

EMOTIONS AND SENTIMENTS

DETECTION

OUR TEAM

Eng. Ahmed Wahba
Eng. Manar El-beltagy



INTRODUCTION

- Social media platforms are a rich source of opinions and sentiments.
- YouTube, Rich with powerful potential user base, provides diverse comments reflecting people's views.
- This project focuses on analyzing the emotional sentiment behind text-based YouTube and Twitter comments.

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The Missing Chums

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PROBLEM STATEMENT

- People post comments freely, but it's hard to understand general sentiment manually.
- We aim to automatically detect sentiment (positive, negative) in YouTube comments or Tweets.

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Literature Review



Year	Author(s)	Focus
2024	Badawood & Aldosari	Real-time multilingual emotion (CNN+Transformer)
2023	Alluhaidan et al.	CNN-based hybrid features for speech emotion
2021	Mohamed & Aly	Emotion detection in Arabic using Wav2vec2.0
2021	Alreshidi et al.	Voice emotion detection for mental health
2020	Gulati et al.	Conformer: CNN + Transformer for speech
2020	Araque et al.	Classical models (NB, LR) with TF-IDF
2019	Devlin et al.	BERT for context-aware text classification



WHAT'S NEW IN THIS PROJECT

- Instead of working with pre-cleaned datasets, we did full end-to-end preprocessing.
- Tried multiple models with lightweight and evaluated them side-by-side
- simpler and faster pipeline that fits our project scope and dataset size.
- This helped us stay efficient while achieving high accuracy.

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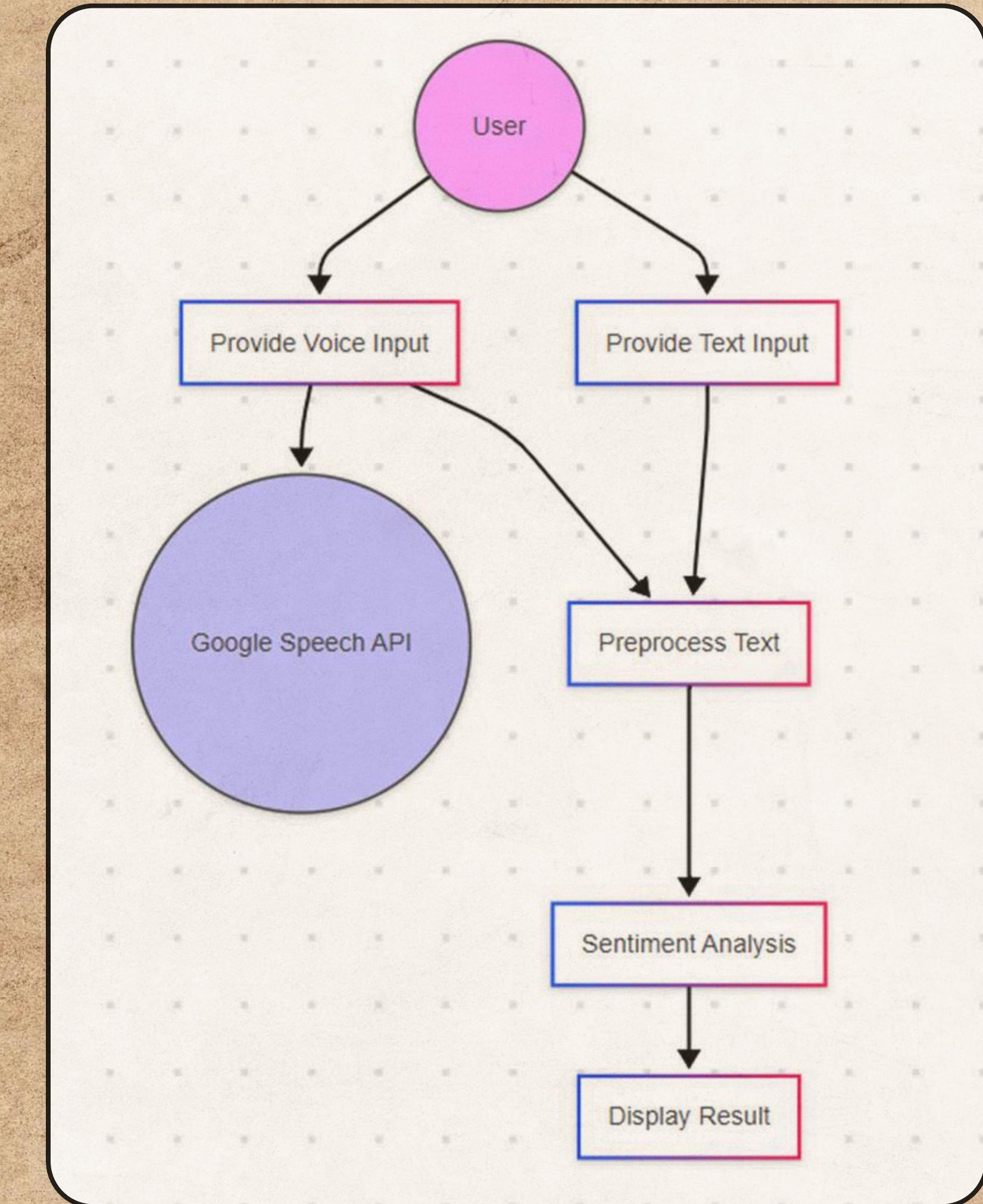
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UseCase Diagram:





