



A Study of Fake News Detection using Machine Learning Algorithms

K.ArunKumar, G.Preethi, K.Vasanth

¹Asst. Professor, Computer Science and Engineering, RVS College of Engineering and Technology,
Coimbatore-641402, Tamil Nadu

^{2,3}. Final year B.E., Computer Science and Engineering, RVS College of Engineering and Technology,
Coimbatore-641402, Tamil Nadu

Abstract: In this paper, we explore the application of Natural Language Processing techniques to identify when a news source may be producing fake news. We use a corpus of labeled real and fake new articles to build a classifier that can make decisions about information based on the content from the corpus. We use a text classification approach, using four different classification models, and analyze the results. The best performing model was the LSTM implementation. The model focuses on identifying fake news sources, based on multiple articles originating from a source. Once a source is labeled as a producer of fake news, we can predict with high confidence that any future articles from that source will also be fake news. Focusing on sources widens our article misclassification tolerance, because we then have multiple data points coming from each source.

Keywords: FakeNews, LSTM Algorithm, SVM, SocialMedia, Fake News Detection Analysis.

1. INTRODUCTION

Fake news, defined as a made-up story with an intention to deceive, has been widely cited as a contributing factor to the outcome of the 2016 United States presidential election. While Mark Zuckerberg, Facebook's CEO, made a public statement [1] denying that Facebook had an effect on the outcome of the election, Facebook and other online media outlets have begun to develop strategies for identifying fake news and mitigating its spread. Zuckerberg admitted identifying fake news is difficult, writing, "This is an area where I believe we must proceed very carefully though. Identifying the truth is complicated." Fake news is increasingly becoming a menace to our society. It is typically generated for commercial interests to attract viewers and collect advertising revenue. However, people and groups with potentially malicious agendas have been known to initiate fake news in order to influence events and policies around the world. It is also believed that circulation of fake news had material impact on the outcome of the 2016 US Presidential Election.

2. LITERATURE SURVEY

1)Fake News Detection Using Naive Bayes Classifier-Mykhailo Granik, Volodymyr Mesyura.Published in the year in 2017 in Vinnitsia, Ukraine.

The paper shows a simple approach for fake news detection using naive Bayes classifier. This approach was implemented as a software system and tested against a data set of Facebook news

posts. We achieved classification accuracy of approximately 74% on the test set which is a decent result considering the relative simplicity of the model. This results may be improved in several ways, that are described in the article as well. Received results suggest, that fake news detection problem can be addressed with artificial intelligence methods.

2) Fake News Detection-Akshay Jain, Amey Kasbe.Published in the year 2018 in Bhopal,India

Information preciseness on Internet, especially on social media, is an increasingly important concern, but web-scale data hampers, ability to identify, evaluate and correct such data, or so called “fake news,” present in these platforms. 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. Received results suggest, that fake news detection problem can be addressed with machine learning methods.

3) Fake News Detection on Social Media:A Data Mining Perspective by Kai Shuy, Amy Slivaz, Suhang Wangy, Jiliang Tang , and Huan Liuy Computer Science & Engineering, Arizona State University, Tempe, AZ, USA

Social media for news consumption is a double-edged sword. On the one hand, its low cost, easy access, and rapid dissemination of information lead people to seek out and consume news from social media. On the other hand, it enables the wide spread of “fake news”, i.e., low quality news with intentionally false information. The extensive spread of fake news has the potential for extremely negative impacts on individuals and society. Therefore, fake news detection on social media has recently become an emerging research that is attracting tremendous attention. Fake news detection on social media presents unique characteristics and challenges that make existing detection algorithms from traditional news media ineffective or not applicable. First, fake news is intentionally written to mislead readers to believe false information, which makes it difficult and nontrivial to detect based on news content; therefore, we need to include auxiliary information, such as user social engagements on social media, to help make a determination. Second, exploiting this auxiliary information is challenging in and of itself as users' social engagements with fake news produce data that is big, incomplete, unstructured, and noisy. Because the issue of fake news detection on social media is both challenging and relevant, we conducted this survey to further facilitate research on the problem. In this survey, we present a comprehensive review of detecting fake 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. We also discuss related research areas, open problems, and future research directions for fake news detection on social media.

