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Fake News Detection Using Machine Learning

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ABSTRACT

This Project comes up with the applications of NLP (Natural Language Processing) techniques for detecting the 'fake news', that is, misleading news stories that comes from the non-reputable sources. Only by building a model based on a count vectorizer (using word tallies) or a (Term Frequency Inverse Document Frequency) tfidf matrix, (word tallies relative to how often they're used in other articles in your dataset) can only get you so far. But these models do not consider the important qualities like word ordering and context. It is very possible that two articles that are similar in their word count will be completely different in their meaning. The data science community has responded by taking actions against the problem. Our proposed work is on assembling a dataset of both fake and real news and employ a supervised classifier in order to create a model to classify an article into fake or real based on its words and phrases.

OBJECTIVE

The main objective is to detect the fake news, which is a classic text classification problem with a straight forward proposition. It is needed to build a model that can differentiate between "Real" news and "Fake" news

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 seemed to produce a model that can accurately predict the likelihood that a given article is fake news.

Facebook has been at the epicenter of much critique following media attention. They have already implemented a feature to flag fake news on the site when a user sees's it; they have also said publicly they are working on to to distinguish these articles *in* an automated way. 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 is. Later, it is needed to look into how the techniques in the fields of machine learning, natural language processing help us to detect fake news.

EXISTING SYSTEM

There exists a large body of research on the topic of machine learning methods for deception detection, most of it has been focusing on classifying online reviews and publicly available social media posts. Particularly since late 2016 during the American Presidential election, the question of determining 'fake news' has also been the subject of particular attention within the literature.

Conroy, Rubin, and Chen [1] outlines several approaches that seem promising towards the aim of perfectly classify the misleading articles. They note that simple content-related n-grams and shallow

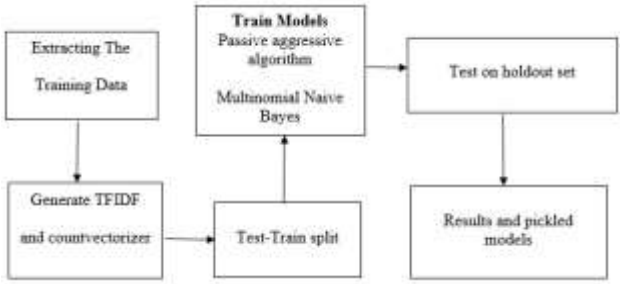
parts-of-speech (POS) tagging have proven insufficient for the classification task, often failing to account for important context information. Rather, these methods have been shown useful only in tandem with more complex methods of analysis. Deep Syntax analysis using Probabilistic Context Free Grammars (PCFG) have been shown to be particularly valuable in combination with n-gram methods. Feng, Banerjee, and Choi [2] are able to achieve 85%-91% accuracy in deception related classification tasks using online review corpora.

Feng and Hirst implemented a semantic analysis looking at 'object: descriptor' pairs for contradictions with the text on top of Feng's initial deep syntax model for additional improvement. Rubin, Lukoi anova and Tatiana analyze rhetorical structure using a vector space model with similar success. Ciampaglia et al. employ language pattern similarity networks requiring a pre-existing knowledge base.

Top Five Unreliable News Sources		Top Five Reliable News Sources	
Before It's News	2066	Reuters	3898
Zero Hedge	149	BBC	830
Raw Story	90	USA Today	824
Washington Examiner	79	Washington Post	820
Infowars	67	CNN	595

PROPOSED SYSTEM

In this paper a model is build based on the count vectorizer or a tfidf matrix (i.e) word tallies relatives to how often they are used in other artices in your dataset) can help . Since this problem is a kind of text classification, implementing a Naive Bayes classifier will be best as this is standard for text-based processing. The actual goal is in developing a model which was the text transformation (count vectorizer vs tfidf vectorizer) and choosing which type of text to use (headlines vs full text). Now the next step is to extract the most optimal features for countvectorizer or tfidf-vectorizer, this is done by using a n-number of the most used words, and/or phrases, lower casing or not, mainly removing the stop words which are common words such as “the”, “when”, and “there” and only using those words that appear at least a given number of times in a given text dataset.



Modules

Data Pre-processing

This file contains all the pre-processing functions needed to process all input documents and texts. First we read the train, test and validation data files then performed some pre-processing like tokenizing, stemming etc. There are some exploratory data analysis is performed like response variable distribution and data quality checks like null or missing values etc.

Feature Extraction

In this file we have performed feature extraction and selection methods from sci-kit learn python libraries. For feature selection, we have used methods like simple bag-of-words and n-grams and then term frequency like tf-tdf weighting. We have also used word2vec and POS tagging to extract the features, though POS tagging and word2vec has not been used at this point in the project.

Classification

Here we have built all the classifiers for predicting the fake news detection. The extracted features are fed into different classifiers. We have used Naive-bayes, Logistic Regression, Linear SVM, Stochastic gradient decent and Random forest classifiers from sklearn. Each of the extracted features were used in all of the classifiers. Once fitting the model, we compared the f1 score and checked the confusion matrix. After fitting all the classifiers, 2 best performing models were selected as candidate models for fake news classification. We have performed parameter tuning by implementing GridSearchCV methods on these candidate models

and chosen best performing parameters for these classifier. Finally selected model was used for fake news detection with the probability of truth. In Addition to this, we have also extracted the top 50 features from our term-frequency tfidf vectorizer to see what words are most and important in each of the classes. We have also used Precision-Recall and learning curves to see how training and test set performs when we increase the amount of data in our classifiers.

