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College Name: Andhra University College of Engineering
College State: Andhra Pradesh
Internship Domain: [Artificial Intelligence]
Internship Start and End Date: [18th Aug to 30th Sept 2023]

Topic:

Sentiment Analysis of Restaurant Reviews

AGENDA

Sentiment Analysis of restaurant reviews is a vital application of natural language processing (NLP) and machine learning. It involves automatically evaluating the sentiments expressed in customer reviews of restaurants. This analysis helps restaurants gain insights into customer satisfaction, identify strengths and weaknesses, and make informed decisions to enhance their services. Whether it's assessing positive experiences to improve on them or addressing negative feedback, Sentiment Analysis empowers restaurants to better understand and cater to their customers' preferences, ultimately leading to improved dining experiences and customer relationships.

OVERVIEW

- **Purpose:**

-To perform sentiment analysis on restaurant reviews to gain insights into customer opinions and enhance the dining experience.

- **Scope:**

- Analyzing a diverse set of restaurant reviews.
- Extracting sentiments (positive, negative, neutral) from text data.
- Exploring patterns and trends in customer feedback.

- **Objectives:**

- Understand customer sentiment towards various restaurants.
- Identify areas for improvement in restaurant services.
- Provide actionable insights for restaurant owners and managers.
- Showcase the potential of sentiment analysis in the restaurant industry.

WHO ARE THE END USERS?

The end users of Sentiment Analysis of Restaurant Reviews encompass restaurant owners, managers, and staff seeking to enhance customer experiences and refine their offerings. Additionally, marketing teams leverage sentiment analysis to inform advertising strategies, while consumers rely on it to make informed dining choices. Business analysts, investors, and stakeholders also utilize sentiment data to assess restaurant reputation and potential profitability. Together, these end users leverage sentiment analysis to gain insights, improve operations, and make data-driven decisions within the restaurant industry.

SOLUTION AND ITS VALUE PROPOSITION

The Sentiment Analysis of Restaurant Reviews solution gives enormous value by giving restaurant owners and managers useful information about patron preferences and satisfaction. This technology helps the restaurant business to make data-driven choices, improve menus, and raise service standards by using the power of natural language processing and machine learning. It enables marketing teams to design successful campaigns, supports customers in making educated eating decisions, and offers business analysts useful market knowledge. In the end, this solution promotes enhanced customer experiences, enhances restaurant reputations, and generates profitability by matching restaurant offers with consumer expectations and market trends, making it a vital resource in the fiercely competitive restaurant business.

How did you customize the project and make it your own

Consider a few options for customization to truly make the Sentiment Analysis of Restaurant Reviews project our own.

- First, our project establish clear research objectives or corporate objectives, such as detecting regional eating trends, improving menu options, or gauging consumer attitudes toward sustainable practices.
- Adapt the data gathering method to incorporate sources that are relevant to the project's goals, such as consumer feedback databases, online platforms, or social media evaluations.
- Adapt the sentiment analysis model to handle domain-specific subtleties, such as restaurant lingo or cultural allusions.
- In order to acquire a greater understanding of the many aspects of the eating experience, we may also use cutting-edge methods like aspect-based sentiment analysis.
- Our project construct a special and important instrument that immediately responds to our particular demands by customizing the project's scope, objectives, and methodology.

