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ADAPTIVE DETECTING FAKE PROFILES IN ONLINE SOCIAL NETWORKS

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ABSTRACT Online social networking sites became an important means in our daily life. Millions of users register and share personal information with others. Because of the fast expansion of social networks, public may exploit them for unprincipled and illegitimate activities. As a result of this, privacy threats and disclosing personal information have become the most important issues to the users of social networking sites. The intent of creating fake profiles have become an adversary effect and difficult to detect such identities/malicious content without appropriate research. The current research that have been developed for detecting malicious content, primarily considered the characteristics of user profile. Most of the existing techniques lack comprehensive evaluation. In this work we propose new model using machine learning and NLP (Natural Language Processing) techniques to enhance the accuracy rate in detecting the fake identities in online social networks. We would like to apply this approach to Facebook by extracting the features like Time, date of publication, language, and geoposition.
Keywords: Social Networks, Threats, Fake Profiles, Malicious, Comprehensive, Machine learning and NLP

I. INTRODUCTION

Online Social Networks are most popular through which information can be exchanged throught the world. Social Networks being the center of attraction for many applications and they incorporate a range of new information and communication tools to the user community. A Social Network is best viewed as a graphical structure with nodes and edges depicting the users and their interaction activities respectively. The nodes and edges in a Social Network graph can be labeled or unlabeled depending upon the structure of the network being used. Because of the great reputation of social intelligence, social networking sites such as Facebook, YouTube, Twitter, LinkedIn, Pinterest,Google+, Tumblr and Instagram have become the preferred means of communication and information sharing tools amongst a diverse set of users including individuals and companies. The users of the social networks will play a vital role and they are completely responsible for the contents being exchanged in the networks. Users share information by interesting websites, videos and files. People share confidential data through the set-up of great faith and others have the same faith in the data shared. The rush of online social

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networks' reputation and the accessibility of huge amount of data enable them simple objective to the opponents. These objectives mainly include stealing individual user's details without seeking any permission.

1.1 Information Extraction Information extraction is the process of identifying key words and relationships in the text. It uses pattern matching algorithms to search for predefined sequences within the text. The software used for information extraction draws new relationships among known community and locations. And also it provides significant user information over time. These tools are extremely helpful while working with large amounts of data. Conventional data mining tools presume that the data being extracted is stored in the form of tables. Unfortunately, for most of the current applications, the only means of accessing digital information is by natural language processing [14].

1.2 Natural Language Processing NLP is a field of artificial intelligence and computational linguistics concerned with how information systems can be used to understand and process natural language documents.NLP research main objective is to gather information about how people comprehend and use natural language to accomplish the required job [15]. The origin of Natural Language Processing depend on most promising areas, such as computer and information sciences, linguistics, artificial intelligence and robotics ,mathematics, psychology, etc. NLP applications include a number of research areas like natural language text processing machine translation, language information retrieval, summarization, user interfaces, multilingual and cross speech recognition, artificial intelligence, and expert systems etc.[15]

1.3 Pre-processing methods Preprocessing techniques play a vital role in text mining. Preprocessing is the beginning step in the text mining approach. Preprocessing is done in three steps namely, stop words removal, stemming and lemmatization and Tokenization.

II. RELATED WORK The availability of data in social networks has drawn many research concerns encountered by online users. A Substantial research work has been carried out for a variety of social network problems like spam filtering, information diffusion and community detection. In[21] the researchers presented the possibility of information distribution without disclosing confidential data via graph models. In the research [22], they investigated "topological characteristics of Twitter" and presented that the behavior of information distribution in online networks known by examining "retweets".In the paper[23],they elaborated a report on "click-stream data in online networking sites" and proved that click-stream data provides a means to use rich information for drawing social relations .They also proved that most of user actions in online networks include browsing. Likewise in [24] the researchers examined social communications of user community in online social networks and initiated that most of the communications in online social networks are hidden and evident actions take place infrequently. Various research efforts

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have been also turned towards the identification of malicious content in social networks. In the paper [25] the researchers planned a real-time spam detection scheme for Twitter social network in which they registered browser activities while loading a page for an URL.One more significant work for identifying spam on online social networking sites is proposed in [26] .In this proposed method, they created honey-profiles based on nationality, time ,age etc.This research is aimed at different accounts representing different areas . The researchers in [27] also made an attempt to use social honeypot to entice spammers on Twitter. In [28], the researchers described a significant attempt to typify various spams on Twitter social network.

The authors in[29] elaborated that the attacks of social junction were efficient and cheaper to get private information of an individual. Further in [30] the authors presented an approach to detect the users who are involved in malicious activities on Facebook. There are two stages in this mechanism. In first stage semantic analysis was done.In second stage spatiotemporal analysis was done.