Project objective

- Extract text comments from YouTube and twitter.
- Clean and preprocess the text for machine learning.
- Convert text to numerical data using TF-IDF.
- Apply multiple ML models to detect sentiment.
- Compare model performance.

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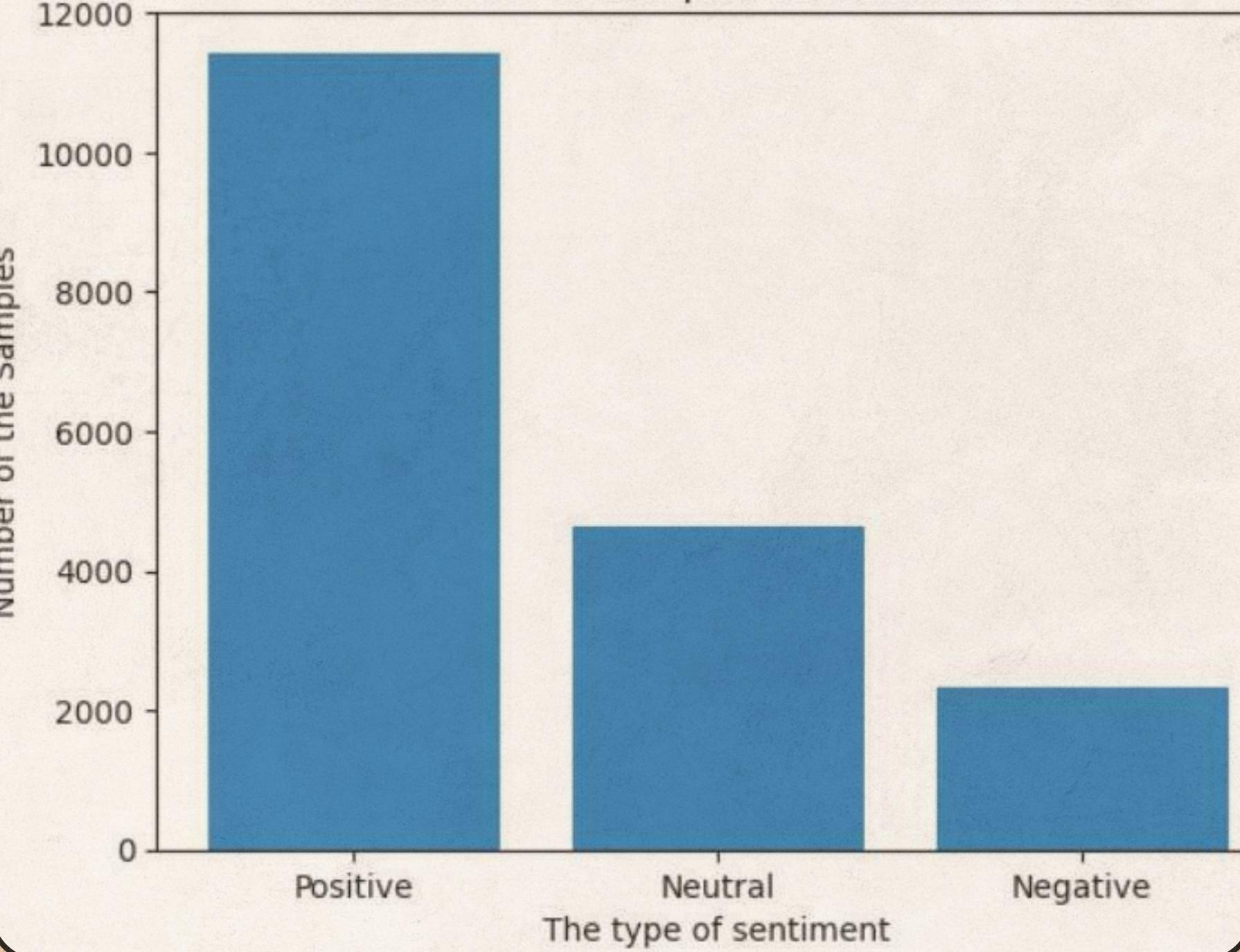
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DATASET