4) FAKEDETECTOR: Effective Fake News Detection with Deep Diffusive Neural Network by Jiawei Zhang, Bowen Dong, Philip S. Yu IFM Lab, Department of Computer Science, Florida State University, FL, USA

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. This paper addresses the challenges introduced by the unknown characteristics of fake news and diverse connections among news articles, creators and subjects. This paper introduces a novel automatic fake news credibility inference model, namely FAKEDETECTOR. Based on a set of explicit and latent features extracted from the textual information, FAKEDETECTOR builds a deep diffusive network model to learn the representations of news articles, creators and subjects simultaneously. Extensive experiments have been done on a real-world fake news dataset to compare FAKEDETECTOR with several state-of-the-art models, and the experimental results have demonstrated the effectiveness of the proposed model

3. STUDY OF FAKE NEWS DETECTION USING MACHINE LEARNING ALGORITHMS

I. PROPOSED SYSTEM

In this project we are going to make use of Natural Language Techniques to overcome the widespread of false news on the internet. In this project we make use of deep learning techniques to determine how the LSTM algorithm works on the given clip of information which can be given as input to the system either in text format or image format. The approach used in this project is to first train the system and then add the news information for which one needs to check if its reliable or not reliable as well as print the accuracy of the algorithm performance on the news clip inserted by the respective reader. The dataset used in this process contains 25117 entries collected from kraggle and github, which goes across 4 columns named as the journalist id which will be provided by their particular newspaper organisation, the headline of the news which is given as title ranges around 15 to 30 words at most, the content of the news which is tagged as text and finally the label that is either 1 or 0 which means that 1 indicates that the news is true and 0 indicates that the news is false, these datasets are checked and published by journalists who also make sure these information have high level of authenticity. News in these datasets contain news from domains like sports, politics, health, etc. After this the training dataset is processed and after processing it the users has to choose which format of news are they willing to use that is either text format or image format. When the reader chooses the text format they can copy the news from the website and paste it on the prompt displayed on the window and then click ok. In case of image format the user has to snip the image from the website and save it in the system then upload the image and click ok, the image will be converted into a grayscale image and will be displayed before processing the contents in it. On processing, the contents in the image will be converted into text. After this process is done the confusion matrix is displayed which contains the true positive value, false positive value, false negative value and true negative value as in a graph format. Once this process is over close the window and then will you see a prompt which denotes whether the given news is reliable or unreliable.

II. SYSTEM ARCHITECTURE

The specific purpose of this architecture is to explain the working of the reliability detecting system. This system consists of few methods to detect the reliability of the news. The first method that has been implemented is the preprocessing steps. Texts or images got from the

internet or social media are stored in the form of datasets at regular intervals for training the system. The dataset used in this process contains 25117 entries collected from kaggle and github, which goes across 4 columns named as the journalist id which will be provided by their particular newspaper organisation, the headline of the news which is given as title ranges around 15 to 30 words at most, the content of the news which is tagged as text and finally the label that is either 1 or 0 which means that 1 indicates that the news is true and 0 indicates that the news is false. After this process next we perform feature extraction and feature selection on the dataset, the goal is to produce a vector representation of each article. Before applying Doc2Vec, we perform some basic pre-processing of the data. This includes removing stopwords, deleting special characters and punctuation, and converting all text to lowercase. This produces a comma-separated list of words, which can be input into the Doc2Vec algorithm to produce a 300-length embedding vector for each article. Then we apply the LSTM algorithm which stands for long short term memory unit good at classifying serialized objects because it will selectively memorize the previous input and use that, together with the current input, to make prediction. The news content (text) in our problem is inherently serialized. The order of the words carries the important information of the sentence. So the LSTM model suits for our problem. We first clean the text data by removing all characters which are not letters nor numbers. Then we count the frequency of each word appeared in our training dataset to find 5000 most common words and give each one a unique integer ID. After that we replace each common word with its assigned ID and delete all uncommon words. Notice that the 5000 most common words cover most of the text. We also delete the data with only a few words since they don't carry enough information for training. By doing this, we transfer the original text string to a fixed length integer vector while preserving the words order information. Finally we use word embedding to transfer each word ID to a 32-dimension vector. The word embedding will train each word vector based on word similarity. The LSTM is still a neural network. But different from the fully connected neural network as it has cycle in neural connections. The LSTM model preserves the order using a different pre-processing method and makes prediction based on both the words and their order.

III. MODULE DESCRIPTION

1) TRAINED DATA AND PRE PROCESSING MODULE

First is the trained data get the latest news and updates on news channel like cnn, ndtv, abp, etc. International news channels are 24 hours news television channels which cover international news updates on their newscast programmes. The next step is the pre-processing the data need to be subjected to certain refinements like stop-word removal, tokenization, a lower casing, sentence segmentation, and punctuation removal. This will help us reduce the size of actual data by removing the irrelevant information that exists in the data. We created a generic processing function to remove punctuation and non-letter characters for each document; then we lowered the letter case in the document.

2) FEATURE EXTRACTION MODULE

The next module is the feature extraction module. In this module, we extract unigrams and bigrams derived from the bag of words representation of each news channel. Punctuation might be useful to differentiate from truthful texts. This includes punctuation characters such as

periods, commas, dashes, question marks and exclamation marks. Finally, we extract a set of features derived from production rules based on context free grammar.

