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Hoax News Detection in Twitter

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***Abstract*: Twitter is one of the online media that is as of now prominently used throughout the world. It's simply that Twitter has a few issues that unfavorably influence its clients. The lie is one of the negative things that frequently happen in web-based media, news in deception is as yet questioned reality or the reality. In this last project, we created a system to detect COVID-related hoax news on Twitter. Our proposed framework will recognize the fake news based on the given dataset. This project will be worked by performing two machine learning algorithms which are Random Forest and Support Vector Machines. The Twitter dataset will be used as an input to this Machine Learning Model. The correlation will be done on the information prepared by RFC and SVM. It will check for the accuracy of the model by assessing the dataset and perform grouping of information also. The model with the highest accuracy will be utilized for the outcome and discovery of fake news.**

***Keywords*: COVID-19; fake news detection, twitter fake news, hoax news, fake news detection on social media.**

1. Introduction

In the recent past expanding fame of web-based media, an ever-increasing number of individuals burn through news from online media. In any case, web-based media has likewise been utilized to get out counterfeit words, which contrarily affects people and society. As a solution to this problem, we present a system that detects the fake news from user's posts classifies them as either fake or true. The objective of our project is to classify whether a tweet is fake or real and has been specifically trained to detect COVID-specific fake news. Section 2 contains the literature review of related work. Sec- tion 3 describes the Twitter dataset used. Section 4 contains the proposed methodology. Section 5 gives a detailed description of the algorithms used and the implementation of the project.

Section 6, 7, and 8 contains result, conclusion, and future work respectively. The stated methods is 74% using Random Forest classifier and 68% accuracy using Logistic Regression. The application is designed using two methods which are Random Forest classifier and Logistic Regression. In this paper [2] to classify a tweet as fake or real, they are using supervised machine learning classification techniques.The accuracy of the stated methods is 83% using Na¨ıve Bayes with Lidstone smoothing 81% using Support Vector Machine 65% using Logistic Regression.

The authors in this research paper [3] have used Domain Reputations and Content Understanding to detect fake news over online social media and also used Latent Dirichlet allo- cation topic modeling. This is the first effort to systematically study domain reputations and content characteristics of fake and real news, which will provide key insights for effectively detecting fake news on social media.This research paper [4] focuses on a novel automatic fake news detection model based on geometric deep learning. The underlying core algorithms are a generalization of classical convolutions neural networks to graphs, allowing the fusion of heterogeneous data such as content, user profile and activity, social graph, and news propagation. The authors in the research paper [5] aim to Term Frequency Inverse Document Frequency (TF-IDF), Support Vector Ma- chine (SVM). The use of the Term Frequency Inverse Doc- ument Frequency (TF-IDF) weighting system in the system gives a weighted value to a tweet taken from the occurrence of hoax news sent by someone on Twitter. Data classification uses the Support Vector Machine (SVM) method of the system to predict the possibility of a Twitter account user spreading a piece of hoax news based on the user's behavior.

2. Review of Literature

The application is designed using two methods which are Random Forest classifier and Logistic Regression. In this paper [1] To classify a tweet as fake or real, they are using supervised machine learning classification techniques. The accuracy of the stated methods is 74% using Random Forest classifier and 68% accuracy using Logistic Regression. The application is designed using two methods which are Random Forest classifier and Logistic Regression. In this paper [2] to classify a tweet as fake or real, they are using supervised machine learning classification techniques. The accuracy of the stated methods is 83% using Na¨ıve Bayes with Lidstone smoothing 81% using Support Vector Machine 65% using Logistic Regression. The authors in this research paper [3] have used Domain Reputations and Content Understanding to detect fake news over online social media and also used Latent Dirichlet allo- cation topic modeling. This is the first effort to systematically study domain reputations and content characteristics of fake and real news, which will provide key

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3. Data Description

1) Data Source

We obtained twitter data set from GitHub [11]. The size Data set is 549 rows. It has two columns Tweet id and Label.

2) Data Description

The dataset we used is the infodemic covid 19 twitter dataset, it is a covid specific misinformation dataset. Based on Twitter's data distribution policy, Twitter only shares the Tweet IDs and the annotated labels. The labels used are + 0: Tweets that do not have verifiable information. + 1: Tweets that contain verifiable information.

4. Proposed Methodology

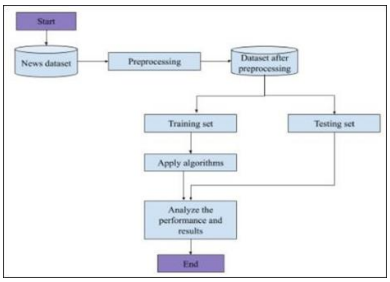

Fig. 1. Block Diagram of the Proposed System before deployment

In figure 1 the machine learning model of the system is still under training. After pre-processing step, the dataset is divided into training and testing sets. Then RFC and SVM algorithm is applied.

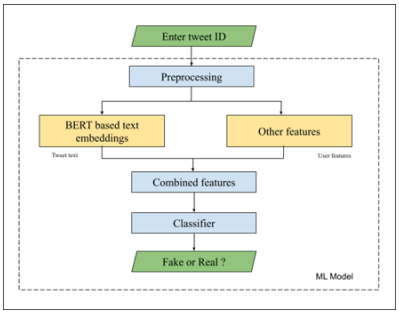

Fig. 2. ML Model Description

The system model is deployed onto a local server after the training procedure. Here, real-time tweets can be used to perform the task of credibility check. In figure 2 the internal processing of the ML model. When the user enters the tweet id or the URL of the tweet we extract the tweet text from it, pre-process it. In the pre-processing part, we removed all the emojis, URLs mentioned in the tweet, user mentions, and all the rt from the beginning of the retweet. After this step, we get BERT-based embedding's out of it and augment them with various supplementary features concatenate them all together pass it to a classifier. Then let the classifier predict whether the tweet is real or fake.

