

Real Time Fake News Detection System by using Supervised Learning Model for Social Media Contents

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Abstract - Increase and Evolution in communication technologies, has resulted in creating and spreading fake news, which can mislead people, or lead to problems in society or a country. In this project are the applications for the detection of 'fake news,' which is misleading news stories from reputable sources of the NLP (Natural Language Processing) methods. This approach has been implemented and examined in the form of a web application system. In this novel real time fake news detection approach, among the four classifiers -Random Forest, Logistic Regression, SVM, Naïve Bayes-Random Forest achieved the accuracy of 95% and performed better than the rest of classifier models in new prediction approach.

Index Terms - Random Forest, Logistic Regression, Naive Bayes, news and Fake, support vector machine, feature extraction, and classification.

I.INTRODUCTION

The evolution of ICTs has dramatically increased the number of people with internet access, which has altered the way the information is consumed. As a result, fake news has become one of the main concerns in the society. Fake news detection on social media is still at the early age of development, and there are still many challenging issues that need further investigations. So, it is compelling enough acknowledge this problem take on this challenge to control the rates of crime, political unrest, grief, and thwart the attempts of spreading fake news.

This research work studies the possibility of using supervised learning techniques to discriminate against counterfeit news on the Internet using only their text. In this project are the applications for the real time detection of 'fake news' which is misleading news stories, from sources of the news, such as Deccan Chronicles, and verified twitter accounts. This

approach has been implemented and examined in the form of a web application system. Supervised machine learning algorithms are applied to perform feature extraction and prediction. After classification is done by using supervised learning algorithms to classify the news as fake or real.

II.EXISTING SYSTEM

Research on fake news detection is still at an early stage, as this is a relatively recent phenomenon, at least regarding the interest raised by society. Rubin et al. [1] discuss three types of fake news. Each is a representation of inaccurate or deceptive reporting. Furthermore, the authors weigh the different kinds of fake news and the pros and cons of using different text analytics and predictive modelling methods in detecting them.

Horne et al. [2] illustrated how obvious it is to distinguish between fake and honest articles. According to their observations, fake news titles have fewer stop-words and nouns, while having more nouns and verbs.

The proposal was made by Mr. Leskovec et.al [3] have popularity of the web and internet business offers several extremely big datasets that can be gleaned from information via data mining. The main focus of this book is on practical algorithms used to solve key data mining problem areas and which can even be used on the largest datasets.

The below table I gives a literature summary about the papers being reviewed for this project work.

Table I: Literature Summary

S. NO	Title	Methodology	Advantages
1.	When fake news becomes real: Combined exposure to	Text Mining	This study contributes to scientific knowledge regarding influence

	multiple news sources and political attitudes		of various types of media use on political effects.
2.	Detecting hoaxes, frauds, and deception in writing style online	KNN Classifier	It is used to detect deception in writing style.
3.	Social media and fake news in the 2016 election	-	we have studied about the effects of social media in 2016 election.
4.	The impact of real news about fake news: Inter-textual processes and political satire	Inter-textual process	We have studied about the impact of real news about fake news.

III. PROPOSED SYSTEM

We propose a machine learning approach for real time fake news detection using multiple supervised learning algorithms. In this proposed model, initially both training and testing data are pre-processed by removing unwanted punctuation and word, by next feature extractions are used to the extract the needful information from the pre-processing data. These algorithms are applied

with three different feature extraction techniques. To get the prediction score and accuracy, confusion matrices are generated for each algorithm, to compare and determine the better performing algorithm. After classification model is done by using the best algorithm- Random Forest- to classify the news predicted as fake or real.

In this paper the models are Support Vector Machine, Naive Bayes, Logistic Regression and Random Forest. All are types of classification algorithms capable of learning order dependence in sequence prediction problems.

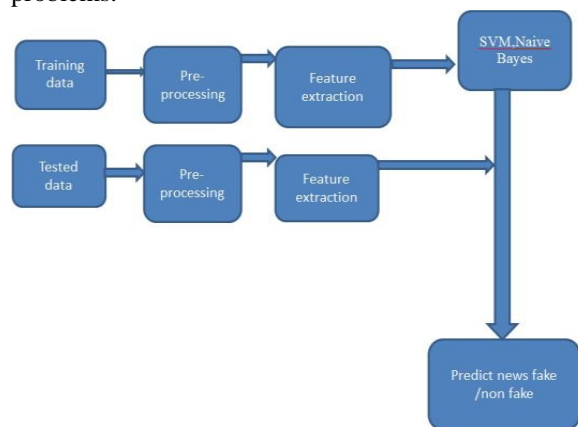


Fig.1 Proposed System

IV. TRAINED DATA AND PRE-PROCESSING

Get all the news and updates from Deccan Chronicles, Times of India, The Hindu and others. Global media outlets have newscast programmers that cover international news 24 hours a day, seven days a week.

