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TRACKING AND TRACING OF FAKE NEWS USING URL

Dr P Pritto Paul, Deepthi V, Geeta Lakshmi P and Pooja Thanushree K

Associate Professor, Velammal Engineering College, India, E-mail: prittopaul.p@velammal.edu.in
UG Scholars, Department of Computer Science Engineering, India, E-mail: deepthivanivijay@gmail.com
UG Scholars, Department of Computer Science Engineering, India, E-mail: geetalakshmipittip@gmail.com
UG Scholars, Department of Computer Science Engineering, India, E-mail: poojathanushreek@gmail.com

Abstract:- With the increasing quality of social media, individuals have modified the means they access news. The aborning increase in pretend News because of social media's intensive usage could be a massive downside in today's world. Any background as well as policy, crime, health, or Pandemics like Covid-19 may be coupled to pretend news. To avoid its outsourcing at the person level, communities of social media actively work to resolve the problems to avoid the danger display by information on-line. Some pretend news square measure almost like the 64000 ones that it's tough for human to spot them. Therefore, machine controlled pretend news detection tools became an important demand. During this system we tend to appraise the fakeness and realism of stories victimization, using five machine learning models (ML) and two deep learning models (DL) with novel stacking model. They'll observe advanced patterns in matter information. This method works for wide numerous real time links; it ranges from varied on-line social media like Facebook, twitter, Instagram, google sites etc. The links are URLs. To pretend blogs, pretend websites that deceive the users in a way or the opposite, this method conjointly dynamically collects datasets from user. They conjointly enable to report the pretend news manufacturing links to crime. Thus, victimization of the novel stacking approach performance of system has enlarged.

Key words: Uniform Resource Locator (URL), Machine Learning (ML), Deep Learning (DL)

1. INTRODUCTION

With the advancement of technology, info is freely accessible to everybody however the believability of data depends upon several factors. Today pretend News is out-looked mutually major threat to the planet within the sense of democracy, journalism, and freedom of anyone, because it has affected the religion of individuals in government. Huge quantity of data is printed daily via on-line and it's harsh to inform whether or not the knowledge could be a true or false. It needs a deep study and analysis of the story, which checks the facts by assessing the supporting sources, by finding original supply of the knowledge or by checking the believability of authors etc. These, made-up info is deliberate try with the intent so as to damage/favor a company, entity or individual's name or it may be merely with the motive to realize financially or politically. There square measure many approaches to handle the matter of information on social media. This condition is more inculpative for the false news than any totally different piece of information. The terribly reliable resolution for this can be to raise the professionals to embrace journalists to envision the declaration of the proof relating to the previous facts or any spoken words. However, it is terribly long furthermore as a chic method, applied mathematics techniques square measure won't determine the correlation between varied options of the knowledge, analyzing the mastermind of the knowledge, analyzing patterns of dissemination.

A prevailing system doesn't work for the important time information and that they lack the believability because the potency of classifiers square measure restricted to trained datasets alone. There square measure varied ways in which to manage the difficulty consisting of artificial rules or ancient machine learning, deep learning models and neural networks, that have affected dramatically and adversely to find false info mechanically. To our understanding, the whole quantity of the work drained this specific field is quite targeted on characteristic whether or not a particular piece of information is valid or not by winning content from address. URL (Uniform Resource Locator) could be a distinctive symbol to find a resource on the net. It's conjointly observed as an online address. This includes various elements and title that tell an online server however and wherever to get a data. Finish users use this link by typewriting these into the rectangular box of a browser or by pointing that link to given on the website, bookmarker collection, in associate degree mail or from different application.

2. RELATED WORK

2.1 NOVEL STACKING APPROACH FOR FAKE NEWS DETECTION

In [1] Tao Jiang, Jian Ping Li, Amin ul haq, Abdus Saboor, and Amjad Ali projected the pursuit of false news victimisation with novel stacking approach. With the increasing quality of social media, individuals have modified the manner they access news.