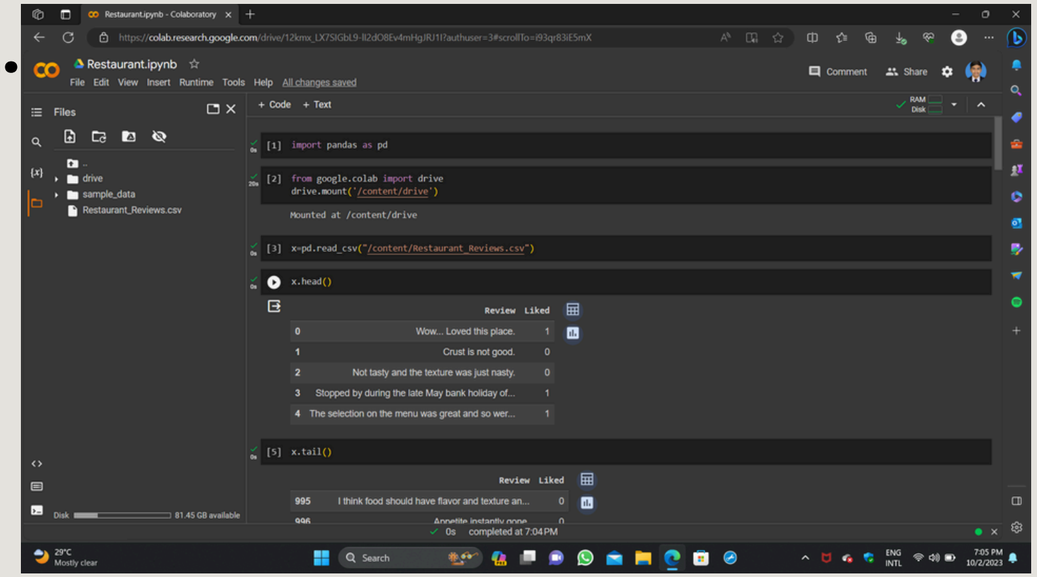
MODELLING

Using Support Vector Machines (SVM) and linear algorithms like logistic regression to model a Sentimental Analysis project for restaurant reviews. Here is a general overview of how we may move forward with this modeling:

- Gather a labeled dataset of restaurant reviews with each review having a sentiment label (positive, negative).
- Tokenization, stopword removal, and other text cleaning techniques are used to prepare the text data.
- **Feature Extraction:** Convert the preprocessed text input into numerical features.Utilizing TF-IDF vectorization is one such approach.
- **Data splitting:** To assess model performance, divide the dataset into training and testing sets.A typical proportion is 80% for training and 20% for testing.
- **Model selection:** Decide which machine learning techniques to use for sentiment categorization. Here, we employed Logistic Regression and Linear Support Vector Machine.
- **Model Training and Evaluation:** Using the training dataset, train the chosen models. To translate input characteristics to sentiment labels, the models will gain experience. Utilize performance indicators like accuracy, precision, and recall to assess the model's effectiveness.

SCREENSHOTS

1.



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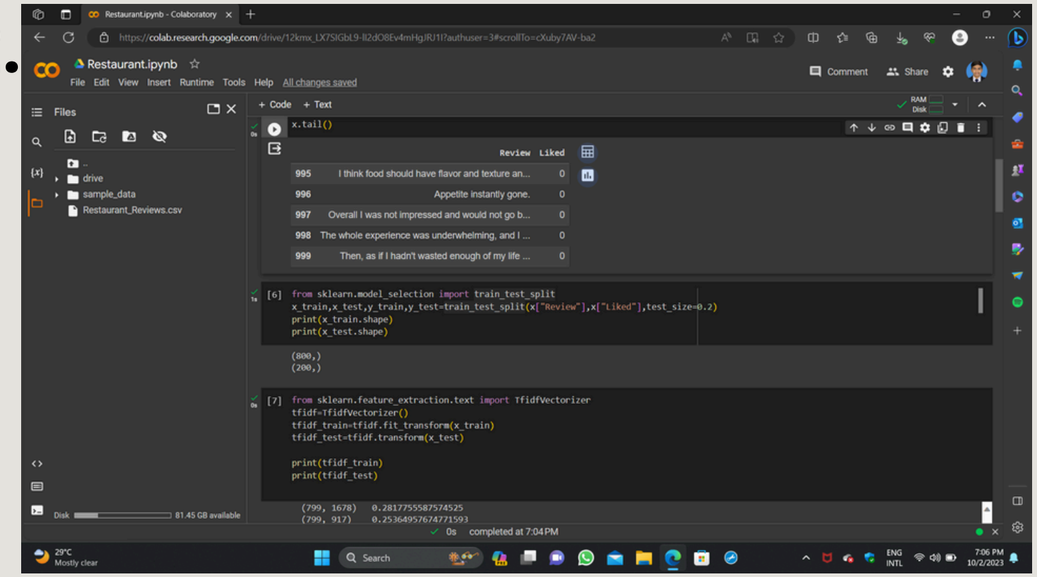

