Movie Review Sentiment Analysis Using Natural Language Processing

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IMDb

Goals

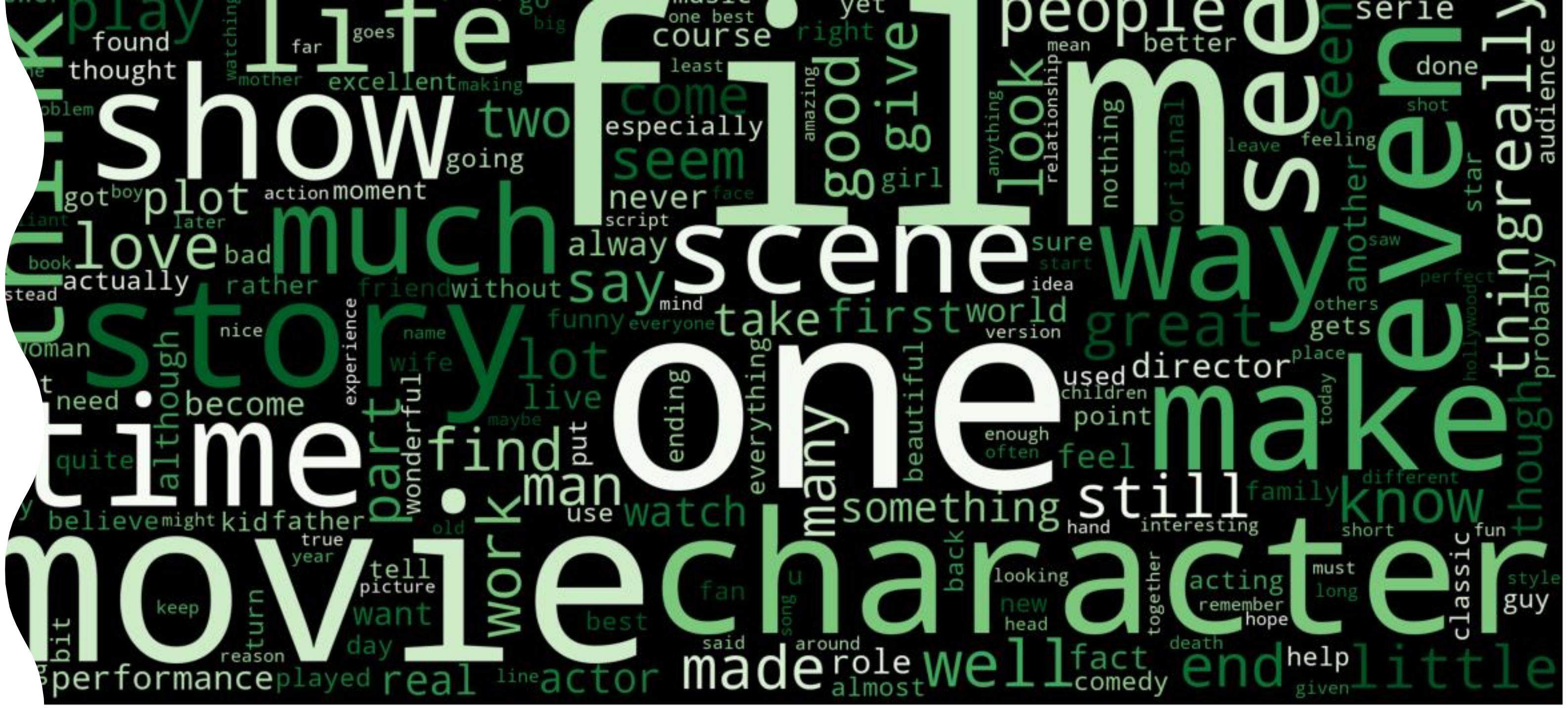
- Use Natural Language Processing (NLP) with machine learning models to classify IMDB user reviews as ‘Positive’ or ‘Negative’
- Understand how our model distinguishes between ‘Positive’ and ‘Negative’
- Explore alternative scoring system for movies based on sentiment analysis

Data

- Obtained 50,000 IMDB movie reviews
- Reviews are labeled ‘positive’ or ‘negative,’ and are considered “highly polar” reviews
  - 25,000 positive
  - 25,000 negative
- No associated movies or traditional 1-10 rankings were provided
- Model targeted ‘positive’ or ‘negative’ sentiment

