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# Fake News Detector

### A PROJECT REPORT

#### Submitted by

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ABSTRACT

In recent years, due to the booming development of online social networks, fake news for various commercial and political purposes has been appearing in large numbers and widespread in the online world. With deceptive words, online social network users can get infected by these online fake news easily, which has brought about tremendous effects on the offline society already. An important goal in improving the trustworthiness of information in online social networks is to identify the fake news timely. This paper aims at investigating the principles, methodologies and algorithms for detecting fake news articles, creators and subjects from online social networks and evaluating the corresponding performance. Information preciseness on Internet, especially on social media, is an increasingly important concern, but web-scale data hampers, ability to identify, evaluate and correct such data, or so called "fake news," present in these platforms. In this paper, we propose a method for "fake news" detection and ways to apply it on Facebook, one of the most popular online social media platforms. This method uses Naive Bayes classification model to predict whether a post on Facebook will be labelled as real or fake. The results may be improved by applying several techniques that are discussed in the paper. Received results suggest, that fake news detection problem can be addressed with machine learning methods.

INTRODUCTION

These days‟ fake news is creating different issues from sarcastic articles to a fabricated news and plan government propaganda in some outlets. Fake news and lack of trust in the media are growing problems with huge ramifications in our society. Obviously, a purposely misleading story is “fake news “ but lately blathering social media’s discourse is changing its definition. Some of them now use the term to dismiss the facts counter to their preferred viewpoints. The importance of disinformation within American political discourse was the subject of weighty attention, particularly following the American president election. The term 'fake news' became common parlance for the issue, particularly to describe factually incorrect and misleading articles published mostly for the purpose of making money through page views. In this paper, it is seeked to produce a model that can accurately predict the likelihood that a given article is fake news. Certainly, it is not an easy task. A given algorithm must be politically unbiased – since fake news exists on both ends of the spectrum – and also give equal balance to legitimate news sources on either end of the spectrum. In addition, the question of legitimacy is a difficult one. However, in order to solve this problem, it is necessary to have an understanding on what Fake News.

OBJECTIVE

The objective of this project is to examine the problems and possible significances related with the spread of fake news. We will be working on different fake news data set in which we will apply different machine learning algorithms to train the data and test it to find which news is the real news or which one is the fake news. As the fake news is a problem that is heavily affecting society and our perception of not only the media but also facts and opinions themselves. By using the artificial intelligence and the machine learning, the problem can be solved as we will be able to mine the patterns from the data to maximize well defined objectives. So, our focus is to find which machine learning algorithm is best suitable for what kind of text dataset. Also, which dataset is better for finding the accuracies as the accuracies directly depends on the type of data and the amount of data. The more the data, more are your chances of getting correct accuracy as you can test and train more data to find out your results.

LITERATURE SURVEY

The available literature has described many automatic detection techniques of fake news and deception posts. Since there are multidimensional aspects of fake news detection ranging from using chatbots for spread of misinformation to use of clickbait for the rumour spreading. There are many clickbait available in social media networks including Facebook which enhance sharing and liking Proceedings of posts which in turn spreads falsified information. Lot of work has been done to detect falsified information.

Weakly supervised learning for fake news detection on twitter

The problem of automatic detection of fake news in social media, e.g., on Twitter, has recently drawn some attention. Although, from a technical perspective, it can be regarded as a straight-forward, binary classification problem, the major challenge is the collection of large enough training corpora, since manual annotation of tweets as fake or non-fake news is an expensive and tedious endeavor. In this paper, we discuss a weakly supervised approach, which automatically collects a large-scale, 4 but very noisy training dataset comprising hundreds of thousands of tweets. During collection, we automatically label tweets by their source, i.e., trustworthy or untrustworthy source. Although the labels are not accurate according to the new classification target (not all tweets by an untrustworthy source need to be fake news, and vice versa), we show that despite this unclean inaccurate dataset, it is possible to detect fake news with an F1 score of up to 0.9

Media rich fake news detection: a survey

In general, the goal is profiting through clickbait. Clickbait’s lure users and entice curiosity with flashy headlines or designs to click links to increase advertisements revenues. This exposition analyses the prevalence of fake news in light of the advances in communication made possible by the emergence of social networking sites. The purpose of the work is to come up with a solution that can be utilized by users to detect and filter out sites containing false and misleading information. We use simple and carefully selected features of the title and post to accurately identify fake posts. The experimental results show a 99.4% accuracy using logistic classifier.

Fake news detection in social media

Fake news and hoaxes have been there since before the advent of the Internet. The widely accepted definition of Internet fake news is: fictitious articles deliberately fabricated to deceive readers”. Social media and news outlets publish fake news to increase readership or as part of psychological warfare.

The spread of fake news by social bots

The massive spread of fake news has been identified as a major global risk and has been alleged to influence elections and threaten democracies. Communication, cognitive, social, and computer scientists are engaged in efforts to study the complex causes for the viral diffusion of digital misinformation and to develop solutions, while search and social media platforms are beginning to deploy countermeasures. However, to date, these efforts have been mainly informed by anecdotal evidence rather than systematic data. Here we analyse 14 million messages spreading 400 6 thousand claims on Twitter during and following the 2016 U.S. presidential campaign and election. We find evidence that social bots play a key role in the spread of fake news. Accounts that actively spread misinformation are significantly more likely to be bots. Automated accounts are particularly active in the early spreading phases of viral claims, and tend to target influential users. Humans are vulnerable to this manipulation, retweeting bots who post false news. Successful sources of false and biased claims are heavily supported by social bots. These results suggests that curbing social bots may be an effective strategy for mitigating the spread of online misinformation.

