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Automating the Creation of Bias Lexica

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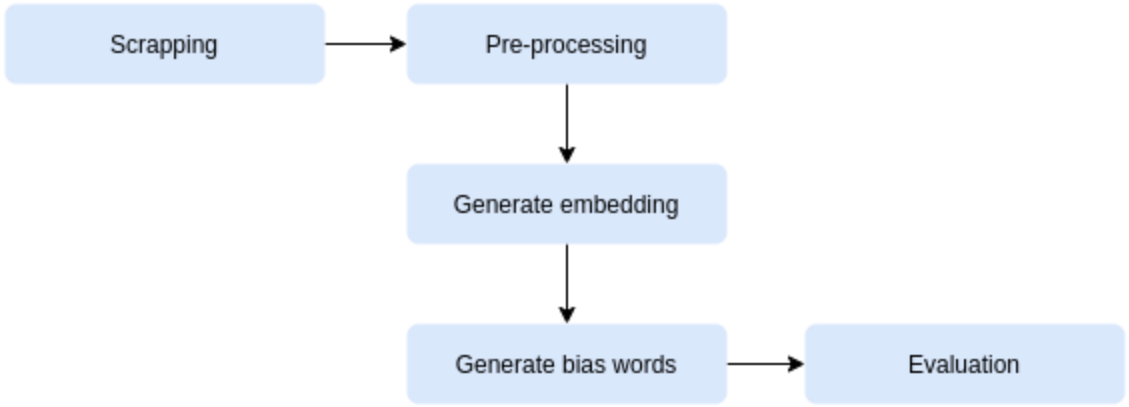
Introduction

- Bias usually refers to the inclined point of view towards someone or something.
- Quantifying such bias is harder compared to identifying them in media articles.
- Bias in the text is not explicitly given as an opinion or a comment, but rather is subtle and underlying[1].
- Our objective is to automate the process of creating bias lexica using *word2vec* word embedding model.

1. K. Lazaridou, R. Krestel, and F. Naumann. 2017. *Identifying Media Bias by Analyzing Reported Speech*. In 2017 *IEEE International Conference on Data Mining (ICDM)*. IEEE, New Orleans, LA, 943–948

Workflow

- The following figure depicts the workflow of our project:



Scrapping

- Dataset used here related to the paper[1], in which news articles are labeled based on their bias towards the democrat and republican party of the USA.
- This dataset contains news articles from various media sources.
- Each article in the dataset was assigned one of the following five labels:

1. Very positive
2. Somewhat positive
3. Neutral
4. Somewhat negative
5. Very negative

1. Ceren Budak, Sharad Goel, and Justin M. Rao. 2016. *Fair and Balanced? Quantifying Media Bias through Crowdsourced Content Analysis*. Public Opinion Quarterly (April 2016), 250–271. https://doi.org/10.1093/poq/nfw007

Pre-processing

- In this phase, we focus on preparing the data to make it suitable for *word2vec*.
- We perform following oprerations on the data:

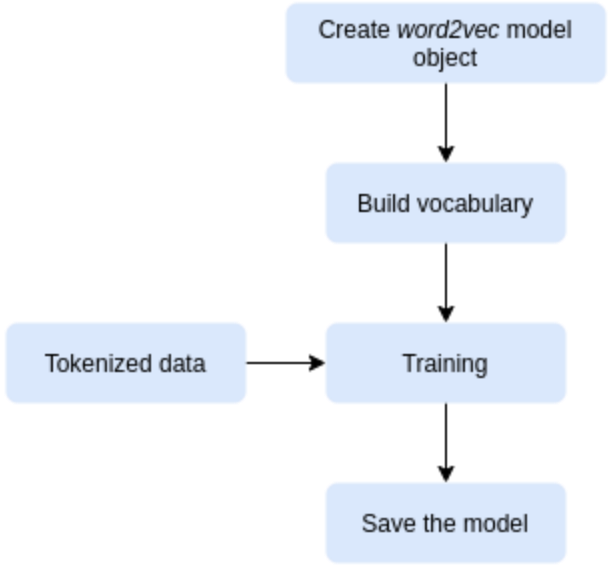
1. Merge multiple columns
2. Cleaning
3. Lemmatization
4. Generate (*binary*) labels

Outcome:

Total news articles	7961
Label 0 (Not bias)	4165
Label 1 (Bias)	3796

Generate embedding

Following figure depicts process of training a *word2vec* model:

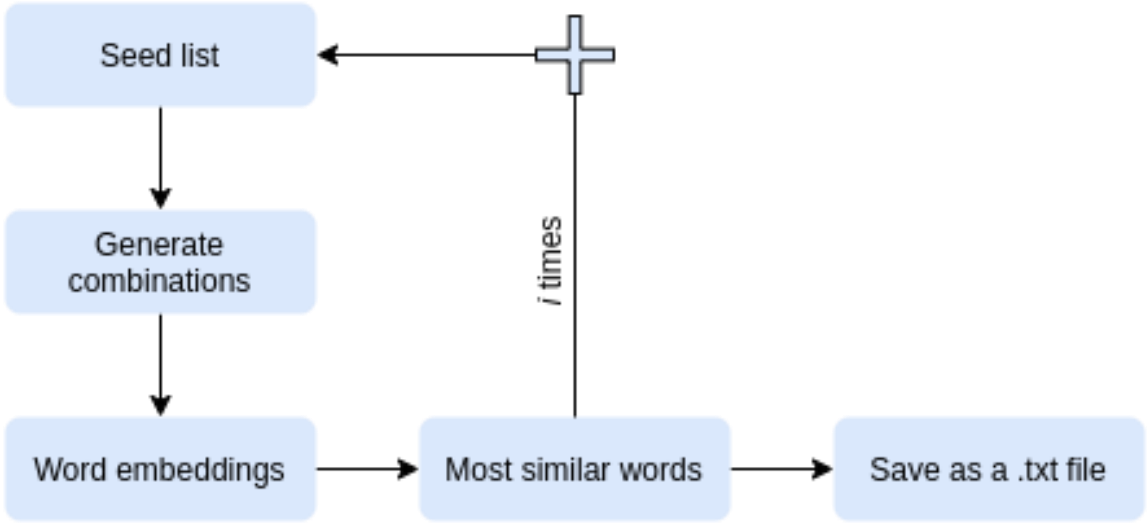


Important hyper-parameters required to train a *word2vec* model:

Parameter	Value
min_count	5
window	5
size	300
sample	6e-5
alpha	0.03
min_alpha	0.0007

Generate bias words

- Following figure shows the process of generating bias words using the seed list and word embeddings:



Evaluation

- Evaluation strategy:

1. Count the number of biased words each article in the dataset contains.
2. Define a threshold for how much bias words an article should contain for it be considered as biased article.
3. Predict labels for each article using this threshold.
4. Compare the predictions with actual targets and get the results.

Evaluation results:

Performance metric	Value
Accuracy	0.6050747393543525
Precision	0.5808531746031746
Recall	0.6169652265542677
F1	0.598364844149208
Cohen's Kappa	0.2106228619589827 2

Conclusion

- Although the results are not up to the level as expected, we can state that our approach is working properly.
- These results can be improved by making following changes:

1. Increase the **size** of the dataset
2. Experiment with ***topn*** value
3. Try different **threshold** values

Thank you

Questions?