Business Insights using Yelp Review

Contents

INTRODUCTION

Yelp is an American multinational corporation headquartered in San Francisco, California. It develops, hosts and markets Yelp.com and the Yelp mobile app, that publish crowd-sourced reviews about local businesses, as well as the online reservation service “Yelp Reservations”. The company also trains small businesses on how to respond to reviews, hosts social events for reviewers, and provides data about businesses, including health inspection scores. It has an online food delivery service known as Eat24.

The project uses a series of datasets which include information from cities in select countries, and we will be using this data to analyze various cultural and seasonal trends. First off, according to Yelp, the dataset encompasses the following areas and includes the following information:

● 4.1M reviews and 947K tips by 1M users for 144K businesses ● 1.1M business attributes, e.g., hours, parking availability, ambience. ● Aggregated check-ins over time for each of the 125K businesses ● 200,000 pictures from the included businesses	Countries ● U.K ● Germany ● Canada ● U.S.

Yelp provides, in a Json file, multiple datasets which include general information on businesses, reviews received, information on users, check-ins logged, tips given, and user-uploaded images. For the project, the businesses and reviews datasets are considered.

PROBLEM STATEMENT

Using Yelp’s businesses and reviews dataset, the project attempts to answer the following questions:

- What are the restaurant's’ biggest problems which affect a restaurant’s overall rating based on customer reviews?

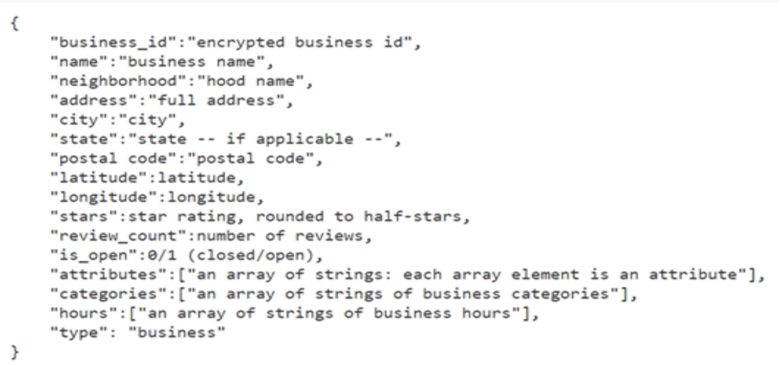
ABOUT DATASET

Yelp provides the datasets as Json files. Data source for the project comes from: https://www.yelp.com/dataset_challenge.

The following are the datasets used for the project including the attribute information contained in each dataset.

