

I'm Loving it



Sentiment Analysis

Why is it important to understand sentiment?

- Customer satisfaction is key to maintaining a strong brand image & loyalty
- Valuable insights into customer satisfaction, complaints, and suggestions.
- Identify patterns and trends in customer feedback
 - Inform business strategies
 - Sentiment Prediction
 - increase customer satisfaction and loyalty



Agenda

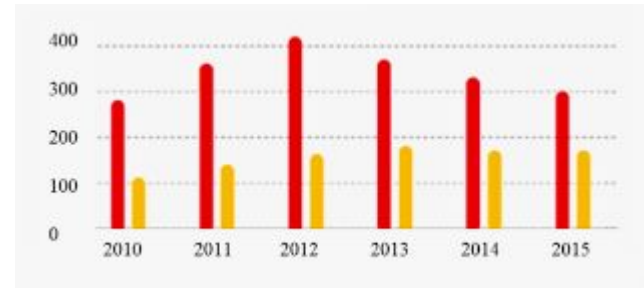
- Business Question
- Data analysis
- Data
- Findings
- Modelling
- Conclusion
- Next steps
- References
- Questions

Business Question

“What are the key themes and sentiments in customer reviews for McDonald’s”

1% increase in customer satisfaction translate to loyal customers.

If each customer spends \$5 more per month = millions in additional revenue / yr



Data Analysis

Visualisation:

- 5-Star Ratings
- Heatmap
- Most frequently occurring words
- Distribution of sentiment
- Word Cloud (Positive & Negative Words commonly found in reviews)
- Semantic Analysis

Modelling:

- Sentiment Prediction
- Topics



Data

- Scrapped from Google reviews
- 33,000 anonymous reviews

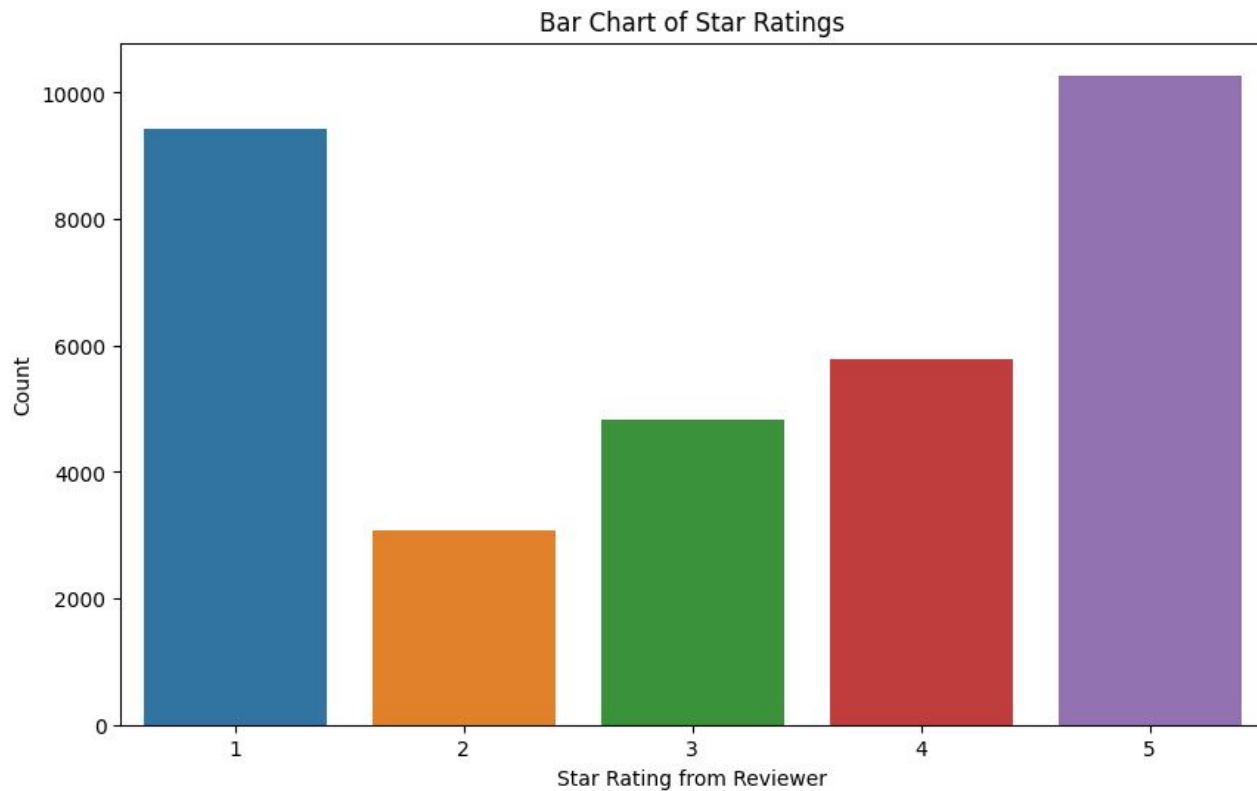
Feature	Description
reviewer_id:	Unique identifier for each reviewer (anonymized)
store_name:	Name of the McDonalds store
category:	Category or type of the store
store_address:	Address of the store
latitude:	Latitude coordinate of the stores location
longitude:	Longitude coordinate of the stores location
rating_count:	Number of ratings/reviews for the store
review_time:	Timestamp of the review
review:	Textual content of the review
rating:	Rating provided by the reviewer

