STUDENT DETAILS

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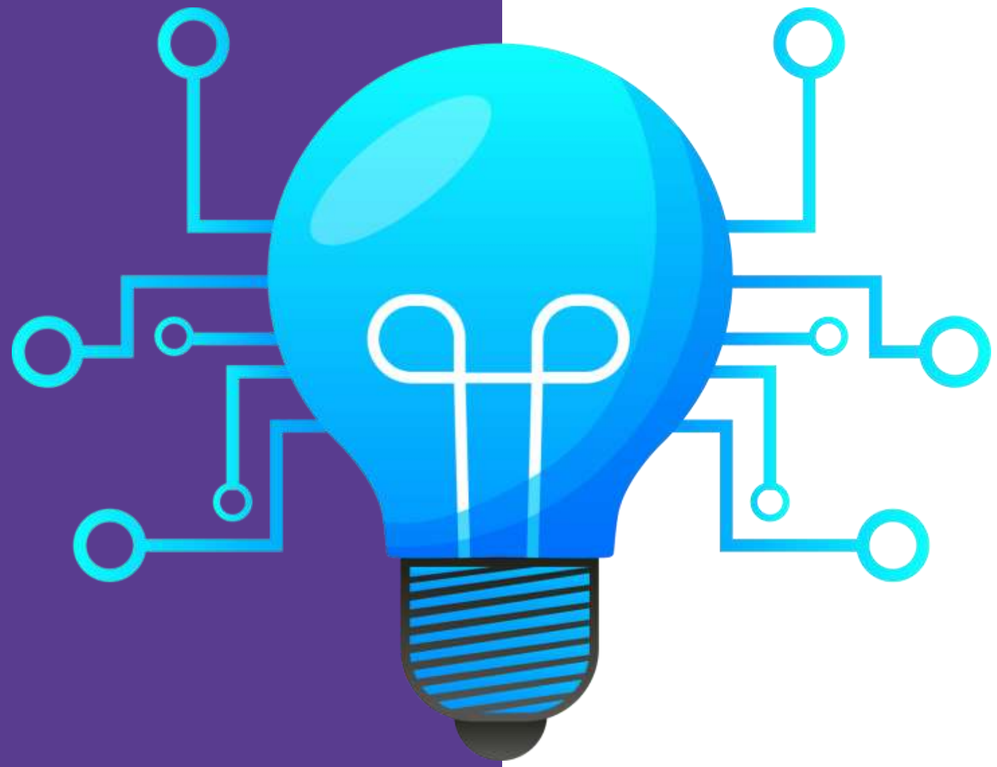
Internship Domain : Artificial Intelligence
Internship Start & End Date: 11 Aug 2023 to 3 Oct 2023

Problem Statement

Sentiment Analysis
of
Restaurant Reviews

AGENDA

- Importing Dataset
- Preprocessing Dataset
- Removing stopwords
- Training and Classification
- Analysis Conclusion
- Project Link



PROJECT
OVERVIEW

The goal of this study is to create a prediction model that can foretell whether a review of the restaurant will be favorable or unfavorable, We'll use the Restaurant Review dataset to accomplish this and load it into the multinomial naive bayes, bernoulli naive bayes, and logistic regression predictive algorithms. In the end, our goal is to identify the "best" model for analysing the sentiment of reviews.

WHO ARE THE END USERS

- Owners/managers of restaurants
  - Determine what needs to be improved.
  - rely on analysis while making operational decision
  - Menus can be changed as needed.
- Professionals and Academics
  - scientists who study languages
  - specialists in psychology
- Customers
  - Sentiment analysis is advantageous to restaurant patrons.
  - Reviewers can read them.
  - They view sentiment scores overall.
- culinary marketers
  - Businesses that conduct market research use sentiment analysis.
  - Industry of interest: the dining sector.
  - Educate reports and strategic decisions.
- Health or government officials

YOUR SOLUTION

Comprehensive Sentiment Analysis Tool

- Create a robust sentiment analysis tool for restaurant reviews.
- Designed to handle large volumes of reviews from diverse sources.
- Tailored specifically for the restaurant industry.

User-Friendly Interface

- Create a web- and mobile-friendly application.
- available to restaurant proprietors, patrons, and researchers.
- Easy-to-use interface with a clear design.

Competitive Benchmarking

- Finding Industry Leaders: Assists in locating the best eateries.
- Areas for work: Highlights areas that want work

Trend Identification

- Finding emerging trends is the goal.
- Focus areas include client preferences, food selections, and service standards.

