Amazon Review - Sumamrizer and Sentiment Analyser

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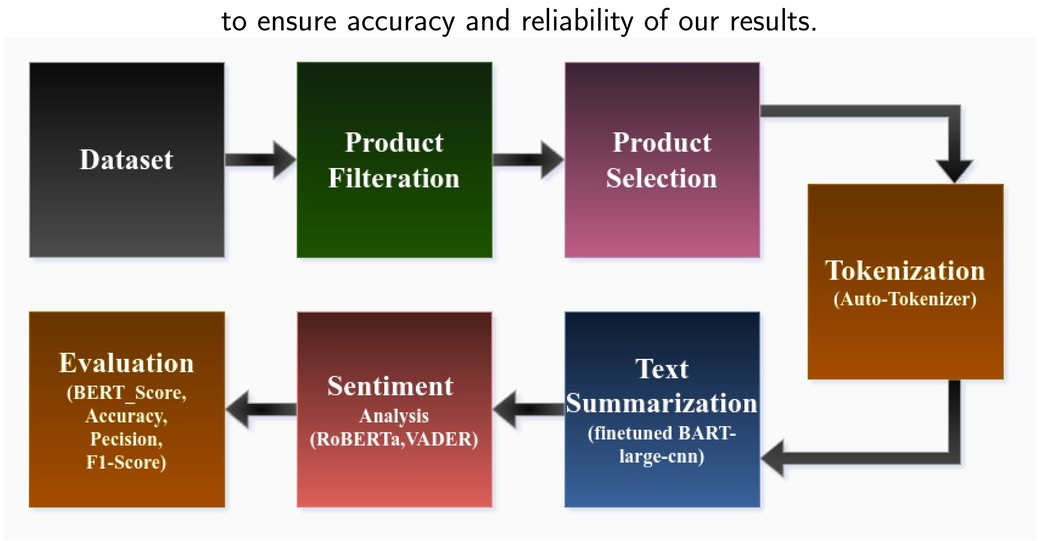
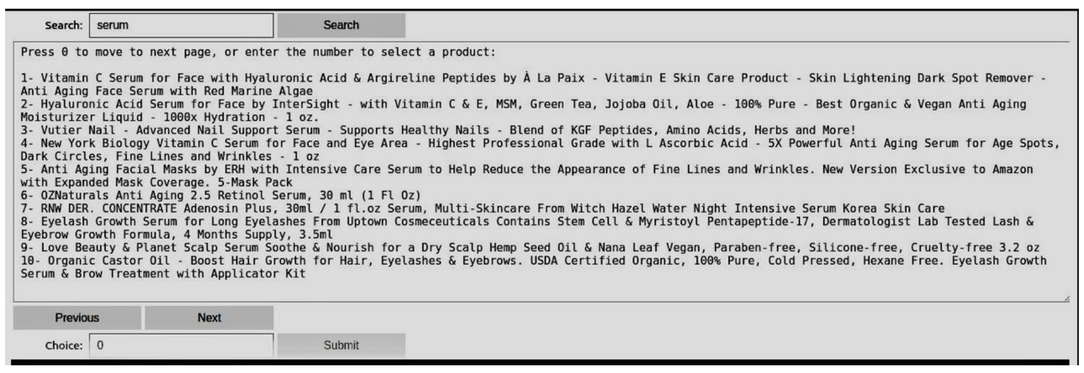
Introduction

In today's digital age, online reviews significantly influence consumer behavior and purchasing decisions. Amazon, as one of the largest e-commerce platforms, hosts a vast repository of user reviews that provide valuable insights into customer satisfaction and product quality. However, the sheer volume of these reviews can be overwhelming for buyers. Our project, "Amazon Review Analysis" aims to address this challenge by developing a text summarization and sentiment analysis model specifically tailored for Amazon reviews, focusing on "ALL BEAUTY" category. This dual approach provides concise summaries and captures overall sentiment, enabling users to quickly gauge product perception and understand key review points without sifting through extensive text. We employ fine-tuned BART-large-cnn model for text summarization and twitter-RoBERTa-base-sentiment model for sentiment analysis, with model evaluations conducted using Bert Score, precision, accuracy, and F1-score to ensure accuracy and reliability of our results.



Project Description

The Amazon Reviews dataset from McAuley Lab, encompasses (701528, 10) features like review text, ratings, and product metadata.An interface allows the users to filter and select a product. Selected products' reviews are combined and summarized, followed by sentiment analysis using RoBERTa to capture user sentiments, enhancing customer feedback understanding and decision-making for product selection.



Reviews of the product :
1.My granddaughter loved them
2.WOW great price.
3.I love this item so far, very cute of design, all colors are beautiful, the quality is great as well.I use it everyday,not too tie not too loose, it is perfect!
4.Cheap, one of the clips broke right away on the spot. And it tough on hair , it pulls hair, because the surface of the clips is not smooth
5.Bueno
6.So much prettier in person!! I love them! Simple clip and pin makes it easy to use.
7.Nice color and nice size
8.Very elegant and nice to wear to different events. The way it looks in the picture, is the same way it is. Very very nice. And it's sturdy as well, I dropped them and they stay together.
9.Adorable but hard to stay in the hair.
Positive Feedback: 98.82%
Neutral Feedback: 0.92%
Neutral Feedback: 0.26%
Summarized review : Adorable but hard to stay in the hair, it's a bit tough on hair, but worth the price. I love this item so far, very cute of design, all colors are beautiful, the quality is great as well. So much prettier in person