Word Clouds

- **Positive** and **Negative**
- Other than color palette, difficult to distinguish

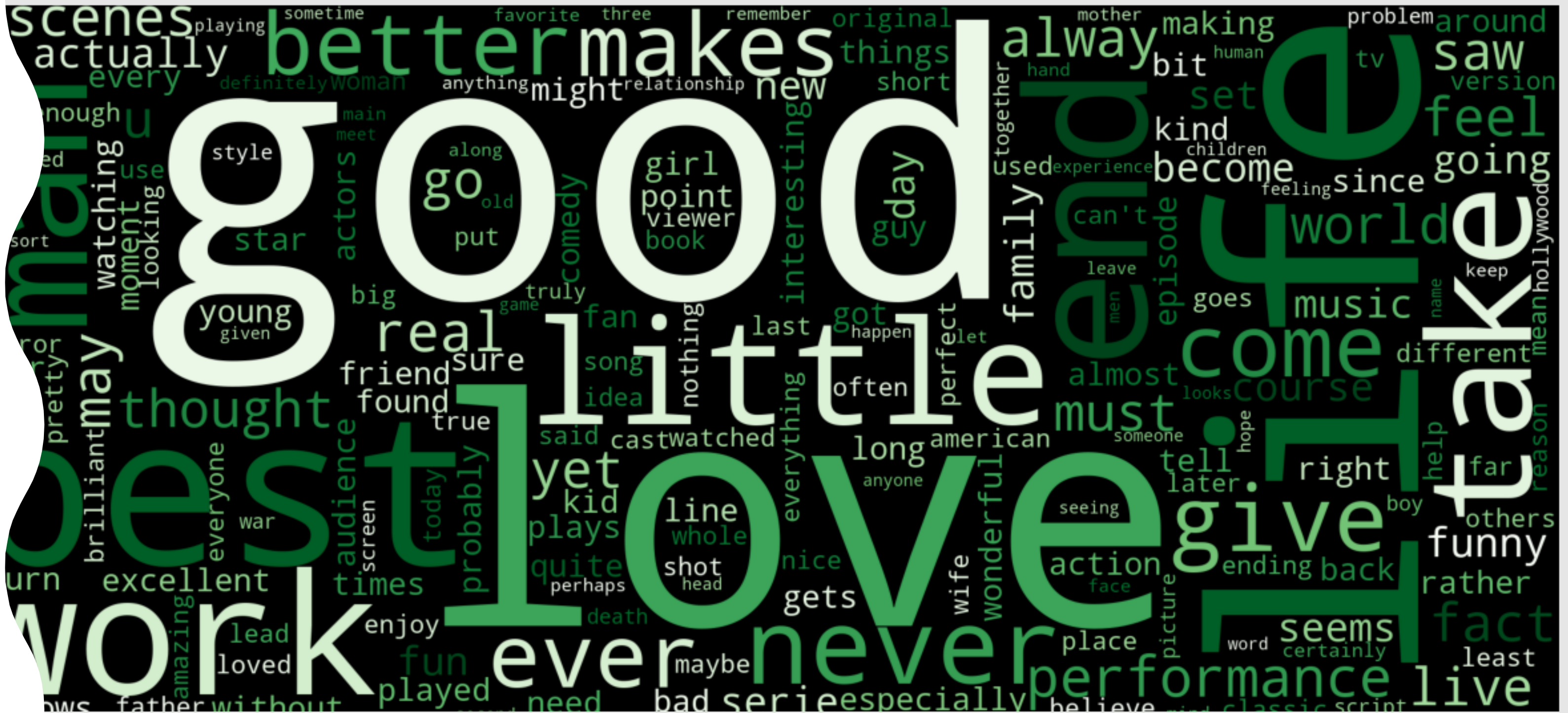


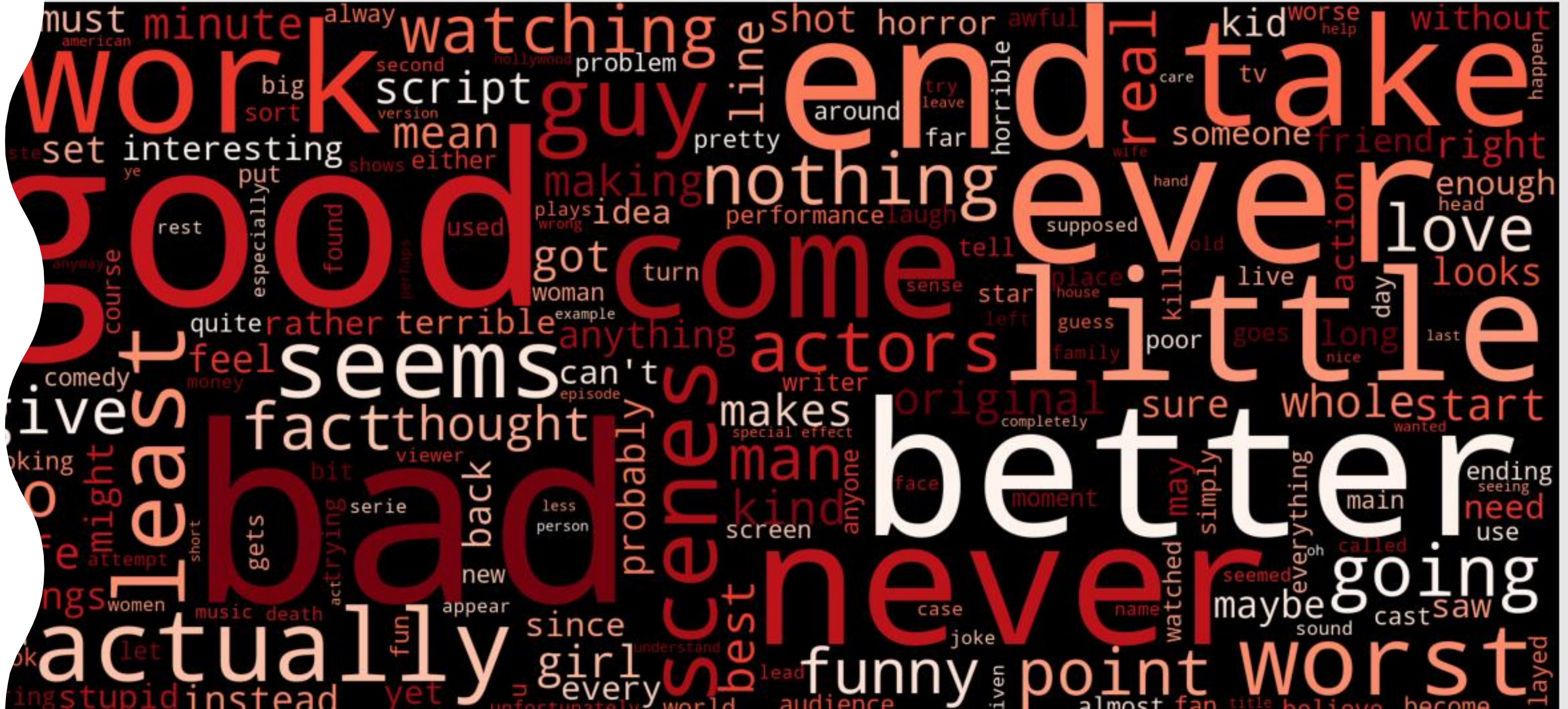
film
one
movie
character
even
show
story
time
scene
make
way
well
seem
think
look
see
plot
bad
people
good
really
take
director
actor
come
lot
little
end
watch
know
seen
going
find
say
life
great
something
thing
least
seem
first
work
though
instead
right
funny
original
start
probably
kind
mean
love
maybe
never
fact
script
another
actually
still
nothing