Customizable Dashboards

- dashboards with user choice customization.
- Restaurant is a filter for sentiment analysis findings,Location,Time frame.

VALUE
PREPOSITION

Data-Driven Decision-Making

- For data-driven decisions, access insights from sentiment analysis.
- Obtain a precise understanding of client preferences and attitudes.

Improved Customer Experience

- improve dining experience.
- customized dining occasions.

Market Insights

- Establish market trends.
- Give clients in the restaurant business insightful information.

Streamlined Regulatory Compliance

- simplify the compliance process.
- Inspect restaurants more thoroughly for public safety.

Efficient Marketing

- allows for customized advertising.
- guarantees resonance with the intended audience.

HOW DID YOU CUSTOMIZE THE PROJECT &

MAKE IT YOUR OWN

Multimodal Analysis

- includes examination of both text and images.
- takes typical text-only sentiment analysis a step further.
- examines pictures posted in reviews.
- improves knowledge of consumer experiences.

Aspect-Based Sentiment

- Identifying Weaknesses and Strengths: Enables users to pinpoint particular factors contributing to positive or negative sentiment.
- Targeted Improvement: Enables users to concentrate on particular elements for exact improvements.

Location-Based Insights

- determines differences in customer sentiment by area.
- allows restaurant chains to develop location-based customised tactics.
- improves localised customer decisions and experiences.

Sentiment Trend Forecasting

- forecasts the sentiment trend.
- assists with predicting changes in customer sentiment.
- enables the proactive addressing of issues.

Real-Time Customer Feedback

- client feedback in real-time via the app.
- allows for prompt customer complaints response.
- the chance to solve problems quickly.
- Possibility of transforming unpleasant events into positive ones.

Personalized Recommendations

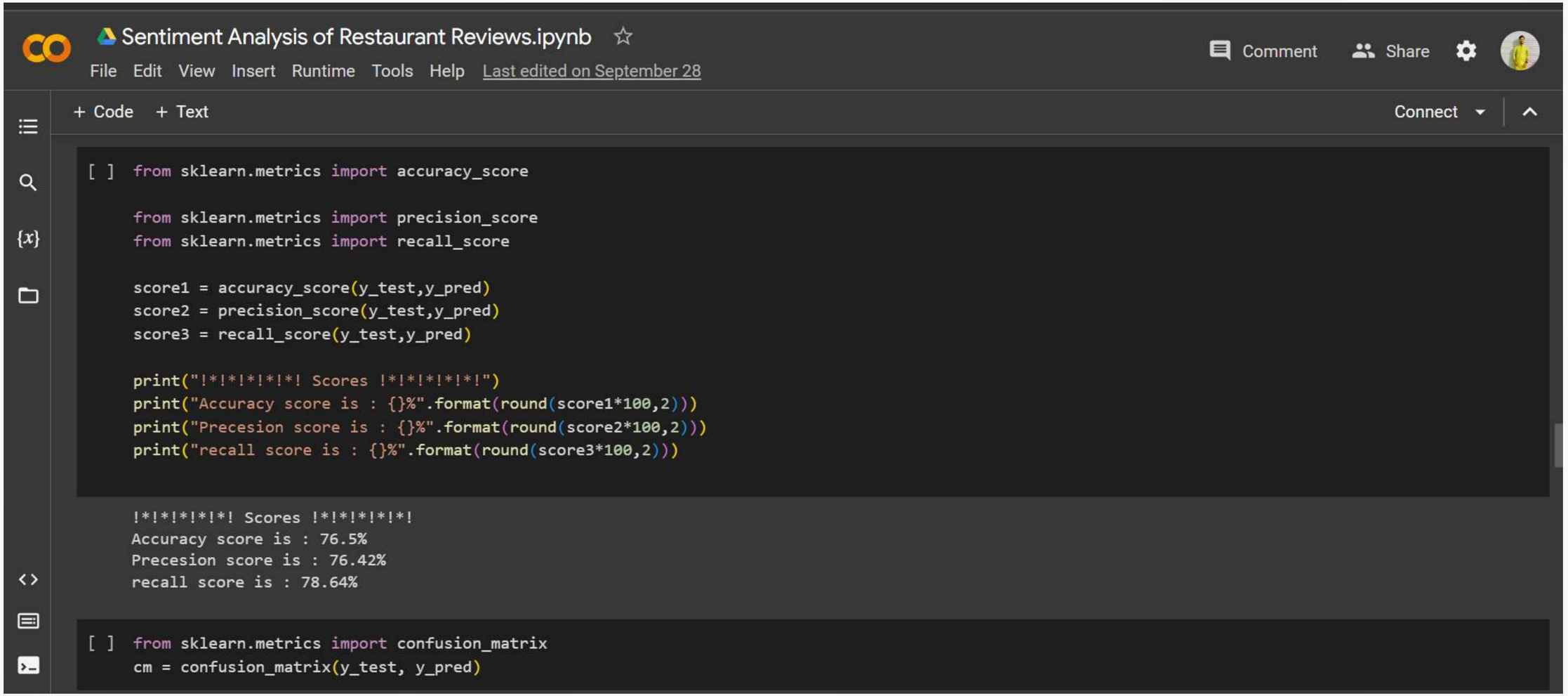
- particular suggestions for dining establishments.
- based on sentimental inclinations from the past.
- makes dining encounters better.

