Fake Product Review Detection and its Removal

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Abstract: *Most of the people requires genuine information about the online product. Before spending their economy on particular product can analyse the various reviews in the website. In this scenario, they did not identify whether it may be fake or genuine. In general, some reports in the websites are good, company technical people itself add these for making the product famous. Here, it may be possible that the single negative review changes the angle of the customer not to buy that product. In this situation, it might possible that this one review is fake. So, in order to remove this type of fake reviews and provide the users with the original reviews and rating related to the products, we proposed a Fake Product Review Detection and Removal System which is an Intelligent Interface and analyses the reviews, and provides the customer with the original rating. The proposed work achieved the accuracy of 87% in detecting fake reviews of written in English by using intelligent learning techniques which is greater than the accuracy of the previous systems.*

Keywords: Fake Reviews Detection, Text Classification, Natural Language Processing, Bigrams, Term Frequency and Inverse Document Frequency, SVM classifier

I. INTRODUCTION

Most of the people requires genuine information about the online product. Before spending their economy on particular product can analyse the various reviews in the website. In this scenario, they did not identify whether it may be fake or genuine. In general, some reports in the websites are good, company technical people itself add these for making the product famous. These people belong to media and social organization teams, they give reviews with a good rating by their own firm. On-line purchasers did not identify the fake product because of this falsification in the reviews of the website. In this research, the SVM classification mechanism has been used for detect the fake reviews. This implementation helpful for users find out the correct review of online product.

The scope and need of online markets and e-commerce platforms are on the rise and many people buy products from these platforms. The amounts of feedbacks for products as a result are also present in detail for users to analyse the product they are buying. This can work against the users as well because users can sometime bombard the review section with extreme opinion comments which can work in favour or against the product. Thus, we need to take care of this because this can be done either by the merchant to increase the value of his product or the user to degrade the ratings of that product.

There are different ways to shop like you can buy a specific thing of your need by going to a store or mall. In this style of shopping the seller gives you the feedback of the product, you do not know whether he/she is giving fake feedback or original. Because, it is upon seller honesty, how much the seller is true in his/her words and you have to carefully examine the product because you do not have any other option in examining the product. If you don't pay attention in buying that product then it may be proved a waste for you. On the other hand, nowadays source of shopping has been changed. You can buy the products from the online stores of different brands. Here, you have to place the order without seeing and examining the original product. You read the reviews and buy the product. Therefore, you are dependent on the reviews about the product. These reviews may be the original or fake. The customer wants to buy an original and reliable product, which is possible only when you get the original feedback related to that product. If you are provided with the system in which you can find the original feedback and rating related to a specific product. Then, it is the source of satisfaction and reliability for you. In the proposed technique, the reviews related to a product for which the URL is given are extracted. After it, the system finds the fake reviews and finally by analysing these reviews system finds the original reviews of the product. Previous researches detect fake reviews using different approaches including identification address, opinion mining and sentiment analysis, machine learning approach. we have proposed Fake Product Review Detection and Its

Removal System in which a customer can get the best possible item from the online store in a short time and with the original reviews associated with that product. This system gives you the original words of people related to the product with genuine reviews. Some popular products can get hundreds of reviews at large merchant sites and it gives you the promising reviews by filtering fake reviews and then you can decide whether you want to buy or not. This framework encourages the client to find out proper survey of the object.

II. LITERATURE SURVEY

To address the above problem literature review has been carried out. The following are the few works which are listed,

Fake Product Review Monitoring System [1] This paper came up with the objective to bring the solution to all problems related to detecting the fake review. This paper discusses about the various ways to detect spam reviews in order to the opinion mining. A detail discussion has been made on the existing technique to find out whether the review is spam or not. Different techniques such as IP address tracking and Ontology to detect spam reviews are incorporated to get more accurate results from the opinion mining.

Once the spam reviews are detected from the existing Dataset then a new Dataset is created which doesn't contain spam reviews and then the Opinion Mining is performed on the new spam filtered dataset. A new algorithm is proposed that detects spam reviews more precisely and performs opinion mining using spam filtered data. This paper includes techniques such as Ontology, Geo location and IP address tracking, Spam words Dictionary using Naïve Bayes, Brand only review detection and tracking account used.

