Bias Detection in News Articles
PROJECT PLAN

Team Name: 6. Sentiment Detected: HMMMMMM

Problem Statement: Detecting hyperpartisan bias in news articles.

Problem Background/Description

Sentiment Analysis is a well-known problem in NLP, with various facets like bias detection, fake news detection, etc. Of these, bias detection is a very popular area in contemporary NLP. Such bias can be based on religion, race, gender, a political organization etc.

The goal of this project is to detect hyperpartisan bias in news articles. This kind of bias is one where news is reported in such a way that it strongly favours a particular position(mostly political), and would be in fierce disagreement with the opponents. Such kind of news often involves either sketching the truth or combining it with fake news in an attempt to create sensational content.

The problem taken in the project is a binary classification problem, where we would be classifying whether a particular article has a hyperpartisan bias or not.

Examples

- The article [The New York Times abandoned its integrity just to bash Donald Trump](#) has a clear bias in favour of Donald Trump's right-wing politics and bashes left-favouring news articles.
- On the other hand, the article [CAPLAN: Will Bannonism—Not Trumpism—Shape The Republican Party's Future?](#) is clearly biased against Trump, and has a hyperpartisan bias towards the left-wing.
- Another class of articles are the ones with no bias, like [Jennifer Aniston And Justin Theroux's Marriage In Trouble Because Of Chelsea Handler?](#), which clearly doesn't have any hyperpartisan bias and is simply celebrity news.

Relevant Papers

- [SemEval-2019 Task 4: Hyperpartisan News Detection](#)
- [Sentence-BERT: Sentence Embeddings using Siamese BERT-Networks](#)
- [Team Bertha von Suttner at SemEval-2019 Task 4: Hyperpartisan News Detection using ELMo Sentence Representation Convolutional Network](#)

Dataset

The dataset that we are going to use is the one used in the [International Workshop on Semantic Evaluation (SemEval-2019)](#). Specifically, we are going to use the dataset for Task 4 which is **Hyperpartisan News Detection**. The dataset is tagged article-wise whether it follows a hyperpartisan argumentation or not i.e. if it exhibits bind, prejudice, or unreasoning allegiance to one party, faction, cause or person.

The dataset is already divided into training and validation datasets. An example from the dataset:

```
<article hyperpartisan="true" id="0000012" labeled-by="article"
url="https://www.circa.com/story/2017/09/13/action-sports/jemele-hill-trump-tweets-espn-
distances-itself-from-sportscenter-anchors-comments"/>
```

Planned Work

Baseline:

- For the baseline model, we would be implementing the top-scoring paper on the SemEval 2019 task: [Team Bertha von Suttner at SemEval-2019 Task 4: Hyperpartisan News Detection using ELMo Sentence Representation Convolutional Network](#).
- For the baseline model, we would be using [pre-trained ELMO embeddings](#) to calculate sentence embeddings as the averaged word embeddings.
- Post this, these embeddings would be given as input to a Convolutional Neural Network, that would use ReLU activation function to give the output.
- Post this, batch normalization and max-pooling of the output would be done, after which the outputs would be combined to get a single output.
- This output would be subjected to a sigmoid function in order to classify the article as biased or unbiased.

Baseline+ Improvements:

1. The sentences in the dataset can be either objective - which are facts, or subjective, which are opinions. The detection of bias is supposed to come only from the subjective sentences, and thus, we would make use of **Sentence Subjectivity Classification** to only use Subjective Sentences in our task. This is expected to improve the model since the irrelevant noise would be reduced from consideration in the neural network.
2. The given articles contain a lot of publisher-specific annotations, which would create a bias in hyperpartisan detection. For instance, mention of the publisher name in various links, etc. would make the model biased towards certain publishers' articles being biased. We will remove such bias from the dataset, making the model more accurate on more general data.
3. ELMO is essentially bi-directional LSTM at its core, which has been succeeded by transformers based embeddings like BERT. Thus, we would be using variations of BERT like BERT, BERT-LARGE, S-BERT in place of ELMo to improve the accuracy.
4. We would also try to incorporate sentence-level attention in our classifier.

Tentative Plan

17 Nov to 19 Nov	Integrate ELMo embeddings and fine-tune if necessary
19 Nov to 24 Nov	Coding CNN to classify the obtained embeddings
24 Nov to 27 Nov	Integrate Sentence Subjectivity Classification to improve the baseline
27 Nov to 30 Nov	Write python scripts for cleaning the data to get rid of the publisher bias
30 Nov to 04 Dec	Experiment with various transformers based embeddings and attention mechanism to improve the model.

Deliverables

- Code for baseline and baseline+ models.
- Final Report and Qualitative/Quantitative analysis of the results.
- Model files for both baseline and baseline+ implementations.