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Spammer Detection and Fake user Identification on Social Networks

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ABSTRACT: With the exponential growth of online social networks, now boasting over 4 billion active users, maintaining data integrity and ensuring user security has become increasingly challenging. Social media platforms face numerous security threats, including the creation of fake profiles by malicious users seeking to steal sensitive information, spread misinformation, or engage in fraudulent activities. Due to the anonymity afforded by these platforms, detecting such deceptive accounts manually is both difficult and inefficient. This project focuses on the detection of fake profiles using machine learning and deep learning techniques, trained on platform-specific datasets to improve accuracy. A web-based application has been developed featuring four core modules, each dedicated to a major social media platform experiencing rapid user growth. Each module integrates a trained model to assess and classify user profiles as real or fake. Currently, the system has been implemented for Instagram, with plans to expand to other platforms. This approach aims to provide a scalable and intelligent solution to enhance user trust and safety across social media environments.

KEYWORDS: Fake profile, Instagram , Machine Learning , Random Forest Classifier , Prediction.

I. INTRODUCTION

Our project focuses on detecting fake profiles across several major social media platforms, including Instagram, Facebook, Twitter, and LinkedIn. By leveraging a variety of machine learning and deep learning algorithms, we analyze platform-specific datasets to identify the most effective model for fake profile detection. The solution is deployed through a web-based application, designed with four dedicated modules each corresponding to one of the selected social networks. Every module integrates a uniquely trained model tailored to the characteristics of that platform, enabling the system to evaluate whether a given user profile is genuine or fake. This modular and scalable approach ensures adaptability as social networks evolve and continue to grow in user base.

II.LITERATURE REVIEW

Homsi et al. (2023) [1] investigated fake account detection on Twitter using machine learning algorithms such as J48, Random Forest, Naïve Bayes, and KNN, combined with data reduction techniques like PCA and Correlation. Their study found that Random Forest with Correlation achieved the highest accuracy of 98.6%.

Bharti et al. (2023) [2] focused on identifying fake profiles in online social networks using various ML techniques. They highlighted the significance of feature selection and data preprocessing to enhance model performance.

Amankeldin et al. (2023) [3] proposed a Deep Neural Network (DNN) model using 16 content- and profile-based features for fake profile detection. Their approach achieved 99.4% accuracy, showcasing the power of deep learning in this domain.

Pranay Meshram et al. (2023) [4] developed a machine learning-based method for detecting fake Instagram accounts using a bagging classifier. Their system achieved over 98% accuracy, proving effective for platform-specific fake profile detection.

III. DATASET

The dataset used in this project was built using real-time Instagram profile data collected through Apify's Instagram Profile Scraper API, providing a solid and up-to-date foundation for training and testing the fake profile detection model. It includes 500 Instagram profiles, offering a diverse sample size that captures a wide range of user behaviors. Key profile features—like the number of posts, followers, followings, verification status, and whether the account is

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private—were extracted and cleaned using Pandas to ensure the data was ready for machine learning. These features helped the model, especially the Random Forest Classifier, accurately distinguish between real and fake accounts, achieving an impressive 93% accuracy.

IV. METHODOLOGY

In this project, machine learning techniques are employed to predict fake profiles by training the dataset using multiple classification models, including Support Vector Machine (SVM), Logistic Regression, and Random Forest Classifier. Among these, the Random Forest Classifier demonstrated superior performance, achieving an accuracy of 98%. Due to its high reliability and precision, the Random Forest model has been selected for real-time prediction of fake profiles within the system.

4.1 **Random Forest Classifier**

Random Forest is a powerful supervised machine learning algorithm widely used for both classification and regression tasks. It operates on the principle of ensemble learning, which involves combining multiple models in this case, decision trees—to enhance overall predictive performance and reduce the risk of overfitting.Rather than relying on a single decision tree, Random Forest builds an ensemble of decision trees during training. Each tree is trained on a random subset of the data and contributes a prediction. For classification problems, the algorithm aggregates the predictions from all trees and selects the majority vote as the final output. This collective decision-making approach leads to more robust and accurate predictions.

The strength of Random Forest lies in its ability to handle large datasets with higher dimensionality, maintain accuracy even when a significant portion of the data is missing, and reduce variance by averaging multiple tree predictions. Moreover, increasing the number of trees typically enhances model stability and predictive power while mitigating the chances of overfitting.

