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FAKE NEWS DETECTION USING DEEP LERANING ARCHITECTURE

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.Abstract:Most of the smart phone users prefer to read the news via social media over internet. The news websites are publishing the news, providing the source of authentication. Human inefficiency to distinguish between true and false facts poses fake news as a threat to logical truth, which deteriorates democracy, journalism, and credibility in governmental institutions. In the wake of emerging technologies, there is dire need to develop methodologies, which can minimize the spread of fake messages or rumours that can harm society in any manner.Online clients are normally vulnerable and will, in general, perceive all that they run over web-based networking media as reliable. Consequently, mechanizing counterfeit news recognition is elementary to keep up hearty online media and informal organization.. It is harmful for the society to believe on the rumours and pretend to be a news. The need of an hour is to stop the rumours especially in the developing countries, and focus on the correct, authenticated news articles.And so, we propose a model for recognizing forged news, which is a computational stylistic analysis based on natural language processing, efficiently applying deep and machine learning algorithms like ANN and decision tree algorithm to detect fake news in texts extracted from social media.

Keywords:Fake news, Social media, Web Mining, Machine Learning, Support Vector Machine.

I. INTRODUCTION

In the 20th century, the Internet has become the most powerful tool for communication. It facilitates efficient and effective transfer of media from one location to another. With the development of Internet technology, social networks such as Facebook, WhatsApp, Twitter and Instagram have become a vital platform for information exchange. Lie gets travelled around us quicker, and more extensively than reality in all spheres of information, and the effects were more dangerous and horrifying. As fast the technology is moving, on the same pace the preventive measures are required to deal with such activities. Broad communications assuming a gigantic job in impacting the general public and as it is normal, a few people attempt to exploit it. There are numerous sites which give false data. They deliberately attempt to bring out purposeful publicity, deceptions and falsehood under the pretense of being true news. The fight against fake news renders the social network and data consumption problems inseparable. By spreading malicious content, a user is wasting network and processing resources and undermining the credibility of the service provided. Fake news on social media which got viral like a rocket in no time can cause much havoc to our society human and country.The main objective is to detect the fake news, which is a text classification problem. It is needed to build a model that can differentiate between “Real” and “Fake” news. This leads to consequences in social networking site, microblogging and instant messaging applications where these fake news gets a major boost and gets viral among people, around the world. In the age of technology, a tremendous amount of data is being generated online every day. However, an unprecedented amount of the data flooded on the Internet is fake news, which is generated to attract the audience, to influence beliefs and decisions of people

to increase the revenue generated by clicking, and to affect major events such as political elections. Readers are misguided by deliberately spreading false information. Obtaining and spreading information through social media platforms has become extremely trouble-free, which makes it difficult and nontrivial to detect based merely on the content of news. According to a research poll, 64% of US citizens reported that fake news has caused a "great deal of confusion" about the factual content of reported events. Pre-processing is a data mining technique that transforms incomplete and inconsistent raw data into a machine understandable format. Several tasks for texts pre-processing were performed. In order to perform these tasks, NLP techniques such as the conversion of the texts' characters to lowercase letters, stop words removal, stemming, and tokenization was applied, with the application of algorithms available in Keras's library.

II. LITERATURE REVIEW

Federico Monti, Fabrizio Frasca, Davide Eynard, Damon Mannion, Michael M. Bronstein1,"Fake News Detection on Social Media using Geometric Deep Learning", 2019

Methodology:

Propagation-based approaches have multiple advantages compared to their content-based counterparts, among which is language independence and better resilience to adversarial attacks. In this paper, we show a novel automatic fake news detection model based on geometric deep learning. The underlying core algorithms are a generalization of classical convolutional neural networks to graphs, allowing the fusion of heterogeneous data such as content, user profile and activity, social graph, and news propagation. Our model was trained and tested on news stories, verified by professional fact-checking organizations that were spread on Twitter. Our experiments indicate that social network structure and propagation are important features allowing highly accurate (92.7% ROC AUC) fake news detection. Second, we observe that fake news can be reliably detected at an early stage, after just a few hours of propagation. Third, we test the aging of our model on training and testing data separated in time. Our results point to the promise of propagation-based approaches for fake news detection as an alternative or complementary strategy to content-based approaches.

