TEXT SENTIMENT ANALYSIS FOR BOOK RECOMMENDATION

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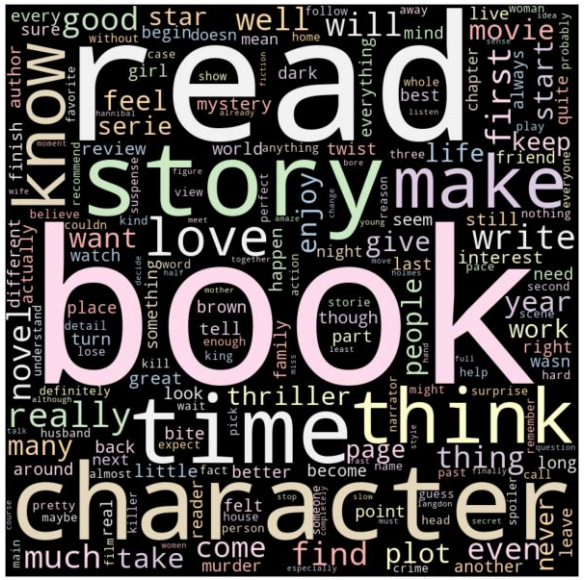


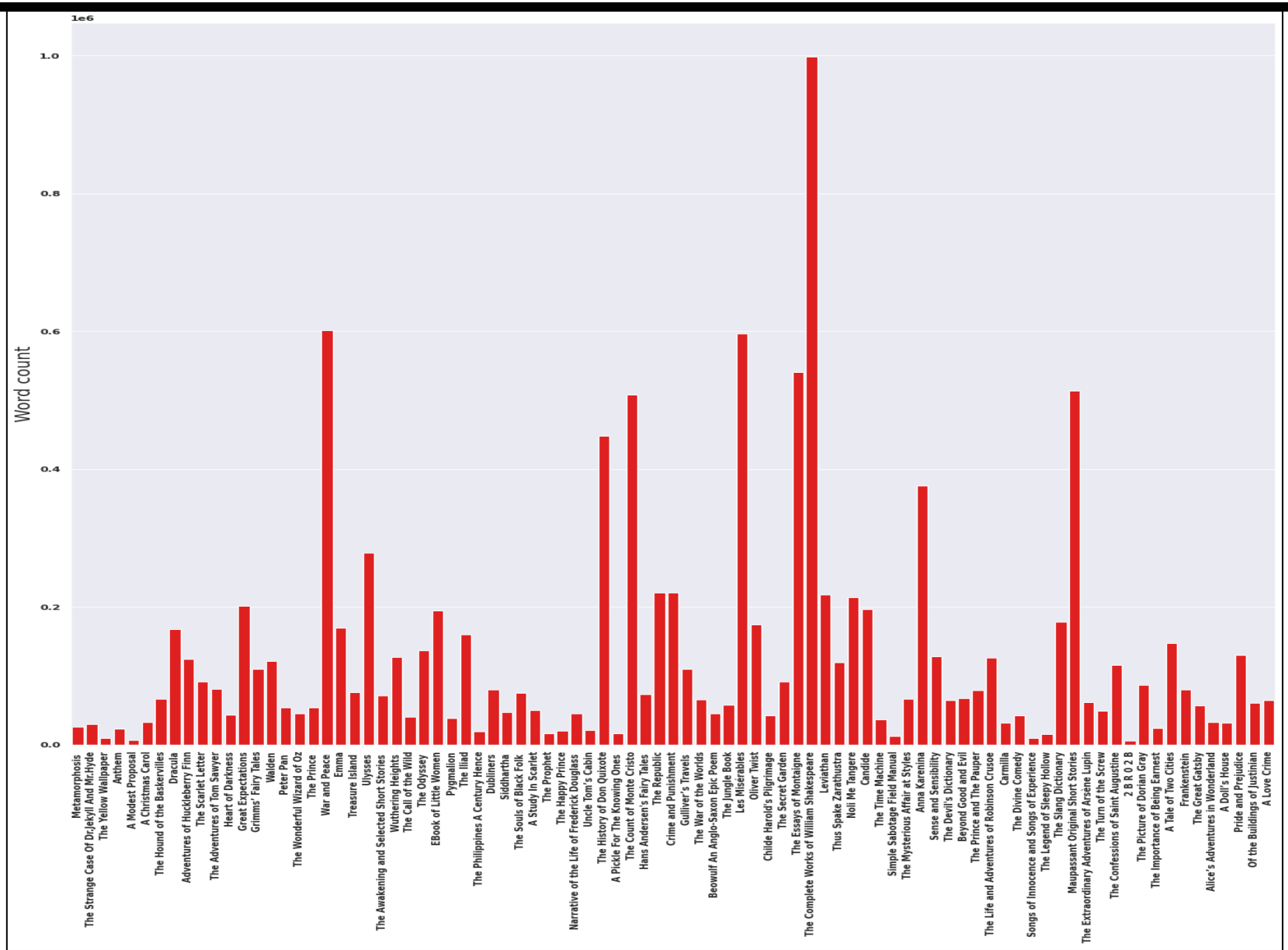
SUMMARY

- Creation of statistical models to provide book recommendations.
- Understand similarity and patterns as well as provide suggestions on similar books to readers
- <u>Existing approaches :</u>
  - One of the approaches towards development of statistical models for book recommendations involves the use of text sentiment analysis (aspect-based sentiment analysis).
  - Aspect level sentiment analysis is the most fine-grained analysis of reviews of texts or social media opinions with respect to specific aspects.
  - Existing published research studies use machine learning techniques such as artificial neural networks, Naïve Bayes classifiers, KNN etc.
- There is a need for better modeling of the sentiment and more accurate estimation of the overall sentence sentiment bearing words.

SUMMARY

- End user for the project :
  - Feature based or aspect-based sentiment analysis would be helpful to understand feedback and reviews from a website such as Goodreads.
  - Someone in the early stages of buying a book may look for opinions and reviews online. These snippets of texts could be a gold mine for companies/authors that would want to monitor their reputation as well as get real-time feedback about the products / texts
  - The direct beneficiaries of text sentiment analysis could be readers, marketing managers, public relations officials, authors of texts and online retailers.
  - Such an analysis for a book recommendation system may be transferrable to other problems to provide movie recommendations or music recommendations (not in current scope).
