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Fake Reviews Detection using Supervised Machine Learning

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Abstract— *Now a days in the time of pandemic people are using online websites and online apps for daily life things and almost all they need. [1]So the increase in usage of online purchasing they are trying to get the good reputation by using the reviews. Yet, the spread of false reviews has turned into a worrying problem since it deceives online shoppers as they make purchases and boosts or degrades the reputation of rival firms.*
In this study, we provide an approach based on supervised learning for the identification of fraudulent reviews in the dataset of online reviews. In order to distinguish between false and real reviews, the study uses machine learning methods like KNN, Naive Bayes, and logistic regression.

Keywords—*KNN, Naïve Bayes, Logistic regression*

I .Introduction

In this introduction we briefly discussed about the reviews and the methods used to classify the reviews. In the current day, reviews have taken the role of other kinds of information for consumers trying to make decisions about services or products. For instance, before making a hotel reservation, customers check reviews to learn what other traveler's think of the accommodations. They use the comments from the reviews to decide whether or not to make a reservation. If they thought the reviews were positive, they would probably book the room. Thus, historical analyses top many web services' lists of the most trustworthy information sources. Because reviews are thought of as genuine input on whether a service is good or terrible, any attempt to skew them by adding incorrect or misleading material is perceived as dishonest behavior and is followed by the moniker "fake reviews." In light of this circumstance, we wonder what might transpire if not all reviews submitted were reliable or sincere. What if any of these references prove to be false? As a result, identifying fraudulent reviews has become and still is a crucial and active research area.

This study employs a number of machine learning classifiers to detect fraudulent reviews based on the reviewers' own characteristics as well as the content of the reviews in order to accomplish this. We employ the classifiers on a genuine set of reviews gathered from opensource websites. In addition to using basic natural language processing to extract and input the review features to the classifiers, the research applies a variety of feature engineering techniques to the data set. Due to this, several reviewer behaviors can be extracted. The study contrasts how classifiers respond to features that reviewers have retrieved and taken into account. [1] The TF-IDF and models without the retrieved attributes are two different language models whose results are examined in the study. The findings show that the built features improve the effectiveness of the method for identifying false reviews.

The Internet's rapid development has had an impact on many of our daily activities. One of the industries with the quickest growth is e-commerce. Most e-commerce websites let consumers write reviews of the products and services they offer. These reviews' presence can be used as a source of knowledge. It can be used by companies to decide how to design their products or services, as well as by potential customers to decide whether or not to buy or use a product. Sadly, some people have attempted to fabricate false evaluations in an effort to either increase or decrease the product's popularity by exploiting its significance. This study analyses a review's content and rating attributes to spot false product reviews. Machine learning techniques can be quite helpful in identifying incorrect assessments of site material. Generally speaking, valuable information is identified and extracted using a number of machine learning techniques through web

mining approaches. One of the key tasks of web mining is content analysis.

Headings: Problem statement is described as IInd heading, Literature survey is in IIIrd heading which contains similar projects, Proposed system is described in IVth heading it contains work flow and working of project, Implementation and results are in Vth heading which contains project implantation and results, Performance analysis is VIth heading, Conclusion is in VIIth heading, VIIIth heading contains future enhancement, References is the IXth heading which contains the details of the papers we referred.

II .Problem Statement

In this growing world technologies and online marketing playing a vital role or main role. In these people are preferring to buy in online cause cost effective, time saving and lot of choices. Soconsidering this onlinemarketing and technologiesmarketers are using the reviews to increase their sales by creating fake reviews. People are not able to discover about the products by this fake reviews. So considering this detecting fake reviews helps the people to identify or make a decision about the online products. In this work we are using the supervised machine learning models to predict or to detect the fake reviews.

III. Literature Survey

[1]Ronark Agarwal; et al proposed an overview of existing detection approaches in a systematic way.
[2]Md Mahadi Hassan Sohan; et al proposed a paper work to detect false product reviews, using semi-supervised machine learning approach.
[3]Ting-You Lin; et al developed a framework that uses the review, sentiment features, subject characteristics, and readability features to detect fake reviews.
[4]Shubhangi Rastogi; et al proposed a paper which is at a later time, after news has thoroughly propagated throughout the social network, factors like user involvement, propagation patterns, etc. will be studied.
[5]P. Devika; et al proposed a work on the reviews that are extracted from the web and to find the false reviewers, additional reviewer-related data was also gathered and used using a decision tree classifier.
[6]Wenqian Liu; et al proposed a paper it will validate the performance of their solution and compare it to various existing temporal outlier identification methods using the crawling Amazon China dataset.
[7]Pratiksha Shetgaonkar; etal proposed a survey focuses on using sentiment analysis and natural language processing to identify false reviews and feedback.

[8]J k rout; et al proposed a workenumerate the main problems and difficulties in identifying fraudulent reviewers and fake reviews.

IV. Proposed system

In this we are going to see about proposed application that can be considered a useful system which helps to reduce the limitations from other existing methods. This method helps to know about the reviews given by reviewers are fake or not. In this we are using KNN, Naïve bayes, logistic regression for better accuracy. This will be helpful for the people to know about reviews and make good decision.