Advantage:

- The key advantage of using a deep learning approach as opposed to 'handcrafted' features is its ability to automatically learn task-specific features from the data; the choice of geometric deep learning in this case is motivated by the graph-structured nature of the data.

Shuo Yang,Kai Shu, Suhang Wang, Renjie ,"Unsupervised Fake News Detection on Social Media: A Generative Approach", 2019

Methodology:

Social media has become one of the main channels for people to access and consume news, due to the rapidness and low cost of news dissemination on it. However, such properties of social media also make it a hotbed of fake news dissemination, bringing negative impacts on both individuals and society. Therefore, detecting fake news has become a crucial problem attracting tremendous research effort. Most existing methods of fake news detection are supervised, which require an extensive amount of time and labor to build a reliably annotated dataset. In search of an alternative, in this paper, we investigate if we could detect fake news in an unsupervised manner. We treat truths of news and users' credibility as latent random variables, and exploit users' engagements on social media to identify their opinions towards the authenticity of news. We leverage a Bayesian network model to capture the conditional dependencies among the truths of news, the users' opinions, and the users' credibility. To solve the inference problem, we propose an efficient collapsed Gibbs sampling approach to infer the truths of news and the users' credibility without any labelled data. Experiment results on two datasets show that the proposed method significantly outperforms the compared unsupervised methods.

Advantage:

- CRH achieve higher recall on fake news class, they have a high tendency classifying news as fake news, leading to poor performance in true news class.
- These results are in line with people's expectation that professional news reporters and news agencies should have high expertise in identifying fake news.

Mohamed K. Elhadad, Kin Fun Li, Fayez Gebali ,"Fake News Detection on Social Media: A Systematic Survey", 2019

Methodology:

These days there are instabilities in many societies in the world, either because of political, economic, and other societal issues. The advance in mobile technology has enabled social media to play a vital role in organizing activities in favour or against certain parties or countries. Many researchers see the need to develop automated systems that are capable of detecting and tracking fake news on social media. In this paper, we introduce a systematic survey on the process of fake news detection on social media. The types of data and the categories of features used in the detection model, as well as benchmark datasets are discussed.In this paper, we present a systematic survey on fake/false news on social media and their detection focusing on the research.

Advantage*:*

- Low quality journalism which is intended to attract traffic and benefit from advertising revenue.
- It can be observed that Twitter is the most popular target for recent researchonsocialmedianetworks.

Faisal Hussain , Syed Ghazanfar Abbas , Ghalib A. Shah , Ivan Miguel Pires , Ubaid U ,"Rumor Identification in Microblogging Systems Based on Users' Behavior", 2019

Methodology:

In recent years, microblog systems such as Twitter and Sina Weibo have averaged multimillion active users. On the other hand, the microblog system has become a new means of rumor-spreading platform. In this paper, we investigate the machine-learning-based rumor identification approaches. We observed that feature design and selection has a stronger impact on the rumor identification accuracy than the selection of machine-learning algorithms. Meanwhile, the rumor publishers' behavior may diverge from normal users', and a rumor post may have different responses from a normal post. However, mass behavior on rumor posts has not been explored adequately. Hence, we investigate rumor identification schemes by applying five new features based on users' behaviors, and combine the new features with the existing well-proved effective user behaviorbased features, such as followers' comments and reposting, to predict whether a microblog post is a rumor. Experiment results on real-world data from Sina Weibo demonstrate the efficacy and efficiency of our proposed method and features. From the experiments, we conclude that the rumor detection based on mass behaviors is more e effective than the detection based on microblogs' inherent features.