BUSINESS DATASET

The business dataset provides information about different businesses from different countries. For each business establishment, there is a unique Business ID, name, complete address with latitude and longitude of the city it is situated in, type of business, and review counts.



```
{
    "business_id":"encrypted business id",
    "name":"business name",
    "neighborhood":"hood name",
    "address":"full address",
    "city":"city",
    "state":"state -- if applicable --",
    "postal code":"postal code",
    "latitude":latitude,
    "longitude":longitude,
    "stars":star rating, rounded to half-stars,
    "review_count":number of reviews,
    "is_open":0/1 (closed/open),
    "attributes":["an array of strings: each array element is an attribute"],
    "categories":["an array of strings of business categories"],
    "hours":["an array of strings of business hours"],
    "type": "business"
}
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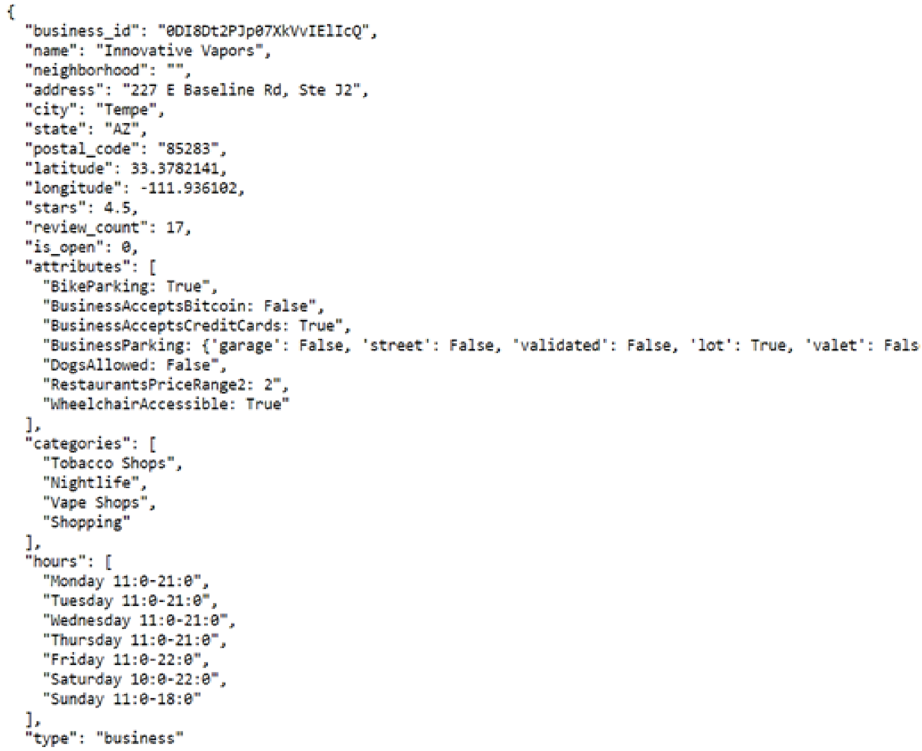

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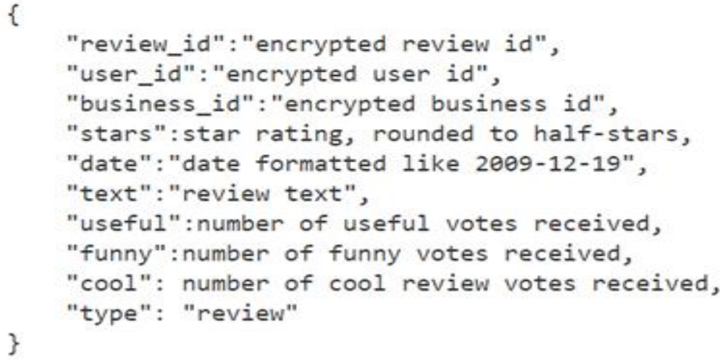
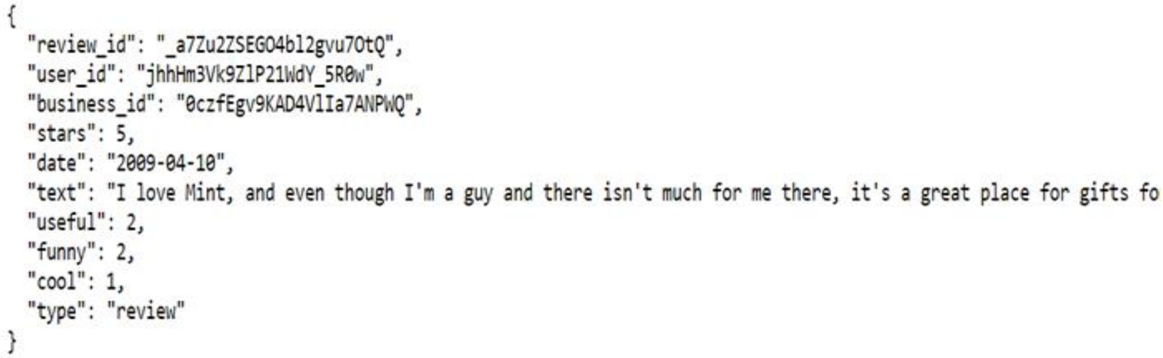
{
  "business_id": "0DI8Dt2PJp07XkVvIElIcQ",
  "name": "Innovative Vapors",
  "neighborhood": "",
  "address": "227 E Baseline Rd, Ste J2",
  "city": "Tempe",
  "state": "AZ",
  "postal_code": "85283",
  "latitude": 33.3782141,
  "longitude": -111.936102,
  "stars": 4.5,
  "review_count": 17,
  "is_open": 0,
  "attributes": [
    "BikeParking: True",
    "BusinessAcceptsBitcoin: False",
    "BusinessAcceptsCreditCards: True",
    "BusinessParking: {'garage': False, 'street': False, 'validated': False, 'lot': True, 'valet': Fals
    "DogsAllowed: False",
    "RestaurantsPriceRange2: 2",
    "WheelchairAccessible: True"
  ],
  "categories": [
    "Tobacco Shops",
    "Nightlife",
    "Vape Shops",
    "Shopping"
  ],
  "hours": [
    "Monday 11:0-21:0",
    "Tuesday 11:0-21:0",
    "Wednesday 11:0-21:0",
    "Thursday 11:0-21:0",
    "Friday 11:0-22:0",
    "Saturday 10:0-22:0",
    "Sunday 11:0-18:0"
  ],
  "type": "business"
```