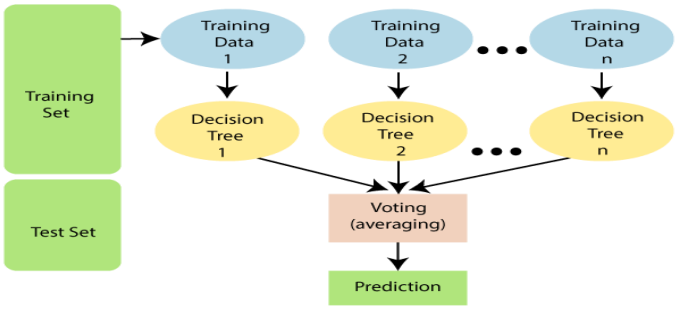

Fig 1. Random Forest Classifier

This classifier takes the input as Post Counts, Following Count, Follows Count, Verified and private and the random forest takes the prediction from each tree across the data and predicts the output.

4.2 Training

The model training process begins by splitting the dataset in an 80:20 ratio, where 80% is used for training and 20% for testing. The independent and dependent features are then passed into the model, which is trained using the training portion of the dataset to learn patterns and relationships for accurate prediction.

4.3 Testing

Once the model is trained, it is evaluated using the remaining test dataset through the predict function. The model's performance is then measured using evaluation metrics, revealing an accuracy score of 98%.

4.4 Real Time account prediction

By using API(Application Programming interface) which is APIFY Instagram-profile-scarpper the client is integrated in the python code to access and implement real time account prediction.

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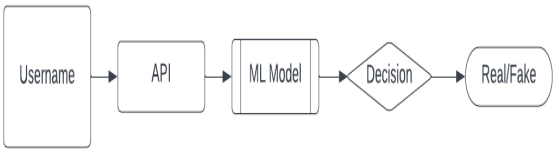

Fig 2 . Flow of data to the model

4.5 Deployment using Streamlit

The code is deployed using Streamlit for frontend to provide user interface to predict the profile is real or fake.

4.6 Architecture

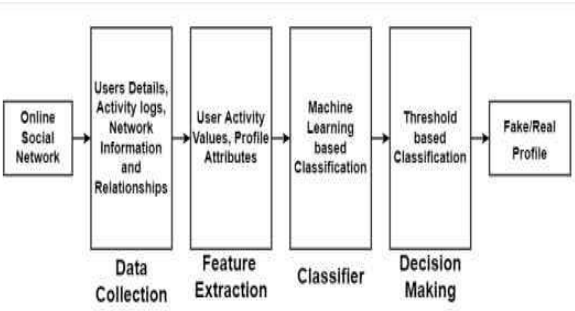

Fig 3. Architecture

V.RESULT

5.1 Output Screens

Fig 4. Frontend for Prediction

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Fig 5 . Predicting a Real Account by username

Fig 6. Predicting a Fake Account by username

VI. CONCLUSION

In today's digital world, social media platforms like Instagram play a huge role in how we connect, communicate, and express ourselves. However, the rise of fake profiles has brought serious issues such as identity theft, scams, and the spread of false information, making it harder to trust what we see online. To tackle this growing problem, a project was launched to create a system that can accurately detect fake Instagram accounts. The main tool used was a machine learning model called Random Forest Classifier, which outperformed other models like SVM and Logistic Regression. Trained on 500 Instagram profiles and tested with an 80:20 ratio, the model achieved a strong 93% accuracy. It relied on cleaned and processed data using features like Post Count, Following Count, Follower Count, Verified status, and more, making sure the input was reliable and consistent.

VII. FUTURE WORK

Looking ahead, there are several exciting directions this project can take to make the fake profile detection system even more powerful and versatile. One of the key goals is to expand the model to other major platforms like Facebook, Twitter, and LinkedIn, each with its own unique user behaviors and features. Adapting the model to these platforms will require gathering new datasets and fine-tuning the algorithm to recognize platform-specific indicators of fake profiles. Additionally, the model could benefit from incorporating more advanced features such as engagement metrics (likes, comments, shares), language patterns in bios or captions, and even image-based analysis using computer vision to detect suspicious content.

Another future enhancement involves improving the system's real-time capabilities and scalability. Integrating a more dynamic data pipeline would allow the model to continuously learn from new data and adapt to evolving tactics used by fake accounts. Introducing a feedback loop where users can report misclassifications would also help in refining the model further. Finally, implementing stronger privacy and ethical safeguards will be important, ensuring the tool respects user data and is used responsibly. With these improvements, the system can become an even more effective shield against online fraud, making social media platforms safer for everyone.

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