Disadvantage:

- Sina Weibo and used them as high-order features to construct a graph-kernel-based SVM classifier for rumor identification.
- KNN algorithm are both high, but it does not mean the performances of these two rumor classifiers are the best among the eleven rumor classifiers trained.

Bodunde Akinyemi," An Improved Classification Model for Fake News Detection in Social Media", 2020

Methodology:

Fake news dissemination is a critical issue in today's fast-changing network environment. Existing classification models for fake news detection have not completely stopped the spread because of their inability to accurately classify news, thus leading to a high false alarm rate. This study proposed a model that can accurately identify and classify deceptive news articles content infused on social media by malicious users. The news content, social-context features and the respective classification of reported news was extracted from the PHEME dataset using entropy-based feature selection. The selected features were normalized using Min-Max Normalization techniques. A predictive fake news detection model was formulated as a stacked ensemble of three algorithms. The model was simulated and its performance was evaluated by benchmarking with an existing model using detection accuracy, sensitivity, and precision as metrics.

Disadvantage:

- The single algorithm solutions mostly are disadvantaged with the high false alarm rate problem leading to inaccurate classification.

• The problem of fake news detection by incorporating the text, the response an article receives, and the users who source it.

Ankit Kesarwani , Sudakar Singh Chauhan, Anil Ramachandran Nair ,"Fake News Detection on Social Media using K-Nearest Neighbor Classifier", 2020

Methodology:

Consumption of news from social media is gradually increasing because of it's easy to access, cheap and more attractive and it's capable to spread the "fake news". The widespread of fake news has latent adverse impressions on people and culture. Some people spread wrong information on social media to get the attention or financial and political gain. We need to be smarter at the recognition of fake or real news. The unique feature of detecting fake news on social media that make current detection algorithms ineective or not appropriate. Thereafter is essential to consider secondary information. Secondary information may include social activities of user on social media. So, in this research work we are presenting a simple approach for detecting fake news on social media with the help of K-Nearest Neighbor classifier. We achieved a classification accuracy of this model approximate 79% tested against Facebook news posts dataset.

Disadvantage*:*

• Many scholars consider that with help of artificial intelligence and machine learning technique we can easily handle fake news detection problem because of recently artificial intelligence algorithms are used in classification problems.

Julio C. S. Reis, Andre Correia, Fabrıcio Murai, Adriano Veloso, and Fabrcio Benevenuto ,"Supervised Learning for Fake News Detection", 2020

Methodology:

A large body of recent works has focused on understanding and detecting fake news stories that are disseminated on social media. To accomplish this goal, these works explore several types of features extracted from news stories, including source and posts from social media. In addition to exploring the main features proposed in the literature for fake news detection, we present a new set of features and measure the prediction performance of current approaches and features for automatic detection of fake news. Our results reveal interesting findings on the usefulness and importance of features for detecting false news. Finally, we discuss how fake news detection approaches can be used in the practice, highlighting challenges and opportunities.A key problem today is that social media has become a place for campaigns of misinformation that affect the credibility of the entire news ecosystem.

Advantage*:*

• While a fully automated approach for the fake news problem can be quite controversial and is still open for debate.

III.EXISTING STYSTEM

Spreading of fake news is a major problem these days. Because there are so many sites that delivers false data. It is very dangerous if not immediately resolved on time as it may have desperate effects. The existing system to predict the news doesn't effectively classify and the news into "real" and "fake.

DISADVANTAGES:

- Not Efficient for handling large volume of data.
- Theoretical Limits
- Incorrect Classification Results.
- Less Prediction Accuracy.
- It takes more time consumption for practical use.

IV. PROPOSED SYSTEM

The proposed model is introduced to overcome all the disadvantages that arises in the existing system. We are applying data mining techniques to identify suitable techniques for predicting the real and fake news. This system will increase the accuracy of the Supervised classification results by classifying the data based on the text content and others using classification algorithm..In this system, the fake news dataset was taken as input.

