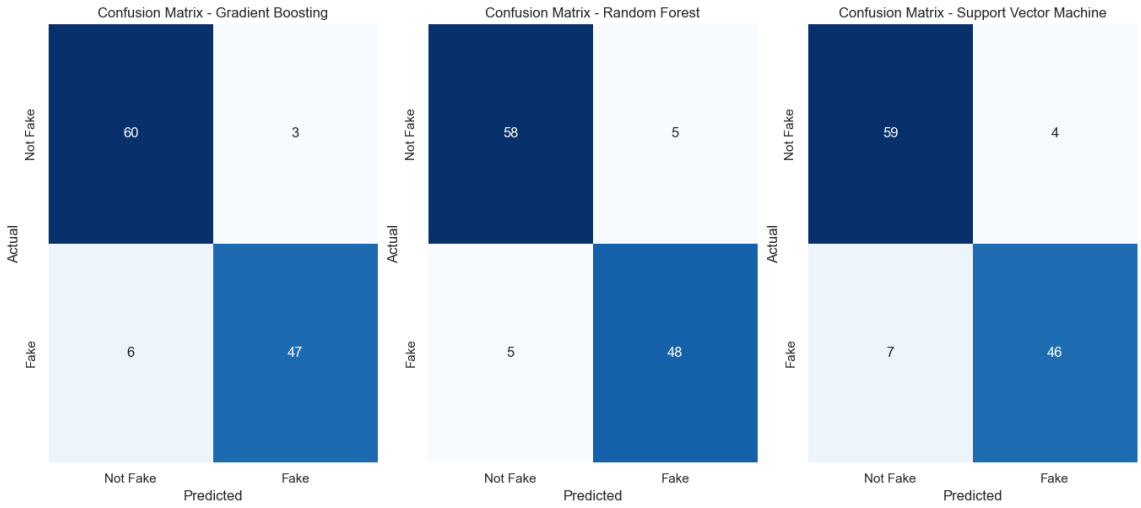
(SVM), and neural networks. Evaluate the trained model using metrics such as accuracy, precision, recall, and F1 score on a separate validation set or through cross-validation to assess its performance. Deploy the trained model to detect fake profiles in real-time or batch mode. This can be integrated into social media platforms or used as a standalone tool for profile verification. Monitor the performance of the deployed model and update it periodically with new data to adapt to evolving tactics used by fake profiles.

## VI. RESULT




**Accuracy**

**Definition:** Accuracy is the ratio of correct predictions (both true positives and true negatives) to the total number of predictions. It indicates how often the model correctly predicts the correct class.

Interpretation: Higher accuracy suggests that the model is generally performing well. However, accuracy can be misleading if there is a class imbalance, as it doesn't distinguish between correct identification of positive and negative classes.

**Precision**

**Definition:** Precision measures the proportion of true positive predictions out of all predicted positives. It tells us how many of the detected positive results were actually correct.

**Interpretation:** A higher precision means fewer false positives (incorrectly classified positive results). In the context of fake profile detection, high precision indicates that when the model identifies a profile as fake, it is likely to be correct.

## VII. CONCLUSION

The study's primary focus was on developing and assessing machine learning algorithms to detect fake social media profiles. By examining features like profile pictures, usernames, full names, description lengths, external URLs, privacy settings, and metrics such as the number of posts, followers, and follows, the research aimed to create an effective model for distinguishing between genuine and fake profiles. After comparing three popular machine learning algorithms—Gradient Boosting, Random Forest, and Support Vector Machine—the study found that Gradient Boosting consistently delivered the best performance across various metrics, including accuracy, precision, recall, and F1 score. This algorithm's sequential learning approach, which corrects the mistakes of previous iterations, contributed to its superior performance.The conclusions drawn from this study suggest that Gradient Boosting is a robust and reliable algorithm for detecting fake social media profiles. Its ability to handle complex relationships and correct errors during the learning process gives it an edge over other algorithms. As a result, it can be employed as a key component in combating misinformation and ensuring the authenticity of social media content.

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