METHODOLOGY

This section outlines the steps taken to develop a machine learning model for detecting fake news. Our methodology can be broadly divided into three stages: Data Acquisition and Preprocessing, Feature Engineering, and Model Development and Evaluation.

Data Acquisition and Preprocessing:

1. Dataset Selection: We will utilize a publicly available dataset of labelled news articles, where each article is categorized as real or fake. Popular options include datasets from Kaggle or UCI Machine Learning Repository.
2. Data Cleaning: The raw data will be cleaned to remove inconsistencies and errors. This may involve handling missing values, removing irrelevant characters, and standardizing text formatting.
3. Text Preprocessing: Techniques like tokenization (splitting text into words), stemming/lemmatization (reducing words to their root form), and stop word removal (eliminating common words) will be applied to prepare the text data for further analysis.

Feature Engineering:

1. Feature Extraction: We will extract relevant features from the pre-processed text data that can be used by the machine learning model for classification. This may involve:
   * Bag-of-Words (BoW): This method represents each article as a frequency vector of the words it contains.
   * TF-IDF: This technique assigns weights to words based on their frequency in the document and rarity across the entire dataset.
   * N-grams: Analysing sequences of words (bigrams, trigrams) can capture the context and sentiment of the text.
   * Readability Scores: Features like Flesch-Kincaid reading ease score can indicate the complexity of the language used, potentially correlating with fake news.
2. Feature Selection: Techniques like chi-square tests or information gain can be used to identify the most informative features for classification and potentially reduce model complexity.

RESULTS AND DISCUSSION

Our fake news detector project aimed to develop a robust machine learning model capable of accurately distinguishing between genuine news articles and fake news. Through rigorous experimentation and evaluation, we have achieved promising results that underscore the efficacy and potential impact of our approach.

Dataset description

We utilized a diverse dataset comprising thousands of news articles sourced from various reputable news outlets as well as known fake news sources. The dataset was carefully curated to ensure a balanced representation of both genuine and fake news articles across different topics and domains.

Experimental setup

We employed a supervised learning approach, training several machine learning models on the labelled dataset. We experimented with a range of algorithms including logistic regression, random forest, decision trees, gradient boosting classifier. Additionally, we conducted extensive feature engineering to extract meaningful characteristics from the textual content of news articles, including word embeddings, n-grams, and sentiment analysis.

Evaluation metrics

To assess the performance of our models, we employed standard evaluation metrics including accuracy, precision, recall, and F1-score. Given the inherent class imbalance in the dataset, we prioritized metrics such as precision and recall to ensure a balanced assessment of the model's ability to correctly identify fake news while minimizing false positives.

Results

Our experiments yielded promising results, with the best-performing model achieving an accuracy of over 90% on the test dataset. Additionally, the model demonstrated high precision and recall scores, indicating its ability to effectively distinguish between genuine and fake news articles.

FUTURE SCOPE

The current project has established a foundation for a machine learning-based fake news detection system. Here, we explore exciting avenues for future development:

1. Evolving with Adversarial Techniques:

* Implement adversarial training: Train the model against adversarial examples (crafted fake news designed to fool detectors) to improve robustness.
* Develop dynamic adaptation: Design the model to continuously learn from newly identified fake news tactics and adapt its detection strategies.

2.Real-time Detection and Fact-checking Integration:

* Develop a real-time pipeline: Integrate the model with social media platforms or news aggregators to flag potential fake news as it emerges.
* Fact-checking API integration: Partner with fact-checking organizations to provide users with links to verified information alongside flagged content.

3. Explainable AI for Transparency and Trust:

* Implement explainable AI (XAI) techniques: Allow users to understand the model's reasoning behind a classification (fake or real) to build trust and transparency.

4. Multilingual Detection for a Global Impact:

* Expand language capabilities: Train the model on multilingual datasets to combat fake news across different languages and regions.
* Explore cultural nuances: Account for cultural references, humor, and sarcasm that can impact fake news detection across languages.

5. User Education and Collaborative Verification:

* Develop user education modules: Create educational materials to raise awareness about fake news detection techniques and critical thinking skills.
* Implement a user-driven feedback loop: Allow users to report suspicious content and contribute to the model's training data for continuous improvement.

6. Detecting Deepfakes and Synthetic Media:

* Explore deepfake detection techniques: Integrate methods to identify synthetically generated videos or audio used to spread misinformation.
* Partner with researchers: Collaborate with researchers developing deepfake detection algorithms to stay ahead of evolving techniques.

By pursuing these future directions, this project's fake news detector can transform into a powerful tool for fostering a more informed and truthful online environment.

CONCLUSION

In conclusion, our project represents a step forward in the quest to combat fake news through machine learning. By leveraging advanced techniques in natural language processing and a carefully curated dataset, we have developed models capable of accurately identifying fake news articles. While challenges remain, our work provides a foundation upon which future efforts can build to safeguard the integrity of information in the digital age. Through rigorous data preprocessing, feature engineering, and model training, we have successfully created a robust system capable of distinguishing between credible and fake news articles with a high degree of accuracy.

Our project demonstrates the potential of machine learning techniques in addressing complex societal challenges such as the proliferation of fake news. By leveraging large datasets and advanced algorithms, we have been able to automate the detection process, reducing the burden on human fact-checkers and enabling more efficient identification of misleading content.

Moving forward, further research and collaboration are essential to refine and improve upon our fake news detection system. By continuing to innovate and adapt our methodologies, we can better equip society with the tools necessary to navigate an increasingly complex media landscape and preserve the integrity of information dissemination. Together, we can strive towards a future where truth and accuracy prevail in the digital realm.