Sentiment-STARity:

Evaluating Review-Score Consistency for Smarter Shopping

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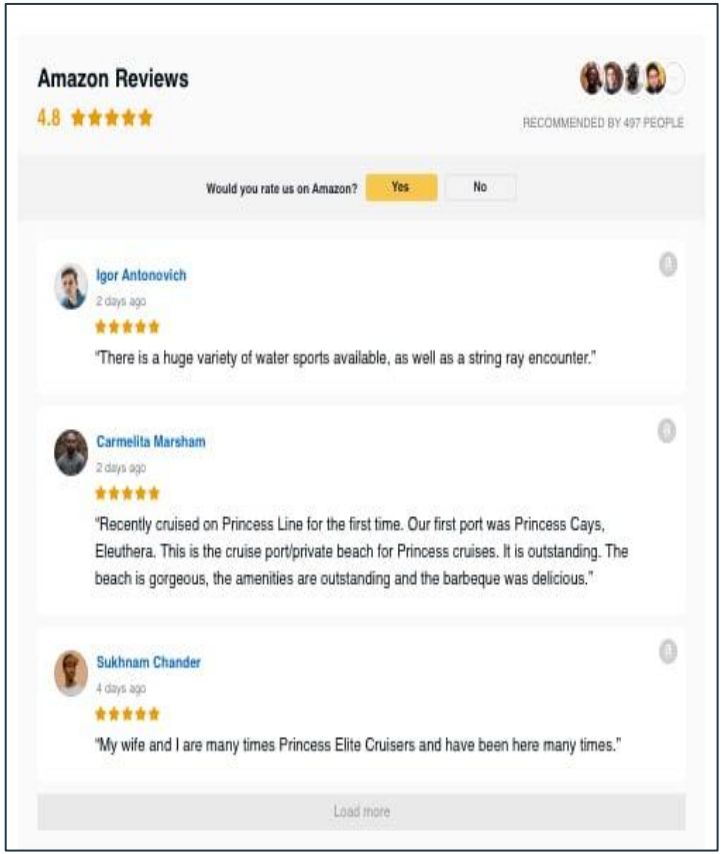
Introduction

- Customer reviews play a vital role in modern e-commerce, shaping purchasing decisions and providing valuable insights into product experiences.

- This study aims to explore the relationship between the sentiment expressed in customer reviews and the corresponding star ratings, evaluating how well they align with each other.



src: https://elfsight.com/amazon-reviews-widget/webflow/

Hypothesis

We hypothesize that higher star ratings will correlate with predominantly positive sentiment, while lower star ratings will align with predominantly negative sentiment.

Dataset

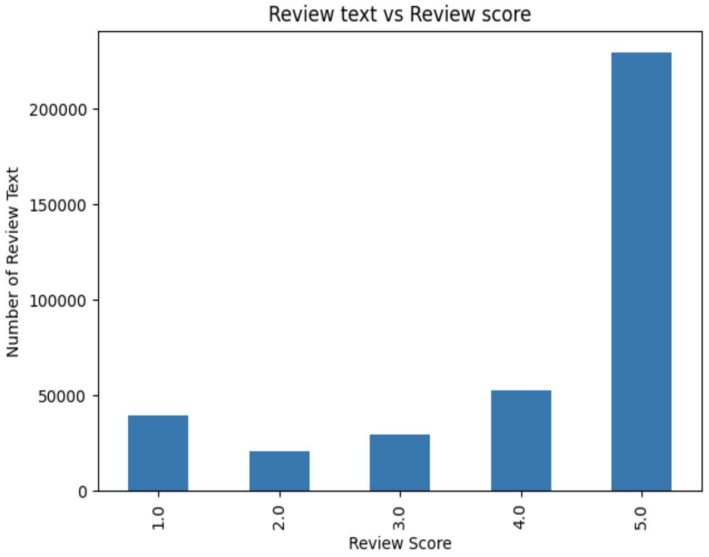
- Amazon Product review dataset [1]
- Size: 82.83 million unique reviews
- Timespan: May 1996 - July 2014
- Beauty Data: 371,345 reviews, 32,992 products
- Contains features:
    - overall, verified, reviewTime, reviewerID, asin, reviewerName, reviewTex', summary, unixReviewTime, vote, style, image

	overall	verified	reviewTime	reviewerID	asin	reviewerName	reviewText	summary	unixReviewTime	vote	st
0	1.0	True	02 19, 2015	A1V6B6TNIC10QE	0143026860	theodore j bigham	great	One Star	1424304000	NaN	N
1	4.0	True	12 18, 2014	A2F5GHSXFQ0W6J	0143026860	Mary K. Byke	My husband wanted to reading about the Negro ...	... to reading about the Negro Baseball and th...	1418860800	NaN	N
2	4.0	True	08 10, 2014	A1572GUYS7DGSR	0143026860	David G	This book was very informative, covering all a...	Worth the Read	1407628800	NaN	N
3	5.0	True	03 11, 2013	A1PSGLFK1NSVO	0143026860	TamB	I am already a baseball fan and knew a bit abo...	Good Read	1362960000	NaN	N
4	5.0	True	12 25, 2011	A6IKXKZMTKGSC	0143026860	shoecanary	This was a good story of the Black leagues. I ...	More than facts, a good story read!	1324771200	5	N

Methodology

In this model creation process we took the following steps:

- Data selection
- Exploratory Data Analysis
- Data Preprocessing
- Tokenization (using Spacy)
- Vocabulary Building
- Embedding (scikit learn)
- Model development (Logistic regression)
  - Training
  - Prediction
- Model Evaluation
  - automatic metrics
    - precision, recall, f1 and accuracy



Results

	precision	recall	f1-score
0	0.70	0.64	0.67
1	0.55	0.39	0.45
2	0.90	0.96	0.93
accuracy			0.84
macro avg	0.71	0.66	0.68
weighted avg	0.83	0.84	0.83

- Our model achieved an accuracy of 84% with a macro average f1 score of 68% on the test data

Conclusion

- In line with our first hypothesis, the model was able to predict the sentiment given unseen test reviews
- Used simple logistic regression model
- For future work:
    - We will investigate the hypothesis that certain words in reviews will contribute significantly to the overall sentiment prediction.
    - We will try to build a more sophisticated sentiment analysis model by exploring transfer learning

References

1. Amazon dataset: https://cseweb.ucsd.edu/~jmcauley/datasets/amazon_v2/
2. Twitter Sentiment Analysis Template: https://colab.research.google.com/github/NeuromatchAcademy/course-content-dl/blob/main/projects/NaturalLanguageProcessing/sentiment_analysis.ipynb
3. Literature:
    a. https://paperswithcode.com/paper/sentiment-analysis-based-on-deep-learning-a
    b. https://spacy.io/usage/linguistic-features