The input data was taken from the dataset repository. Then, we have to implement the text preprocessing step. In this step, we have to remove the stop words and stem words. Then, we have to implement the vectorization.Then, we have to implement the deep and machine learning algorithms such as Artificial Neural Network (ANN) and Decision tree. Finally, the experimental results shows that the performance metrics such as accuracy, precision, recall and confusion matrix. It enhances the performance of the overall classification results.

ADVANTAGES:

- It is efficient for large number of datasets.
- The experimental result is high when compared with existing system.
  - In addition, to implement the ANN for better performance.

V. METHODOLOGY

The proposed system takes as input a dataset of comments and their related information, such as date, source and author. It then transforms them into a features dataset that can be used in the learning phase. This transformation is called preprocessing, it performs a series of operations such as cleansing, filtering and encoding. The preprocessed dataset is divided into two parts: the first for training and the second for testing. The training module uses the training dataset and support vector machine algorithm to build a decision model that can be applied to the test dataset. If the model is accepted (i.e., it is able to achieve an acceptable accuracy rate), it can be kept and used and then training ends. Otherwise, the parameters of the learning algorithm are revised in order to improve the accuracy rate. Figure 1 illustrates the general scheme of the proposed system.

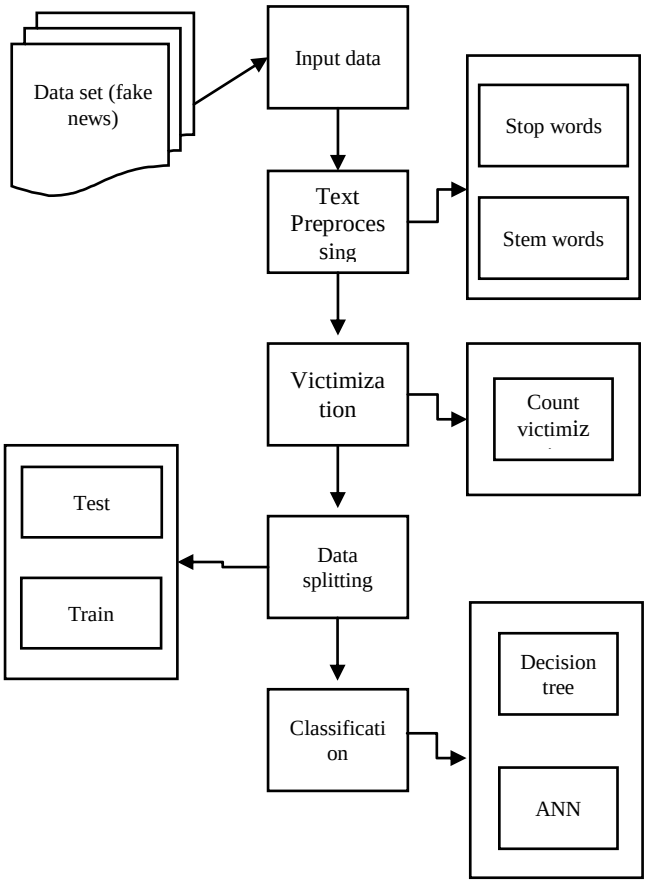

Figure 1. Architecture Diagram

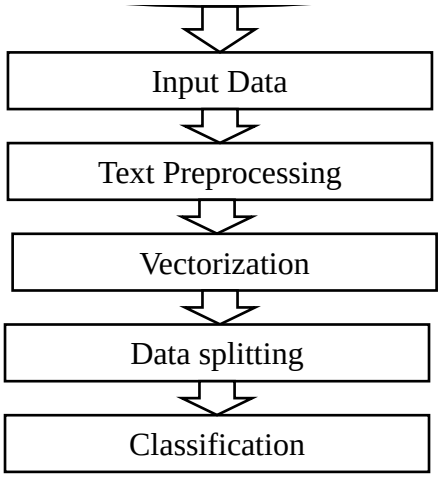

Fig 2 Flow Diagram

VI. EXPERIMENTAL RESULTS AND DISCUSSION

DATA SELECTION:

- The input data was collected from dataset repository.
- The data selection is the process of selecting the data for detecting the news.