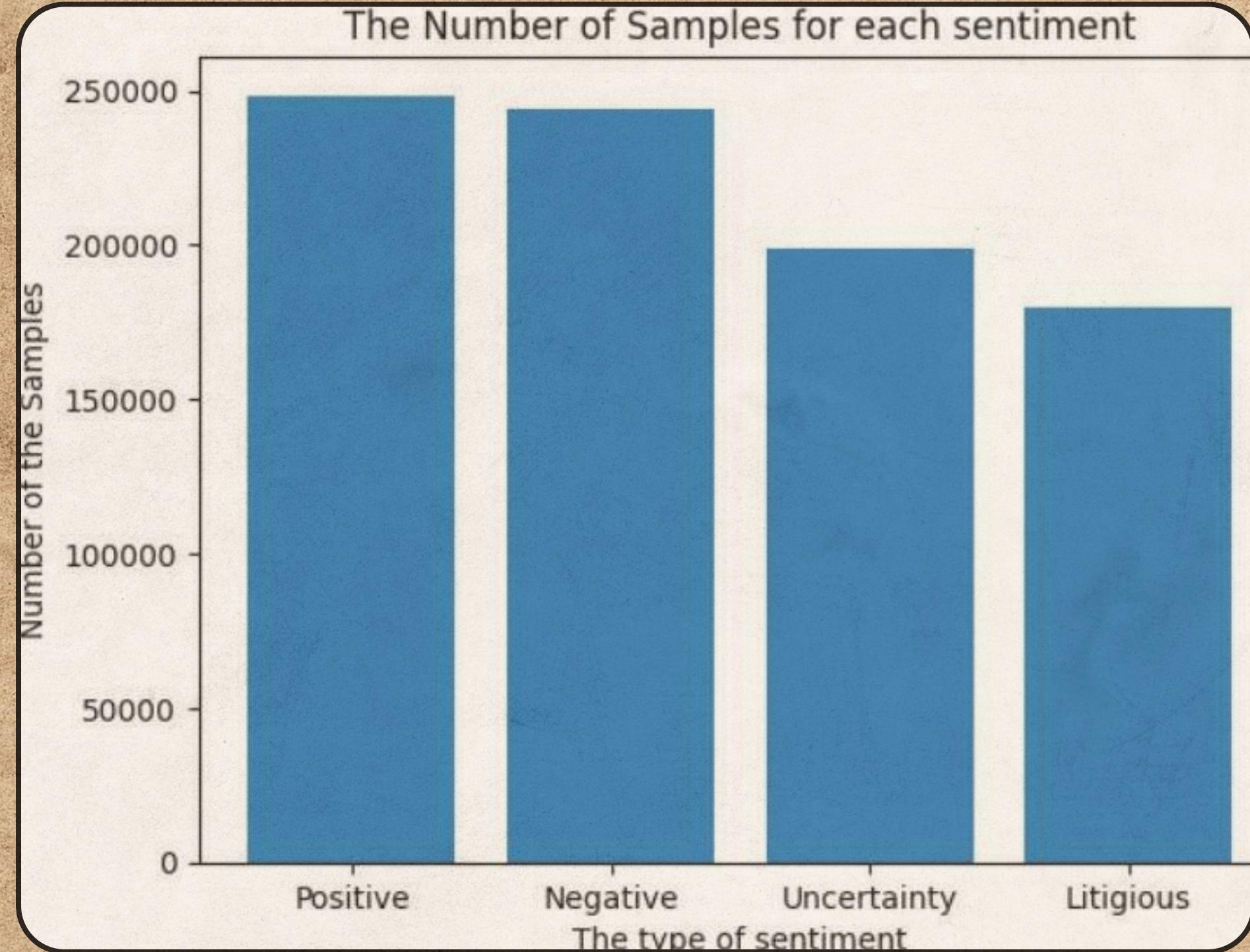
- The datasets contain labeled YouTube and Twitter comments.
- Each comment is tagged with a sentiment: positive, negative, or neutral.
- Additional preprocessing was required due to noise in real-world comment

The Number of Samples for each sentiment



YouTupe DS.

The Number of Samples for each sentiment



Twitter DS.