review

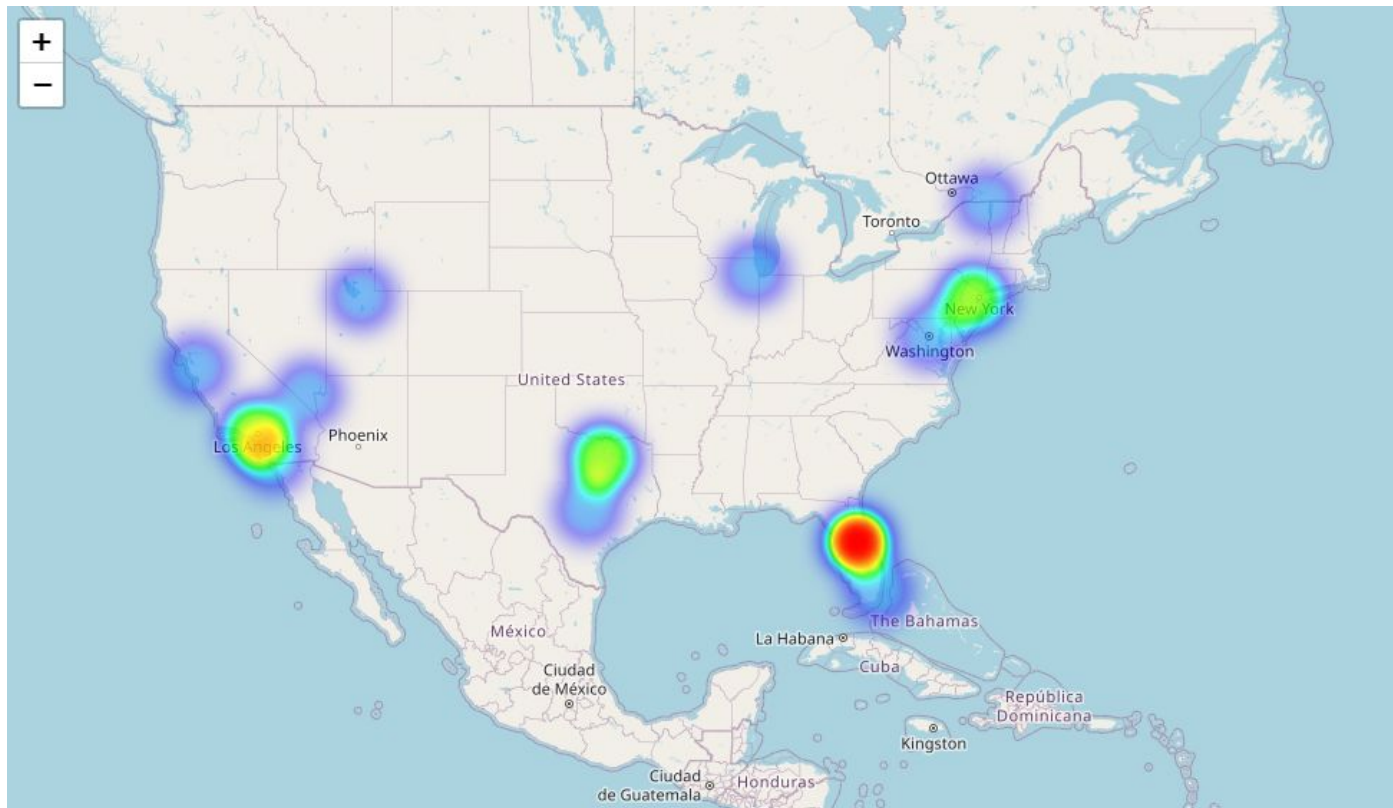
- 0 Why does it look like someone spit on my food?\nI had a normal transaction, everyone was chill and polite, but now i dont want to eat this. Im trying not to think about what this milky white/clear substance is all over my food, i d*** sure am not coming back.
- 1 It'd McDonalds. It is what it is as far as the food and atmosphere go. The staff here does make a difference. They are all friendly, accommodating and always smiling. Makes for a more pleasant experience than many other fast food places.
- 2 Made a mobile order got to the speaker and checked it in.\nLine was not moving so I had to leave otherwise I'd be late for work.\nNever got the refund in the app.\nI called them and they said I could only get my money back in person because it was stuck in the system.\nWent there in person the next day and the manager told me she wasn't
- 3 My mc. Crispy chicken sandwich was good but the customer service was quick and
- 4 I repeat my order 3 times in the drive thru, and she still manage to mess it up , it was suppose to be a large meal double filet of fish with large fries , no cheese . It was all wrong , they either need to pay close attention to the order being made , understand English or they need not to work at a drive thru