- Data sources :
  - Project Gutenberg – opensource access to eBooks, book reviews from Goodreads or online retailers
  - Requires being able to access large datasets, have reasonable access to representative data to perform good analysis and to understand how ratings of a book may vary depending on the genre.
  - Other data sources include reviews on manning.com etc., to process and run algorithms and large-scale computation as afforded by AWS.

EARLY RESULTS : WORD COUNT



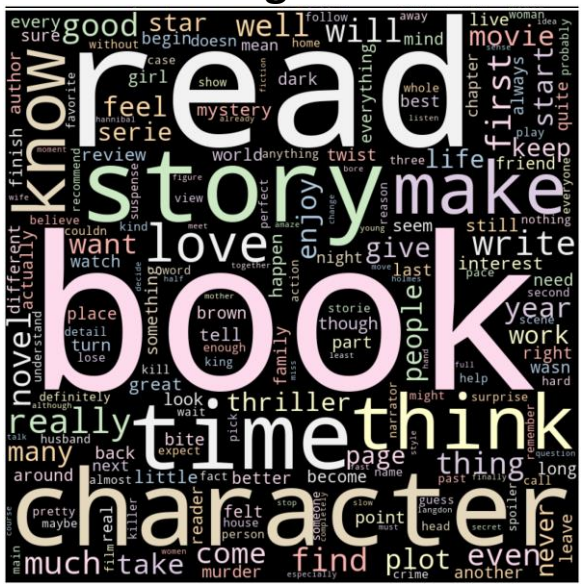
- Data from Gutenberg.org was analyzed to extract the word count of top 86 most downloaded books in the last 30 days.
- 40 MB of data (ASCII Text) was analyzed.
- As part of the analysis / cleaning up the data, BeautifulSoup for web scraping/parsing was used along with RegexpTokenizer.
- Further work is based on understanding correlation between rating or popularity of the book and the word count as well as frequency of words.

EARLY RESULTS (part of speech tagging)

Thriller genre

```
In [310]: print(book_reviews['review'])
0       \nI read this book due to the fact that everyo...
1       \nI just sent a 3 page, 3,000 word email about...
2       \nDepressing from start to finish. Most every ...
3       \n(A-) 83% | Very GoodNotes: It's about escapi...
4       \nHalf a "what the hell happened ?" star !! 20...
                              ...
8646    \nIt was very interesting and exciting to fina...
8647    \npersonally, this's the first time i read thi...
8648    \nFavorites: "A Scandal in Bohemia""A Case of ...
8649    \nThis includes 12 short stories, some of whic...
8650    \nThat's how I like my Sherlock Holmes stories...
Name: review, Length: 8651, dtype: object
```