PREPROCESSING STEPS

1. Lowercasing
2. Removing punctuation
3. Removing stopwords
4. Tokenization
5. Lemmatization using NLTK
6. Converting text to TF-IDF vectors for modeling

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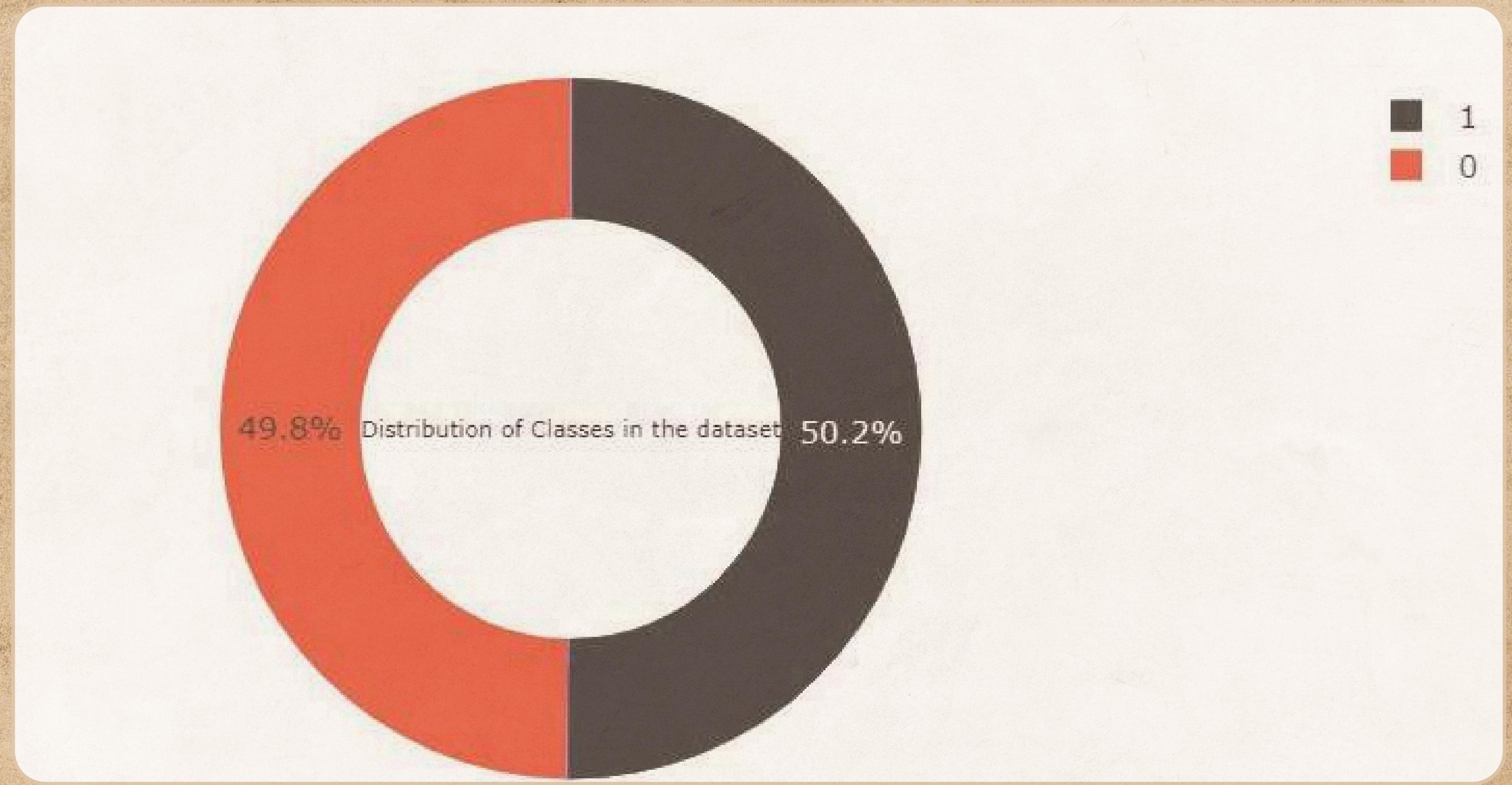
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ocean.



Looks like the Dataset is **BALANCED** so, NOW
WE READY TO THE NEXT STAGE

MACHINE LEARNING MODELS USED

- Random Forest
- Logistic Regression
- Multinomial Naive Bayes
- Decision Tree
- Support Vector Machine (SVM)

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MODEL EVALUATION METRICS

- Accuracy
- Precision
- Recall
- F1-Score

These metrics help evaluate model effectiveness on training data.

