National Conference on Sustainable Engineering And Management (NCSEM24)
ISSN 2349-6002

Fake News Detection Using Machine Learning

Anju. G[1], Aishwarya Lekshmi. A. C[2]
Anju. G[1], *Department of CSE, Sivaji College of Engineering and Technology*
Aishwarya Lekshmi. A. C[1], *Department of CSE, Sivaji College of Engineering and Technology*

Abstract— In recent years, due to the booming development of online social networks, fake news for various commercial and political purposes has been appearing in large numbers and widespread in the online world. With deceptive words, online social network users can get infected by these online fake news easily, which has brought about tremendous effects on the offline society already. An important goal in improving the trustworthiness of information in online social networks is to identify the fake news timely. This paper aims at investigating the principles, methodologies and algorithms for detecting fake news articles, creators and subjects from online social networks and evaluating the corresponding performance. In this paper, we propose a method for "fake news" detection and ways to apply it on Facebook, one of the most popular online social media platforms. This method uses Naive Bayes classification model to predict whether a post on Facebook will be labeled as real or fake. The results may be improved by applying several techniques that are discussed in the paper.

I. INTRODUCTION

These days‟ fake news is creating different issues from sarcastic articles to a fabricated news and plan government propaganda in some outlets. Fake news and lack of trust in the media are growing problems with huge ramifications in our society. Obviously, a purposely misleading story is “fake news “ but lately blathering social media‟s discourse is changing its definition. Some of them now use the term to dismiss the facts counter to their preferred viewpoints.

The importance of disinformation within American political discourse was the subject of weighty attention, particularly following the American president election. The term 'fake news' became common parlance for the issue, particularly to describe factually incorrect and misleading articles published mostly for the purpose of making money through page views. In this paper, it is seeked to produce a model that can accurately predict the likelihood that a given article is fake news. Facebook has been at the epicenter of much critique following media attention. They have already implemented a feature to flag fake news on the site when a user sees‟s it; they have also said publicly they are working on to distinguish these articles *in* an automated way. Certainly, it is not an easy task. A given algorithm must be politically unbiased – since fake news exists on both ends of the spectrum – and also give equal balance to legitimate news sources on either end of the spectrum. In addition, the question of legitimacy is a difficult one. However, in order to solve this problem, it is necessary to have an understanding on what Fake News.

II. MOTIVATION

We will be training and testing the data, when we use supervised learning it means we are labeling the data. By getting the testing and training data and labels we can perform different machine learning algorithms but before performing the predictions and accuracies, the data is need to be preprocessing i.e. the null values which are not readable are required to be removed from the data set and the data is required to be converted into vectors by normalizing and tokening the data so that it could be understood by the machine. Next step is by using this data, getting the visual reports, which we will get by using the Mat Plot Library of Python and Sickit Learn. This library helps us in getting the results in the form of histograms, pie charts or bar charts.

III. OBJECTIVE OF THE PROJECT

The objective of this project is to examine the problems and possible significances related with the spread of fake news. We will be working on different fake news data set in which we will apply different machine learning algorithms to train the data and test it to find which news is the real news or which one is the fake news. As the fake news is a

problem that is heavily affecting society and our perception of not only the media but also facts and opinions themselves. By using the artificial intelligence and the machine learning, the problem can be solved as we will be able to mine the patterns from the data to maximize well defined objectives. So, our focus is to find which machine learning algorithm is best suitable for what kind of text dataset. Also, which dataset is better for finding the accuracies as the accuracies directly depends on the type of data and the amount of data. The more the data, more are your chances of getting correct accuracy as you can test and train more data to find out your results.