Opinion Mining using Ontological Spam Detection [2] In this paper, the proposed technique includes Ontology, Geo location, and IP address tracking, Spam words Dictionary using Naïve Bayes, Brand only review detection and tracking account used to detect Spam reviews in order to get more accurate results from Opinion mining. In current scenario, the data on the web is growing exponentially. As there are a number of fake product reviews, so opinion mining technique incorporates spam detection to produce a genuine opinion. The online shopping is mainly influenced by the reviews but all these reviews are might not real or trustworthy, some reviews are manipulated by suppliers, vendors or publishers to promote their sales. Writing such fake and untrue reviews is called as review manipulation. After detecting the Spam reviews from the existing Dataset, a new Dataset is created which doesn't contain spam reviews. At last, a new algorithm is proposed that detects spam reviews more precisely and performs opinion mining using Spam Filtered Dataset. This paper indicates that the proposed algorithm is scalable and performs well irrespective type of dataset used. Fake review detection and its elimination from the given dataset using different Natural Language Processing (NLP) techniques is important in several aspects. In this article, the fake review dataset is trained by applying two different Machine Learning (ML) models to predict the accuracy of how genuine are the reviews in a given dataset. The rate of fake reviews in E commerce industry and even other platforms is increasing when depend on product reviews for the item found online on different websites and applications.

The products of the company were trusted before making a purchase. So, this fake review problem must be addressed so that these large E-commerce industries such as Flipkart, Amazon, etc. can rectify this issue so that the fake reviewers and spammers are eliminated to prevent users from losing trust on online shopping platforms. This model can be used by websites and applications with few thousands of users where it can predict the authenticity of the review based on which the website owners can take necessary action towards them. This model is developed using Naïve Bayes and random forest methods. By applying these models one can know the number of spam reviews on a website or application instantly. To counter such spammers, a sophisticated model is required in which a need to be trained on millions of reviews. In this work" amazon Yelp dataset" is used to train the models and its very small dataset is used for training on a very small scale and can be scaled to get high accuracy and flexibility.

Fake Product Review Monitoring and Removal for Genuine Online Reviews [3] In today's world reviews on online websites play a vital role in sales of the product because people try to get all the pros and cons of any product before they buy it as there are many different options for the same product as there can be different manufactures for the same type of product or there might be difference in sellers that can provide the product or there might be some difference in the procedure that is taken while buying the product so the reviews are directly related to the sales of the product and thus it necessary for the online websites to spot fake reviews as it's their own reputation that comes into consideration as well, so a Fake Review Detection is used to spot any fraudulent going on because it's not possible for them to verify every

product and sale manually so a program comes into the picture that tries to detect any pattern in the reviews given by the customers.

A framework for Fake Review Detection: Issues and Challenges [4] In this paper an overall issue has been summarized as well as challenges for detection of fake reviews as about fake reviewers have been discussed. The proposed framework discussed in this paper is used to deal with both labelled and un labelled data. This paper works on the framework which works with 90.19% of accuracy for Supervised learning and 83.70% for Semi supervised learning. This paper outlines the issues and challenges from the literature. All the possible features were explored and discussed in this paper. With the available dataset, this paper carries and compiles the experiment and result. All the possible future directions were discussed in this paper

GSCPM: CPM based group spamming detection in online product reviews [5]. In this paper, researchers proposed a novel of three-step method to detect group spammers based on Clique Percolation Method (CPM) in a completely unsupervised way, called GSCPM. First, it utilizes clues from behavioural data (timestamp, rating) and relational data (network) to construct a suspicious reviewer graph. Then, it breaks the whole suspicious reviewer graph into k clique clusters based on CPM, and we consider such k-clique clusters as highly suspicious candidate group spammers. Finally, it ranks candidate groups by group based and individual-based spam indicators. They used three real world review datasets from Yelp.com to verify the performance of the proposed method. Experimental results showed that the proposed method outperforms four compared methods in terms of prediction precision. However, it advisable to label a small amount of data to improve the precision of detection. Future direction is directed towards the use of partially supervised techniques.

III. PROPOSED SYSTEM

Detecting fake reviews from product is very much important in this era. As there are two types of purchases in every ecommerce website which are verified purchase and Nonverified purchase. Verified purchase means that the customer who was writing the review purchased the product from the online store and who did not receive the product at a great discount. For the verified purchase, it is an obvious thing that the customer has bought that product for which he/she is giving the review. We use sentimental analysis for the verified purchase. For the word like 'good, excellent' etc. the sentiment is to be positive and for the 'bad, poor quality' etc. type words the sentiment is to be negative.

For the Non-verified purchase anyone can give the review of the product without having any type of purchase history on e-commerce Website. Now in this situation, it is possible that the person who is giving the positive review related to the product also gives the good rating to that product. But here this possibility also falls that the person may be giving the positive review and rating to increase the rating of that product and he is a spammer. In this type of reviews, the technique of sentimental analysis is not worked properly because by using sentimental analysis it is considered as a genuine review. So that is the reason the proposed system is using another technique in which Support Vector Machine (SVM) is a classifier. In this proposed system we developed a website for reviewing a product, here user can login and give reviews to product and user can analyse the real and fake reviews.