Tag cloud



The girl with the dragon tattoo

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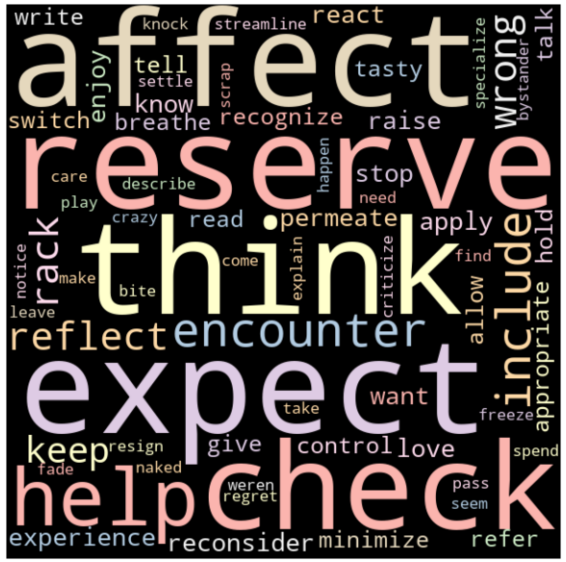
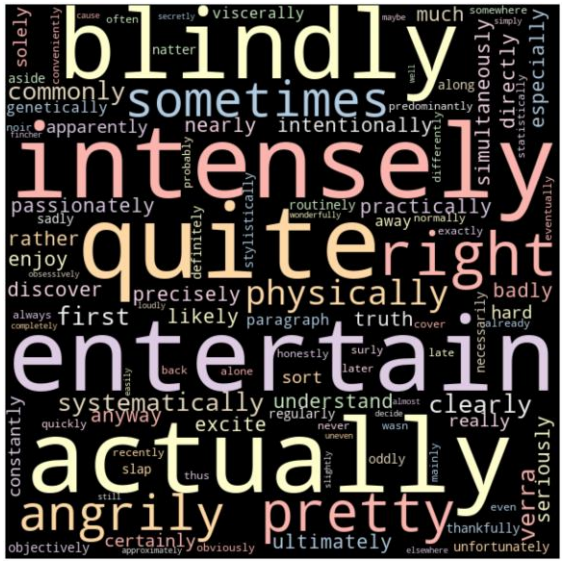
In [458]: print(book_reviews['review'])
0    \nSwedish people are nuts! I realize that’s a ...
1    \n(A) 85% | ExtraordinaryNotes: It's a logical...
2    \nWomen are raised to routinely fear rape.“If ...
3    \nAfter having leaped onto the bandwagon with ...
4    \nI HATED this book. I don't understand all of...
5    \nHe slapped her hard. Salander opened her eye...
6    \nThanks to the slew of Swedish and Hollywood ...
7    \nNordic noir of the highest order and very en...
8    \nThe Girl with the Dragon Tattoo ranks high a...
Name: review, dtype: object
```

Tag cloud (nltk pos tagger used to extract verb)



Tag cloud (nltk pos tagger used to extract adverb)



EARLY RESULTS (part of speech tagging)

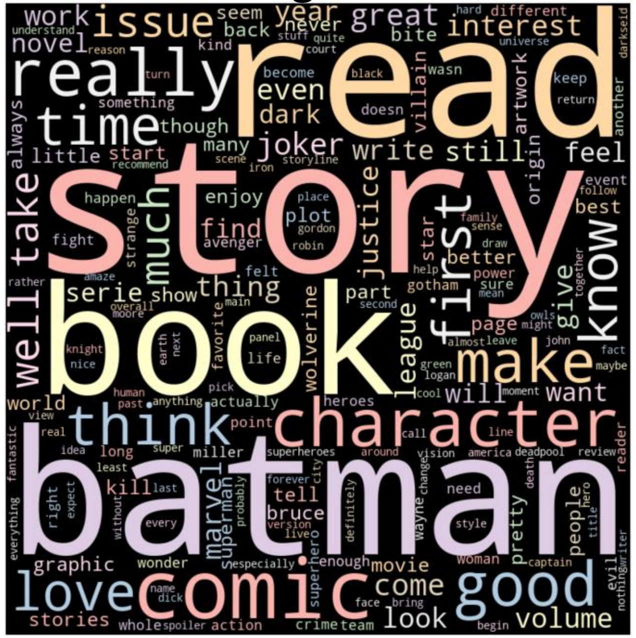
Comics