IV. OVERVIEW OF PROJECT

With the advancement of technology, digital news is more widely exposed to users globally and contributes to the increment of spreading and disinformation online. Fake news can be found through popular platforms such as social media and the Internet. There have been multiple solutions and efforts in the detection of fake news where it even works with tools. However, fake news intends to convince the reader to believe false information which deems these articles difficult to perceive. The rate of producing digital news is large and quick, running daily at every second, thus it is challenging for machine learning to effectively detect fake news

V. LITERATURE SURVEY

The available literature has described many automatic detection techniques of fake news and deception posts. Since there are multidimensional aspects of fake news detection ranging from using chatbots for spread of misinformation to use of clickbaits for the rumor spreading . There are many clickbaits available in social media networks including facebook which enhance sharing and liking Proceedings of posts which in turn spreads falsified information. Lot of work has been done to detect falsified information.

A. MEDIA RICH FAKE NEWS DETECTION

Ingeneral, the goal is profiting through clickbaits. Clickbaits lure users and entice curiosity with flashy headlines or designs to click links to increase advertisements revenues. This exposition analyzes the prevalence of fake news in light of the advances in communication made possible by the emergence of social networking sites. The purpose of the work

is to come up with a solution that can be utilized by users to detect and filter out sites containing false and misleading information. We use simple and carefully selected features of the title and post to accurately identify fake posts. The experimental results show a 99.4% accuracy using logistic classifier.

B. WEAKLY SUPERVISED LEARNING FOR FAKE NEWS DETECTION ON TWITTER

The problem of automatic detection of fake news in social media, e.g., on Twitter, has recently drawn some attention. Although, from a technical perspective, it can be regarded as a straight-forward, binary classification problem, the major challenge is the collection of large enough training corpora, since manual annotation of tweets as fake or non-fake news is an expensive and tedious endeavor. In this paper, we discuss a weakly supervised approach, which automatically collects a large-scale, but very noisy training dataset comprising hundreds of thousands of tweets. During collection, we automatically label tweets by their source, i.e., trustworthy or untrustworthy source, and train a classifier on this dataset. We then use that classifier for a different classification target, i.e., the classification of fake and nonfake tweets. Although the labels are not accurate according to the new classification target (not all tweets by an untrustworthy source need to be fake news, and vice versa), we show that despite this unclean inaccurate dataset, it is possible to detect fake news with an F1 score of up to 0.9.

C. FAKE NEWS DETECTION IN SOCIAL MEDIA

Fake news and hoaxes have been there since before the advent of the Internet. The widely accepted definition of Internet fake news is: fictitious articles deliberately fabricated to deceive readers". Social media and news outlets publish fake news to increase readership or as part of psychological warfare. Ingeneral, the goal is profiting through clickbaits. Clickbaits lure users and entice curiosity with flashy headlines or designs to click links to increase advertisements revenues. This exposition analyzes the prevalence of fake news in light of the advances in communication made possible by the emergence of social networking sites. The purpose of the work is to come up with a solution that can be utilized by users to detect and filter out sites containing false and misleading information. We use

simple and carefully selected features of the title and post to accurately identify fake posts.

The experimental results show a 99.4% accuracy using logistic classifier.

D. Automatic Online Fake News Detection Combining Content and Social Signals

The proliferation and rapid diffusion of fake news on the Internet highlight the need of automatic hoax detection systems. In the context of social networks, machine learning (ML) methods can be used for this purpose. Fake news detection strategies are traditionally either based on content analysis (i.e. analyzing the content of the news) or - more recently- on social context models, such as mapping the news" diffusion pattern. In this paper, we first propose a novel ML fake news detection method which, by combining news content and social context features, outperforms existing methods in the literature, increasing their already high accuracy by up to 4.8%. Second, we implement our method within a Facebook Messenger chatbot and validate it with a real-world application, obtaining a fake news detection accuracy of 87.6%.

In recent years, the reliability of information on the Internet has emerged as a crucial issue of modern society. Social network sites (SNSs) have revolutionized the way in which information is spread by allowing users to freely share content. As a consequence, SNSs are also increasingly used as vectors for the diffusion of misinformation and hoaxes. The amount of disseminated information and the rapidity of its diffusion make it practically impossible to assess reliability in a timely manner, highlighting the need for automatic hoax detection systems.As a contribution towards this objective, we show that Facebook posts can be classified with high accuracy as hoaxes or non-hoaxes on the basis of the users who "liked" them. We present two classification techniques, one based on logistic regression, the other on a novel adaptation of boolean crowdsourcing algorithms. On a dataset consisting of 15,500 Facebook posts and 909,236 users, we obtain classification accuracies exceeding 99% even when the training set contains less than 1% of the posts. We further show that our techniques are robust: they work even when we restrict our attention to the users who like both hoax and non- hoax posts. These results suggest that mapping the diffusion pattern of information can be a useful component of automatic hoax detection systems.