News on-line has become the key supply of data for individuals. However, abundant info showing on the web is dubious and even meant to mislead. Some faux news is therefore almost like the important ones that it's troublesome for human to spot them. Hence, machine-driven faux news detection tools like machine and deep learning models became a vital demand. during this paper, we have a tendency to rate the outcome of 5 machine learning models and 3 deep learning models on false and original content datasets of numerous quantities with hold out univariate. They have a tendency to conjointly used term frequency, term frequency inverse document frequency and embedding techniques to get data illustration for machine learning and deep learning models severally. to judge models' performance, we have a tendency to used accuracy, precision, recall and F1-score because the analysis metrics and a corrected version of McNemar's take a look at to see if models' performance is considerably totally different. Then, we have a tendency to projected our novel stacking model and obtained accuracy of 94% and 96.05 nothing severally on the ISOT dataset and KDnugget dataset. moreover, the performance of our projected methodology is high as compared to baseline ways. Therefore, all have a nature to at most validate it for faux news detection.

2.2 DETECTING FAKE NEWS WITH CAPSULE NEURAL NETWORKS

In [9] M.H. Goldani, Saeedeh Momtazi, Reza Safabakhsh performed detective work faux News with Capsule Neural Networks. faux information is gravely augmented in online platform in the latest days. This has prompted the necessity for effective faux information spotting algorithms. Capsule neural networks are made in laptop vision and area unit receiving attention to be used in linguistic communication process (NLP). The objective is to utilize capsule neural networks within the faux news detection task. we have a propensity to use entirely distinct embedding models for news things of various lengths. Static word embedding is employed for brief news things, whereas non-static word embeddings that permit progressive up-training and change within the coaching part area unit used for medium length or giant news statements. Besides, we have a tendency to implement completely various quantity of n-grams for extracting features. Our planned architectures area unit evaluated on 2 recent wellknown datasets within the field, particularly ISOT and prevaricator. The outcome portrays good execution, surpass the progressive ways by seven.8% on ISOT and three.1% on the validation set, and 1 chronicle on the check set of the prevaricator dataset.

2.3 FNDNet

In [15] R. K. Kaliyar, A. Goswami, P. Narang, and S. Sinha analysis on the theme of computer science (AI) ways for pretend news detection. within the past, a lot of of the main target has been given on classifying on-line reviews and freely accessible on line social networking-based posts. During these tasks, we have a tendency to put forward a deep convolutional neural network (FNDNet) for pretend data spotting. rather than hoping on oversewn options, our model (FNDNet) is meant to mechanically learn the discriminatory options for pretend news classification through multiple hidden layers in-built the deep neural network. we have a tendency to produce a deep Convolutional Neural Network (CNN) to extract many options at every layer. we have a tendency to compare the performance of the planned approach with many baseline models. Benchmarked datasets were accustomed train and take a look at the model, and also the planned model achieved progressive results with associate accuracy of ninety-eight.36% on the take a look at information. varied performance analysis variables like Wilcoxon, false positive, true negative, precision, recall, F1, and accuracy, etc. were accustomed to check the results. Those outcomes illustrate vital enhancements within the space of pretend of faux data spotting as contrast to prevailing progressive outcomes and confirm the prospective of our view for categorizing fake news on social media. This analysis can support researchers in enhancing the knowledge of the pertinency of CNN-based deep models for pretend news detection.