Word Clouds Pt. 2

Select frequent words removed

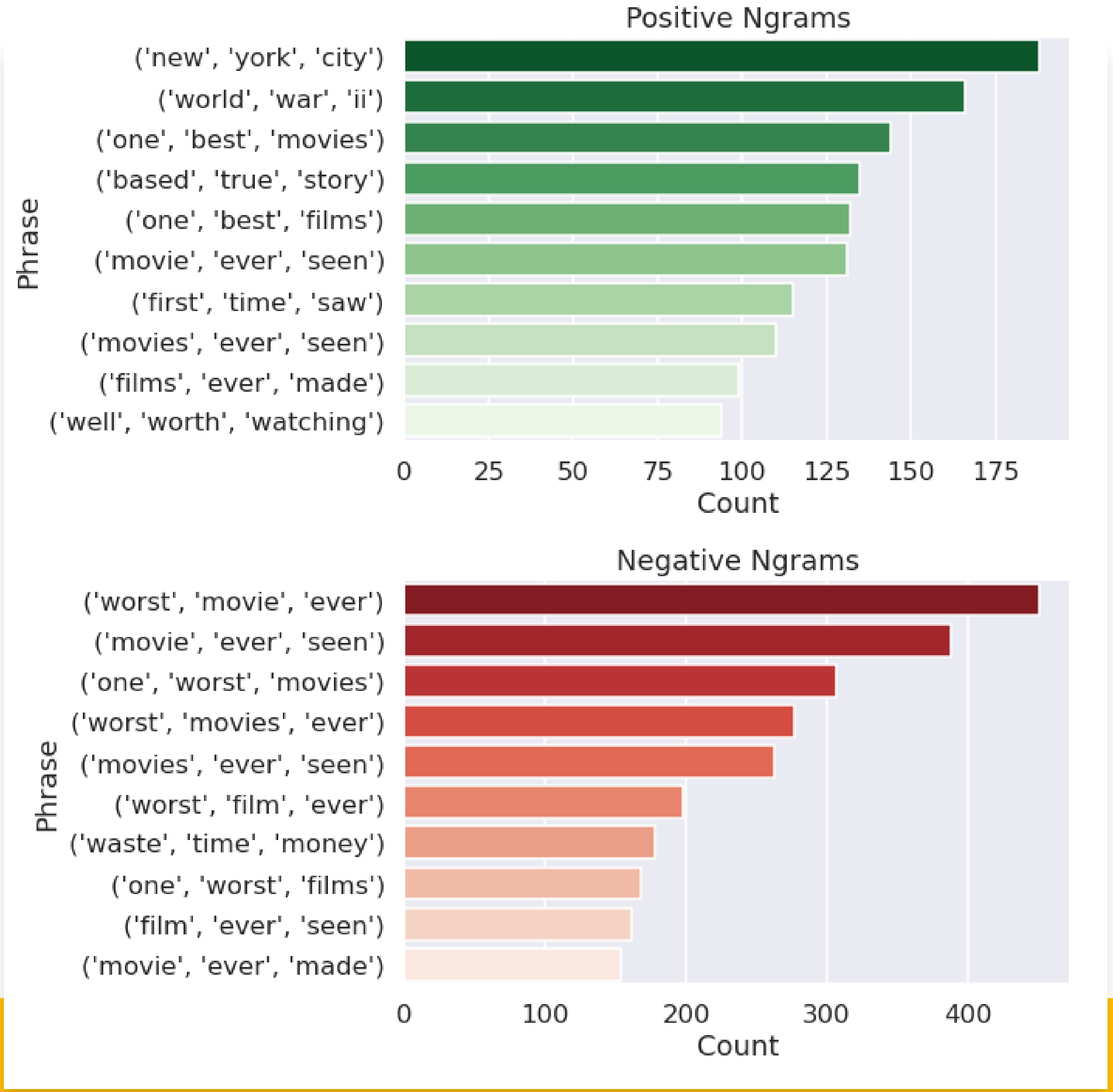
- **Positive** and **Negative**
- Much easier to distinguish
- ‘good’ is still a significant word in both positive and negative reviews, would be interesting to confirm what word comes before ‘good’ (i.e. ‘**not** good’)