Big Data Analytics and Deep Learning are two high-focus of data science. Big Data has become important as many organizations both public and private have been collecting massive amounts of domain-specific information, which can contain useful information about problems such as national intelligence, cyber security, fraud detection, marketing, and medical informatics. Companies such as Google and Microsoft are analyzing large volumes of data for business analysis and decisions, impacting existing and future technology. Complex abstractions are learnt at a given level based on relatively simpler abstractions formulated in the preceding level in the hierarchy. A key benefit of Deep Learning is the analysis and learning of massive amounts of unsupervised data, making it a valuable tool for Big Data Analytics where raw data is largely unlabeled and un-categorized. In the present study, we explore how Deep Learning can be utilized for addressing some important problems in Big Data Analytics, including extracting complex patterns from massive volumes of data, semantic indexing, data tagging, fast information retrieval, and simplifying discriminative tasks. We also investigate some aspects of Deep Learning research that need further exploration to incorporate specific challenges introduced by Big Data Analytics, including streaming data, high-dimensional data, scalability of models, and distributed computing. We conclude by presenting insights into relevant future works by posing some questions, including defining data sampling criteria, domain adaptation modeling, defining criteria for obtaining useful data abstractions, improving semantic indexing, etc

VI.METHODOLOGY

A. PROPOSED SYSTEM

In this paper a model is build based on the count vectorizer or a tfidf matrix (i.e) word tallies relatives to how often they are used in other artices in your dataset) can help . Since this problem is a kind of text classification, Implementing a Naive Bayes classifier 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 the next step is to extract the most optimal features for countvectorizer 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 number of times in a given text dataset.

A. SYSTEM ARCHITECTURE

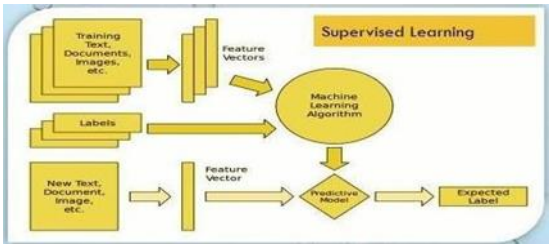

Fig:3.1 Architecture diagram

VII. SYSTEM REQUIREMENTS

A. HARDWARE REQUIREMENTS:

- System - Pentium-IV
- Speed- 2.4GHZ
- Hard disk - 40GB
- Monitor - 15VGA color
- RAM- 512MB

B. SOFTWARE REQUIREMENTS:

- Operating System - Windows XP
- Coding language - PYTHON

VIII. SOFTWARE ENVIRONMENT

A. PYTHON

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

- Python is Interpreted − Python is processed at runtime by the interpreter. You do not need to compile your program before executing it. This is similar to PERL and PHP.
- Python is Interactive − You can actually sit at a Python prompt and interact with the interpreter directly to write your programs.
- Python is Object-Oriented − Python supports Object-Oriented style or technique of programming that encapsulates code within objects.
- Python is a Beginner's Language − Python is a great language for the beginner- level programmers and supports the development of a wide range of applications from simple text processing

B. FLASK FRAMEWORK

Flask is a web application framework written in Python. Armin Ronacher, who leads an international group of Python enthusiasts named Pocco, develops it. Flask is based on Werkzeug WSGI toolkit and Jinja2 template engine. Both are Pocco projects.

Http protocol is the foundation of data communication in world wide web. Different methods of data retrieval from specified URL are defined in this protocol.