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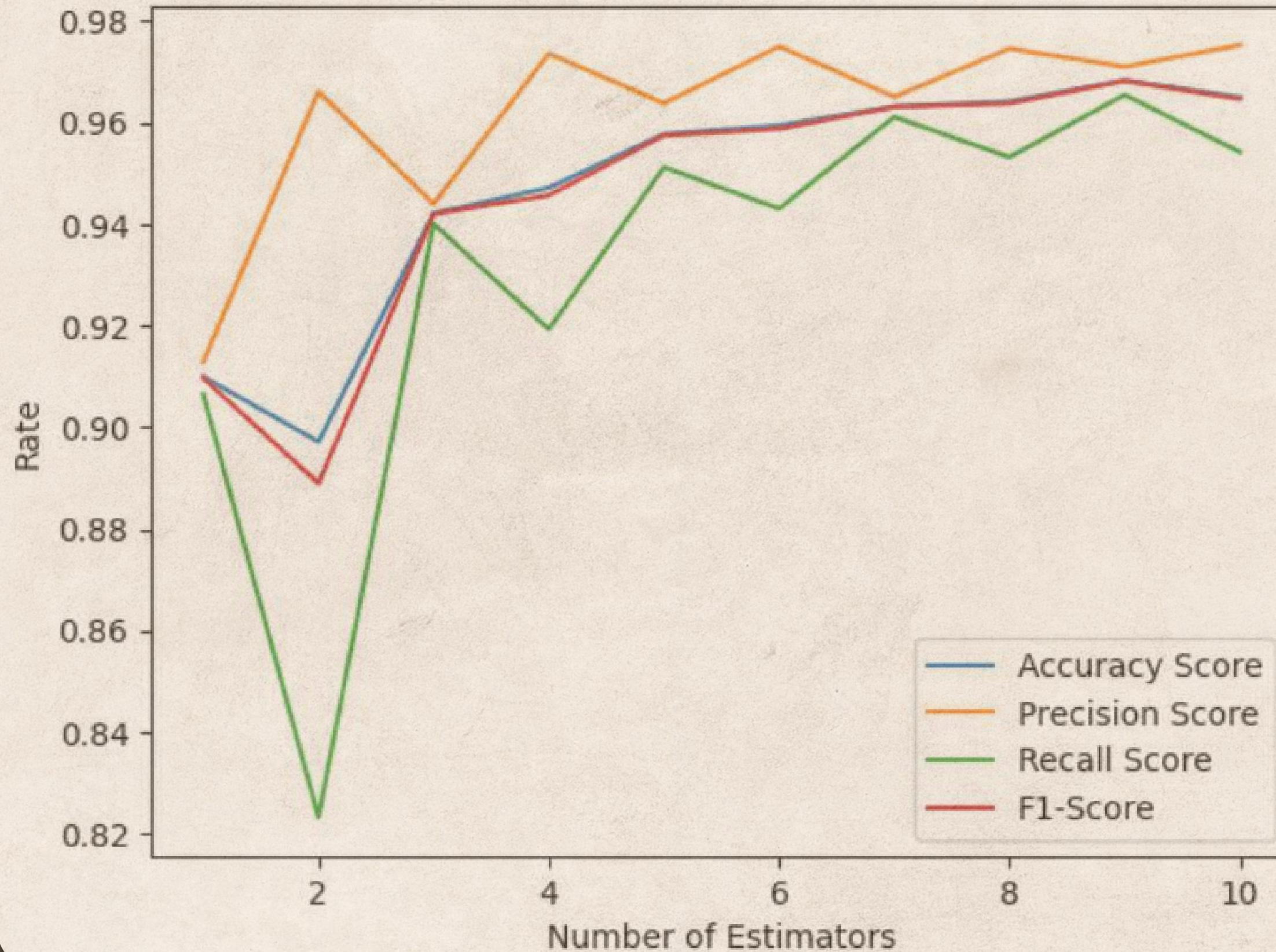
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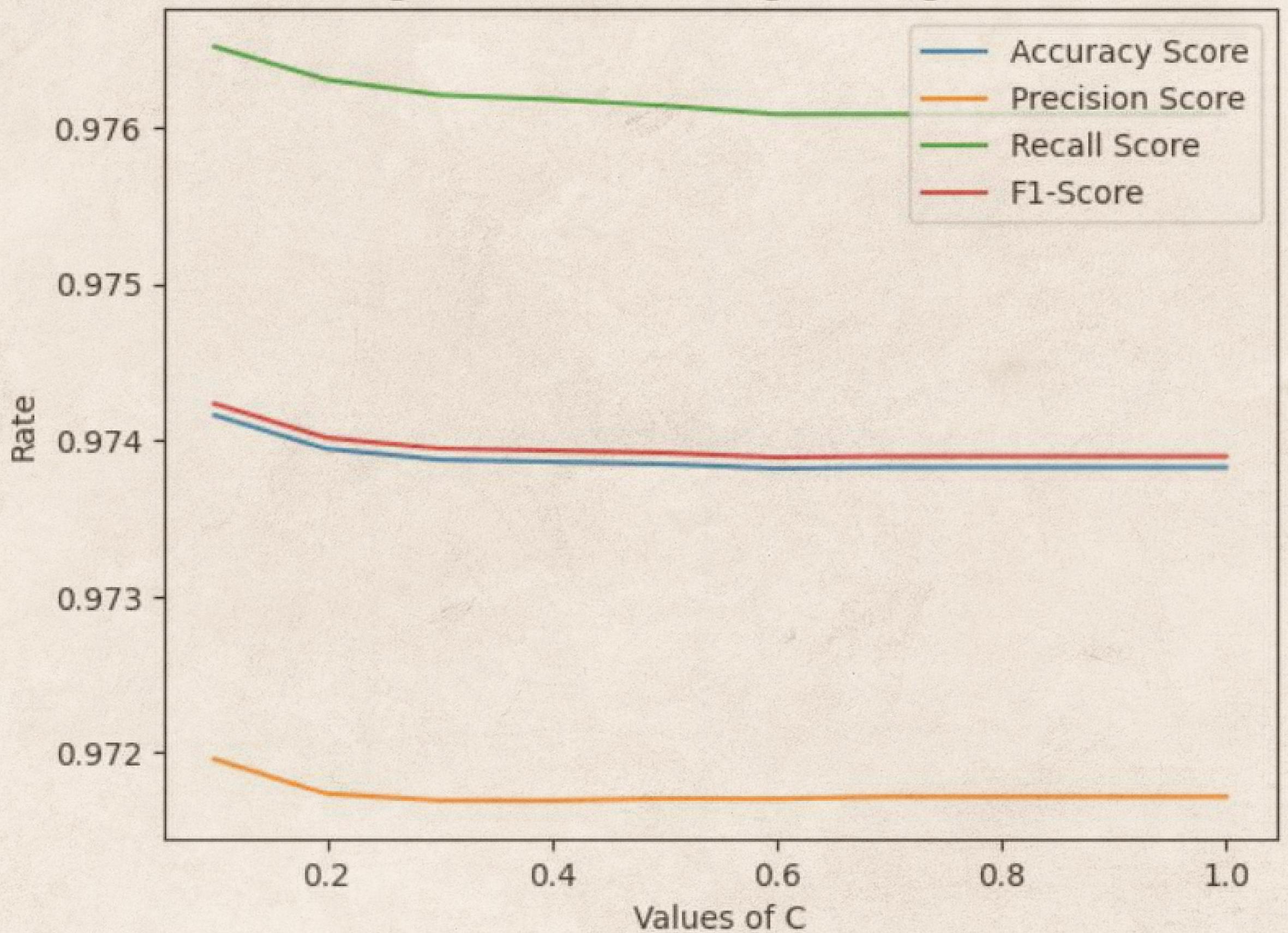