REVIEW DATASET

The review dataset provides information about the different reviews posted by different users for different business establishments. Each record has a unique review ID, user ID of the Yelp user, and business ID of the business reviewed by the Yelp user and other details such as date of the review and type of reviews.



```
{
    "review_id":"encrypted review id",
    "user_id":"encrypted user id",
    "business_id":"encrypted business id",
    "stars":star rating, rounded to half-stars,
    "date":"date formatted like 2009-12-19",
    "text":"review text",
    "useful":number of useful votes received,
    "funny":number of funny votes received,
    "cool": number of cool review votes received,
    "type": "review"
}
```



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{
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  "user_id": "jhhHm3Vk9Z1P21WdY_5R0w",
  "business_id": "0czfEgv9KAD4VlIa7ANPWQ",
  "stars": 5,
  "date": "2009-04-10",
  "text": "I love Mint, and even though I'm a guy and there isn't much for me there, it's a great place for gifts fo
  "useful": 2,
  "funny": 2,
  "cool": 1,
  "type": "review"
}
```

TECHNOLOGY

TEXT MINING/K MEANS CLUSTERING

To collect and analyze the keywords in the Business and Review datasets, the project applies text mining as one of the technologies. Text mining, also referred to as text data mining, roughly equivalent to text analytics, is the process of deriving high-quality information from text.

Also, the project utilizes K-means clustering as the other technology. K-means clustering aims to partition n observations into k clusters in which each observation belongs to the cluster with the nearest mean, serving as a prototype of the cluster. A word cloud of the negative words frequently appearing in customer reviews was made by collecting the most influential problems faced by restaurants using K-means clustering.

The results of K-means clustering show directly the average of each problem that matters the impression of restaurants customer have been visited.

TOOLS

Three main Python libraries were used:

1. NLTK
2. Sklearn
3. TextBlob

ANALYSIS

The code takes a particular business ID, and the reviews with the rating of less than 3 and review count of more than 500 and attempts to identify the main reason for low ratings by the customers.

The **function words_count**, concentrates on removing the stop words from the reviews and finding the word count of each word.