By default, the Flask route responds to the GETrequests. However, this preference can be altered by providing methods argument to route() decorator.

In order to demonstrate the use of POST method in URL routing, first let us create an HTML form and use the POST method to send form data to a URL.

I. MODULES DESCRIPTION

So, this project we are using different packages and to load and read the data set we are using pandas. By using pandas, we can read the .csv file and then we can display the shape of the dataset with that we can also display the dataset in the correct form. We will be training and testing the data, when we use supervised learning it means we are labeling the data. By getting the testing and training data and labels we can perform different machine learning algorithms but before performing the predictions and accuracies, the data is need to be preprocessing i.e. the null values which are not readable are required to be removed from the data set and the data is required to be converted into vectors by normalizing and tokening the data so that it could be understood by the machine. Next step is by using this data, getting the visual reports, which we will get by using the Mat Plot Library of Python and Sickit Learn. This library helps us in getting the results in the form of histograms, pie charts or bar charts.

A. Preprocessing

The data set used is split into a training set and a testing set containing in Dataset 1-3256 training data and 814 testing data and in Dataset II- 1882 training data and 471 testing data respectively. Cleaning the data is always the first step. In this, those words are removed from the dataset.

That helps in mining the useful information. Whenever we collect data online, it sometimes contains the undesirable characters like stop words, digits etc. which creates hindrance while spam detection. It helps in removing the texts which are language independent entities and integrate the logic which can improve the accuracy of the identification task.

B. Feature Extraction

Feature extraction s the process of selecting a subset of relevant features for use in model construction. Feature extraction methods helps in to create an accurate predictive model. They help in selecting features that will give better accuracy. When the input data to an

algorithm is too large to be handled and i ts supposed to be redundant then the input data will be transformed into a reduced illustration set of features also named feature vectors. Altering the input data to perform the desired task using this reduced representation instead of the full-size input. Feature extraction is performed on raw data prior to applying any machine learning algorithm, on the transformed data in feature space.

C. Training the Classifier

As In this project I am using Scikit-Learn Machine leanring ibrary for implementing the architecture. Scikit Learn is an open source python Machine Learning library which comes bundled in 3rd distribution anaconda. This just needs importing the packages and you can compile the command as soon as you write it. If the command doesn‟t run, we can get the error at the same time. I am using 4 different algorithms and I have trained these 4 models i.e. Naïve Bayes, Support Vector Machine, K Nearest Neighbors and Logistic Regression wic are very popular methods for document classification problem. Once the classifiers are traned, we can c heck the performance of the models on test-set. We can extract the word count vector for each mail in test-set and predict it class with the trained models.

I. ALGORITHMS

A. Naive Bayes

- One of supervised learning algorithm based on probabilistic classification technique.
- It is a powerful and fast algorithm for predictive modelling.
- In this project, I have used the Multinomial Naive Bayes Classifier.

B. Support Vector Machine- SVM

- SVM‟s are a set of supervised learning methods used for classification, and regression.
- Effective in high dimensional spaces.
- Uses a subset of training points in the support vector, so it is also memory efficient.

C. Logistic Regression

- Linear model for classification rather than regression.
- The expected values of the response variable are modeled based on combination of values taken by the predictors.

II. RESULTS AND DISCUSSION

- Algorithm‟s accuracy depends on the type and size of your dataset. More the data, more chances of getting correct accuracy.
- Machine learning depends on the variations and relations
- Understanding what is predictable is as important as trying to predict it.
- While making algorithm choice, speed should be a consideration factor.

III. REQUIREMENT ANALYSIS

Requirement analysis, also called requirement engineering, is the process of determining user expectations for a new modified product. It encompasses the tasks that determine the need for analysing, documenting, validating and managing software or system requirements. The requirements should be documentable, actionable, measurable, testable and traceable related to identified business needs or opportunities and define to a level of detail, sufficient for system design.