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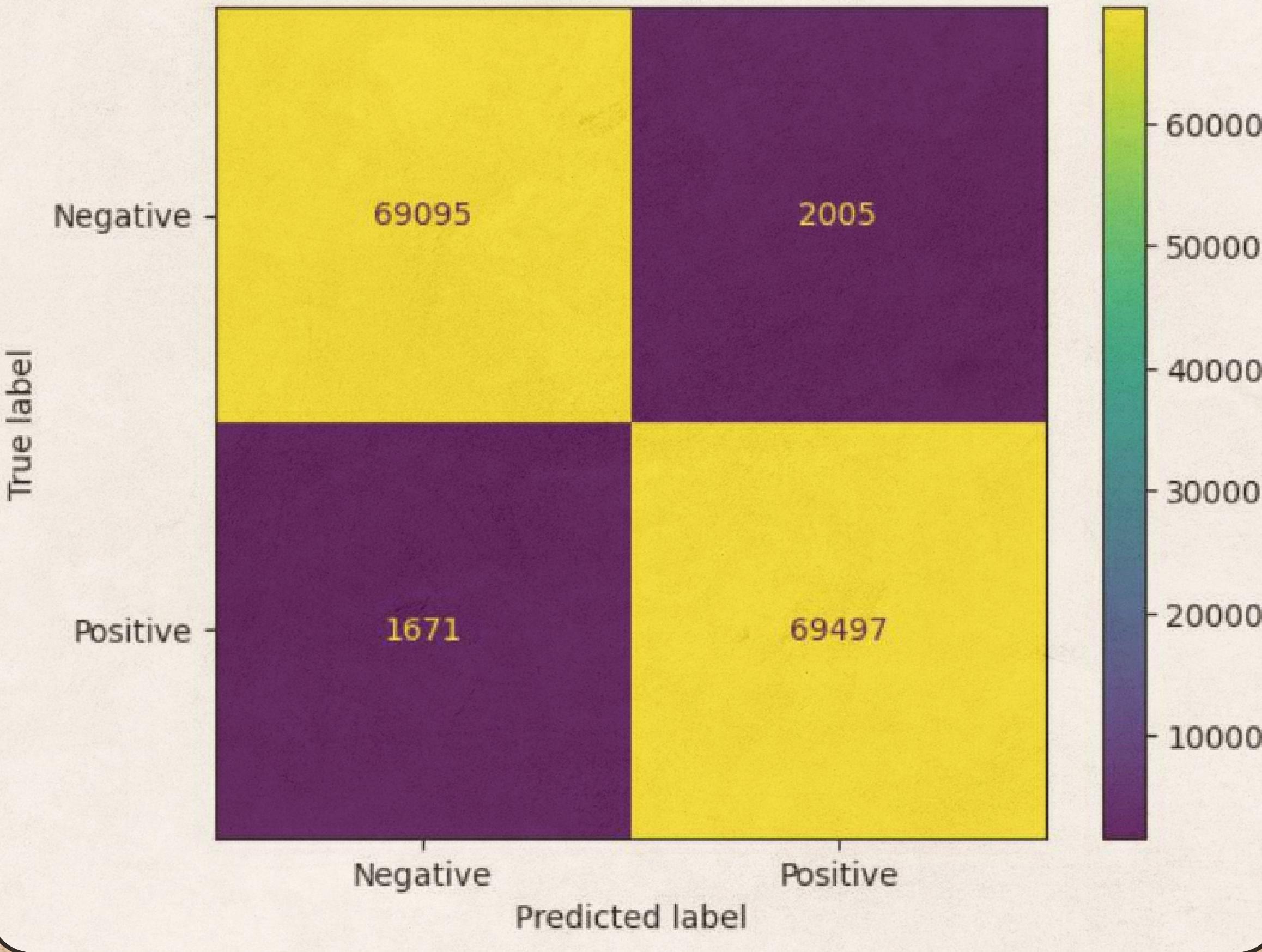
The Training Performance of Random Forest Classifier