1. **Approach for Verified Purchase:** The proposed system takes the reviews from the website based on the product, scrape all the reviews related to that product. Stores all the reviews in a comma separated values (CSV) file. Load the CSV file and separate the verified reviews from non-verified reviews. Apply sentiment analysis on verified purchase reviews and add another column sentiment polarity. Assigning the positive, negative or neutral to each review has been done at this stage.

2. **Approach for Non-verified Purchase:** The technique to detect the fake reviews of the non-verified purchase, we use another approach. For this first step is to collect the text related to the reviews of the product. After gathering textual data, the system applies preprocessing on each review related to the product and then extracts features from the reviews. After features extraction, the next step is to apply the SVM model and after it the results corresponding to the genuine or fake reviews is to be shown to the user.

   a. **Collection of Dataset:** The dataset of English reviews that the system is using to train the model was the Deceptive Opinion Spam Corpus, which consists of both the deceptive and genuine reviews about hotel collected from the website. Data consists of 2000 reviews of which 1000 reviews are genuine whereas other 1000 reviews are deceptive.

b. **Data Pre-Processing:** Before representing, the data using the n-gram model and add features to it, first the system need to do some refinements to the present data that includes removing punctuation and stop words, convert all the data into lower case. This helps to focus only on the actual data that gives more information rather than the information that only adds noise in the model. The system uses the functions to remove all the punctuation, stop words, and then convert all of the remaining words in lower case. After that, the propose technique applies lemmatization and then uses the bigrams technique.

c. **Feature Extraction:** Feature Extraction is the most difficult task that is the main reason behind your classifier accuracy System is studied by two feature selection methods: Term Frequency (TF) and Term Frequency Inverse Document Frequency (TF-IDF) for the selection of features related to our dataset. In the proposed approach, system uses Count Vectorizer that converts each review into bag of words and is used to tokenize the set of words described in the reviews and after it system applies TF-IDF transformer.

d. **Classification Process:** After the feature selection, the last step in the classification process is to train the classifier. The proposed architecture is tested by applying supervised machine learning algorithms including SVM. The fig1. Shows the classification process
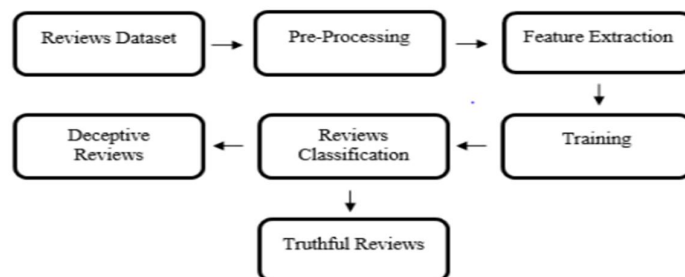

Fig1. Classification process

IV. RESULT

The proposed architecture uses the SVM classifier to train the model that consists of 147,440 rows. Confusion matrix of this dataset is given in Table1.

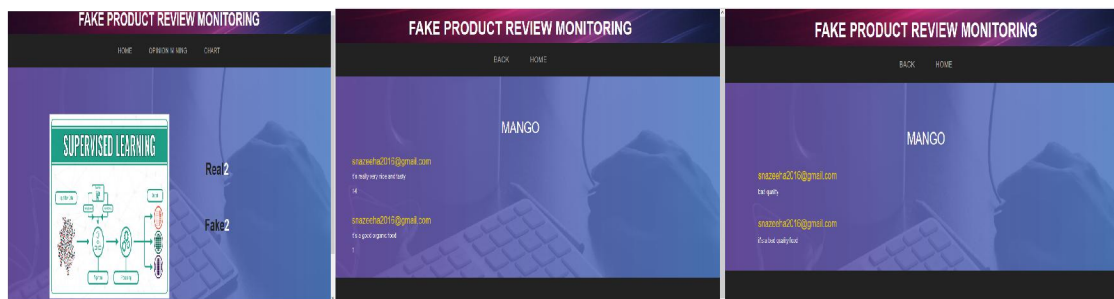|	**Predicted False**	**Predicted True**
Actual False	13,542	1185
Actual True	2700	12,061

Table 1.confusion matrix of the data set

Fig 2: Screenshot of result, fake and real reviews detected

V. CONCLUSION

In the proposed work, it is observed that the text categorization with SVM classifier is best approach for the detection of fake reviews. Now a days, as the technology is growing day by day and there are so many Websites and applications

available in the online market by which seller can sell their products and, on that product, there are millions of reviews available. There are some organizations posting fake reviews for the products of the seller in order to increase or decrease the rating of the products. In future work, hybrid models and new models can be tried for the fake review detection model. By using Google co-lab and NVIDIA graphics GPU, the research can speed up the process of execution.

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