A. FUNCTIONAL REQUIREMENTS

It is a technical specification requirement for the software products. It is the first step in the requirement analysis process which lists the requirements of particular software systems including functional, performance and security requirements. The function of the system depends mainly on the quality hardware used to run the software with given functionality.

i. Usability

It specifies how easy the system must be use. It is easy to ask queries in any format which is short or long, porter stemming algorithm stimulates the desired response for user.

ii. Robustness

It refers to a program that performs well not only under ordinary conditions but also under unusual conditions. It is the ability of the user to cope with errors for irrelevant queries during execution.

iii. Security

The state of providing protected access to resource is security. The system provides good security and unauthorized users cannot access the system there by providing high security.

iv. Reliability

It is the probability of how often the software fails. The measurement is often expressed in MTBF (Mean Time Between Failures). The requirement is needed in order to ensure that the processes work correctly and completely without being aborted. It can handle any load and survive and survive and even capable of working around any failure.

v. Compatibility

It is supported by version above all web browsers. Using any web servers like localhost makes the system

real-time experience.

vi. Flexibility

The flexibility of the project is provided in such a way that is has the ability to run on different environments being executed by different users.

vii. Safety

Safety is a measure taken to prevent trouble. Every query is processed in a secured manner without letting others to know one‟s personal information.

IV. CONCLUSION AND FUTURE WORK

Many people consume news from social media instead of traditional news media. However, social media has also been used to spread fake news, which has negative impacts on individual people and society. In this paper, an innovative model for fake news detection using machine learning algorithms has been presented. This model takes news events as an input and based on twitter reviews and classification algorithms it predicts the percentage of news being fake or real.

The feasibility of the project is analyzed in this phase and business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. For feasibility analysis, some understanding of the major requirements for the system is essential. This study is carried out to check the economic impact that the system will have on the organization. The amount of fund that the company can pour into the research and development of the system is limited. The expenditures must be justified. Thus the developed system as well within the budget and this was achieved because most of the technologies used are freely available. Only the customized products had to be purchased.

REFERENCES

[1]. Parikh, S. B., & Atrey, P. K. (2018, April). Media-Rich Fake News Detection: A
Survey. In 2018 IEEE Conference on Multimedia Information Processing and Retrieval (MIPR) (pp. 436-441). IEEE.

[2]. Conroy, N. J., Rubin, V. L., & Chen, Y. (2015, November). Automatic deception detection: Methods for finding fake news. In Proceedings of the 78th ASIS&T Annual Meeting: Information Science with Impact: Research in and for the Community (p. 82). American Society for Information Science.

[3]. Helmstetter, S., & Paulheim, H. (2018, August). Weakly supervised learning for fake news detection on Twitter. In 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM) (pp. 274-277). IEEE.

[4]. Stahl, K. (2018). Fake News Detection in Social Media.

[5]. Della Vedova, M. L., Tacchini, E., Moret, S., Ballarin, G., DiPierro, M., & de Alfaro, L. (2018, May). Automatic Online Fake News Detection Combining Content and Social Signals. In 2018 22nd Conference of Open Innovations Association (FRUCT) (pp. 272-279). IEEE.

[6] Tacchini, E., Ballarin, G., Della Vedova, M. L., Moret, S., & de Alfaro, L. (2017). Some like it hoax: Automated fake news detection in social networks. arXiv preprint arXiv:1704.07506.

[7]. Shao, C., Ciampaglia, G. L., Varol, O., Flammini, A., & Menczer, F. (2017). The spread of fake news by social bots. arXiv preprint arXiv:1707.07592, 96-104.

[8]. Chen, Y., Conroy, N. J., & Rubin, V. L. (2015, November). Misleading online content: Recognizing clickbait as false news. In Proceedings of the 2015 ACM on Workshop on Multimodal Deception Detection (pp. 15-19). ACM.

[9]. Najafabadi, M. M., Villanustre, F., Khoshgoftaar, T. M., Seliya, N., Wald, R., & Muharemagic, E. (2015). Deep learning applications and challenges in big data analytics. Journal of Big Data, 2(1), 1.

[10]. Haiden, L., & Althuis, J. (2018). The Definitional Challenges of Fake News