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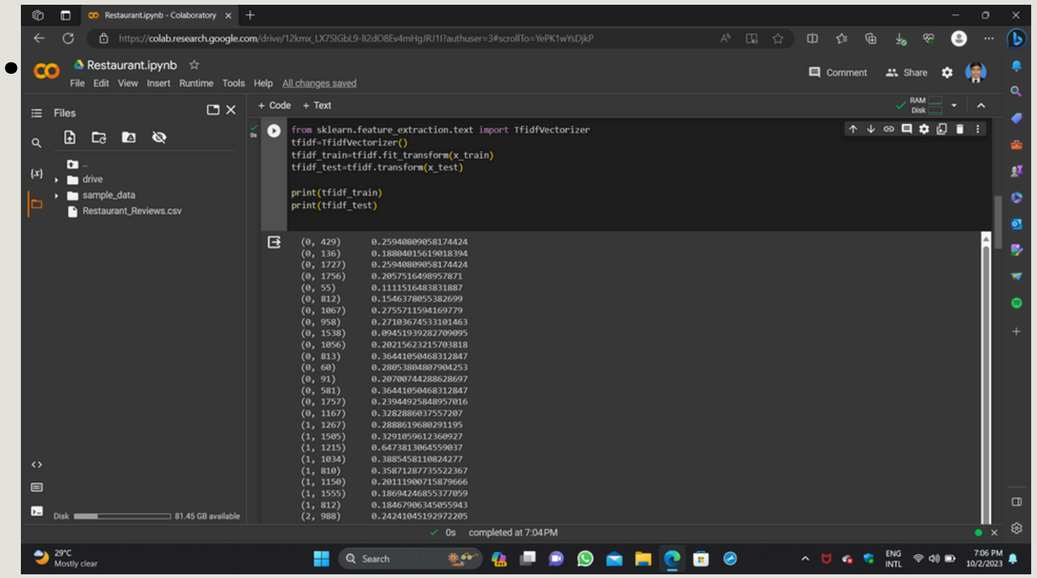

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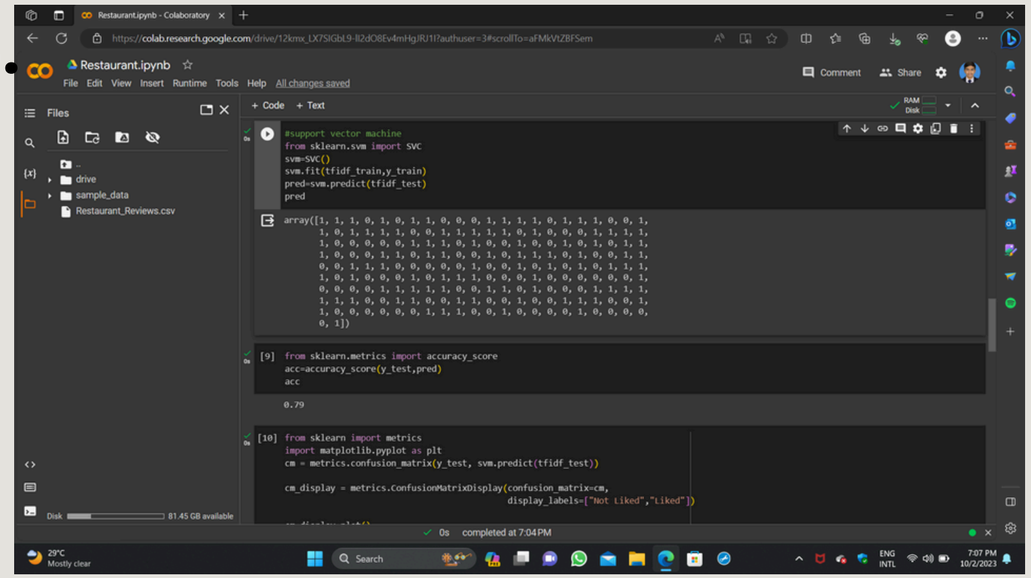