The **function process_text**, tokenizes and stems the reviews to remove words that have less meaningful.

The function **cluster_texts,** uses tfidf to vectorize the words in the reviews, and subsequently uses K-means clustering on the stem words, and cluster the words with similar tfidf score.

From the clusters, the nouns are extracted, the sentimental analysis is run on these nouns. Also, the count of the number of times these nouns recur in each cluster is maintained, which identifies the main problems of the restaurant.

BUSINESS CASES

Project choses reviews of three business cases:

1.Mon Ami Gabi

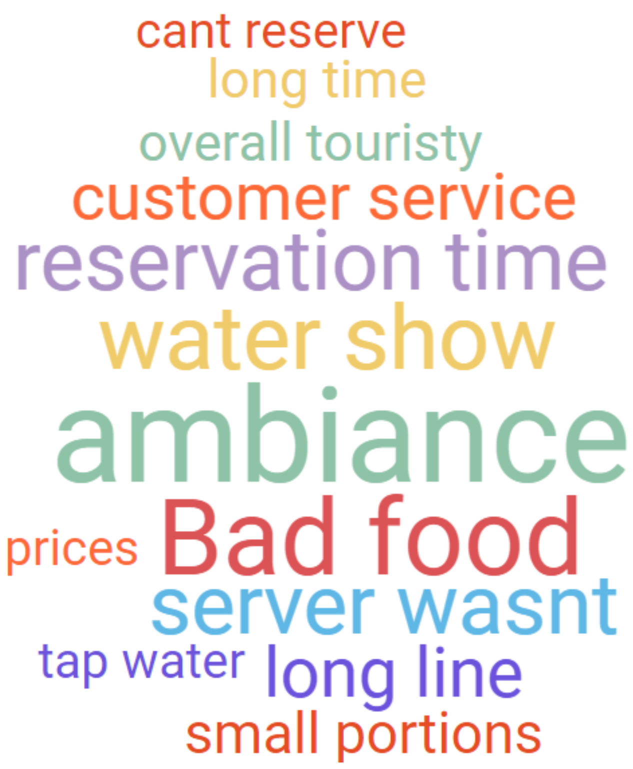
2. Monte Carlo Hotels and Casino

3.LoLo's Chicken and Waffle

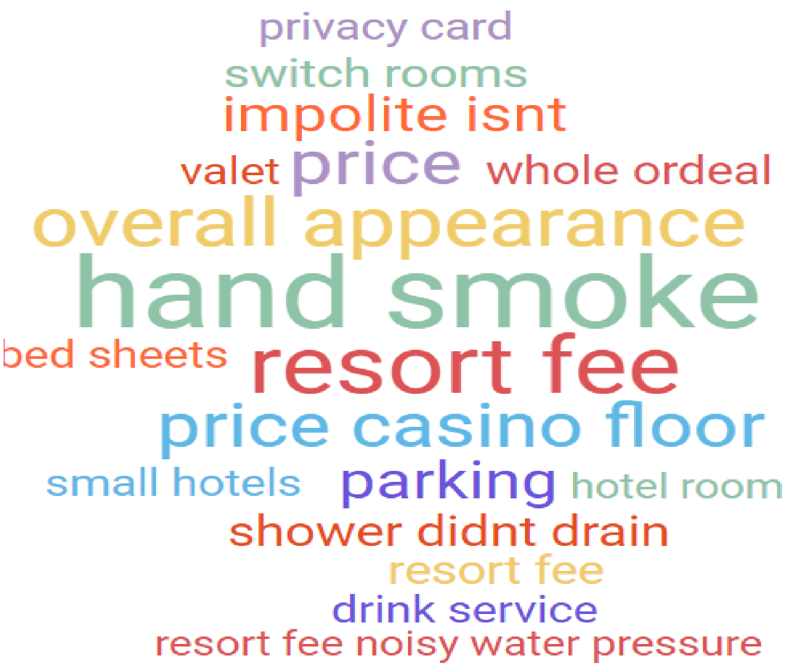
To draw a distinction, the following table shows the total number of reviews, total number of words in reviews, hours to read and total price at a rate of $12 per hour.

Name of business case	Total Number of Reviews	Total number of Words in Reviews	Hours to read	Total price at a rate of $12 per hour
1.MON AMI GABI	6414	781207	65	$780
2.MONTE CARLO	2080	363732	30	$360
3.LO-LO'S CHICKEN & WAFFLES	1276	156102	13	$156

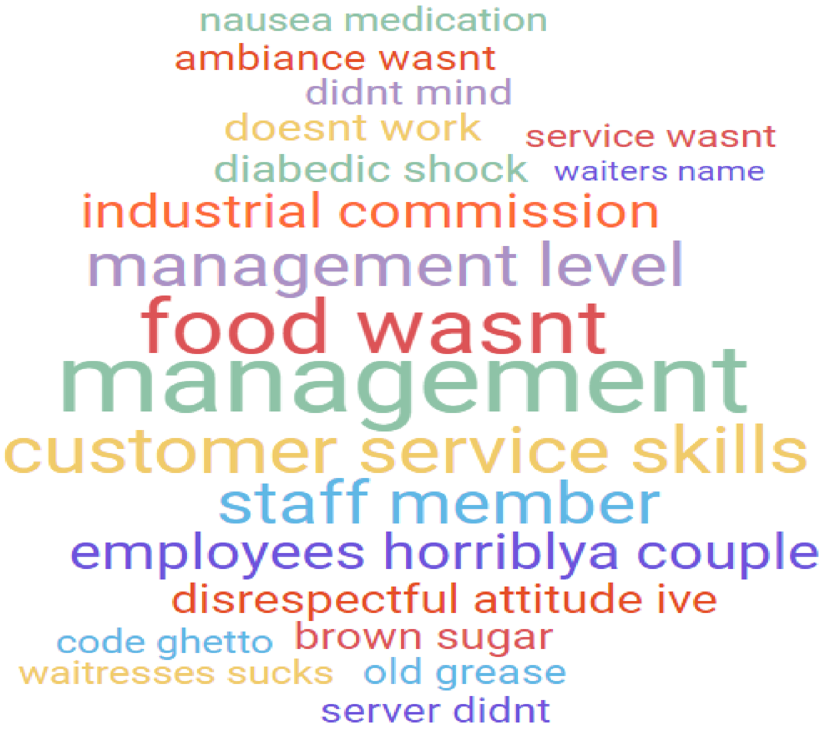
The analysis reveals commonly occurring negative comments of each case as follows:



Commonly Occurring Negative Comments of MON AMI GABI



Commonly Occurring Negative Comments of MONTE CARLO



Commonly Occurring Negative Comments of LO-LO'S CHICKEN & WAFFLES

CONCLUSION

In the current world where technology is at its peak, it's imperative that businesses make sure they provide the best services to their customers. With the help of Kmeans clustering and Tfidf Vectorizer, project identifies recurring problems customers faced. We make it easy for the businesses to sift through millions of reviews on Yelp website/mobile app, quickly find the root cause for any bad reviews and fix it immediately. Because, in the case of restaurant business, the only kind of publicity that works is good publicity.

FUTURE SCOPE

Online presence for any business establishment is a top priority. Recent studies have shown that 90% of the customers read online reviews and 88% use these reviews to take decisions.

Online presence does not involve just the content businesses puts in but the content generated by the users. It is essential to understand the impact of online reviews and also online review sites as many users use this content to take decisions.

REFERENCES

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