A. Pre- Processing

Prior to training and data evaluation using machine learning, data processing is a normal first step. Algorithms for machine learning are always as useful as information you fed them. It is important to format correct data and to include relevant items so that they are consistent enough to produce best outcomes possible. Stopword removal, tokenization, lower case and punctuation removal are all examples of data refinement. This allows us to reduce the size of the real data by removing irrelevant information. We created a simple processing function for each document to remove punctuation and non-letter characters, followed by the letter case in the document was lowered. Make different steps to clean text (remove all non-alphanumeric characters, delete stop words, delete missing rows, etc.).

B. Feature Extraction

Feature selection is the method of reduction that reduces an original batch of actual data to even more controllable computing categories. Ngram are a type of grammatical unit. Every news channel's word bag is mined for unigrams and bigrams. Tfidf Vectorizer is used to score the relative importance words in a document. CountVectorizer is used for creating vectors that have a dimensionality equal to the size of our vocabulary, and if the text data features that vocab word, we will put a one in that dimension. The result of this will be very large vectors, if we use them on real text data, however, we will get very accurate counts of the word content of our text data.

Trained data:

The idea to use data from training in machine learning programmes is a simple idea, however the way such innovations work is also really simple. The training process is an initial piece of facts used to help a programme to realize how computational intelligence technologies can be applied and specialized results produced.

Prediction:

Usually, a data set is separated into a training and test set. The majority of the data is used for training, while only a small portion of the data is used for testing. Using web application module to display the interface for taking input from the user, by using the trained data machine it can predict output and display it to the user. Test data is also applied for feature extraction and pre-processing.

Algorithms:

For the prediction, multiple supervised learning algorithms are trained using the training set, after which using the testing set performance evaluation occurs. These algorithms are:

A. Random Forest

```

STEP 1: START
STEP 2: SPLIT dataset into 67 percent training
set, 33 percent testing set
STEP 3: FOR train dataset
            CALL RFClassifier
            TRAIN RFClassifier
STEP 4: FOR test dataset
            CALL RFClassifier
            PREDICT the label
            COMPUTE

```

AccuracyScore

```

            SAVE AccuracyScore
            DISPLAY

```

ConfusionMatrix

STEP 5: STOP

B. Logistic Regression

```

STEP 1: START
STEP 2: SPLIT dataset into 67 percent training set,33
percent testing set
STEP 3: FOR train dataset
CALL LogisticRegression
TRAIN LogisticRegression
STEP 4: FOR test dataset
CALL LogisticRegression
            PREDICT the label
            COMPUTE AccuracyScore
            SAVE AccuracyScore
            DISPLAY ConfusionMatrix

```

STEP 5: STOP

C.

D. Naïve Bayes

```

STEP 1: START
STEP 2: SPLIT dataset into 67 percent training set, 33
percent testing set
STEP 3: FOR train dataset

```

CALL MultinomialNB

```

            TRAIN MultinomialNB

```

STEP 4: FOR test dataset

```

CALL MultinomialNB
            PREDICT the label
            COMPUTE AccuracyScore
            SAVE AccuracyScore
            DISPLAY ConfusionMatrix

```

STEP 5: STOP

E. Support Vector Machine (SVM)

```

STEP 1: START
STEP 2: SPLIT dataset into 67 percent training set, 33
percent testing set
STEP 3: FOR train dataset
            CALL SVMClassifier
            TRAIN SVMClassifier
STEP 4: FOR test dataset
            CALL SVMClassifier
            PREDICT the label
            COMPUTE AccuracyScore
            DISPLAY ConfusionMatrix
STEP 5: STOP

```

V. SYSTEM ARCHITECTURE

The system “design” is defined as the process of applying various requirements and permits it physical realization. Various design features are followed to develop the system design specification describes the feature of the system, the opponent or elements of the system and their appearance to the end-users

The below figure illustrates the steps in fake news detection system. Data scraping is first performed in our fake news detection structure, which includes duplicate and missing value processing. Then, pre-processing is done for the dataset, after which conversion of the dataset into vectors occurs, and using the vectors, we train the algorithm using machine learning algorithms.

