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Fake News Detection on Social Media-A Review

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Abstract:
These days a lot of information is being shared over social media and we are not able to differentiate between which information is fake and which is real. People immediately start expressing their concern or sharing their opinion as soon as they come across a post, without verifying its authenticity. This further results in spreading of it. Fake news and rumors are the most popular forms of false and unauthenticated information and should be detected as soon as possible for avoiding their dramatic consequences. This paper is a review and comprehensive analysis of the articles in recent literatures which were about detecting fake news over social media.

Keywords*: Fake News Detection, Machine Learning Algorithms, Natural Language Processing, Social Media, Text Mining.*

I. INTRODUCTION

Now a days, Internet has become an integral part of our life. It is not exaggerating to say that it has become the main part of our lifestyle. The role of print media e.g. newspapers and electronic media e.g. Television, Radio, News channels in communicating has reduced with the onset of social media e.g. Facebook, Twitter, Instagram, YouTube, WhatsApp etc. The growth of social media platforms has played an important role in this transformation.

The reach of Social media is far more than the other media e.g. each house would have a single Television set/ Radio/ newspaper, but every member of the house nowadays has access to electronic gadgets. With a far more reach the speed with which information is shared has increased multifold over social media.

Lot of people use social media not only to keep in touch with their friends but also to gather news around us. Social media is more relevant for news consumption. Flip side of this is, without substantiation/ false information also spread very fast over social media. The fine-grained fake news detection is still a big challenge for research perspective. The challenge in social media is gathering verified/ authenticated news. Our review analyses how to detect the fake news on social media to overcome this problem.

II. LITERATURE REVIEW

The Aim of this review is to gather the various sequence of related works done on the area of fake news detection over the social network. Thereby, I proceed the survey from various areas like Facebook, Twitter etc. with the intention of detecting the possible reliability of the worldly knowledge.

A. Domain

In this review, will be working on the papers which have achieved the possible results in detecting the untruthful news over Social media, Posts sharing attitude on Facebook[15,34], sentiment analysis on Facebook[16,3,2], identifying fake users and fake news in the Twitter social network[19], fraudulent attempt to obtain sensitive information on Facebook[36], analyzing fake content of Twitter[38,25], automatic real-time detection of malicious content on Facebook [29], Understanding users behavior on Facebook through opinion

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mining[5,9], the author presented the geometric deep learning approach for fake news detection were spread on Twitter [14], the author design the semi-supervised learning to detect fake news on Twitter[1]. The author targeted political domain to identify the impostures on Facebook [17].

B. Methodology

Author created the algorithm to be good fit for checking the reliability of a news articles from Facebook using sentiment analysis, N-grams and Natural language Processing method to convert the natural language to specific format [37][41]. Using convolution Neural Network, the author designed the geometric deep learning method of propagation-based approaches for fake news detection instead of using the content-based approaches [14]. The author introduced the set of features to measure the prediction performance and automatic fake news detection using the method lexical Features, Syntax Features, Semantic Features, Linguistic Features [18]. The deep two path semi-supervised learning where one path is for supervised learning and another is for unsupervised learning introduced by author for fake news detection using method Naive Bayes, Decision Tree, Adaboost, Support Vector Machine, bidirectional recurrent neural networks Twitter [1]. The author proposed a deep neural network classifier to spontaneously detect the fake content on political domain including Recurrent Neural Network and Convolution Neural Network[40], Recurrent Neural Network are used in natural language Processing tasks and Convolution Neural Network are used for computer vision tasks[26].Using the naïve Bayes classifier the author implemented the system for detection of fake news[31].The method proposed to classify the general idea about the participant in an action on Facebook how the individuals play with the exclusive field of reference using naïve Bayes classifier[7].The pattern designed to identifying the people usage time and access frequency of Facebook by data mining techniques namely Decision tree Algorithm, Support Vector Machine, Apriori Algorithm[8].

Based on the method K-mean clustering Savvan et al proposed the model to understand the users behavior and analyze the reaction of users on Facebook[34].The analytical driven model is introduced to analyze and detect the fake news to reduce the risk of misinformation using the techniques k-mean and affinity propagation [33].Wang et al introduced the new dataset that commercially available for the purpose of fake news detection using the technique convolution neural network[20].Vignette study used to understand relationship between the author, participant, location and type of the post on Facebook[36].Ghafari et al introduced the new algorithm to predict and detect the fake news on online social network based on tensor decomposion approach[30].

