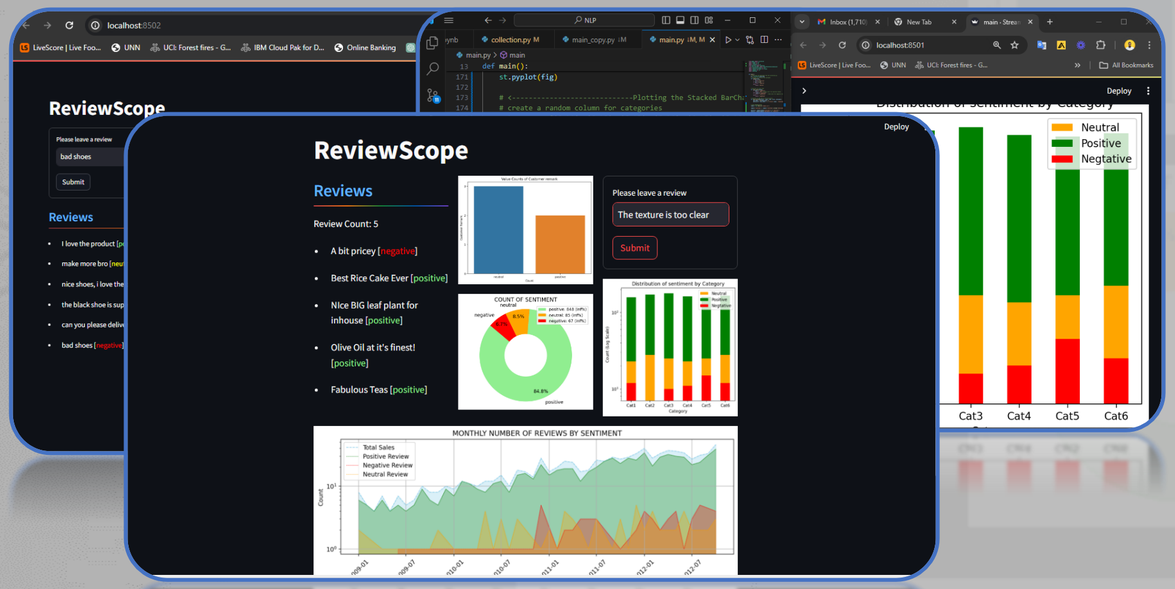
ReviewScope

VADERS vs Roberta in Sentiment Analysis



Comparison of Sentiment Models

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VADER:
(Valence Aware Dictionary and sEntiment Reasoner)

- Lexicon-based approach
- Fast and lightweight
- Well-suited for short texts
- Easy to understand sentiment scores

