MACHINE LEARNING METHODS FOR FAKE NEWS DETECTION- LITERATURE SURVEY

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ABSTRACT

In the modern time the internet is ubiquitous, everyone relies on various online resources for news. Along with the increase in the use of social media platforms like Facebook, Twitter, etc. Internet is one of the important inventions and a large number of persons are its users. These
persons use this for different purposes. There are different social media platforms that are accessible to these users. Any user can make a post or spread the news through these online platforms. These platforms do not verify the users or their posts. So some of the users try to spread fake news through these platforms. These fake news can be a propaganda against an individual, society, organization or political party. A human being is unable to detect all these fake news.
With the widespread dissemination of information via digital media platforms, it is of utmost importance for individuals and societies to be able to judge the credibility of it. Fake news is not a recent concept, but it is a commonly occurring phenomenon in current times. The consequence of fake news can range from being merely annoying to influencing and misleading societies or even nations. A variety of approaches exist to identify fake news. By conducting a systematic literature review, we identify the main approaches currently available to identify fake news and how these approaches can be applied in different situations. Some approaches are illustrated with a relevant example as well as the challenges and the appropriate context in which the specific approach can be used. So there is a need for machine learning classifiers that can detect these fake news automatically. Use of machine learning classifiers for detecting the fake news is described in this systematic literature review.

Keyword : - *Fake news, Social media, Machine Learning, Digital tools, Algorithms.*

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1. INTRODUCTION

World is changing rapidly. No doubt we have a number of advantages of this digital world but it also has its disadvantages as well. There are different issues in this digital world. One of them is fake news. Someone can easily spread a fake news. Fake news is spread to harm the reputation of a person or an organization. It can be a

propaganda against someone that can be a political party or an organization. There are different online platforms where the person can spread the fake news. This includes the Facebook, Twitter etc. Machine learning is the part of artificial intelligence that helps in making the systems that can learn and perform different actions (Donepudi, 2019). A variety of machine learning algorithms are available that include the supervised, unsupervised, reinforcement machine learning algorithms. The algorithms first have to be trained with a data set called train data set. After the training, these algorithms can be used to perform different tasks. Machine learning is using in different sectors to perform different tasks. Most of the time machine learning algorithms are used for prediction purpose or to detect something that is hidden.

Different researchers are working for the detection of fake news. The use of Machine learning is proving helpful in this regard. Researchers are using different algorithms to detect the false news. Researchers in (Wang, 2017) said that fake news detection is big challenge. They have used the machine learning for detecting fake news. Researchers of (Zhou et al., 2019) found that the fake news are increasing with the passage of time. That is why there is a need to detect fake news. The algorithms of machine learning are trained to fulfill this purpose. Machine learning algorithms will detect the fake news automatically once they have trained.

This literature review will answer the different research questions. The importance of machine learning to detect fake news will be proved in this literature review. It will also be discussed how machine learning can be used for detecting the false news. Machine learning algorithms that are used to detect false news will be discussed in the literature review. The structure of the rest of paper is as Methodology in section two, section three shows the research questions, section four is showing the search process model that is followed for this literature review, result and discussion is given in section five, the conclusion is presented in section six. In the last, references are given for the papers that are discussed in this literature review.

2. LITERATURE REVIEW

Hadeer Ahmed et. al. [1] propose a fake news detection model that uses n-gram analysis and machine learning techniques by comparing two different feature extraction techniques and six different classification techniques. The experiments carried out show that the best performances are obtained by using the so-called features extraction method (TF-IDF). The used the Linear Support Vector Machine (LSVM) classifier that gives an accuracy of 92%. This model uses LSVM that is limited to treat only the case of two linearly separated classes.

Mykhailo Granik et. al. [3] present a simple approach to fake news detection using a naive Bayesian classifier. This approach is tested on a set of data extracted from Facebook news posts. They claim to be able to achieve an accuracy of 74%. The rate of this model is good but not the best, as many other works have achieved a better rate using other classifiers. We discuss these works in the following.

Junaed Younus Khan et. al. [4], the authors present an overall performance analysis of different approaches on three different datasets. This work focused on the text of the information and the feeling given by it, and ignores some features like the source, the author or the the date of the publication that can have a dramatic impact on the result. Besides, in our work, we will show that the integration of the feeling in the detection process does not bring any valuable information.

Vincent Claveau et. al. [5] propose several strategies and types of indices relating to different modalities (text, image, social information). They also explore the value of combining and merging these approaches to assess and verify shared information.

In his paper Florian Sauvageau et. al. [6] describe how users of social networks can ensure the truth of information. They also describe the mechanisms that allow their validation and the role of journalists or what to expect from researchers and official institutions. This work helps people see a little bit of the truth behind the news on social media and not believe anything.

Rupanjal Daigupta et. al. [7] created a new public dataset of valid new articles and proposed a text-processing based machine learning approach for automatic identification of Fake News with 87% accuracy. It appears that this work focuses on the emerging feelings from the text
and not on the contain of the text in it self.