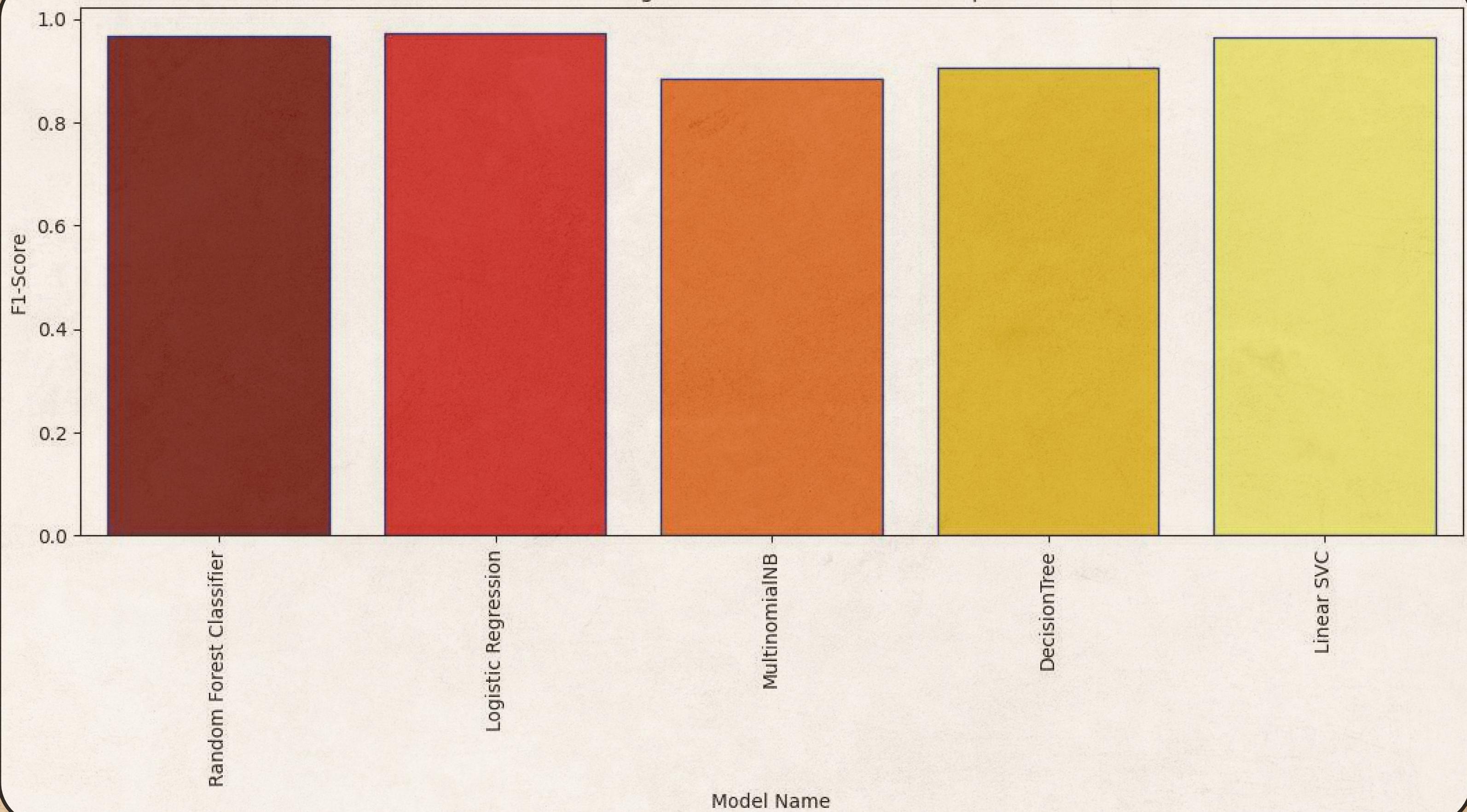
The Training Performance of Logistic Regression Classifier