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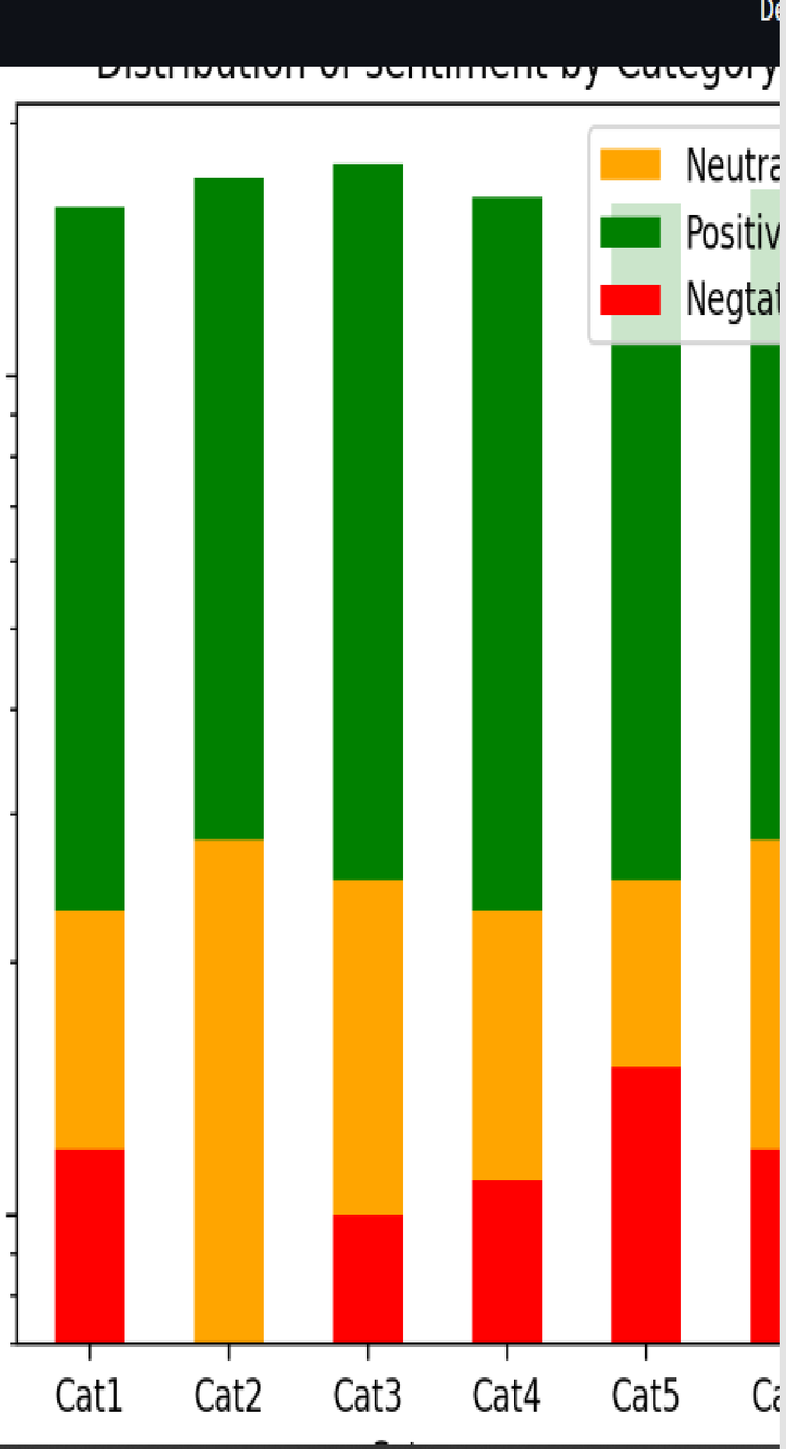
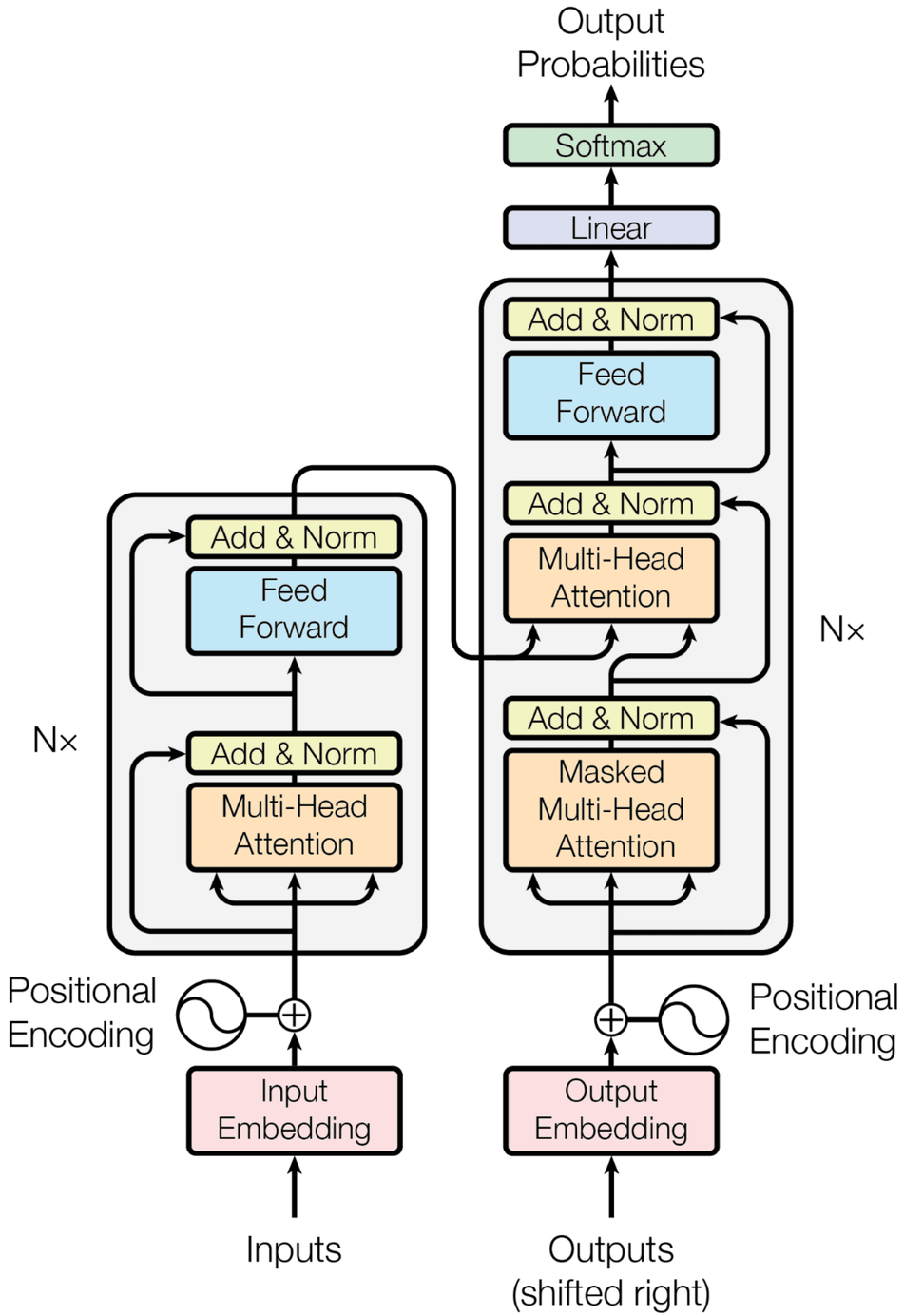