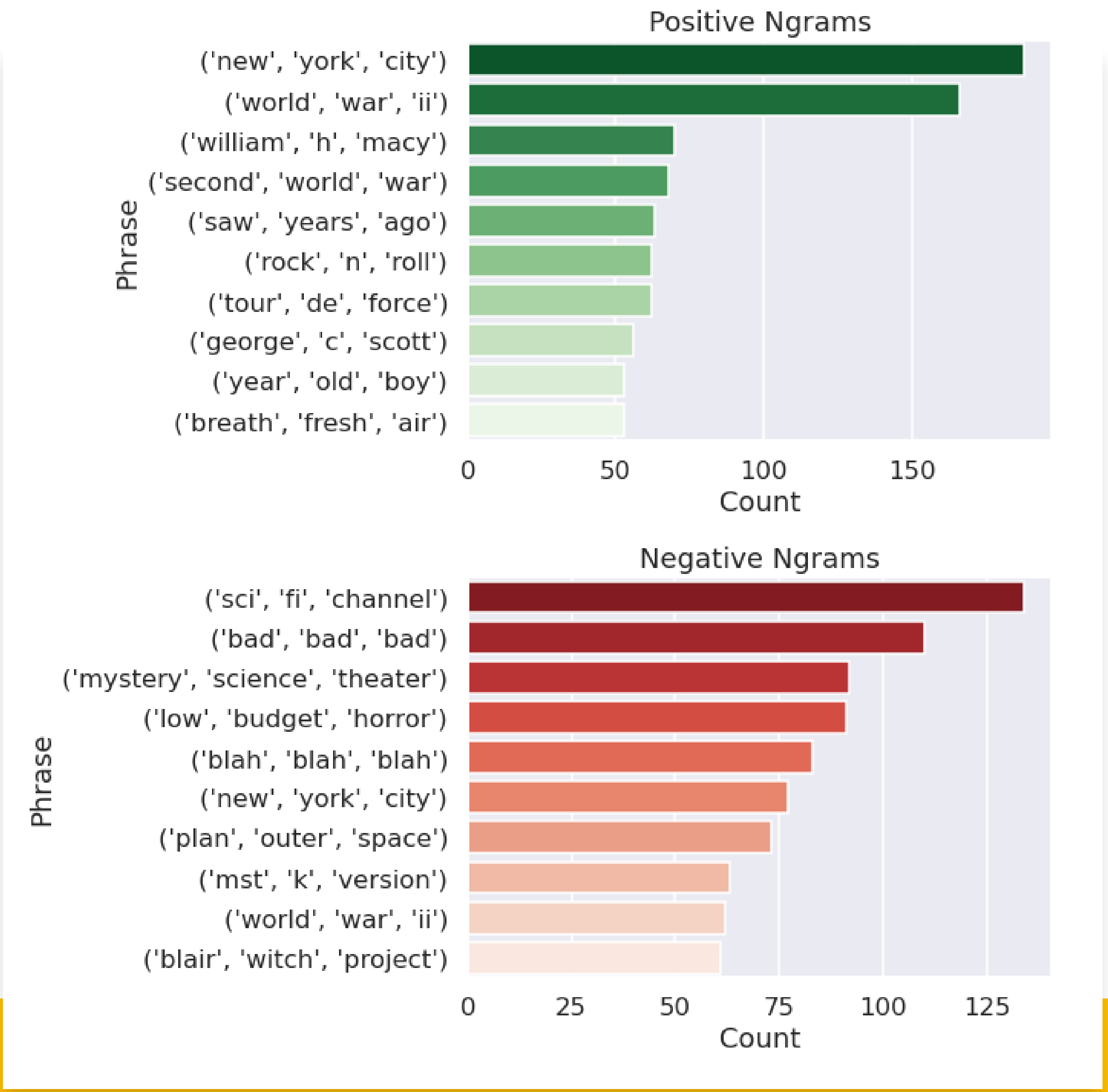
- **Trigrams**

- **Positive** and **Negative**
- Collection of three words that appear most commonly
- Generally superlative
  - "One best movies"
  - "Worst film ever"



