Fake News Detection: A Survey

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Abstract - *Fake news is a fabricated information which widely spreads due to the immense usage of social media and online news sites to deceive people. Because of the easier access to the social media people tries getting news via these online medias and hence its easier to deceive people if the fake news is spread through it. Thus we could say that obtaining news from social media has two sides, one is the possibility of consuming different aspects of a single news easily and the other is the manipulation of the news due to private opinions or interest. Most of the times a fake news become unidentifiable with a real one. Also, social media is an easier platform to widely spread an information and at the end of the day it deliberately causes someone to believe what is not true and has the ability to create an immense impact on the society. This paper is a study on different techniques that deals with the classification of a news as real or fake.*

Key Words: **Fake News, Real News, Machine Learning, Deep Learning, Natural Language Processing**

1. INTRODUCTION

Internet plays an important role in our daily life and can reach millions of users within minutes. Its ease of access and lesser expense makes the people around to consume news from online medias. Social media provides a platform for sharing different information and views on a topic and hence it causes a fake news to be created and spreaded faster through online medias rather than a traditional media like television or newspaper. It is also difficult to identify a fake news as there exists no dominion of publishing information or there exists no control over the spread of information. Fake news is false information that might be created by an individual or organization inorder to deceive people or done for some material advantages. Social media is the biggest source of spreading fake news as anyone can spread an information from anywhere at anytime. Spreading fake news has a pessimistic motive behind such as damaging a person or entity's image on the society, gaining financially or politically and also used for online advertising to improve ratings. It was also found on a study that fake news spread during the US presidential election on 2016 had more views by the users than the real news spread through the media outlets. There exists various approaches for the identification of a fake news such as fake news style detection, crowd sourcing, Social arguments by experts and Machine Learning approach. Fake news style approach cannot be relayed on as it says that a real news is well written. But this doesn't work as fake news can also be well written with a good vocabulary support. Crowd sourcing is a process by which one classifies a news as fake or real on the basis of the votes obtained from the people on the topic. Social Argument by experts is a method by which a news is considered fake or real on the basis of expert's opinion on the news and finally Machine Learning approaches uses various algorithms for the purpose of classification.

2. FAKE NEWS TYPES

The various types of fake news by Authors of paper [7] , in their recent paper is summarize below.

1. Visual-based: These fake news posts use graphics a lot more in as content, which may include morphed images, doctored video, or combination of both [10].

2. User-based: This type of fabricated news is generated by fake accounts and is targeted to specific audience which may represent certain age groups, gender, culture, political affiliations .

3. Knowledge-based: these types posts give scientific (so called) explanation to the some unresolved issues and make users to believe it is authentic. For example natural remedies of increased sugar level in human body.

4. Style-based posts are written by pseudo journalists who pretend and copy style of some accredited journalists

5. Stance-based: It actually is representation of truthful statements in such a way which changes its meaning and purpose.

3. METHODOLOGIES

3.1 Naïve Bayes Model

- It uses probabilistic approaches and are based on Bayes theorem. They deal with probability distribution of variables in the dataset and predicting the response variable of value

- They are generally used for text classification and also used in medical diagnosis.

- There are mainly 3 types of naïve base models. Gaussian Naïve Bayes, Multinomial naïve Bayes and Bernoulli Naïve Bayes.

- Naive Bayes classifier model have worked well in many complicated real-world situations.

- An advantage of naïve Bayes classifier is that it requires less training data to access the parameters necessary for classification.

3.2 Decision Tree:

- It is used to optically serve decisions and decision making.

- It uses tree like model of both classification and regression.

- They are commonly used for data mining that support machine learning.

3.3 Random forest

- It is an ensemble method which can be assigned both for classification and regression.

- It is a combination of decision trees. Here each tree will build a random subset of a training dataset.

- Each of the tree gives a prediction and the one with the majority vote becomes the models prediction.

- Random forest corrects the overfitting habit of decision trees.

3.4 K nearest neighbour

- They store the entire data set for the implementation. It is an instant based learning which is actually done by approximation.