Findings

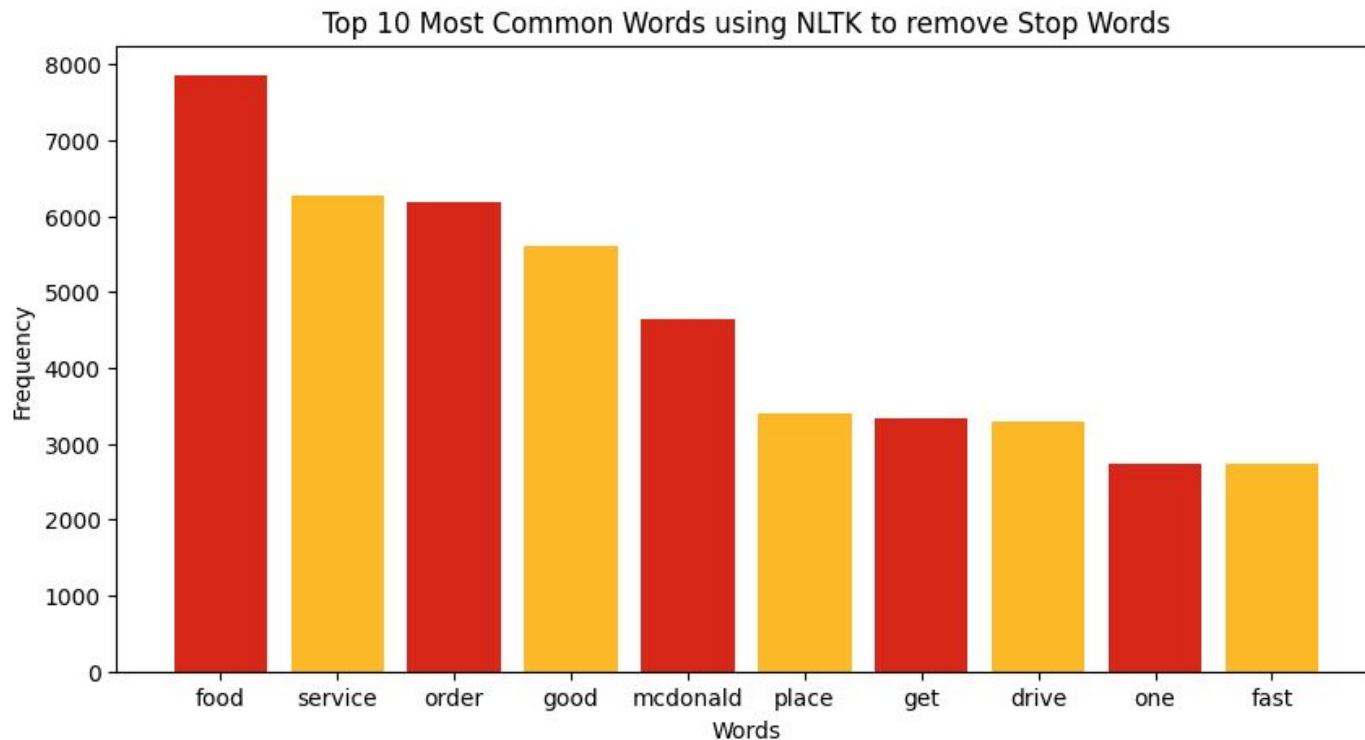
Bar Chart of Star Rating