2.4 DEEP LEARNING MODELS FOR FAKE NEWS DETECTION

Social platforms square measure beneath constant pressure to come back up with economical ways to resolve this drawback as a result of users' interaction with pretend and unreliable news results in it unfold at a private level. This spreading of info adversely affects the perception regarding a very important activity, and per se, it must be prohibited employing a fashionable approach. In these papers, we tend to collect 1356 news instances from numerous users via Twitter and media sources like PolitiFact and make many datasets for the $64000 and also the pretend news stories. Our study compares multiple progressive approaches like convolutional neural networks (CNNs), long short recollections (LSTMs), ensemble ways, and a focus mechanism in [1,10,17]. we tend to conclude that CNN + biface LSTM ensembled network paying attention mechanism achieved the best accuracy of eightyeight.78%, whereas knockout et al tackled the pretend news identification drawback and achieved a detection rate of eighty fifth. Therefore, machine driven pretend news detection tools became a vital demand in [10]. to handle the problem and improve, a hybrid Neural spec, that mixes the capabilities of CNN and LSTM, is employed with 2 completely different spatial property reduction approaches, Principal element Analysis (PCA) and ChiSquare in [11]. This work planned to use the spatial property reduction techniques to scale back the spatial property of the feature vectors before passing them to the classifier. To develop the reasoning, this work noninheritable a dataset from the pretend News Challenges web site that has four varieties of stances: agree, disagree, discuss, and unrelated. The nonlinear options square measure fed to PCA and chi-square that provides a lot of discourse options for pretend news detection. The motivation of this analysis is to work out the relative stance of a newspaper article towards its headline. The planned model improves results by ∼ fourdimensional and ∼ 2 hundredth in terms of Accuracy and F1 − score.

3. PROPOSED MODEL

In this paper we fetch the data from URL and try to fetch the data. the URL allows to fetch the domain details and search keywords which can be used to generate the related source from other authenticate websites. Then use various machine learning and deep learning algorithms to train and test the models by extracting features using domain checking, GloVe, Bag of Words, Tf-idf Vectorizer and count vectorizer and running through them. Deep learning techniques like Bidirectional CNN and LSTM are used to train the models and the ensemble algorithms of machine learning are used to improve the accuracy during classification. We used novel stacking method to improve the individual model performance. Therefore, using URLs have vital vicinity in detecting faux NEWS and for classifying them quickly as they provide efficient way to produce related source files. It is discovered from the literature overview that powerful features received from the various algorithms boom the accuracy of the classification.

3.1 DATASET

The datasets that are used to train this model is URL links from social media posts like fakebook, twitter etc. that are collected from legitimate websites as they work for real time data. And for testing the accuracy across available datasets URLS are collected from Kaggle. These datasets can be categorized to real and fake where real are marked as '1' as fake are marked as '0.

3.2 DATA PREPROCESSING

Real word news articles, so there are a lot meaningless URLs which carry none information. Before the data were fed into machine learning and deep learning models, the text data need to be preprocessed using methods like stop word removal, tokenization, sentence segmentation, and punctuation removals. Then, the data are fed into machine learning and deep learning models. The processed data are sent to the train module. The operations can significantly help us select the most relevant terms and increase model performance. In this system we import necessary packages and read the data. Perform the Tokenization. Do Stemming process where converting text to lower case, removing punctuation, removing special characters, removing extra whitespaces and removing English stop words are carried out. Using Count Vectorizer the frequency of words in the text and other features are extracted. Use TF-IDF transformer and feed the data into the Classifiers for training. We also use GloVe and Bag of words to extract features.

3.2.1 **Term Frequency:**

TF is a common tokenization technique that calculate the similarity between documents by using the counts of words in the documents. By utilizing TF technique, each document will be represented by a vector that contains the word counts. Then each vector will be normalized and the sum of its elements will be one which makes the word counts convert into probabilities.

Term frequency-inverted document frequency Term frequency-inverted document frequency (TF-IDF) is used to transform the data into vectors. TF-IDF is a weighting metric commonly used in text classification problem. It is used to assign a score which shows the importance of the term to every term in the document. In this method, a term's significance increases with the frequency of the term in the dataset.

3.2.2 Global Vectorizer:

GloVe could be a text preprocessing technique accommodated by the NLP cluster of Stanford. world vectors can be unauthenticated calculations for effort binary portrayals of information. Already ready world vector text embedding is employed to manage the extremely necessary news stories. Putting in half can stack all hundreds from the world vector as critical stacking irregular hundreds. GloVe applies round the world collected co-event measurements through every word within the given knowledge. Resultant portrayals standardize crucial straight bases of the binary word space. This modified binary addressed data divided into coaching, approval and testing data. Because the preparation is completed on the information, the approval informational assortment is employed for calibrating the technique. Moreover, the testing data is employed to urge the anticipated mark of information obsessed on a ready technique.

