Fake News Detections Project

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**Introduction**

Wouldn’t it be nice to detect fake news and filter it out of your news feeds to generate more trusted media? What exactly is fake news? One article, “Detecting Fake News in Social Media Networks”, provides the following definition, “fictitious article deliberately fabricated to deceive readers”. This project is the initial step in generating detection that could be filtered out in an online environment with a follow-on implementation and increased scope of this effort. I think this project would be interesting to the general public that is interested in reading unbiased neutral news. I expect that given the choice discerning consumers would appreciate additional filtering of their news outlets. I would explore selling the software filtering to aggregated news sources.

In this project, I ingested various forms of news and using a Passive Aggressive algorithm which is an online learning algorithm starting with the provided datasheet, and then, expanding to other data sources. In addition, I will explore a separate dataset with the same model to see if it is compatible with various datasets.

It was interesting to see the various results for media outlets like the National enquirer stories which are sometimes expected to be sensationalized or in pop-up articles that are sometimes eye-catchers while reading other articles online.

I am hoping to learn more about media sources that might generate new that will be detected as “fake” news. Also, in expanding from the initial dataset, I will gain more experience with additional data sets and exploratory analysis.

The risks are that incorrectly labelled news stories in the next steps following the project, might be filtered out, creating bias in news sources by eliminating perhaps colorful but true articles and stories.

In the larger scope, ethical concerns at the false positives might cause bias and eliminate news stories that are not fake news. Sometimes perception alone can be an ethical concern if the method and results are not publicly known or well understood. In addition, false negatives would allow fake news to become validated as true and might even be more harmful and riskier.

My initial data set is located at:

<https://data-flair.training/blogs/advanced-python-project-detecting-fake-news/>

**Methods/Results**

**Will I be able to answer the questions I want to answer with the data I have?**

I was able to answer the intended questions including- Can this effort detect fake news from

A list of potential news stories? It appears to be able to detect fake news. I have found several.

approaches to work through to detect fake news and display with what accuracy this can be

achieved. I was able to locate an additional data source for news stories, and given more time,

additional sources could be mined. These datasets are also labelled which aids the process.

Given additional time, I would have explored the “LIAR”, and “BS DETECTOR” datasets.

**What visualizations are especially useful for explaining my data?**

With additional research, I was able to determine that word clouds and network diagrams are

useful visualizations for text. “Text visualization is the technique of using charts, graphs, or

word clouds to showcase written data in a visual manner.” (Monkey Learn Blog, n.d.)

**Do I need to adjust the data and/or driving questions?**

At this point, I don’t need to adjust the data or driving questions, and this appears to be a

solid approach to detecting fake news. This includes the original idea to add additional datasets to

the initial one, it all seems achievable at this point.

**Do I need to adjust my model/evaluation choices?**

I haven’t determined any reason to adjust my model/evaluation choices, and I have

modified my Milestone 2 write-up below to reflect the comments that I received in the prior

milestone review from the professor.

**Are my original expectations still reasonable?**

The original expectations seem reasonable with no need to modify at this point.

**Data Preparation**

My process for prepping the data for the second dataset began with reading in the data and viewing the head of the data. I reviewed the column names and value counts for various subjects. To visualize I created a count plot and found the counts for each subject type. To generate a word cloud, I joined the text and created a list. This was accomplished for both the fake and real datasets of articles. I also reviewed what data had unknown publishers, and dropped a row that had empty text, and cleaned up the index and dropped the fake index. After data munging, I was able to append the real and fake data into one data file. I had some challenges with splitting the data into test and training due to the shape of the data files being inconsistent. I found a way to transpose the x and make the shape of each compatible. To split the data, I needed to also flatten the x set. Then I could split the test and training data. I ran the tfid vectorizer to convert text into numerical values. Finally, I fit the Passive Aggressive Classifier model and ran it. The next step was to predict on the test set and display accuracy.

Build and evaluate at least one model—I built two models; one for each dataset and evaluated their accuracy as well as providing a confusion matrix to view the results including creating the matrix to show classification problems to assess where the errors occurred. It illustrates the true label and predicted label results.

Interpret your results- the results were much more accurate with the first dataset. Given more time, I would try out some additional modelling for each dataset to attempt greater accuracy results. This model is not ready for deployment, additional exploration is required given the significantly lower accuracy of the model generated with the second dataset. Before deployment, I would want very consistent model results across a representative data set in which the solution would be deployed it would be essential to be able to illustrate very accurate and consistent results to the intended media platform- which was an aggregated news source. Ethical concerns could come into the decision calculus if it seemed the model was displaying such variation on the accuracy dependent upon certain datasets. I would want to be able to generate a dashboard that illustrated the improved model results once the root cause was determined and have that solved before presenting this as a solution to fake news detection.

