Sentiment Analysis for Amazon Review Dataset & Drug Dataset

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Data Preprocessing

- Data before cleaning

	Sentiment	SentimentText
1	"2",	"Stuning even for the non-gamer","This sound track ...
2	"2",	"The best soundtrack ever to anything.","I'm reading a...
3	"2",	"Amazing!","This soundtrack is my favorite music of a...
4	"2",	"Excellent Soundtrack","I truly like this soundtrack an...
5	"2",	"Remember, Pull Your Jaw Off The Floor After Hearing...

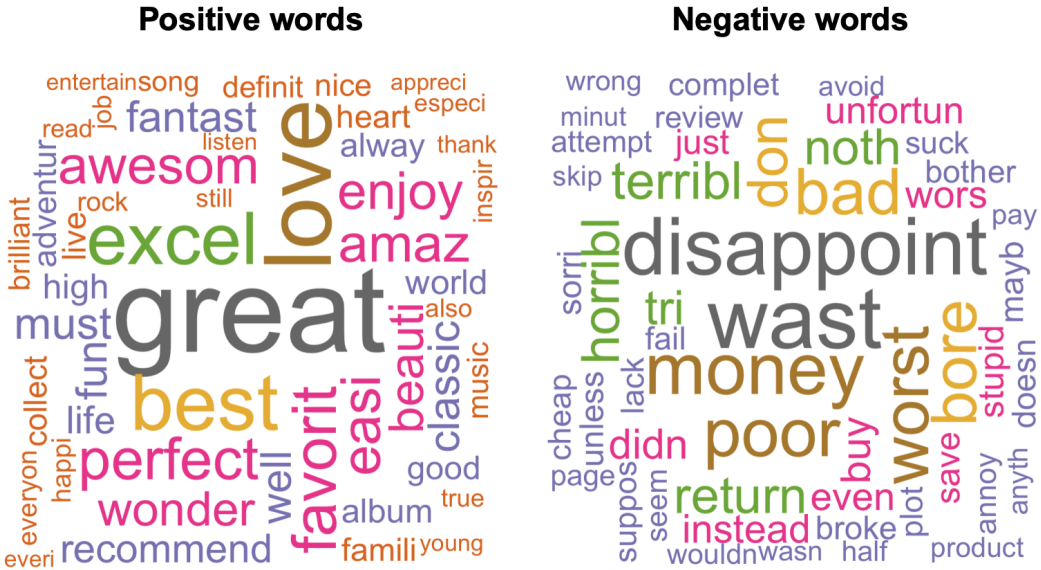
- Data after cleaning

	Sentiment	SentimentText
1	2	Stuning even for the non gamer This sound track was...
2	2	The best soundtrack ever to anything I m reading a lo...
3	2	Amazing This soundtrack is my favorite music of all ti...
4	2	Excellent Soundtrack I truly like this soundtrack and I ...
5	2	Remember Pull Your Jaw Off The Floor After Hearing i...

Model 1: Bag of Words(BoW) with Naive Bayes

- BoW: widely used in NLP and computer vision fields. It takes the occurrence of each word in the text regardless of grammar and makes it into "bags" to characterize the text.
- Final results:
  - *Amazon Review* dataset: 81.19%
  - *Drug Review* dataset: 74.77%

```
## Docs    book get good great just like movi one read time
##   34297    0   1    0     0    2    5    0   3    0    0
##   38984    6   0    0     1    1    0    0   1    0    1
##   42051    3   0    1     0    2    1    0   3    5    1
```



Word Clouds from Amazon reviews

Model 2: Pretrained word2vec word embedding with random forest algorithm

- pretrained word embedding
- based on the Reuter_50_50 dataset
- calculated the review sentences embedding
- Final results:
  - *Amazon Review* dataset: 62.56%
  - *Drug Review* dataset: 70.99%

Model 3: GloVe word embedding with random forest algorithm

- combines the global statistics of matrix factorization techniques
- constructs an explicit word context or word co-occurrence matrix
- obtain word embeddings from our own training corpus
- Final results:
  - *Amazon Review* dataset: 72.72%
  - *Drug Review* dataset: 74.96%

Model 4: FastText word Embedding

- fastText: created by the Facebook's AI Research lab in 2016
  - breaking words into n-grams (subwords), and generating word embeddings by taking the sum of those subwords
  - e.g. 2-grams for word *help* will be "he, el, lp"
- `fastTextR` package:
  - `ft_control`: set hyperparameter for fastText
  - `ft_train`: train the model
  - `ft_predict`: predict values based on the trained model
  - `ft_test`: evaluate the model
- Final results:
  - *Amazon Review* dataset: 86.48%
  - *Drug Review* dataset: 78.96%

Conclusion & Discussion

- Results in glance:

	Bow	word2vec	GloVe	FastText
Amazon Review	81.19%	62.88%	71.99%	86.48%
Drug Review	74.77%	71.02%	74.83%	78.69%

- Possible improvements for `word2vec`:
  - create specific word embeddings for the dataset to minimize the effect of pre-trained embeddings
- Future directions:
  - try more classification models such as XGBoost and AdaBoost
  - split the dataset into train, validation, test subsets

Thank you!