Prediction

Our finally selected and best performing classifier was algorithm which was then saved on disk with name final_model.sav. Once you close this repository, this model will be copied to user's machine and will be used by prediction.py file to classify the fake news. It takes a news article as input from user then model is used for final classification output that is shown to user along with probability of truth.

Result:

Confusion Matrix :

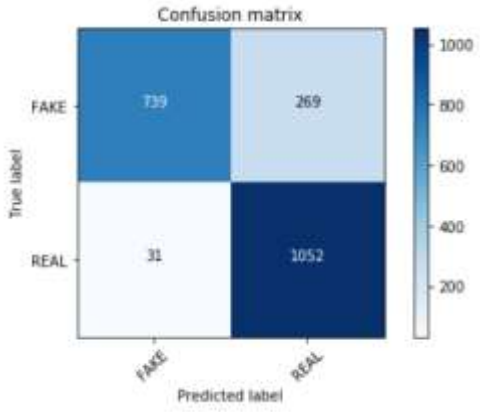


Fig 1. Matrix from multinomialNB

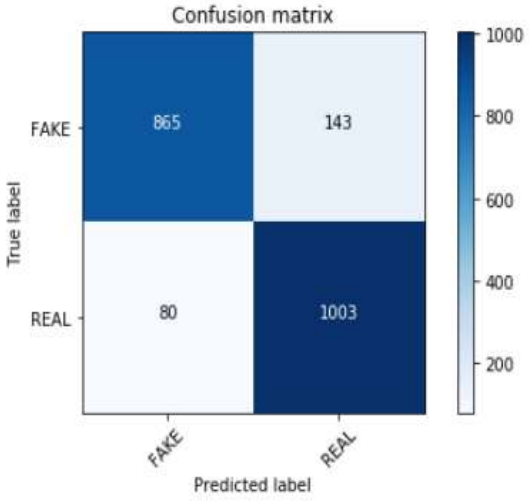


Fig 2. Matrix from multinomialNB used iteratively

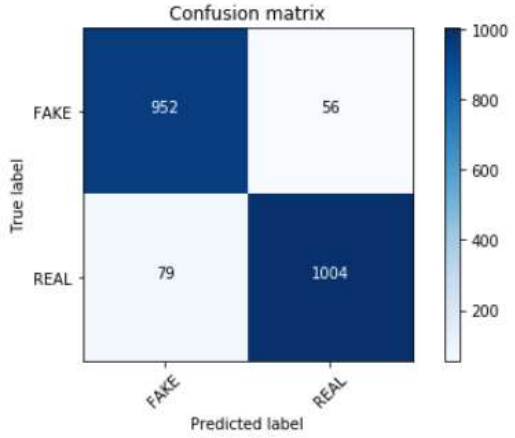


Fig 3. Matrix from PassiveAggressiveClassifier

Conclusion

As per project, defining fake news with simple bag-of-words or TF-IDF vectors is a diificult approach. Especially with a multilingual dataset full of noisy tokens. So, we have used Count vectorizer and TF_IDF to compute or predict the fake news or real news using supervised algorithm MulinomialNB with multi iteration to improve accuracy and progress Aggressive Classifier. We have used Count vectorizer, Term Frequency–Inverse Document Frequency (TF-IDF) to extract features for further

processing and prediction and we reached to 93% accuracy.

Future works

Basing fake news detection only on supervised models on text have shown not to be enough in all the cases. In order to solve this problem, most of the research focus on additional information such as author information. I think the most successful approach would be automatic fact checking model, that is, compelling the model with some kind of knowledge base, the purpose of the model would then be to extract information for the text and verify the information in the database. The problem with this approach would be that the knowledge base would need to be constantly and manually update to stay up to date.

References

[1]HuntAllcott and Matthew Gentzkow. Social media and fake news in the 2016 election. In Journal of Economic Perspective, volume 31, 2017.

[2] William Yang Wang. ”liar, liar pants on fire”: A new benchmark dataset for fake news detection.

[3] Granik, M., &Mesyura, V. 2017. Fake news detection using naive Bayes classifier. 2017 IEEE First Ukraine Conference on Electrical and Computer Engineering (UKRCON), 900-903.

[4] W. Vorhies, Using algorithms to detect fake news - The state of the art, 2017, [online] Available: http://www.datasciencecentral.com/profiles/ blogs/using-algorithms-to-detect-fake-news-the-state-of-the-art.

[5] Ehsanfar, Abbas and Mo Mansouri. 2017. “Incentivizing the dissemination of truth versus fake news in social networks.” 2017 12th System of Systems Engineering Conference (SoSE), 1-6.

[6] Hal Berghel. 2017. Alt-News and Post-Truths in the "Fake News" Era. Computer 50, 4 (April 2017), 110-114. DOI: https://doi.org/10.1109/ MC.2017.104

[7] Buntain, C., &Golbeck, J. 2017. Automatically Identifying Fake News in Popular Twitter Threads. 2017 IEEE International Conference on Smart Cloud (SmartCloud), 208-215.