Mykhailo Granik et. al. in their paper [9] 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. They were collected from three large Facebook pages each from the right and from the left, as well as three large mainstream political news pages (Politico, CNN, ABC News). They achieved classification accuracy of approximately 74%. Classification accuracy for fake news is slightly worse. This may be caused by the skewness of the dataset: only 4.9% of it is fake news.

Cody Buntain et. al. [11] develops a method for automating fake news detection on Twitter by learning to predict accuracy assessments in two credibilityfocused Twitter datasets: CREDBANK, a crowd sourced dataset of accuracy assessments for events in Twitter, and PHEME, a dataset of potential rumours in Twitter and journalistic assessments of their accuracies. They apply this method to Twitter content sourced from BuzzFeed"s fake news dataset. A feature analysis identifies features that are most predictive for crowd sourced and journalistic accuracy assessments, results of which are consistent with prior work. They rely on identifying highly retweeted threads of conversation and use the features of these threads to classify stories, limiting this work's applicability only to the set of popular tweets. Since the majority of tweets are rarely retweeted, this method therefore is only usable on a minority of Twitter conversation threads.

In his paper, Shivam B. Parikh et. al. [12] aims to present an insight of characterization of news story in the modern diaspora combined with the differential content types of news story and its impact on readers. Subsequently, we dive into existing fake news detection approaches that are heavily based on textbased analysis, and also describe popular fake news datasets. We conclude the paper by identifying 4 key open research challenges that can guide future research. It is a theoretical Approach which gives Illustrations of fake news detection by analysing the psychological factors.

Researchers in (Aphiwongsophon & Chongstitvatana, 2018) said that the social media produce a large number of posts. Anyone can register on these platforms can do any post. This post can contain false information against a person or business entity. Detecting such false news is an important and also a challenging task. For performing this task the researchers have used the three machine learning methods. These are the Naïve Bayes, Neural network and the SVM. The accuracy provided by the Naïve Bayes was 96.08%. On the other hand, the other two methods that are neural network and SVM provided the accuracy of 90.90%.

According to the researchers of (Ahmed et al., 2017), false news has major impact on the political situation of a society. False news on the social media platforms can change opinions of peoples. People change their point of view according to a fake news without verifying it. There is a need for a way that can detect such news. The researchers have used classifiers of machine learning for this purpose. The classifiers that are used by different researchers are the K-Nearest Neighbor, Support Vector Machine, Logistic Regression, Linear Support Vector Machine, Decision tree, Stochastic Gradient Descent. According to results, linear support vector machine provided the good accuracy in detecting the false news.

Some of these popular classifiers are given below that are used for this purpose.
Support Vector Machine: This algorithm is mostly used for classification. This is a supervised machine learning algorithm that learns from the labeled data set. Researchers in (Singh et al., 2017) used various classifiers of machine learning and the support vector machine have given them the best results in detecting the fake news.
Naïve Bayes: Naïve Bayes is also used for the classification tasks. This can be used to check whether the news is authentic or fake. Researchers in (Pratiwi et al., 2017) used this classifier of machine learning to detect the false news.
Logistic Regression: This classifier is used when the value to be predicted is categorical. For example, it can predict or give the result in true or false. Researchers in (Kaur et al., 2020)have used this classifier to detect the news whether it is true or fake.
Random Forests: In this classifier, there are different random forests that give a value and a value with more votes is the actual result of this classifier. In (Ni et al., 2020) researchers have used different machine learning classifiers to detect the fake news. One of these classifiers is the random forest.
Recurrent Neural Network: This classifier is also helpful for detecting the fake news. Researchers in (Jadhav & Thepade, 2019) have used the recurrent neural network to classify the news as true or false.

Neural Network: There are different algorithms of machine learning that are used to help in classification problems. One of these algorithms is the neural network. Researchers in (Kaliyar et al., 2020) have used the neural network to detect the fake news.

K-Nearest Neighbor: This is a supervised algorithm of machine learning that is used for solving the classification problems. This stores the data about all the cases to classify the new case on the base of similarity. Researchers (Kesarwani et al., 2020) have used this classifier to detect fake news on social media.

Decision Tree: This supervised algorithm of machine learning can help to detect the fake news. It breaks down the dataset into different smaller subsets. Researchers in (Kotteti et al., 2018)have used different machine learning classifiers and one of them is the decision tree. They have used these classifiers to detect the fake news.

3. CONCLUSIONS

Due to increasing use of internet, it is now easy to spread fake news. A huge number of persons are regularly connected with internet and social media platforms. There is no any restriction while posting any news on these platforms. So some of the people takes the advantage of these platforms and start spreading fake news against the individuals or organizations. This can destroy the repute of an individual or can affect a business. Through fake news, the opinions of the people can also be changed for a political party. There is a need for a way to detect these fake news. Machine learning classifiers are using for different purposes and these can also be used for detecting the fake news. The classifiers are first trained with a data set called training data set. After that, these classifiers can automatically detect fake news.

In this systematic literature review, the supervised machine learning classifiers are discussed that requires the labeled data for training. Labeled data is not easily available that can be used for training the classifiers for detecting the fake news. In future a research can be on the use of the unsupervised machine learning classifiers for the detection of fake news.

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