VADER is a lexicon-based sentiment analysis tool. It analyzes text by referencing a dictionary of words with assigned sentiment scores.

For example, the word "happy" might have a positive score, while the word "sad" might have a negative score. VADER then analyzes the text and assigns a sentiment score based on the words it finds.

This simplicity makes VADER a good choice for analyzing large volumes of short customer reviews, where a quick overview of sentiment is needed.



RoBERTa:

(Robustly Optimized BERT Pretraining Approach)

Deep learning approach

More accurate

Understands context and sarcasms better

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RoBERTa is a transformer-based deep learning model, an improvement over BERT and is designed to enhance BERT's performance by optimizing its pre-training process.

In developing **ReviewScope**, we utilize the **“cardiffnlp/twitter-roberta-base-sentiment”** model from Hugging Face to classify the sentiment of customer reviews on products. The model's weights, obtained through transfer learning, are applied to our use-case dataset to extract sentiment.

Performance Evaluation

Feature Extraction:

Utilized sentiment probabilities from RoBERTa and VADER, including:

- Probability of the review being positive
- Probability of the review being neutral
- Probability of the review being negative

Model Training:

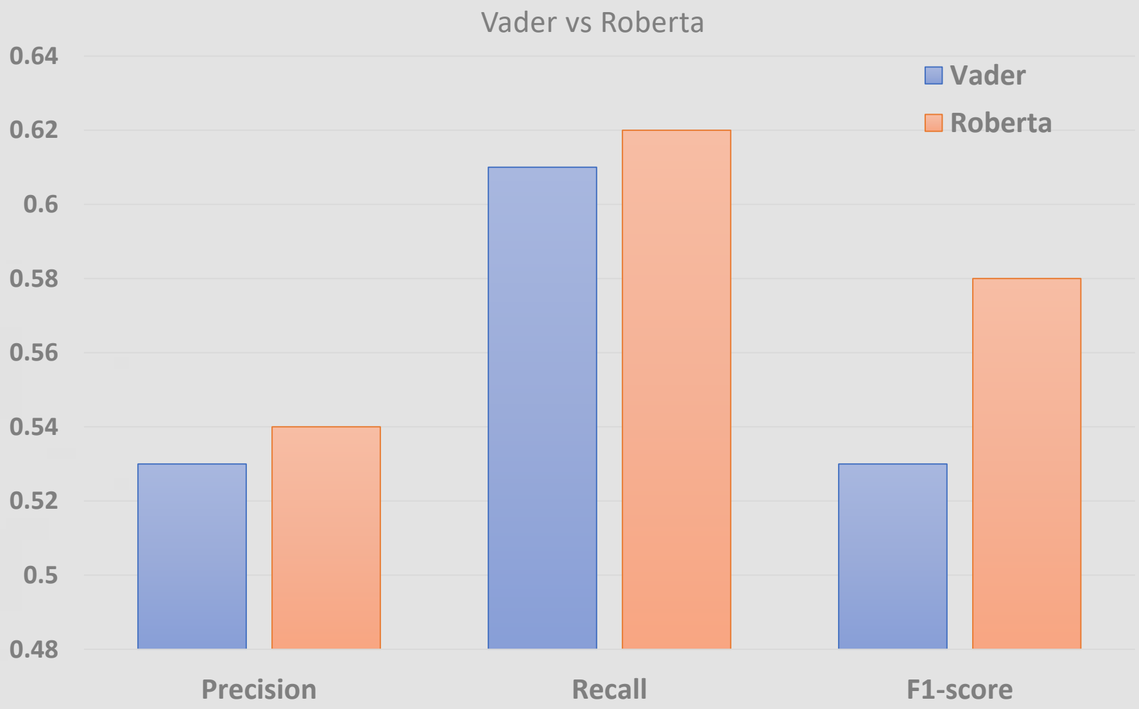
•Trained a RandomForestClassifier with sentiment probabilities as features and actual star ratings as labels.