3.2.3 Count Vectorizer:

Count Vectorizer is employed to rework a given text into a vector on the idea of the frequency of every word that happens within the entire text. this is often useful after we have multiple such texts, and that we would like to convert every word in every text into vectors. It creates a matrix during which every distinctive word is portrayed by a column of the matrix, and every text sample from the document could be a row within the matrix. the worth of every cell is nothing however the count of the word therein specific text sample.

3.2.4 Bag-Of-Words:

A bag-of-words model, or BoW for brief, may be a manner of extracting options from text to be used in modeling, like with machine learning algorithms. The approach is extremely straightforward and versatile, and may be utilized in a myriad of tasks for extracting options from documents. A bag-of-words may be an illustration of text that describes the prevalence of words inside a document. It involves 2 things: a. A vocabulary of noted words b. A live of the presence of noted words. it's known as a "bag" of words, as a result of any data concerning the order or structure of words within the document is discarded. The model is merely involved with whether or not noted words occur within the document, not wherever within the document.

3.3 DEEP LEARNING MODELS

After data preprocessing the extracted features are feed into the train module. Here we use training models like

Train_BCNN and Train_ARIMA deep learning techniques. In Train_BCNN once after performing the data cleaning by applying the data frame function, we obtain the total words present and total number of unique words. Then we need to make these clean words into a

string. Then we plot those result by using word cloud for both fake and real news. we use bidirectional RNN and CNN to classify.

To deal with vanishing gradient problem which means when layers increase the neural network will become untrainable so Bidirectional LSTM and RNN algorithm are used to train the Train_ARIMA model. Due to logistic activation function, their computation results range from 0 to 1. It is a class of RNN mainly implemented in the field of machine learning. The Bi-LSTM network uses a feedback connection mechanism. This is done by combining the results of two different RNNs layers.

3.3.1 Bidirectional Recurrent Neural Network:

RNN is a sophisticated algorithm for chronological data and is one of the most powerful and robust neural network models. RNN models are quite popular and successful in NLP, especially BiLSTM, which resolves the fading serial problem. So that it can gain long-term dependencies. It is the only algorithm that memorizes its input because it has internal memory, which makes it ideally suitable for machine learning problems. RNNs are equipped for encoding successive data and are generally reasonable for displaying short content semantics. The three connection weight matrices are WIH, WHH and WOH represent the weight corresponding to input, hidden and output vectors respectively. RNN maintains state information across time steps that allow handling of varying length inputs and outputs. In the context of credibility analysis of a news article on the whole news articles is of variable length. To access the credibility whether a news article is real or not, a word as token the resultant score of previous state will be considered as input to current state.

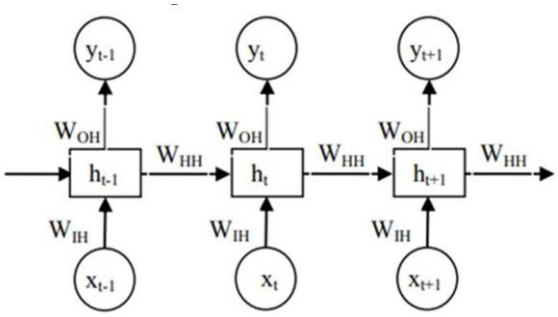

Fig.1 Bi-RNN

3.3.2 Convolutional Neural Network:

CNN is one in all the classes of deep learning, in the main used for analysing ocular symbolism. it's the standardized version for varied perceptions that has convolution and pooling layers. CNN has invariably been comprehensively concerned in linguistic communication process and has given substance to achieve success in text classification, linguistics analysis, Machine Translation, and additionally in some ancient information science tasks. several experiments have already verified that the CNN model will acquire a lot of exactitude than alternative ancient models. numerous words embedding models offered like word2vec, GloVe, or Fast Text could also be used for changing sentences into sentence matrices. Convolutional filters of various window sizes are applied to the current input embedding layer to get a replacement feature illustration. Pooling technique is applied on new options and pooled options from completely different filters are concatenated with one another to create hidden illustration. These representations are then followed by one or multiple absolutely connected layers to create the ultimate prediction.