Transparent Sentiment Scores

- Scores of transparent sentiment.
- Each sentiment assessment's underlying causes are made clear.
- makes it possible for users to comprehend the rationale behind a sentiment score.
- insights specific to the review are given.

MODELLING

Multinomial Naive Bayes - The algorithm is a probabilistic learning method that is mostly Used in Natural Language Processing(NLP).The algorithm is based on the Bayes theorem and predicts the tag of a text such as a piece of email or newspaper article



Sentiment Analysis of Restaurant Reviews.ipynb ☆

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```
[ ] from sklearn.naive_bayes import MultinomialNB

    classifier = MultinomialNB()
    classifier.fit(X_train, y_train)
```

```
MultinomialNB
MultinomialNB()
```

```
y_pred = classifier.predict(X_test)

y_pred
```

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

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```
[ ] cm
```

```
array([[72, 25],
       [22, 81]])
```

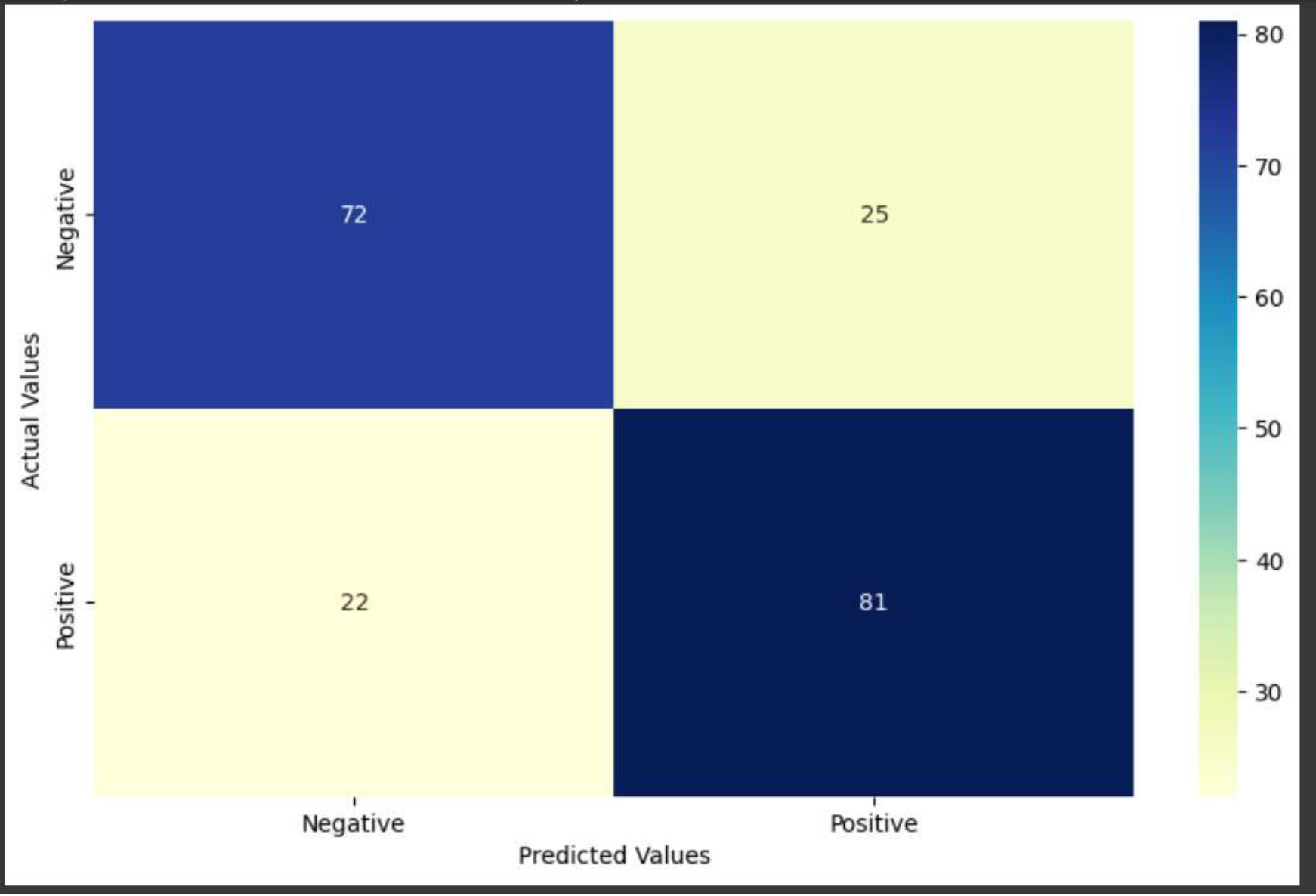
```
[ ] import matplotlib.pyplot as plt
    import seaborn as sns
    %matplotlib inline

    plt.figure(figsize = (10, 6))
    sns.heatmap(cm, annot=True, cmap="YlGnBu", xticklabels=['Negative', 'Positive'], yticklabels=['Negative', 'Positive'])
    plt.xlabel('Predicted Values')
    plt.ylabel('Actual Values')
```

```
Text(95.72222222222221, 0.5, 'Actual Values')
```