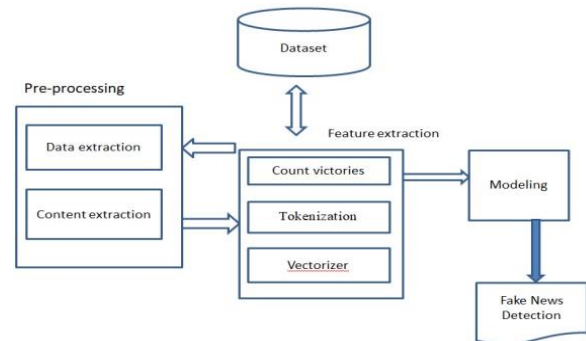


Fig.2. Proposed System Architecture

VI. RESULTS AND DISCUSSION

The system was created using Windows 10 as well as a 64-bit processor with 8 GB of RAM. The model implemented with the help of Python v3.7.8. The performance of the classification techniques are studied with different evaluation measures, namely, accuracy (AC), Precision, Recall and F-1 Score.

$$Precision = \frac{True_Positive}{True_Positive+False_Positive} \quad (1)$$

$$Recall = \frac{True_Positive}{True_Positive+False_Negative} \quad (2)$$

$$F - Measure = 2 * \frac{Precision*Recall}{Precision+Recall} \quad (3)$$

$$Accuracy = \frac{True_Positive + True_Negative}{True_Positive + True_Negative + False_Positive + False_Negative} \quad (4)$$

Table.II Performance Measure.

Algorithm	Accuracy (%)	Precision (%)	Recall (%)	F-1 Score (%)
SVM	92	91	93	92
Naive Bayes	73	74	72	71
Random Forest	95	96	94	97
Logistic Regression	93	93	94	95

In table 2, the proposed model was tested using Nave Bayes, SVM, Logistic Regression and Random classifier methods, with Random Forest achieving the highest accuracy with 95%, followed by Logistic Regression with 93%. By this comparison we conclude that the Random Forest classifier attained the better classification than other classifiers in prediction of news under fake or real category.

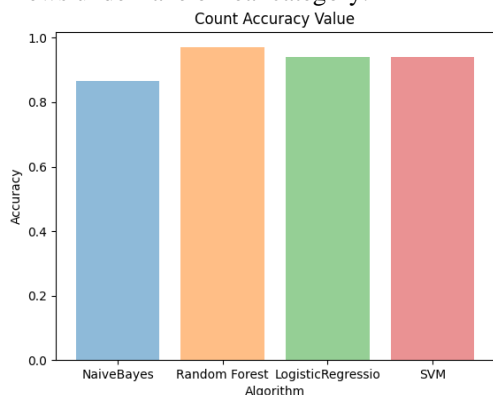


Fig.3. Accuracy Bar Graph

The above figure 3 shows a bar graph generated when Count Model is used as a feature extraction technique and used for showing the accuracy of each algorithm accordingly.

The figure 4 shows the performance evaluation contrast between a previously existing system, and the current system designed and developed in this project work. It showcases the accuracy gain and reduced computation time from the previous one.

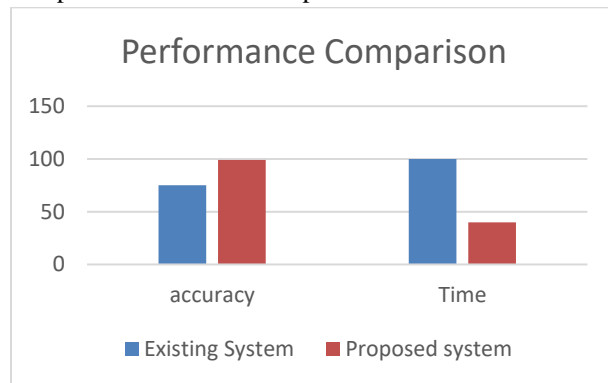


Fig 4: Performance Evaluation

VIII. CONCLUSION

In this work, we have developed a fake news detection software by applying supervised machine learning algorithms to classify a given article taken as input from user, as real or fake. Our proposed system achieves a better accuracy of 95% with Random Forest Classifier, 93% with Logistic Regression, along with better efficiency and optimisation. A fact that differentiates our approach from the previous existing systems is the creation and usage of a dataset in real time, rather than using a pre-existing dataset for training of the algorithms, which makes it viable for future as well, where new ways of fake news articles production may come to existence. Our method has the disadvantage of being based on pre-trained language models, which makes it computationally costly to use in real world applications.

As a result, we plan to use methods to speed up the inference of pre-trained models, as well developing the application for desktop and mobile.

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