**Conclusion**

My conclusion is that the initial dataset was a better combination with the Passive Aggressive model and yielded far more accurate predictions. My recommendations are 1) train and test additional models with the second dataset and see if better accuracy can be achieved. Also, I suspect there may be an underlying issue in the dataset, so I would explore the data more and perhaps combine it differently or at least rule that out as a contributing thread.

There is additional research needed in order to deploy this model as described above.

References

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Previous Milestone Reviews --------------------------------------------------------------------

Milestone 4

My process for prepping the data for the second dataset began with reading in the data and viewing the head of the data. I reviewed the column names and value counts for various subjects. To visualize I created a count plot and found the counts for each subject type. In order to generate a word cloud, I joined the text and created a list. This was accomplished for both the fake and real datasets of articles. I also reviewed what data had unknown publishers, and dropped a row that had empty text, and cleaned up the index and dropped the fake index. After data munging, I was able to append the real and fake data into one data file. I had some challenges with splitting the data into test and training due to the shape of the data files being inconsistent. I found a way to transpose the x and make the shape of each compatible. In order to split the data, I needed to also flatten the x set. Then I could split the test and training data. I ran the tfid vectorizer to convert text into numerical values. Finally, I fit the Passive Aggressive Classifier model and ran it. The next step was to predict on the test set and display accuracy.

Build and evaluate at least one model- I built two models one for each dataset and evaluated their accuracy as well as providing a confusion matrix in order to view the results including creating the matrix to show classification problems to assess where the errors were made. It shows the true label and predicted label results.

Interpret your results- the results were much more accurate with the first dataset. If I had more time, I would try out some additional models for the second dataset and see if I could get something more accurate.

Begin to formulate a conclusion/recommendation.

My conclusion is that the initial dataset was a better combination with the Passive Aggressive model and yielded far more accurate predictions. My recommendations are 1) tray additional models with the second dataset and see if better accuracy can be achieved. Also, I suspect there may be an underlying issue in the dataset, so I would explore the data more and perhaps combine it differently or at least rule that out as a contributing thread.

Milestone 3

**Will I be able to answer the questions I want to answer with the data I have?**

I believe that I will be able to answer the questions that I want to answer, including- Can this

effort detect fake news from a list of potential news stories? It appears to be able to detect

fake news. I have found several approaches to work through to detect fake news and

display with what accuracy can this be achieved. Will I be able to locate additional news

sources and generate similar results? There are also a large variety of news resources that

I can leverage to achieve a variety of news stories available. In addition, these datasets are

labelled which will aid the process. I was able to locate additional datasets, including the

“LIAR”, and “BS DETECTOR” datasets.

**What visualizations are especially useful for explaining my data?**

With additional research, I was able to determine that word clouds and network diagrams are

useful visualizations for text. “Text visualization is the technique of using charts, graphs, or

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modified my Milestone 2 write-up below to reflect the comments that I received in the prior review

from the professor.

**Are my original expectations still reasonable?**

The original expectations seem reasonable with no need to modify at this point.

Milestone 2 (Modified as per comments)

Wouldn’t it be nice to detect fake news and filter it out of your news feeds to generate more trusted media? What exactly is fake news? One article, “Detecting Fake News in Social Media Networks”, provides the following definition, “fictitious article deliberately fabricated to deceive readers”. This project is the initial step in generating detection that could be filtered out in an online environment with a follow-on implementation and increased scope of this effort.

In this project, I would like to be able to ingest various forms of news and using a Passive Aggressive algorithm which is an online learning algorithm starting with the provided datasheet, and then, expanding to other data sources. In addition, I will explore the other models including logistic regression and random forest.

It would be interesting to see the various results for media outlets like the National enquirer stories which are sometimes expected to be sensationalized or in pop-up articles that are sometimes eye-catchers while reading other articles online.

To evaluate the results, I will provide accuracy, precision/recall, and ROC.

I am hoping to learn more about media sources that might generate new that will be detected as “fake” news. Also, in expanding from the initial dataset, I will gain more experience with additional data sets and exploratory analysis.

The risks are that incorrectly labelled news stories in the next steps following the project, might be filtered out, creating bias in news sources by eliminating perhaps colorful but true articles and stories.

In the larger scope, ethical concerns at the false positives might cause bias and eliminate news stories that are not fake news. Sometimes perception alone can be an ethical concern if the method and results are not publicly known or well understood. In addition, false negatives would allow fake news to become validated as true and might even be more harmful and risky.

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