- **Trigrams Pt. 2**

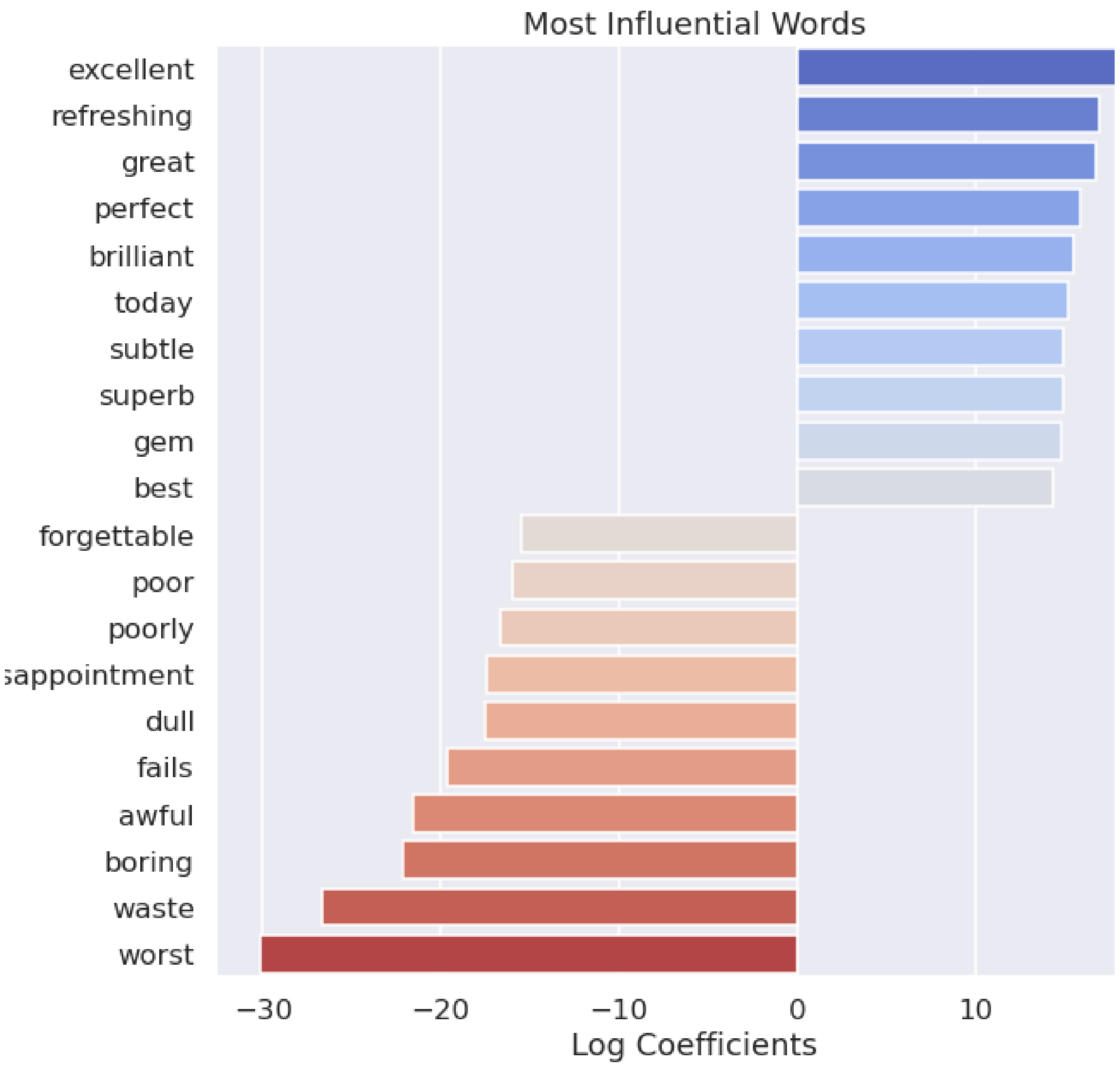
- Positive and Negative
- Same list of words removed from Word Clouds
- Results speak to unique skew of review dataset
  - “William H Macy”
  - “Mystery Science Theater”



- **Best Model: Linear Regression**

- Model Accuracy: **89.51%**

- **Coefficients:**
- Positive and Negative
- Words that influenced towards or away from classifying a review as ‘positive’
- Mostly strong positive or strong negative adjectives



Conclusions

Model depended on overtly positive or overtly negative adjectives

Review sentiment can be reasonably predicted with an accuracy of 89.5%

Recommendations

- Use ‘positive’ and ‘negative’ sentiment model to calculate new score for all movies in database
- Compile a new list of top 250 movies
- Compare user scored top 250 with top 250 as calculated by sentiment analysis
- Depending on results, release to public

Next Steps

- Experiment with different tokenizers, stop word lists, stemming, and lemmatization
- Reviews were added to dataset based on “highly polar” nature, quantify or qualify what this means
- Compile new dataset with buckets for multiclassification
  - Score of 1-3 / 10 = Negative
  - Score of 4-6 / 10 = Neutral
  - Score of 7-10 / 10 = Positive
- Explore alternative machine learning models
  - Support vector machines
  - K nearest neighbors
  - Deep learning / neural network models

Thanks for your time!

Please feel free to ask any questions.