+ Code + Text

[ ]


72
25
22
81
Negative
Positive
Actual Values
Negative
Positive
Predicted Values
80
70
60
50
40
30

Sentiment Analysis of Restaurant Reviews.ipynb

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```
best_accuracy = 0.0
alpha_val = 0.0
for i in np.arange(0.1,1.1,0.1):
  temp_classifier = MultinomialNB(alpha=i)
  temp_classifier.fit(X_train, y_train)
  temp_y_pred = temp_classifier.predict(X_test)
  score = accuracy_score(y_test, temp_y_pred)
  print("Accuracy score for alpha={} is: {}%".format(round(i,1), round(score*100,2)))
  if score>best_accuracy:
    best_accuracy = score
    alpha_val = i
print('.................................................')
print('The best accuracy is {}% with alpha value as {}' .format(round(best_accuracy*100,2),round(alpha_val,1)))
```

```
Accuracy score for alpha=0.1 is: 78.0%
Accuracy score for alpha=0.2 is: 78.5%
Accuracy score for alpha=0.3 is: 78.0%
Accuracy score for alpha=0.4 is: 78.0%
Accuracy score for alpha=0.5 is: 77.5%
Accuracy score for alpha=0.6 is: 77.5%
Accuracy score for alpha=0.7 is: 77.5%
Accuracy score for alpha=0.8 is: 77.0%
Accuracy score for alpha=0.9 is: 76.5%
Accuracy score for alpha=1.0 is: 76.5%
.................................................
The best accuracy is 78.5% with alpha value as 0.2
```

Sentiment Analysis of Restaurant Reviews.ipynb

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```
    score = accuracy_score(y_test, temp_y_pred)
    print("Accuracy score for alpha={} is: {}%".format(round(i,1), round(score*100,2)))
    if score>best_accuracy:
      best_accuracy = score
      alpha_val = i