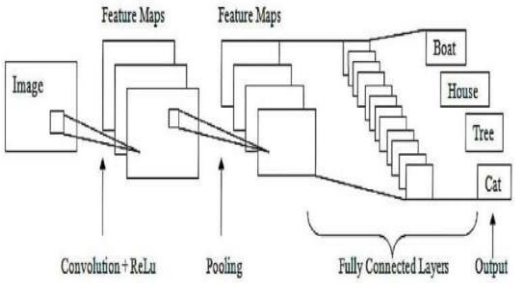

Fig.2 Convolutional Neural Network

3.3.3 Bidirectional Long Short Term Memory:

The Bi-LSTM networks are useful when we need to classify, preprocess or make forecasting of assumptions based on time series data. The Bi LSTM is heavily to learn. All these networks have loops like a chain of recurring models. These recurring models have a simple structure, which can be termed “tanh” as a single layer. The cell is structured like an industrial belt where the belt runs straight downward while having some minor interaction. So, the information passes through without changing. There are gates to provide information in between; they are denoted by sigma in the given diagram. The Bi LSTM has three gates to manipulate the behavior of the cell state.

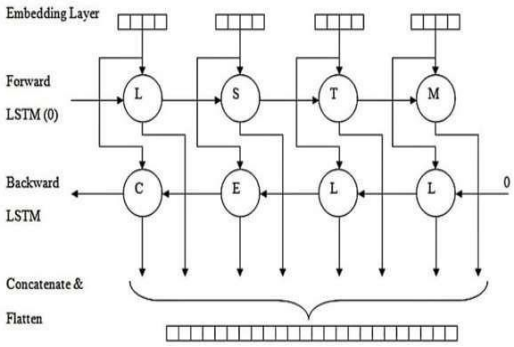

Fig.3 Bi-LSTM

3.4 MACHINE LEARNING MODELS

Then to improve the efficiency further we are using some algorithms like K-Nearest Neighbor, Random Forest, Decision tree, Naive Bayes, Support vector Machine for analyzing some features. By using five machine learning algorithms, where every algorithm provides more accuracy over a specific

extracted features helps in making the system more reliable. This allows to work on as many features as possible. By using these machine learning algorithms, we can improve the training model. If the predicted value is >0.5 then it is real else considered as fake. We get the accuracy from the prediction process, build the confession matrix then categorize the data according to the amount of fakeness or realness.

3.4.1 Random Forest:

Random Forest is associate ensemble consisting of a material of unpruned call trees with an irregular choice of options at every split. every individual tree within the random forest produces a prediction and therefore the prediction with the foremost votes area unit the ultimate prediction. in keeping with No gift theorem: there's no formula that's perpetually the foremost correct, so RF is additional correct and strong than the individual classifiers. The random forest formula is often expressed as. wherever F(x) is that the random forest model, j is that the target class variable and F is that the characteristic operate. to make sure the variety of the choice tree, the sample choice of random forest and therefore the candidate attributes of node cacophonic is randomness.

□(□) = □□□ max □(□(□, □))

3.4.2 Decision Tree:

DT is an important supervised learning algorithm. Researchers tend to use tree-based ensemble models like Random Forest or Gradient Boosting on all kinds of tasks. The DT develops a model that predict the value of a dependent factor. They are carried out by learning different decision rules that are inferred from the entire data. Decision Tree has a top-down structure and shapes like a tree in which a node can only be a leaf node which is binding with a label class or a decision node which are responsible for making decisions.