5. Proposed System and Implementation

Online media has become an extremely mainstream hotspot for news on account of its minimal expense, simple access, and has empowered the widespread use of "counterfeit news", i.e., inferior quality news with deliberately bogus data. Hence, fake news detection in Social media has recently become crucial. Our project aims to develop a system to detect such fake news present on Twitter (a Social networking site) posts and serves as a solution to prevent the negative impact of this news on individuals. We ask the user to enter the tweet id or the URL of the tweet we extract the tweet text from it, pre-process it, get BERT-based embeddings out of it, and augment them with various supplementary features concatenate them all together pass it to a classifier. Then let the classifier predict whether the tweet is real or fake.

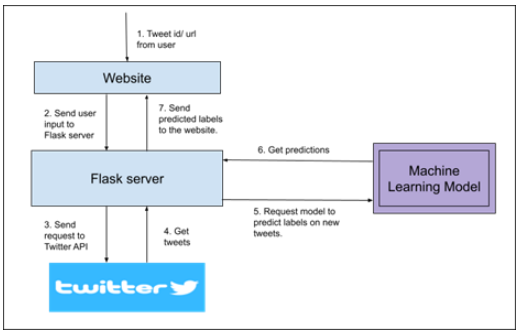

Fig. 3. Project Workflow

In figure 3 designed a website as a user interface where the user can submit his query. Once the user enters the query, it will be sent to the Flask server and then the Flask server will request to Twitter API to get the tweets related to the searched query. The tweets provided by the API are then given to the ML model to predict the label for the tweet. Prediction generated by the Model is then sent back to the website as a result.

6. Results and Discussion

This section shows a comparative study of all the models that were built. These models are evaluated through accuracy, precision, and f1-score. The Table 1 is addressing the various measurements used to assess the behavior of the machine learning model of the Hoax news location. From the above table, it is observed that the Recall of Support Vector Machine

(SVM) is very less i.e

Table 1
Metric scores of models in proposed solution

Model (Algorithms)	Metric Scores		
	Precision	*Recall*	*F-score*
SVM	50	30	60
RFC	88	89	89

30. Along with this even precision and F-score are also less than Random Forest Classifier (RFC). Here, we have observed that the Random Forest Classifier outputs higher precision, recall, and F1-score values as com- pared to Support Vector Machine (SVM). Therefore, we can infer that the Random Forest model is a better classifier for the proposed system to assess the misinformation and their values are higher.

1) Input

Fig. 4. User interface of the system

Fig. 6. After clicking the submit button, the tweet associated with the tweet id is displayed along with its credibility. Here the news is FAKE. This is the GUI that we have created for detection purposes of COVID-related news. As here as an input we need to enter the tweet id of whichever tweet we want to check. In our system, we can also enter the tweet URL to verify the tweet. The output of our system is based on the user is verified or not, a tweet has a decent number of likes and retweets also the dataset used. This is a supervised model i.e. it cannot adapt to the dynamic changes in the nature of the tweets, for example, whatever it is real today and it might become fake tomorrow or vice versa.

2) Output

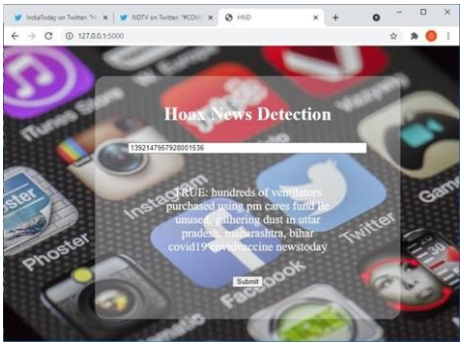

Fig. 5. After clicking the submit button, the tweet associated with the tweet id is displayed along with its credibility. Here the news is true

7. Conclusion

For the matter of news detection, two algorithms were implemented. Optimum results were obtained using Random Forest Classifier and Support Vector Machine for the detection of false information on Social media. Random forest adds additional randomness to the model. It searches for the most effective feature among a random subset of features. This ends up in a good diversity that generally leads to a higher model. Therefore, the random forest can generalize the information in a very better way. This randomized feature selection makes random forest rather more accurate than others. Further, since the accuracy and precision of the Random Forest model were on top of the Support Vector Machine, it will be accustomed to predict the false information present within the user tweet. Since these models provide decent accuracy, social media platforms can use these models to form better decisions. This project aims to produce an answer to spot the mis information present on Twitter and stop the spread of such false information. It is important to possess some mechanism for detecting hoax news to spread awareness about the truth of such news.

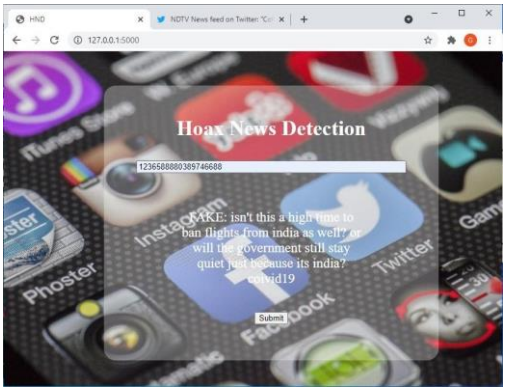

Fig. 6. After clicking the submit button, the tweet associated with the tweet id is displayed along with its credibility. Here the news is FAKE.

8. Future Work

The proposed system is a is supervised model and cannot support changes in the nature of tweets. Hence, we aim to create a model which will adapt to the dynamic nature of the tweets. We also aim to extend the system to other languages than English, Hindi. Increasing the scope of the project i.e detection of any kind of news along with the covid related news.

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