Recent review of literature [22,29] highlights the methods Decision tree, Random forest, naïve Bayesian models used to detect the false content on social media. [28] Ahmed et al introduced the method to detect the false information spread over the social media using n-gram for feature extraction and machine learning techniques, namely, K-Nearest Neighbor, Support vector Machine, Logestic Regression, Linear Support Vector Machine, Decision tree, Stochastic Gradient Descent and uses Term Frequency-Inverted Document Frequency (TF-IDF) as feature extraction technique, and Linear Support Vector Machine (LSVM) as a classifier.[19] Atodiresei et al build the method using linguistic approaches and naïve Bayes classifier to determine the identification of fake news and fake users on twitter.[23,15] highlights linear regression and logistic regression to predetermine future fake news and determine the fake news topics on social media. [13] Bharadwaj et al proposed the model using sematic features to detect the fake news on online articles. [27] Zhuk et al tasked to create the system model capable of detecting the news content with inaccurate information with high reliability and dividing the information into appropriate categories using n-gram, semantic features.[24]To obtain the good quality of text the extend the model contextual

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to syntacto-contextual models by merging sematic and syntax. [10] The new model designed by author to detect the fake news, that the information in the form of image and the model detect with accuracy breakdown of Knowledge.[16]In order to compare the performance in predicting the Facebook update status whether it is negative or positive Troussas et al uses three classifier namely naïve Bayes, Rocchio, Perceptron. however this survey is to early identify the untrue information on social media.

C. Dataset

Datasets like Snopes, PolitiFact and Buzzfeed [14,35] were used to propose the new models for the detection of fake news. The authors collected the datasets like PHEME dataset [1], Buzzfeed [31], Epinions, Ciao[30], API[29], tested model on Horne and Adali [28], which are freely available to the public, for their respective work in the detection of untruthful news.

D. Issues

The main issues showed in this articles is trouble in classification accuracy for misleading information on Facebook due to limitation in datasets and the length of the news articles[31].This article showed the issues like the model do not perform well on event specific data and do not claim that their dataset is representative of the entire Facebook community and also look challenges like gathering Facebook data and the amount of information[29].The limitation of work presents in this article is that the fake information or unsubstantiated information are only from the unofficial news source not from the official newspapers[23].

III. CONSOLIDATED REVIEW REPORT

Title	Objectives	Methods	Year
[1]	Semi-supervised learning for fake news detection on Twitter.	Naive Bayes, Decision Tree, Adaboost, Support Vector Machine, bidirectional recurrent neural networks	2019
[14]	Geometric deep learning method of propagation-based approach for fake news detection.	Geometric deep learning approach, convolution neural network	2019
[18]	Prediction performance and automatically detection of false information on Facebook.	lexical Features, Syntax Features, Semantic Features, Linguistic Features	2019
[22]	Proposed a model for fake news detection on social media.	Decision tree, Random Forest,FNDNet,Context-free models,Contextual-based model	2019
[23]	Framework for identify the fake content on social media.	logistic regression, Linear Regression, Support Vector Machine, K-Nearest Neighbors, Neural Network Models, Decision Trees	2019
[33]	Analytics-driven framework to detect fake news to reduce the risk of misinformation.	K-mean and affinity propagation	2019
[35]	A model to detect the fake news.	Theory-driven model, Lexicon level, Syntax level, Semantic level, Discourse level	2019
[37]	Created the algorithm to check reliability of Facebook news.	N-grams, Sentiment analysis	2019
[19]	Identify fake news, users, likes on	linguistic approach, naïve	2018

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Title	Objectives	Methods	Year
	Twitter.	Bayes classifier	
[26]	Deep neural architecture to classify information.	Deep neural Network	2018
[27]	Introduced the method to detect false information.	n-gram, semantic features	2018
[30]	Predetermine the fake News on online social network.	Tensor Decomposion approach	2018
[20]	Build Publicly available dataset that used for fake news detection.	Convolution Neural Network	2017
[24]	Automatic generation of news headlines.	Deep learning Model, Recurrent Neural Network	2017
[28]	Fake news detection and compare various classifier and feature extraction	TF-IDF, LSVM	2017
[29]	Automatic real-time detection of fake news on Facebook.	Decision tree, Random Forest	2017
[31]	Fake news detection system on Facebook.	Naïve Bayes classifier	2017
[34]	Analyze the reaction of Facebook users	K-mean clustering	2017
[25]	Understand the user behavior, analysis the fake news, classification approach and detect the misinformation on Twitter	classification approach-flat classification and hierarchical classification	2015
[16]	Emotion on particular topic in Facebook	Naïve Bayes classifier,Rocchio, Perceptron	2014
[8]	Usage pattern of Facebook users	Support Vector Machine,Apriori Algorithm, Decision tree	2010

IV. CONCLUSION

This paper presents the survey to fake news detection on social media, which is to identify the community opinion to various posts of a user, and to identify the true news. Survey based on Fake news detection proven using various machine Learning and Deep Learning Techniques. Machine Learning Algorithms such as Linear Regression, Logistic Regression, Support Vector Machine, K-Nearest Neighbors, Neural Network Models and Decision Trees are used to predetermine the future content and determine the inaccurate news and posts. Using these methods, the content filters the originality and user get the correct information and also this literature second look formulated on analysis and classify the news dummy or actual developed on sentiment analysis, linguistic approach, naive Bayes classifier. Evaluation on false news unmasking on social media describe and distinguished various datasets such as LIAR, PHEME,Fake News Net, BuzzFeed News[14,35,31] datasets.

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