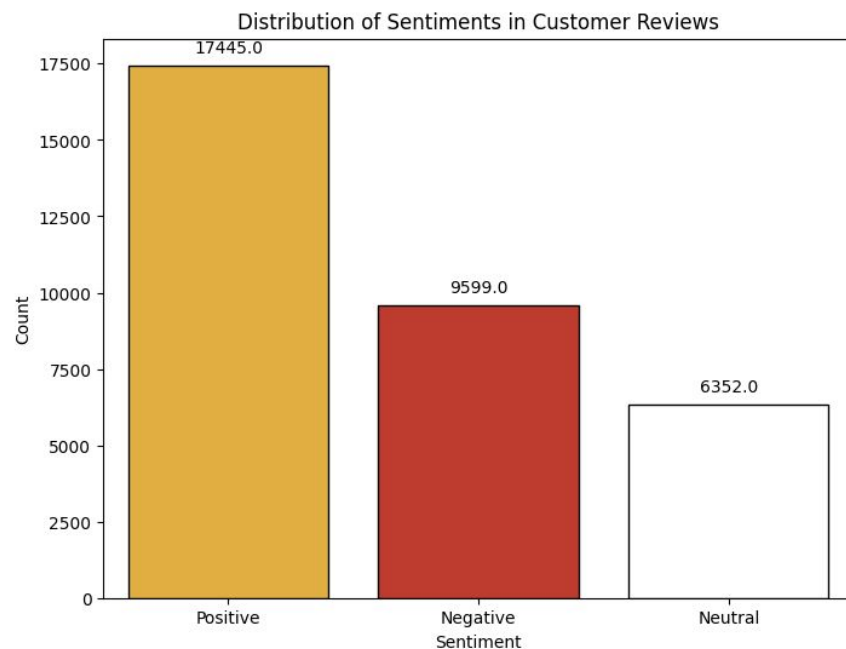
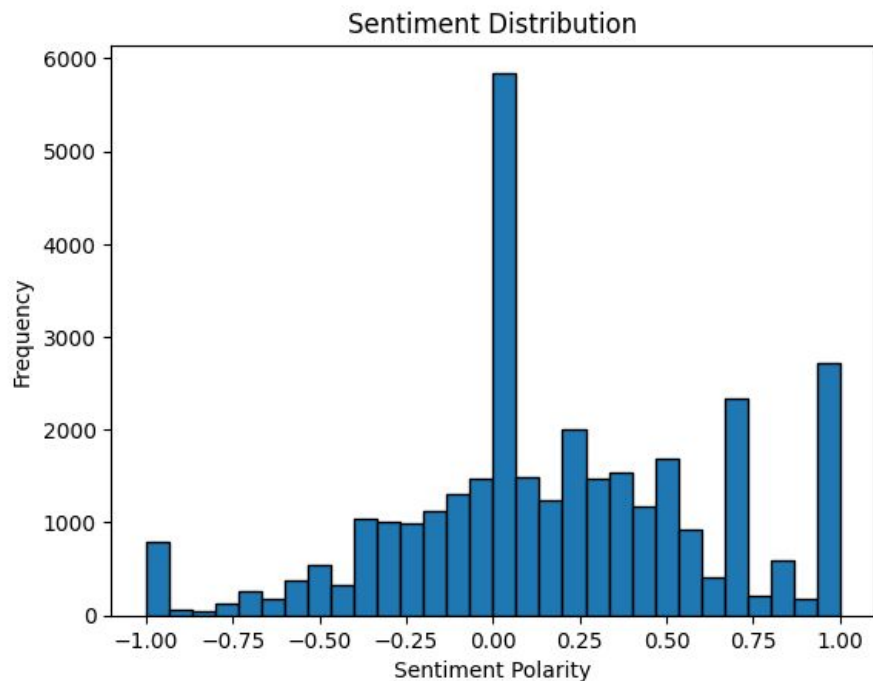
Heat Map - ratings per store