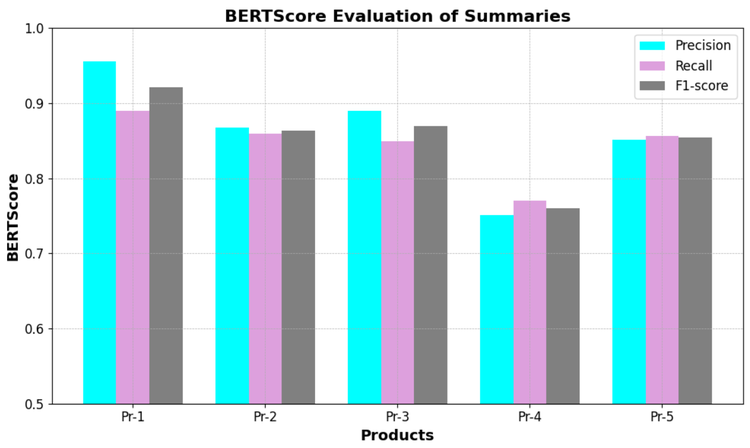
Methodology

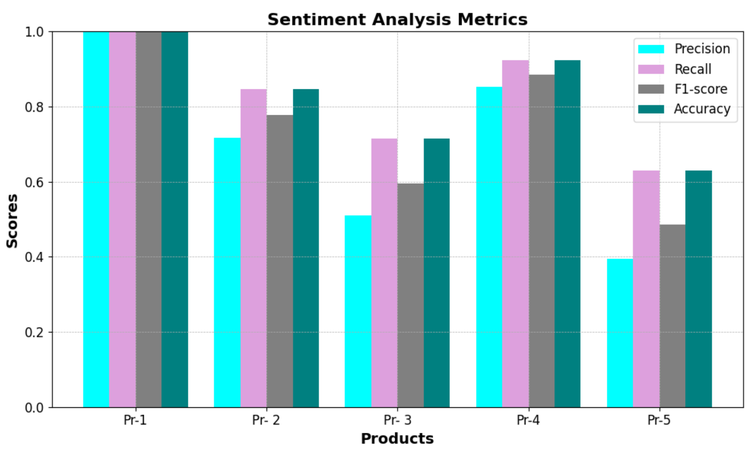
The methodology for this project begins with collecting reviews from the Amazon Reviews dataset.

- Initially, the data undergoes product filtration based on user-defined criteria through a user interface.
- After selecting the relevant products, the reviews are tokenized using an auto-tokenizer to prepare the text for further analysis.
- Next, text summarization is performed using the BART model to generate concise summaries of the reviews.
- These summaries serve as input for sentiment analysis.
- A comparative analysis is conducted on two different models: RoBERTa, a transformer-based model, and VADER, a rule-based sentiment analysis tool.
- The efficiency of these sentiment analysers is compared.After comparison, the RoBERTa model seems more efficient for this use case scenario.
- The output from the RoBERTa model give us three sentiment:
  - Positive Feedback,Negative Feedback and Neutral Feedback.
- Overall model performance is evaluated using metrics such as BERT Score, accuracy, precision, and F1 score to ensure the accuracy and reliability of the analysis.
- This comprehensive methodology enables effective review summarization and sentiment evaluation, providing users with valuable insights.

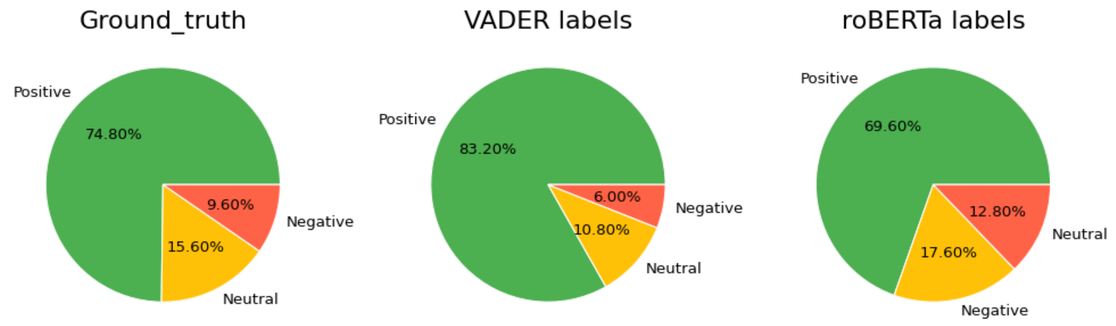
Evaluation

Evaluating the models is crucial for this project. The BART model for text summarization is assessed using the BERT Score, while the RoBERTa model is evaluated with performance metrics like accuracy, precision, and F1 score, alongside specific examples.





Upon comparing the results for effectiveness of VADER and RoBERTa model, the RoBERTa model is choosed based on the below piecharts.



This evaluation provides insights into the models' effectiveness in summarizing reviews concisely and accurately predicting their sentiments.

References

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[2] Ayham Alomari, Norisma Idris, Aznul Qalid Md Sabri, and Izzat Alsmadi. Deep reinforcement and transfer learning for abstractive text summarization: A review. *Computer Speech & Language*, 71:101276, 2022.

Acknowledgement

We'd like to express our heartfelt gratitude to Prof. Dr. Jörn Hees and Tim Metzler for providing us with the opportunity to work on this project. It aided us in conducting extensive research and learning more about NLP.

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