Confusion Matrix of Logistic Regression



Models Testing & Evaluation F1-Score Comparison



	Model Name	Accuracy	Precision Score	Recall Score	F1-Score
0	Random Forest Classifier	0.966739	0.975099	0.957973	0.966460
1	Logistic Regression	0.974161	0.971959	0.976520	0.974234
2	MultinomialNB	0.885420	0.891991	0.877164	0.884515
3	DecisionTree	0.907674	0.909335	0.905744	0.907536
4	Linear SVC	0.964960	0.962682	0.967457	0.965064

RESULTS OVERVIEW

- The Logistic Regression Classifier looks stable and providing the **“BEST”** evaluation performance, adding to its training perfromance displayed before.
- So, we are on our way to use Logistic Regression Classifier for our Problem

```
[ ] # Example usage
LGR_Model = pickle.load(open('LGR_Model.sav','rb'))          # Loading our model
Sentence = "I Regret buying this; it doesn't work as advertised." # The sentence to be tested
processed_sen = preprocess_sentence(Sentence)                  # processed_sen

print("processed_sen = " , (processed_sen))
# Go through the pipeline (Vectorizing & Predict)
sentiment = LGR_Model.predict([processed_sen])
if sentiment[0] == 1:
    print(Sentence, '(is Positive)')
else:
    print(Sentence, '(is Negative)')
```

→ processed_sen = regret buying doesn ' t work advertised
I Regret buying this; it doesn't work as advertised. (is Negative)

OUTPUT EXAMPLES

Input	Prediction
I really love this video!	Positive
This is so boring.	Negative
Great job, well done.	Positive
I hate this part.	Negative

CHALLENGES

- Data cleaning was time-consuming due to unstructured text.
- NLTK resource errors required workarounds (e.g., manual setup of WordNet).

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FUTURE WORK

- Add voice-to-text feature to include video speech in analysis.
- Add other languages more than the English.
- Integrate real-time comment streaming and dashboard.
- Apply Deep Learning models like LSTM for better sentiment accuracy.

WHO CAN BENEFIT?

- To help content creators understand audience feedback.
- To support platforms in identifying negative or harmful comments.
- Social Media helps Business Monitoring
(Analyze public sentiment about a product, brand, or event)
- Public Opinion Analysis (Politicians, and governments to understand)



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CONCLUSION

- Text sentiment analysis provides valuable insights.
- YouTube and Twitter are strong sources for public emotion mining.
- Our ML pipeline enables scalable analysis with future expansion potential.

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