Fake News Detection On Social Media Using Machine Learning

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Abstract: *Fake News has an immense impact in our modern society. As a side effect of increasingly popular social media, fake news has emerged as a serious problem afflicting children, teenager and young adults.*

The main objective is to detect the fake news, which is a classic text classification problem with a straight forward proposition comes up with the applications of NLP (Natural Language Processing) techniques for detecting the 'fake news' in social media. By building a model based on a count vectorizer (using word tallies) or a (Term Frequency Inverse Document Frequency) TFIDF matrix, (word tallies relative to how often they're used in other articles in dataset) can get a solution for this.

The result show that Naïve Bayes to detect the Fake News has accuracy approximately 96% , Support Vector Machine achieve the accuracy of 98% and Random Forest achieve the accuracy of 97%.

Keywords: *Fake news,machine learning,nlp*

I. INTRODUCTION

Fake news detection on social media presents distinctive characteristics and challenges that build existing detection algorithms from ancient print media ineffective or not applicable. First, pretend news is by choice written to mislead readers to believe false information , that makes it troublesome and nontrivial to sight supported news content; so,

We need to include auxiliary info, like user social engagements on social media, to help make a determination.

Second, exploiting this auxiliary info is difficult in and of itself as users' social engagements with pretend news manufacture information that's massive, incomplete, unstructured, and noisy. Because the difficulty of pretend news detection on social media is each difficult and relevant, we have a tendency to conducted this survey to more facilitate analysis on the matter. In this survey, we have a tendency to gift a comprehensive review of police work pretend news on social media, including fake news characterizations on psychology and social theories, existing algorithms from a data mining perspective, evaluation metrics and representative datasets. I also discuss related research areas, open problems, and future research directions for fake news detection on social media. Detecting pretend news on social media poses many new and difficult analysis issues.

Though fake news itself is not a new problem– nations or groups have been using the news media to execute propaganda or influence operations for centuries–the rise of web-generated news on social media makes pretend news a a lot of powerful force that challenges ancient print media norms. There are several characteristics of this problem that make it uniquely challenging for automated detection.

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II. LITERATURE SURVEY

Nematzadeh[1], E. Ferrara[2], A. Flammini[3], Y. Y. Ahu[4] conducted a study and concluded that with the widespread of social networks, the risk of information sharing has become inevitable. Sharing a user's particular information in social networks is an all-or-none decision. Users receiving friendship invitations from others may decide to accept this request and share their information or reject it in which case none of their information will be shared. Access control in social networks is a challenging topic. Social network users would want to determine the optimum level of details at which they share their personal information with other users based on the risk associated with the process. In this, authors formulated the problem of data sharing in social networks using two different models: (i) a model based on diffusion kernels and (ii) a model based on access control. Here author showed that it is hard to apply the former in practice and explore the latter. Here authors proved that determining the optimal levels of information sharing is a Natural Language Processing problem and propose an approximation algorithm that determines to what extent social network users share their own information. Here Authors proposed a trust-based model to assess the risk of sharing sensitive information and use it in the proposed algorithm. Moreover, authors proved the algorithm could be solved in polynomial time. Author's results rely heavily on adopting the super modularity property of the risk function, which allows us to employ techniques from convex optimization. To evaluate our model, we conduct a user study to collect demographic information of several social networks users and get their perceptions on risk and trust. In addition, through experimental studies on synthetic data, we compare our proposed algorithm with the optimal algorithm

both in terms of risk and time. We show that the proposed algorithm is scalable and that the sacrifice in risk is outweighed by the gain in efficiency.J. Firmstone[5], S. Coeman[6] said that Understanding the role ethics plays in standards development and application as well as what questions to ask when deciding whether or not a decision is ethical. Learn what options you have when faced with a Standard related ethical dilemma and what resources are available to assist you in making ethical decisions.

III. PROPOSED WORK

In this project a model is build based on the count vectorizer or a Tfidf matrix how word tallies relatives to how often they are used in other articles in the dataset.

Since this problem is a kind of text classification, implementing some machine learning classifiers will be best as this is standard for text-based processing. The actual goal is in developing a model which was the text transformation (count vectorizer vs tfidf vectorizer) and choosing which type of text to use (headlines vs full text).

Now successive step is to extract the foremost best options for count vectorizer or tfidf-vectorizer, this is done by using a n-number of the most used words, and/or phrases, lower casing or not, mainly removing the stop words which are common words such as “the”, “when”, and “there” and only using those words that appear at least a given range of times in an exceedingly given text dataset.

Finally, by applying various classifiers to the dataset can predict which articles are fake and which are real based on Confusion Matrix and analyzing their accuracies.

Advantages

- Introducing Natural Language Processing techniques for data pre-processing for better results.
- One of the biggest advantages of language processing techniques is this method is able to find relationships among words.
- Algorithms like SVM and Naïve Bayes classifier can improve the accuracy even more.

Algorithm Description

Machine Learning is classified into four categories at a high level depending on the nature of the learning and learning system.

- Supervised learning
- Unsupervised learning
- Reinforcement learning
- Semi-supervised Learning

Supervised Machine Learning

The majority of practical machine learning uses supervised learning. It is called supervised learning because the process of an algorithm learning from the training dataset can be thought of as a teacher supervising the learning process. Learning stops when the algorithm achieves an acceptable level of performance.

Classification: A classification problem is when the output variable is a category, such as “red” or “blue” or “disease” and “no disease”.

Regression: A regression problem is when the output variable is a real value, such as “dollars” or “weight”.