Most Frequently Occuring Words



Distribution of Sentiment



Above 0.05

Below -0.05

Equal Zero

Word Cloud

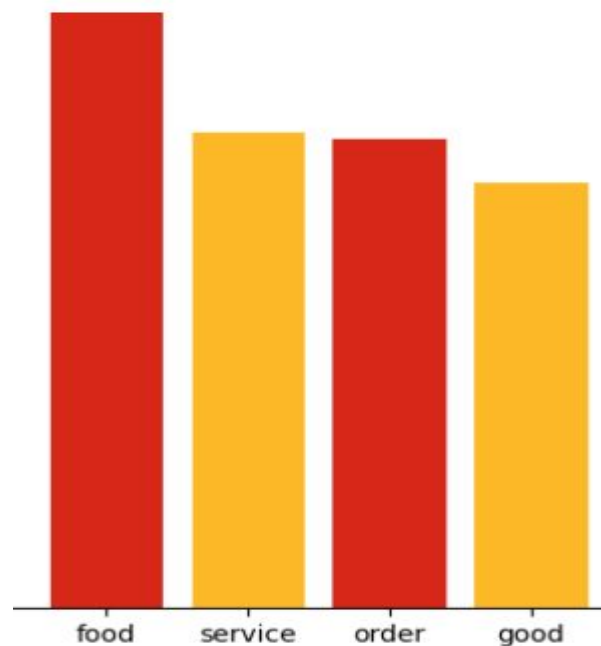
Word Cloud for Extremely Positive Texts



Word Cloud for Extremely Negative Texts



Semantic Analysis



Top 5 words similar to 'food':

```
[('thirty', 0.6645995378494263),  
 ('chocolates', 0.6630560755729675),  
 ('expexted', 0.6515209078788757),  
 ('kiosko', 0.6453144550323486),  
 ('served', 0.6428309082984924)]
```

Top 5 words similar to 'order':

```
[('orders', 0.8911861777305603),  
 ('still', 0.7906568646430969),  
 ('pick', 0.7713063955307007),  
 ('kiosko', 0.7677788734436035),  
 ('finally', 0.7608590722084045)]
```

Top 5 words similar to 'good':

```
[('great', 0.8989771008491516),  
 ('decent', 0.8912596702575684),  
 ('excellent', 0.8741796016693115),  
 ('reasonable', 0.8653976917266846),  
 ('fast', 0.8449199199676514)]
```

Modelling

- Sentiment Prediction
- Topics

Sentiment Prediction

```
new_review = "I'm loving it!."  
predicted_sentiment = predict_sentiment(new_review)  
print("Predicted sentiment:", predicted_sentiment)
```