- In this project, the news articles dataset is used for detecting the real and fake news.
- The dataset which contains the information about the title, text, language, type and label.

```
============   Data Selection   ============

                author  ... hasImage
0     Barracuda Brigade  ...      1.0
1  reasoning with facts  ...      1.0
2     Barracuda Brigade  ...      1.0
3               Fed Up   ...      1.0
4               Fed Up   ...      1.0
5     Barracuda Brigade  ...      1.0
6               Fed Up   ...      1.0
7               Fed Up   ...      1.0
8               Fed Up   ...      1.0
9               Fed Up   ...      1.0

[10 rows x 12 columns]
```

Figure 3. Data selection

TEXT PREPROCESSING:

- Data pre-processing is the process of removing the unwanted data from the dataset.
- Pre-processing data transformation operations are used to transform the dataset into a structure suitable for machine learning.

```
 ============ Before Handling missing values ==============

author                    2
published                 1
title                     1
text                     46
language                  2
site_url                  1
main_img_url              2
type                      2
label                     0
title_without_stopwords     4
text_without_stopwords     52
hasImage                  3
dtype: int64
```

Figure 4. Before handling Missing Values

- One of the major forms of pre-processing is to filter out useless data-
- In preprocessing, we have to use stop words and stem words technique.

```
 ============ After Handling missing values ==============

author                    0
published                 0
title                     0
text                      0
language                  0
site_url                  0
main_img_url              0
type                      0
label                     0
title_without_stopwords     0
text_without_stopwords     0
hasImage                  0
dtype: int64
```

Figure 5. After Handling missing Values

- **Stop words**: is a commonly used word (such as "the", "a", "an", "in") that a search engine has been programmed to ignore.
- **Stem words: it** reduces the words "chocolates", "chocolatey", "choco" to the root word, "chocolate" and "retrieval", "retrieved", "retrieves" reduce to the stem "retrieve"

```
 ============ Before Label Encoding ==============

0    Real
1    Real
2    Real
3    Real
4    Real
5    Real
6    Real
7    Real
8    Real
9    Real
Name: label, dtype: object

 ============ After Label Encoding ==============

0    1
1    1
2    1
3    1
4    1
5    1
6    1
7    1
8    1
9    1
Name: label, dtype: int32
```

Figure 6. Before And After Labeling

VECTORIZATION:

```
======================================================
-------------------- Tokeniazation --------------------
======================================================

Vocabulary size: 47209


Example:


Sentence:
0       print they should pay all the back all the mon...
1       why did attorney general loretta lynch plead t...
2       red state fox news sunday reported this mornin...
3       email kayla mueller was a prisoner and torture...
4       email healthcare reform to make america great ...
                              ...
2092
2093
2094
2095
2096
Name: Summary_Clean, Length: 2097, dtype: object
```

Figure 7. Tokeniazation

- In this step, we have to implement the vectorization method.
- Here we have to use CountVectorizer
- The methods for converting text data into vectors as model can process only numerical data.
- In countvectorizer, it converts the tokens into vectors.