•Conducted data split for training and testing to assess model performance.

Evaluation:

•Assessed the model using metrics like precision, recall, and F1 score.

Performance Evaluation



Metric	Vader	Roberta
Precision	0.53	0.54
Recall	0.61	0.62
F1-score	0.53	0.58

Highlights:

Precision: RoBERTa has higher precision, meaning fewer false positives.

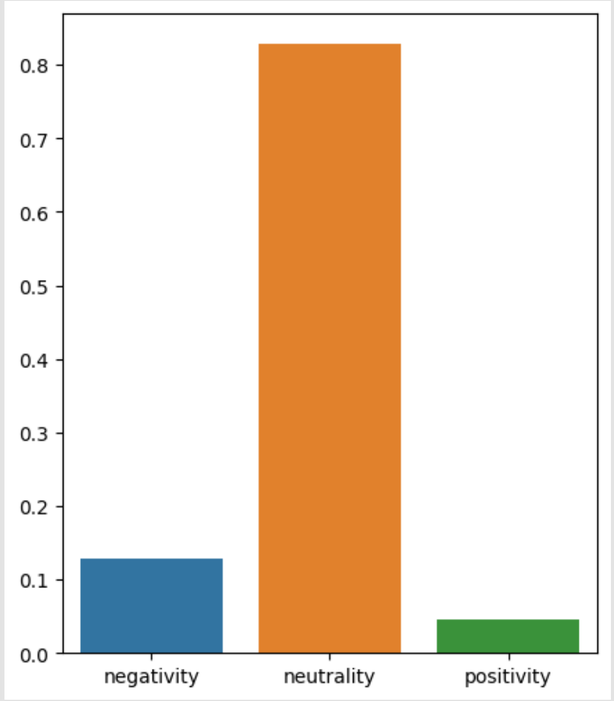
Recall: RoBERTa achieves better recall, capturing more relevant sentiments with fewer false negatives.

F1 Score: RoBERTa's F1 score is higher, indicating a balanced and superior performance overall.