Predicted sentiment: Positive

```
new_review2 = "The staff here are so rude."  
predicted_sentiment = predict_sentiment(new_review2)  
print("Predicted sentiment:", predicted_sentiment)
```

Predicted sentiment: Negative

	Model	Accuracy Score
0	Naive Bayes	0.756587
1	Decision Tree	0.863024
2	Random Forest	0.878892
3	K-Nearest Neighbors	0.471108
4	Gradient Boosting	0.817665
5	SVC	0.917964

```
models.items():  
# Use the model to predict the sentiment of a new review  
new_review = "I'm loving it!."  
predicted_sentiment = predict_sentiment_other_models(model, new_review)  
print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment}")
```

The predicted sentiment by Naive Bayes for the new review is: Positive
The predicted sentiment by Decision Tree for the new review is: Positive
The predicted sentiment by Random Forest for the new review is: Positive
The predicted sentiment by K-Nearest Neighbors for the new review is: Positive
The predicted sentiment by Gradient Boosting for the new review is: Neutral

```
for model_name, model in models.items():  
# Use the model to predict the sentiment of a new review  
new_review2 = "The staff here are so rude."  
predicted_sentiment2 = predict_sentiment_other_models(model, new_review2)  
print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment2}")
```

The predicted sentiment by Naive Bayes for the new review is: Negative
The predicted sentiment by Decision Tree for the new review is: Negative
The predicted sentiment by Random Forest for the new review is: Negative
The predicted sentiment by K-Nearest Neighbors for the new review is: Negative
The predicted sentiment by Gradient Boosting for the new review is: Negative

Sentiment Classification - Other Models

```
new_review3 = "Great service"
predicted_sentiment = predict_sentiment(new_review3)
print("Predicted sentiment:", predicted_sentiment)
```

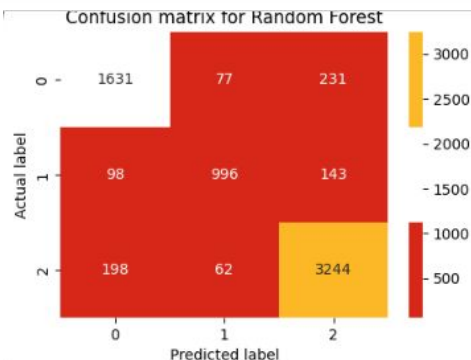
Predicted sentiment: Positive

```
new_review4 = "Dont visit the drive through on a Friday night at 2am, it is so slow"
predicted_sentiment = predict_sentiment(new_review4)
print("Predicted sentiment:", predicted_sentiment)
```

Predicted sentiment: Neutral

```
new_review5 = "Its okay"
predicted_sentiment = predict_sentiment(new_review5)
print("Predicted sentiment:", predicted_sentiment)
```

Predicted sentiment: Positive



```
for model_name, model in models.items():
    # Use the model to predict the sentiment of a new review
    new_review3 = "Great service"
    predicted_sentiment3 = predict_sentiment_other_models(model, new_review3)
    print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment3}")
```

The predicted sentiment by Naive Bayes for the new review is: Positive
The predicted sentiment by Decision Tree for the new review is: Positive
The predicted sentiment by Random Forest for the new review is: Positive
The predicted sentiment by K-Nearest Neighbors for the new review is: Positive
The predicted sentiment by Gradient Boosting for the new review is: Positive

```
for model_name, model in models.items():
    # Use the model to predict the sentiment of a new review
    new_review4 = "Dont visit the drive thruugh on a Friday night at 2am, it is so slow"
    predicted_sentiment4 = predict_sentiment_other_models(model, new_review4)
    print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment4}")
```

The predicted sentiment by Naive Bayes for the new review is: Positive
The predicted sentiment by Decision Tree for the new review is: Positive
The predicted sentiment by Random Forest for the new review is: Neutral
The predicted sentiment by K-Nearest Neighbors for the new review is: Neutral
The predicted sentiment by Gradient Boosting for the new review is: Neutral

```
for model_name, model in models.items():
    # Use the model to predict the sentiment of a new review
    new_review5 = "Its okay"
    predicted_sentiment5 = predict_sentiment_other_models(model, new_review5)
    print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment5}")
```