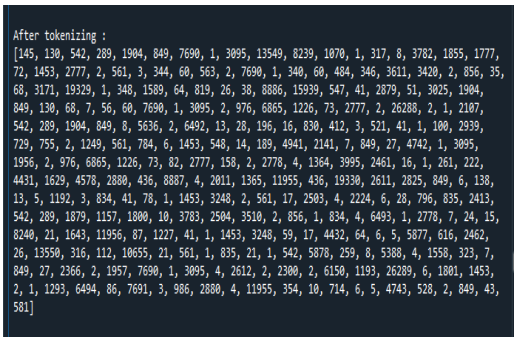

Figure 8. After Tokenization

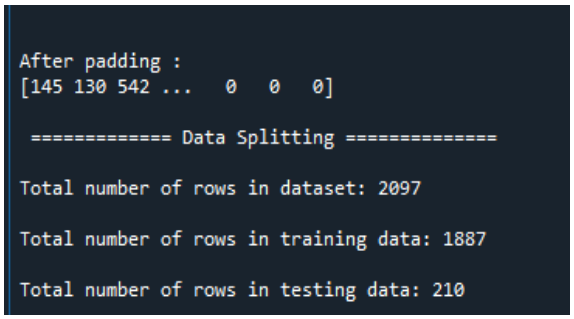

Figure 9 .Padding

DATA SPLITTING:

- Data splitting is the act of partitioning available data into two portions, usually for cross-validator purposes.
- One Portion of the data is used to develop a predictive model and the other to evaluate the model's performance.
- 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.

CLASSIFICATION:

- **Artificial neural networks (ANN)** are used for modelling non-linear problems and to predict the output values for given input parameters from their training values.
- **Decision Trees** are a type of Supervised Machine Learning (that is you explain what the input is and what the corresponding output is in the training data) where the data is continuously split according to a certain parameter. The tree can be explained by two entities, namely decision nodes and leaves.

RESULT GENERATION:

The Final Result will get generated based on the overall classification and prediction. The performance of this proposed approach is evaluated using some measures like,

- **Accuracy**

Accuracy of classifier refers to the ability of classifier. It predicts the class label correctly and the accuracy of the predictor refers to how well a given predictor can guess the value of predicted attribute for a new data.

AC= (TP+TN)/ (TP+TN+FP+FN)

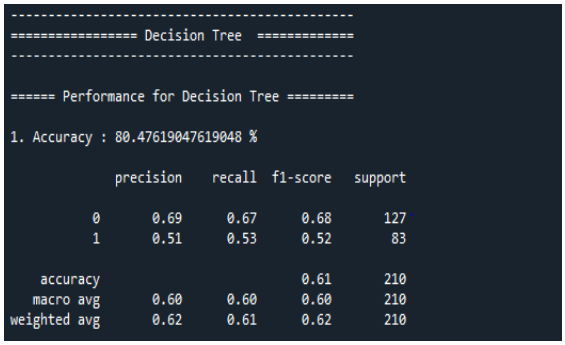

Figure 10 .Accuracy

Precision is defined as the number of true positives divided by the number of true positives plus the number of false positives.

Precision=TP/ (TP+FP)

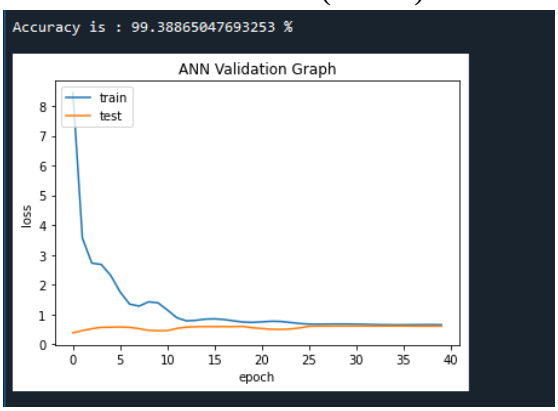

Figure 11.Validation Graph

VII. CONCLUSION

In this paper, we present the predictive models by using deep and machine learning methods including ANN and DT algorithm to detect the fake news. The predictive data model is implemented by using different data mining techniques by paying attention to most unpopular data mining algorithms. As per to the literature surveys conducts in this study, it clearly represents that the most researchers use popular classification algorithms like ANN and DT algorithm as the classification techniques. Finally, the experimental results shows that the accuracy, validation graph.

VIII. FUTURE ENHANCEMENT

In future, it is possible to provide extensions or modifications to the proposed clustering and classification algorithms using intelligent agents to achieve further increased performance. Apart from the experimented combination of data mining techniques, further combinations and other clustering algorithms can be used to improve the accuracy.

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