Unsupervised Machine Learning

Unsupervised learning is where you only have input data (X) and no corresponding output variables.

Clustering: A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behaviour. **Association:** An association rule learning problem is where you want to discover rules that describe large portions of your data, such as people that buy X also tend to buy Y.

Reinforcement learning

In this algorithm interacts with a dynamic environment, and it must perform a certain goal without a guide or teacher.

Semi-supervised Learning

This type of ml i.e. semi-supervised algorithms are the best candidates for the model building in the absence of labels for some data. So if data is a mix of label and un- label then this can be the answer. Typically, a small amount of labeled data with a large amount of unlabeled data is used here.

Classification can be performed on structured or unstructured data.

Classification is a technique where we categorize data into a given number of classes. The main goal of a classification problem is to identify the category to which a new data will fall under.

a) Support Vector Machine

What is Support Vector Machine?

"Support Vector Machine" (SVM) is a supervised machine learning algorithm which can be used for both classification or regression challenges. However, it is mostly used in classification problems. In this algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiate the two classes very well (look at the below snapshot).

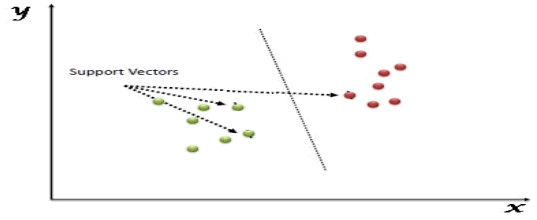


Fig 1: Support Vector Machine

OUTPUT

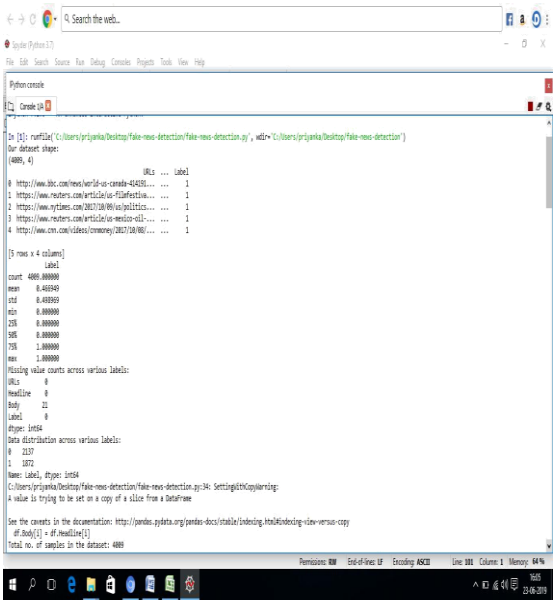


Fig 2 :output

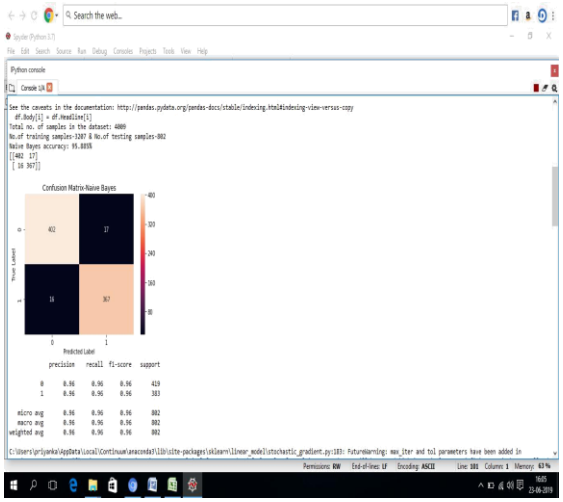
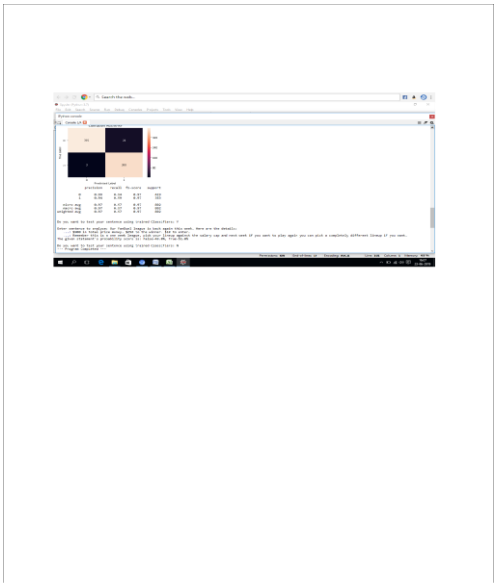


Fig 3 : output



CONCLUSION

This project is developed for detecting fake news that generated in social media. Now a day the rapid growth of social media generates thousands of fake news articles per day. This led to lot of problems for people to differentiate between fake and real

In this project, we have taken a predefined dataset and applied feature extraction to extract features from the dataset. After feature extraction we have applied various machine learning algorithms like svm(support vector machine),Random Forest, Naive Bayes and predicted the output in the form of Confusion Matrix**.**

It is important that we should have some mechanism for detecting fake news, or at the very least, an awareness that not everything we read on

social media may be true, so we always need to be thinking critically.

FUTURE ENHANCEMENTS

The project entitled "**FAKE NEWS DETECTION USING MACHINE LEARNING ALGORITHMS** "has been developed in a structural manner, which helps for future development. In future this project can be more efficient by connecting to social media like Facebook , Instagram and twitter and gathering news into dataset by live using respective application interfaces and analyzing those data and detecting fake news that generated about last second.

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