3) LONG SHORT TERM MEMORY MODULE

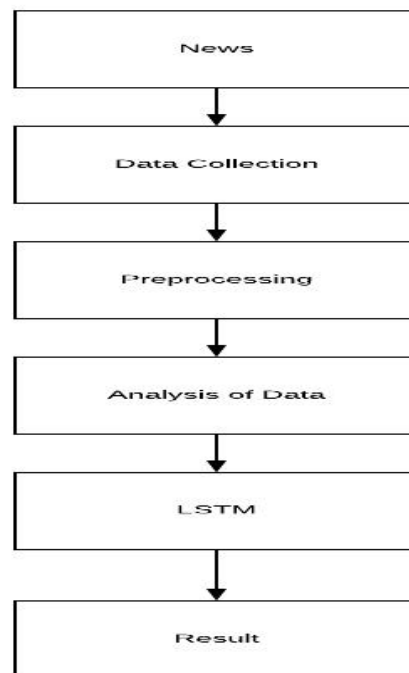
LSTM algorithm which stands for long short term memory unit good at classifying serialized objects because it will selectively memorize the previous input and use that, together with the current input, to make prediction. The news content (text) in our problem is inherently serialized. The order of the words carries the important information of the sentence. So the LSTM model suits for our problem. Detection using a Boosted Cascade of Simple Features” in 2001. It is a machine learning based approach where a cascade function is trained from a lot of positive and negative images. It is then used to detect objects in other images.

4) TESTING DATA MODULE

Separating data into training and testing sets is an important part of evaluating data mining models. Typically, when you separate a data set into a training set and testing set. Most of the data is used for training, and a smaller portion of the data is used for testing after testing is performed the reader is enabled to enter his or her news clip for false news detection.

4. SYSTEM IMPLEMENTATION

1) PERFORMANCE ANALYSIS



The developed project is user friendly and can be accessed over internet easily, in comparison with the previous existing software our project is less complicated and it can be used even by a person who has no computer knowledge, it also displays the number of rows created in a database and consumes very minimal amount of time to register in a particular course or

organization. The developed project is attractive and consumes less amount of space, and is also very easy to implement it.

5. TESTING

1) TEST PLAN

Software testing is an investigation conducted to provide stakeholders with information about the quality of the product or service under test. Software testing can also provide an objective, independent view of the software to allow the business to appreciate and understand the risks of software implementation. Test techniques include, but are not limited to the process of executing a program or application with the intent of finding software bugs (errors or other defects).

Development Testing is a software development process that involves synchronized application of a broad spectrum of defect prevention and detection strategies in order to reduce software development risks, time, and costs. It is performed by the software developer or engineer during the construction phase of the software development lifecycle. Rather than replace traditional QA focuses, it augments. They are:

- Unit testing
- System testing

2) UNIT TESTING

Unit testing is a method by which individual units of source code, sets of one or more computer program modules together with associated control data, usage procedures, and operating procedures, are tested to determine if they are fit for use.

3) SYSTEM TESTING

System testing takes, as its input, all of the "integrated" software components that have passed integration testing and also the software system itself integrated with any applicable hardware system(s). The purpose of integration testing is to detect any inconsistencies between the software units that are integrated together (called assemblages) or between any of the assemblages and the hardware.

6. CONCLUSION

Here, we have proposed a different approach for false news detection using one of the best trained deep neural techniques and LSTM. The LSTM helps in training faster with large datasets compared to other neural network models. Texts or images containing information are processed and recognized as reliable or unreliable using a deep neural network model. The preprocessing of the image is done using LSTM and it also proves to be more efficient than the existing systems. Analyzed image results are converted into text and then processes it. The LSTM model has trained and validated with more than 1000 images collected from various online sources.

7. FUTURE WORK

The future work would extend the same for implementing an false news detection system in a social media scenario where we can predict if a news is reliable or not the moment it is being posted in the web and to delete it completely from the media and avoid its transmission in the internet. Several other features may include identifying the false urls, or finding out if videos are morphed and trying to remove it from the media. For better accuracy results, we can plan to store the results in the cloud. Storing the data in the cloud can enable the possibility of performing classification algorithm at a faster rate.

REFERENCES

- 1) Detecting Fake News in Social Media Networks <https://doi.org/10.1016/j.procs.2018.10.171>
- 2) Automatic Detection of Fake News <https://www.aclweb.org/anthology/C18-1287>
- 3) Fake News Detection on Social Media: A Data Mining Perspective
https://www.kdd.org/exploration_files/19-1-Article2.pdf
- 4) Article what is 'fake news,' and how can you spot it? Available
<https://www.theglobeandmail.com/community/digital-lab/fake-news-quiz-how-to-spot-/article33821986>