Performance Evaluation

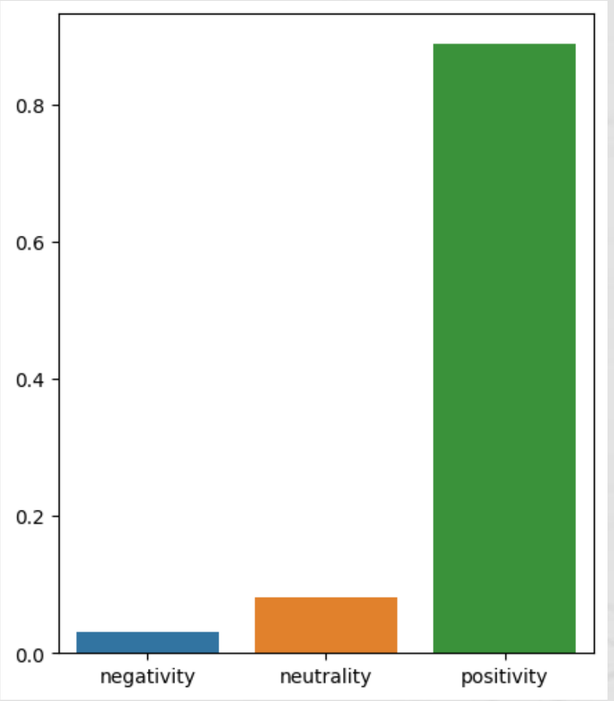
Use Case

VADER



> ***“ With the possible exception of their Fire Roasted Chipotle Salsa (I can't really taste a significant difference), this is the best salsa out there, in my opinion. There are plenty that are less-costly but if cost is no object, this is the real deal ”***

RoBERTa



The VADER model classified the review as more neutral or negative, while RoBERTa assigned a high positivity score, accurately reflecting the review's true sentiment.

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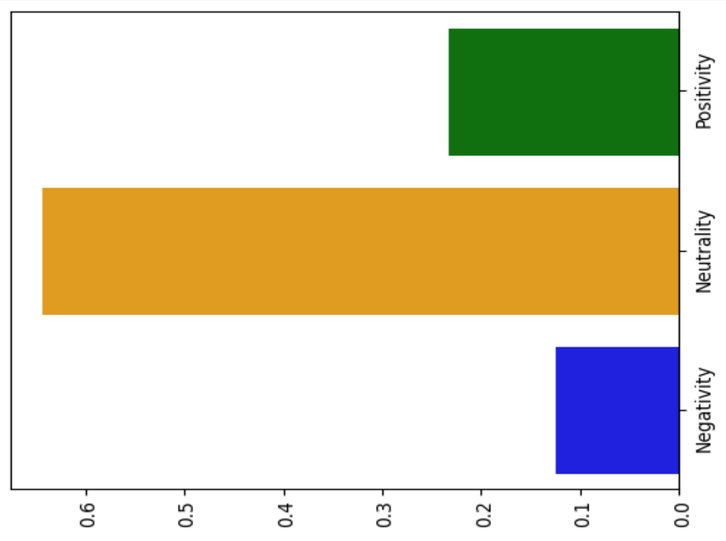
Performance Evaluation

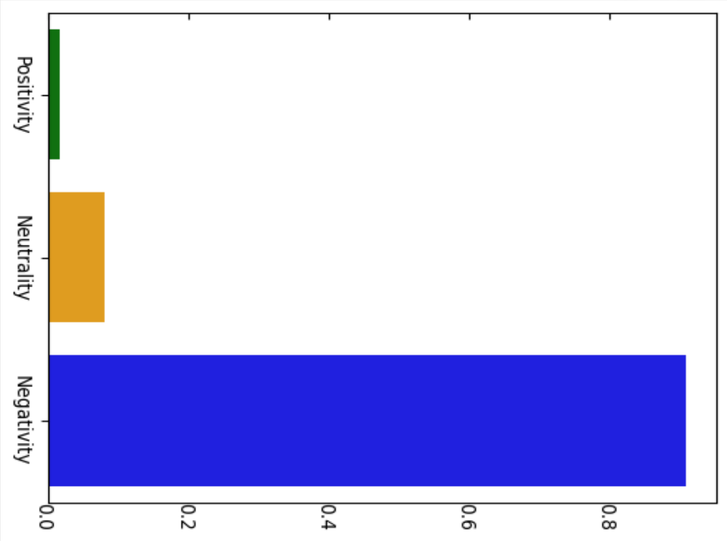
Use Case

VADER



> ***"I was definitely expecting a better product from earth's best. However, these biscuits were not good at all. My son who only has 2 teeth broke these very easily. I will not be buying them again."***

RoBERTa



The VADER model classified the review as more neutral or positive, whereas RoBERTa assigned a high negativity score, accurately reflecting the review's true negative sentiment.

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Conclusion and Recommendations

In summary, the RoBERTa model exhibits a superior performance in sentiment analysis, making it a more reliable and accurate tool compared to VADER. This is especially crucial for applications requiring detailed and context-aware sentiment understanding.

1

Continuous Improvement

Regularly evaluate and fine-tune the sentiment analysis approach to ensure optimal performance.

2

Explore Hybrid Approaches

Considering combining the strengths of different models to create a more robust solution.

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