```
In [18]: print(book_reviews['review'])
0       \nTom King's Vision is literary sci-fi, dark a...
1       \nI don't usually review any of the series I f...
2       \n"I am the astro-creep, a demolition-style he...
3       \nHas the feel of a horror or thriller movie u...
4       \nA lot darker in nature than I thought, but a...
                              ...
3944    \nThis is a though provoking exploration of th...
3945    \nDNF @ like 45%I hated this so effing much. E...
3946    \nM an P are watching this ..... what a fab so...
3947    \nI thought I has already read this, fifteen o...
3948    \nI'm left speechless. Really enjoyed it mostl...
Name: review, Length: 3949, dtype: object
```

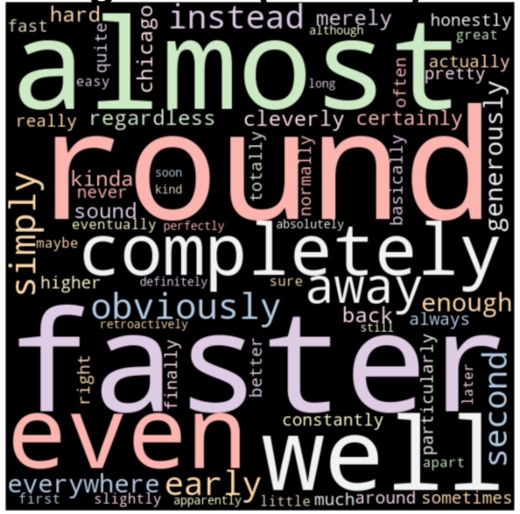
Avengers, Captain Marvel

```
6                        \nThis comic is very fantastic.\n
7     \n"Have you ever seen a little girl run so fas...
8     \nLike most comics, it just assumes you know w...
9     \nAWESOME! Love the crossover with Guardians o...
10    \nBullet Review:Wow, I apparently read this *1...
11    \nCaptain Marvel is kinda boring in my opinion...
12    \nWhat the hell did she need the Guardians of ...
13    \nCarol Danvers is badass and I can't wait to ...
14    \nDefinitely fun, but not really for beginners...
15    \nAww yeah. This was crazy fun and my first im...
16    \noverall 2.5 stars. in 32yrs iv read 8 comicb...
17    \nI'm embarrassed to say the first time I actu...
18    \nFirst time reading any Marvel graphic novels...
19    \nI honestly thought this was very cute with a...
20    \nIt's a free and short comic, so complaints a...
21    \nDon't know wether to laugh or cry with this ...
22                                        \n*yawn*\n
23    \nPoignant AnswersGreat for clarifying certain...
Name: review, dtype: object
```

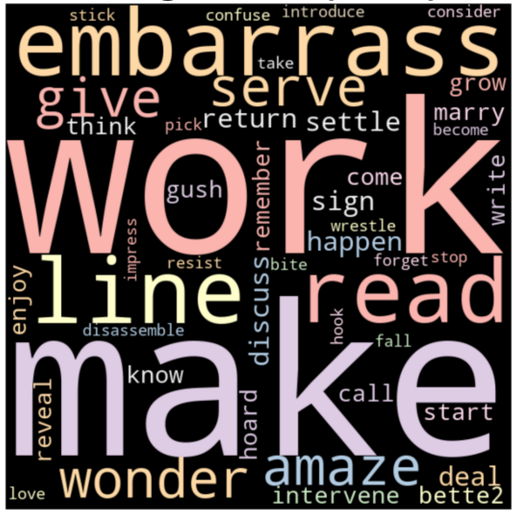
Tag cloud



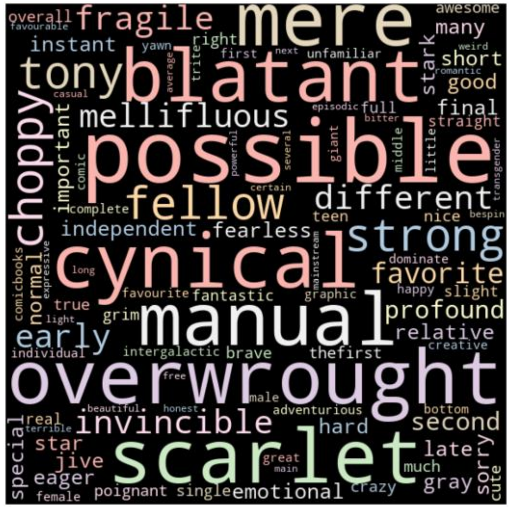
Tag cloud (adverb)



Tag cloud (verb)



Tag cloud (adjective)



Stanford pos tagger was used for the analysis

TAKEAWAYS

- This project proposes the use of text sentiment analysis to develop book recommendations.
- Existing approaches for sentiment analysis could be compared to better understand and quantify the accuracy as well as regression-based approaches could be explored as part of further work.
- The analysis will be helpful to understand how readers enjoy a book as well as determine their reaction, pick up on any aspects on sentiment or emotion that needs immediate attention, understand social impact of books.
- Continued analysis on user acceptance or A/B testing validation tools to understand possible improvement (to the application) could be explored.