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Restaurant.ipynb - Colaboratory

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Restaurant.ipynb

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Files

drive
sample_data
Restaurant_Reviews.csv

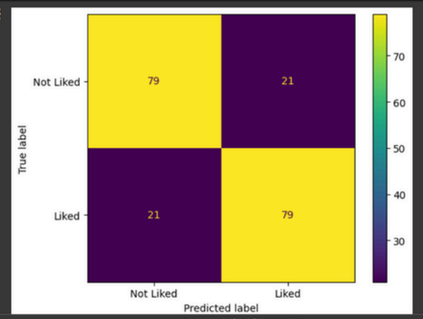
Disk 81.45 GB available

+ Code + Text

```
from sklearn import metrics
import matplotlib.pyplot as plt
cm = metrics.confusion_matrix(y_test, svm.predict(tfidf_test))

cm_display = metrics.ConfusionMatrixDisplay(confusion_matrix=cm,
                                            display_labels=["Not Liked","Liked"])

cm_display.plot()
plt.show()
```



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Restaurant.ipynb

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```
[11] from sklearn.linear_model import LogisticRegression
     nb=LogisticRegression()
     nb.fit(tfidf_train,y_train)
     pred=nb.predict(tfidf_test)
     pred
```

```
array([1, 1, 1, 0, 1, 0, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 1, 1, 1, 0, 1, 1,
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       1, 0, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0,
       0, 1])
```

```
acc=accuracy_score(y_test,pred)
acc
```

0.78

```
[13] cm = metrics.confusion_matrix(y_test, nb.predict(tfidf_test))

     cm_display = metrics.ConfusionMatrixDisplay(confusion_matrix=cm,
                                                 display_labels=["Not Liked","Liked"])

     cm_display.plot()
     plt.show()
```

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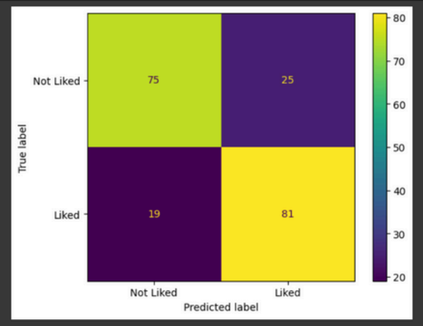

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RESULT

The output of a Sentiment Analysis study for restaurant reviews that used machine learning, particularly using SVM and linear algorithms. The project's results are listed below.

Model Performance Metrics: A matrix of accuracy, precision, recall, and confusion is used to measure the performance of a model.

Comparative analysis: To ascertain which method worked better in the classification of sentiment, evaluate the effectiveness of SVM and Logistic Regression.

Feature Importance: If you're using Logistic Regression, you may provide the model's coefficients to show how important particular terms are for predicting sentiment.

Sentiment patterns: If appropriate, offer insights on changing sentiment patterns. Showing the change in attitude over time, such as from month to month or quarter to quarter, may be necessary.

Review Summarize: Provide restaurant owners with a summary of the findings from the sentiment analysis, emphasizing the major conclusions. For instance, you may discuss how "excellence service" or "delicious food" are commonly mentioned in favorable evaluations.

LINKS

- https://colab.research.google.com/drive/12kmx_LX7SIGbL9-lI2dO8Ev4mHgJRJ1I?usp=sharing
- https://machinelearninggeek.com/analyzing-sentiment-of-restaurant-reviews/
- https://github.com/SarthakRana/Restaurant-Reviews-using-NLP-/blob/master/Restaurant_Reviews.tsv

Thank you for your time!