Decision Tree is easily understandable about the process of making the decisions and predictions. However, it is a weak learner which means it may have bad performance on small datasets. The key learning process in DT is to select the best attribute. To solve this problem, various trees have different metrics such as information gain used in ID3 algorithm, gain ratio used in C4.5 algorithm. Suppose discrete attribute A has n different values and Di is the set which contains all samples that has a value of i in training dataset D. The gain ratio and information gain for attribute A can be calculated as follows:

$$\text{Gain}(A, D) = \text{Entropy}(D) - \sum_{i=1} \frac{|□_i|}{|□|} \text{Entropy}(□_i)$$

$$\text{Entropy}(□) = \frac{\text{Gain}(□, □)}{\text{SplitInfo}(□)}$$

$$\text{SplitInfo}(□) = -\sum_{i=1} \frac{|□_i|}{|□|} \log_2 \frac{|□_i|}{|□|}$$

3.4.3 Naïve Bayes:

In statistics, naive Thomas {bayes|mathematician} classifiers are a family of straightforward "probabilistic classifiers" supported by applying theorem with robust (naive) independence assumptions between the options (see Bayes classifier). they're among the best theorem network models, however, including kernel density estimation, they will come through high accuracy levels. Naive

mathematician classifiers area unit extremely ascendible, requiring range|variety} of parameters linear within the number of variables (features/predictors) in a very learning drawback. Maximum-likelihood coaching will be done by evaluating a closed-form expression,that takes linear time, instead of by pricey unvaried approximation as used for several different kinds of classifiers.

3.4.4 K- Nearest Neighbor:

K-NN is a well-known algorithm in machine learning. The KNN procedures are very simple. Given a test sample, it first finds out k nearest neighbors to this sample based on a distance measure. Then it predicts class label of the test instance with major vote strategy. Sometimes classification performance of K-NN is not high mostly because of curse of dimensionality. K-NN also is a lazy learning algorithm and it can spend a lot time on classification. The main procedures of K-NN algorithm are given by:

Algorithm:

1: for all unlabeled data u do

2: for all labelled data v do

3: compute the distance between u and v

4: find k smallest distances and locate the corresponding labelled instances v1, vk

5: assign unlabeled data u to the label appearing most frequently in the located labelled instances

6: end for

7: end for

8: End

3.4.5 Support Vector Machine:

For binary along with multi-classification related problems, use SVM models. It is a supervised machine learning classifier. They are adopted for binary and mutli-classification related problems. The instances are separated with a hyper plane in binary classification problem in such a way w T x + b = 0, where w is a dimensional coefficient weight vector which is normal to the hyper-plane. The bias term b, which is the offset values from the origin, and data points are represented by x. Determining the values of w and b is the main task in SVM. In linear problem, Lagrangian function with w is used. On the maximum border, the data points are termed as support vectors. As an outcome, the solution of w can be expressed mathematically:

$$\square(\square, \square) = ((\square \ \square) + 1)$$
$$\square(\square, \square) = \exp(-\square\|\square - \square\|)$$

3.5 REPORTING

It is tedious work to track or find the sites that publish those fake news online. But this job is carried out at ease by using the URL to detect the faux news which facilitates the process of directly reporting the links and sites generating that news. On the whole when the prediction is done and if the URL is found to be fake then it goes to the reporting module. Here, the admin is provided with the privilege to gather all the fake URLs identified from the dataset and mailing the report to cybercrime for further actions.

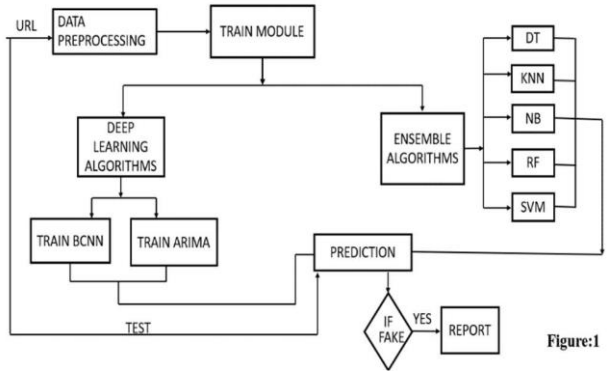

Fig.4 Flow of the Proposed System

4. EVALUATION AND RESULTS

In this research work, we first removed the stop words from our dataset. Then, we used tokenization methods like TF, TF-IDF, GloVe, Bag of Words and embedding to obtain the text representation. The Faux NEWS Detection model was trained and tested using K-Nearest Neighbor, Decision Tree, Naive Bayes, Random Forest and Support Vector Machine classifiers,