print('.....................................................')
print('The best accuracy is {}% with alpha value as {}' .format(round(best_accuracy*100,2),round(alpha_val,1)))
```

```
Accuracy score for alpha=0.1 is: 78.0%
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Accuracy score for alpha=0.9 is: 76.5%
Accuracy score for alpha=1.0 is: 76.5%
.....................................................
The best accuracy is 78.5% with alpha value as 0.2
```
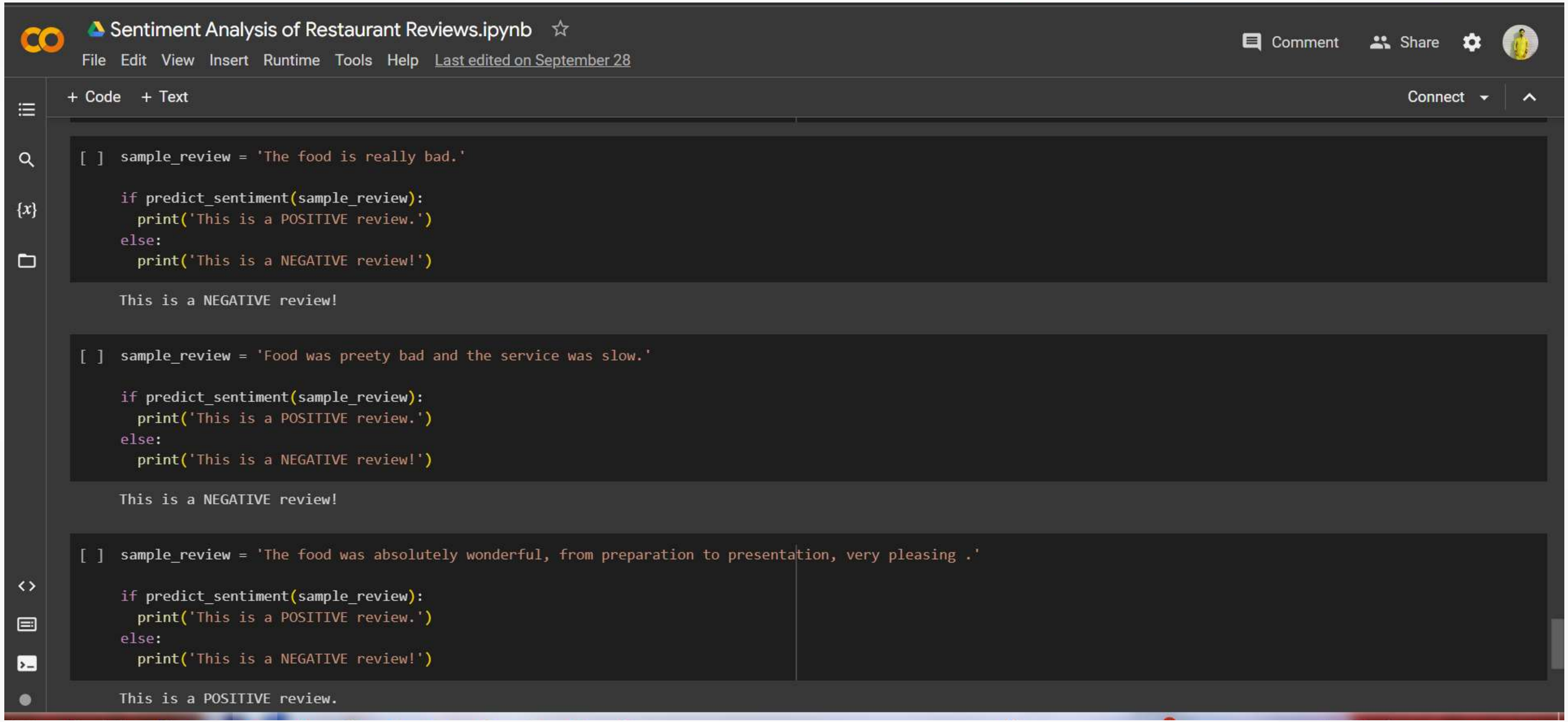

```
[ ] classifier = MultinomialNB(alpha=0.2)
    classifier.fit(X_train, y_train)
```

```
MultinomialNB(alpha=0.2)
```

RESULTS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[ ] sample_review = 'The food is really bad.'
if predict_sentiment(sample_review):
print('This is a POSITIVE review.')
else:
print('This is a NEGATIVE review!')
This is a NEGATIVE review!
[ ] sample_review = 'Food was preety bad and the service was slow.'
if predict_sentiment(sample_review):
print('This is a POSITIVE review.')
else:
print('This is a NEGATIVE review!')
This is a NEGATIVE review!
[ ] sample_review = 'The food was absolutely wonderful, from preparation to presentation, very pleasing .'
if predict_sentiment(sample_review):
print('This is a POSITIVE review.')
else:
print('This is a NEGATIVE review!')
This is a POSITIVE review.

LINKS

PROJECT LINK

https://colab.research.google.com/drive/1Zh49HrOk8yU1mMvOGiEwhFPJIy7DsYO7?usp=sharing

TEMPLATE LINK

https://www.canva.com/design/DAFv1YFiLKM/7nk5nuLftw655_gEatl_pw/view?utm_content=DAFv1YFiLKM&utm_campaign=designshare&utm_medium=link&utm_source=publishsharelink&mode=preview

THANK YOU