III. PROPOSED WORK In our proposed model we would like to detect and classify fake users and real users using Machine learning and Natural Language Processing Techniques. In this work we present some steps that describe the process to distinguish fake users from legitimate users through a flowchart. Figure 1 show the working paradigm of our proposed work. In first step data set will be collected through Facebook using API. After the collection of data set in next step we are applying NLP pre processing techniques like Tokenization, Stop words removal, Stemming and lemmatization to extract features of users profile. After the extraction of the features we use reduction phase to reduce the dimensionality of the dataset. We would like to filter the profiles with tokenization, stemming and stop words to optimize the outcome before reduction. For reduction we apply Principal Component Analysis(PCA) algorithm.After the reduction phase we apply appropriate learning algorithm for classification.At the end we would like to use evaluation parameters like True positive rate (TPR) ,false positive rate (FPR) and AUC(Area Under ROC Curve) for determining the legitimate users and the malicious users.

Depending on AUC we calculate True Positive Rate and False Positive Rate.If True positive rate is higher than False positive rate then it as a legitimate us will be considered as legitimate user otherwise it will be treated as a fake user.In our work we would like to propose a frame work using Machine Learning and NLP Techniques .We would like to apply this frame work for social networking sites like Facebook and others.The main objective of our model is to increase the accuracy in identifying the spam or fake identities in online social networks.

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IV. WORKING PRINCIPLE OF PROPOSED WORK

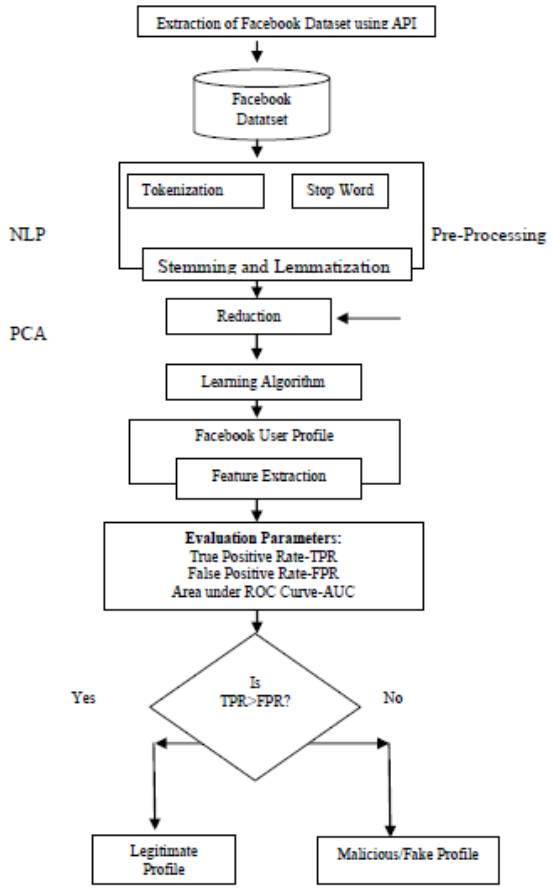
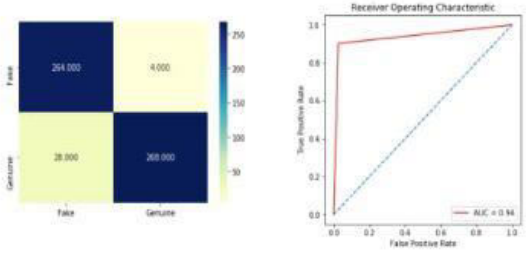
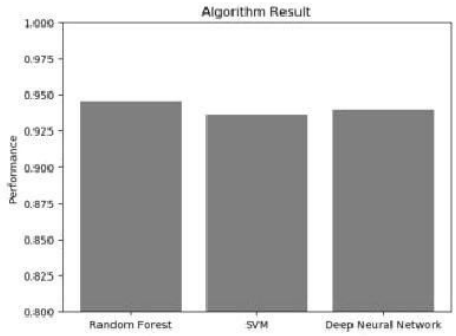


Figure-1: Working Paradigm of Proposed Work

DEEP NEURAL NETWORKS



ACCURACY



V. CONCLUSIONS AND FUTURE WORK

Our proposed work presents various classification , mining and pre-processed techniques to detect malicious users , extract features, reduce the dimensionality and to prevent users from fake profiles. In this work pros and cons of each existing technique have been discussed and alternate method was proposed. After implementation of proposed technique using Machine Learning and Natural Language Processing concepts, we evaluate performance by TPR,FPR and AUC. We try to show that our techniques are most efficient as compared to existing research in terms of accuracy and performance by taking advanced features like geoposition and date of publication. In future work we concentrate on availability of social networking sites datasets and we try to propose a new enhanced model to identify fake profiles on social networks. We are planning to collect dataset using Facebook Graph search API.Important features to be considered: Time, date of Publication or posts, language and geoposition. We are also working on other attributes like typescript of

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user name, size, case and locality.

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