The predicted sentiment by Naive Bayes for the new review is: Positive
The predicted sentiment by Decision Tree for the new review is: Positive
The predicted sentiment by Random Forest for the new review is: Positive
The predicted sentiment by K-Nearest Neighbors for the new review is: Positive
The predicted sentiment by Gradient Boosting for the new review is: Positive

Topics - 20 Groups

	Count Vectors	WordLevel TF-IDF	N-Gram Vectors	CharLevel Vectors
Naïve Bayes	0.864521	0.871557	0.817814	0.834880
Logistic Regression	0.908832	0.892216	0.826048	0.881587
Support Vector Machine	0.913323	0.907485	0.836527	0.892814
Random Forest	0.910928	0.911377	0.860928	0.899551
Gradient Boosting	0.866317	0.867665	0.778144	0.875150

Group Top Words

0 little bacon find middle pancakes straws couldn hold word explain
1 free restroom clean thanks street tasty average run station quickly
2 s mcdonald ever worst ve been poor needs i service
3 we our us were sandwich counter they large order and
4 breakfast no forgot attention disappointed liked eggs salad bags broke
5 love ice cream machine called drinks it soda i decent
6 orders people lot homeless parking hour restaurant too many late
7 very excellent nice staff service slow place was and dirty
8 fantastic reasonable train tomato support costumers wondering throwing consistency exceptional
9 the and i to was a my for it order
10 to the i you they and is a this t
11 terrible awful trash lol loved real ate courteous smh read
12 fries cold chicken and my burger a nuggets were coffee
13 ive offer white skills change soft non mayo biscuits opinion
14 services properly beyond against board whenever usa voice report lousy
15 the is s a it and of mcdonald this food
16 good quick neutral food service always was pretty awesome as
17 service fast and great food clean friendly customer serve efficient
18 used system favorite mc kitchen basic difficult strawberry smoothie badly
19 drive thru through long in wait re line minutes inside

Conclusion

Conclusion

Sentiment is typically positive for this

SVC - text classification

Random Forest - Topics



Next Steps

Feedback loop

Identify entities (e.g., menu items, staff, cleanliness)

Further explore the categories of (positive, negative, neutral)

Run the modelling on two class (positive, negative)



References

- 1 . Kaggle <https://www.kaggle.com/datasets/nelgiriyeewithana/mcdonalds-store-reviews/code>
2. IOD Labs 8.4 and 8.5
3. Word Cloud
 - https://amueller.github.io/word_cloud/auto_examples/masked.html
 - <https://www.holisticseo.digital/python-seo/word-cloud/>
4. Logo's taken from Google search
5. Chat GPT and Microsoft Copilot

Questions?

Sentiment Classification - Other Sentences

```
for model_name, model in models.items():  
    # Use the model to predict the sentiment of a new review  
    new_review = "Mcdonalds staff are slow"  
    predicted_sentiment = predict_sentiment_other_models(model, new_review)  
    print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment}")
```

The predicted sentiment by Naive Bayes for the new review is: Positive
The predicted sentiment by Decision Tree for the new review is: Neutral
The predicted sentiment by Random Forest for the new review is: Neutral
The predicted sentiment by K-Nearest Neighbors for the new review is: Neutral
The predicted sentiment by Gradient Boosting for the new review is: Neutral

```
: for model_name, model in models.items():  
    # Use the model to predict the sentiment of a new review  
    new_review2 = "Mcdonalds has the best food!"  
    predicted_sentiment2 = predict_sentiment_other_models(model, new_review2)  
    print(f"The predicted sentiment by {model_name} for the new review is: {predicted_sentiment2}")
```

The predicted sentiment by Naive Bayes for the new review is: Positive
The predicted sentiment by Decision Tree for the new review is: Positive
The predicted sentiment by Random Forest for the new review is: Positive
The predicted sentiment by K-Nearest Neighbors for the new review is: Positive
The predicted sentiment by Gradient Boosting for the new review is: Positive