Convolutional Neural Networks with Bidirectional RNN and Bi LSTM with Bi-RNN. The ratios in which we split the train and test dataset is 80:20. The models were tested against various metrics such as precision, recall, f1 score on prevailing datasets. K-Nearest Neighbor yielded an accuracy of 94%, Random Forest model yielded an accuracy of 95% and SVM yielded an accuracy of 100%, Decision Tree yielded an accuracy of 83%, Naive Bayes yielded an accuracy of 93%. The deep learning algorithms Convolutional Neural Networks with Bidirectional RNN provided accuracy of 92% and Bi- LSTM with Bi-RNN yielded an accuracy of 92%. Thus, the SVM model yielded a high accuracy compared to others. Finally, to improve the individual model performance, we proposed our stacking method of training a LR model based on the prediction results of all individual models for prediction and classification of amount of realness and fakeness on NEWS.

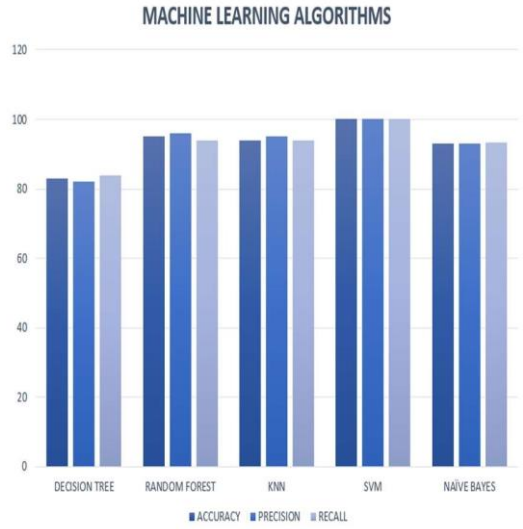

Fig.5 Machine Learning Algorithms Accuracy

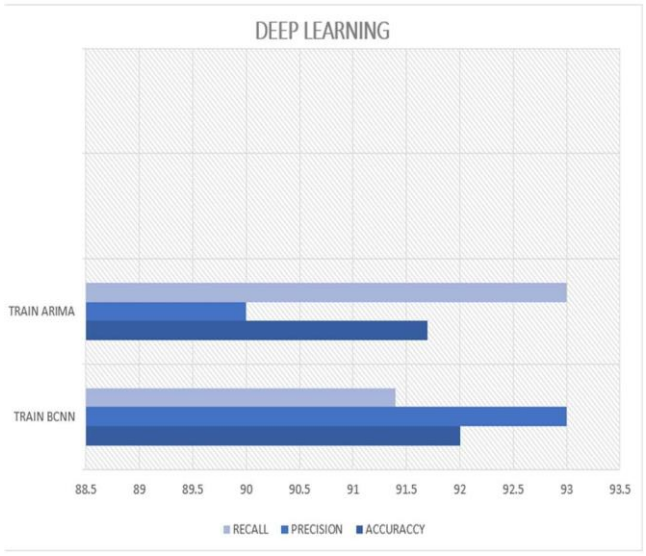

Fig.6 Deep Learning Algorithms Accuracy

5. CONCLUSION AND FUTURE SCOPE

In this proposed model, the realness and fakeness of a news calculated are more accurate than currently available systems since they overcome the limitations of existing system using many classifiers to extract different features. This system is easy to use by just pasting the URL that are suspicious and are friendlier to report. They rather work for any real time datasets whereas other systems work only on trained datasets. The software is trained dynamically each time the user provides a URL to check. The software is implemented and the output is studied. The achieved results demonstrate the appropriateness of the proposed system to perform the classification between real and fake news.

In future this system can be expanded by: Designing them to work for different languages. The current system only works for English language but they can also be trained in other languages too, making them work multilingual. They can also be enhanced with a feature to track the IP address of the person posting those fake blogs or post on the internet. Thus, allowing to eradicate the origin of the fake news. We will also try to use more different machine learning and deep learning models for fake news link detection.

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