In this we will get the accuracy of three models and we will consider the best accuracy model to make a conclusion about dataset.
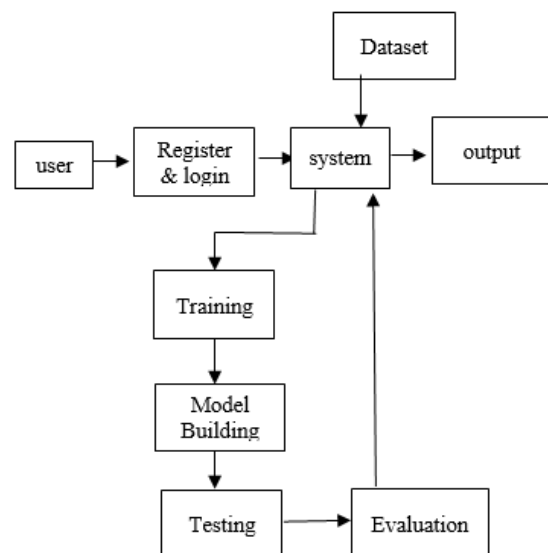
Fig1 Proposed Method WorkFlow

- **User** - In this phase user go through the website and know more about the website.
- **Register & login** - In this phase user register with his mail and login through the mail to check about the false reviews.
- **Dataset** - In this phase user collect the reviews and make them a dataset which is useful to know about the false reviews.
- **System**- In this phase system takes the dataset and train it according to the algorithm we need to check and build the model for it and then test the accuracy of the given dataset based on the given algorithm.
- **Evaluation**- In this phase it will take the results and share the results to the system according to it. In this it will also predict the reviews if they were fake or not. And also

provide a graph to compare the accuracy of given algorithms.

- **Output**- In this phase it will provide output of algorithms accuracy and prediction of false reviews.

V. Implementation and Results

We implemented the following project by using PyCharm, we have executed our code of each module and got the output results successfully for backend coding. For the front-end coding part, we have worked using Django framework and code runner applications and done coding in python language and implemented our work by using the saved details from MySQL database. we developed user interface model to implement our work and to check the output results. These are the results and outputs obtained by the website we created.

Fig.2 Accuracy for LG

Fig.3 Accuracy for NB
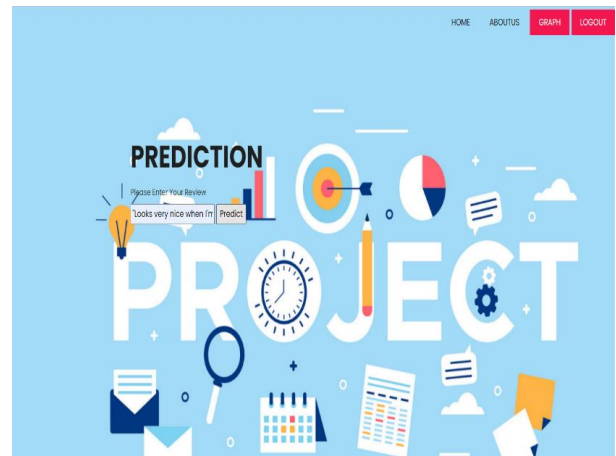

Fig.4 Accuracy for KNN

Fig.5 Prediction of review

Fig.6 Algorithms comparison graph for reviews

VI. Performance Analysis

The best accuracy was achieved by Rout et al. with supervised learning using a logistic regression classifier at 83.32%. The data split ratio for training and testing was 80:20. Using supervised Positively learning with a logistic regression classifier, Rakibul Hassan et al. obtained 85% accuracy. Using the same train-to-test ratio, our model's Naive Bayes, Logistic Regression, and KNN classifiers offer, respectively, classification accuracy of 73.37%, 88.43%, and 60.75%. The results unmistakably demonstrate that our suggested supervised classification algorithms may effectively and more accurately classify false online reviews on the reviews dataset.

Works	Algorithm	classifier	Accuracy
Rout et al	Semi-Supervised	Logistic Regression	0.8375
		KNN	0.5314
Rakibul Hassan et al	Supervised	Naïve Bayes	0.7021
		Logistic Regression	0.8512
Proposed Work	Supervised	KNN	0.6017
		Naïve Bayes	0.7372
		Logistic Regression	0.8862

VII. Conclusion

With Python programming and the Django framework, we have successfully developed a technique to detect fraudulent reviews, which is produced in a user-friendly setting. The system is likely to gather information from the user in order to determine if the review is false or not. [3] Here, we focused on the importance of reviews and how they affect almost all aspects of web-based data. Reviews are surely affect people's choices, as is clear.

As a result, the detection of fraudulent reviews is a lively and active study subject. Here, a machine learning strategy for detecting bogus reviews is described. The proposed approach takes into account both the characteristics of the reviews and the reviewers' behavioral characteristics. The proposed approach is examined using the Yelp dataset.[2]In the developed approach, various classifiers are used. The presented approach employs and contrasts the Bi-gram and Trigram language models. The outcomes show that the KNN classifier performs better than the other classifiers in the fraudulent review identification process.

VIII Future Enhancement

In this project we developed a website based on the python, Django and UI technologies to predict the fake reviews. In this we will create a app for this and add new developed technologies.

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