- Their data values are arranged in a feature space. They depend on the value of 'k'.

- The data value or the feature unknown to us is found out by using the value of 'k'. That is, the nearest 'k' neighbours is taken and most occurring feature is observed.

- It becomes slow as the volume of data increases and becomes impractical in environments where predictions needs to be made rapidly.

3.5 LSTM

- Traditional neural networks cannot remember or keep the record of what all is passed before they are executed this stops the desired influence of words that comes in the sentence before to have any influence on the ending words, and it seems like a major shortcoming. For example, imagine you want to classify what kind of event is happening at every point in a movie. It's unclear how a traditional neural network could use its reasoning about previous events in the film to inform later ones.

- LSTM address this issue. They are networks with loops in them, allowing information to persist.

- Long short-term memory (LSTM) units are a building blocks for the layers of a recurrent neural network (RNN).

- A LSTM unit is composed of a cell, an input gate, an output gate and a forget gate. The cell is responsible for "remembering" values over a vast time interval so that the relation of the word in the starting of the text can influence the output of the word later in the sentence.

4. LITERATURE SURVEY

In [1] a machine learning classification technique called Naïve Bayes Classification technique was used which considered each word in the article as independent to identify the fake news. According to this technique a fake news might consist of certain specific words and hence checks the conditional probability. The test data was a dataset of Facebook and achieved an accuracy of 74%. In [2] tweets were collected using the twitter API and classified to trustworthy and untrustworthy sources. The classifier is trained on this dataset and the classifier is used for the purpose of detecting a fake news. The approach used was a weakly supervised learning approach. The classification is based on the source of the post and the algorithms used are Naïve Bayes, SVM, Random forest, Neural networks etc. In the paper [3] an automatic fake news model called FakeDetector was used which is based on text classification. It uses a deep diffusive network consisting of two components called representation feature learning and credibility label inference. It performs the classification of falsified news, authors and subjects from online social networks and evaluating the corresponding performance. In [4] the paper represents a model that considers the content of the article, the client reaction and the source client advancing and combined these qualities to make three modules namely Capture, Source and Integrate where capture depends on the reaction and content and score depends on the source qualities dependent on the conduct of clients. These two modules are combined with the third to find whether an article is fake or real. The paper [5], deals with a developed a model for recognizing fake news in twitter, which used two twitter datasets CREDBANK and PHEME where CREDBANK is a dataset for precision assessment and PHEME for potential talk and journalistic evaluation of their exactness. The accuracy assessment strategy was then applied on another dataset named Buzzfeed's fake news dataset. In [6] a Machine learning approach is used that combines the news content with the social content implemented using a Facebook messenger chatbot obtaining an accuracy of 81.7%. The paper[7] proposed two approaches, one a linguistic cue approach and the other network analysis approach. The linguistic-based features basically are extracted from the text content where

as the network-based features are extracted via constructing specific networks among the users who published related social media posts and both these approaches uses machine learning techniques for classification and categorized the news based on degree of accuracy. In the paper [8] NLP techniques were used to predict fake news on the basis of the linguistic features of the fake news and the real news with the assumption that fake news has a difference in its language on comparison with the fake news. In the paper [9] a review on the detection of fake news and the explanation on the benefits of accessing news information and also discusses that there exists only a very little quality for the news obtained through the social media on comparison to the traditional approaches. The paper also discusses on the future directions of fake news detection in social media.

5. CONCLUSION

Fake News Detection is an approach for distinguishing between the real and the fake. Detecting fake news is still a research topic. With the increasing popularity of social media more and more people consume news from social media than traditional news media. In this paper various types of fake news and also methods to classify the news are been discussed. The distribution of dataset effects the model and also the datasets are limited for fake news detection. The data is preprocessed and NLP is applied consisting of methods like stop word removal, lemmatization with part of speech tagging etc. before a classification model is applied to it. An overview of the research shows that earlier researchers have exploited only the machine learning techniques whereas now deep learning methods are also emerging. The topics presented in this paper are expected to become prominent in the discussion around social media, both from the social and research standpoint.

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