Patterns in Types Of Restaurants in New York

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1. INTRODUCTION

1.1 Background

New York City (NYC), often called simply New York, is the most populous city in the United States. With an estimated 2019 population of 8,336,817 distributed over about 302.6 square miles (784 km^2), it is one of the world's most populous megacities. Situated on one of the world's largest natural harbors, New York City is composed of five boroughs, each of which is a county of the State of New York.

The restaurant industry is essential to New York City's social and economic fabric. From small, family-owned restaurants and food carts to four-star world-famous establishments, the City abounds with restaurants that offer cuisines from every corner of the globe. Restaurants lend vitality to each neighborhood and are integral to Manhattan's central business districts and the City's vibrant tourism industry, attracting millions of visitors each year who spend a total of $46 billion annually.

1.2 Problem

The project aims to find out if there is any pattern in the type of restaurants located in every borough and neighborhood of New York.

- Are some cuisines / types of restaurants more represented in certain areas than in others?
- Which cuisines / types of restaurants have delivery options?
- Is it possible to group neighborhoods together based on the sole criteria of food?
- Which borough has the most restaurants?

The project will also focus on the borough with most restaurants in New York and provide a list of top restaurants based on user ratings and likes and dine-out and delivery services considering current covid scenarios.

1.3 Interest

Imagine you plan to move to New York or travel for vacation or for work or you are just passing by, your top priorities will always include food. As we all know eating out and sipping on a cup of coffee is a major aspect of people's lives. So, wouldn't it be great to know beforehand the boroughs and neighborhoods of New York based on what we can eat there? What are the major cuisines or types of food famous there? or Which area to visit as per our taste of eating.

This project helps every person travelling or moving to New York by providing details of restaurants in the neighborhoods or borough they would be travelling. And with current covid situations we might need to know restaurants who have dine out options or which provide delivery service. Also it will

help if someone only wants to eat a specific type of food, for example a person only likes to eat korean food so this will help in locating korean restaurants in the neighborhoods the person is. If the neighborhood does not have any korean restaurants then you can get a list of nearby neighborhoods which have it.

2. Data

2.1 Data Sources

Neighborhood has a total of 5 boroughs and 306 neighborhoods. In order to segment the neighborhoods and explore them, we will essentially need a dataset that contains the 5 boroughs and the neighborhoods that exist in each borough as well as the latitude and longitude coordinates of each neighborhood. This dataset exists for free on the web. Here is the link to the dataset: https://geo.nyu.edu/catalog/nyu_2451_34572. Geopy library was used to get the latitude and longitude values of New York City. Next, Foursquare API was utilized to explore all the neighborhoods and segment them. The API was also used to get details of venue

2.2 Data Cleaning

Data downloaded was cleaned and saved in a dataframe. The file contained json data so it was converted into a dataframe. Only required features from data were saved in the data frame. Then I checked if the data has all 5 boroughs and 306 neighborhoods. The data was further divided into two different data frames consisting data of boroughs for further analysis.

2.3 Feature Selection

Each record in json file contain following features:

```
{'type': 'Feature',
 'id': 'nyu_2451_34572.1',
 'geometry': {'type': 'Point',
  'coordinates': [-73.84720052054902, 40.89470517661]},
 'geometry_name': 'geom',
 'properties': {'name': 'Wakefield',
  'stacked': 1,
  'annoline1': 'Wakefield',
  'annoline2': None,
  'annoline3': None,
  'annoangle': 0.0,
  'borough': 'Bronx',
  'bbox': [-73.84720052054902,
   40.89470517661,
   -73.84720052054902,
   40.89470517661]}}
```

For the project only the following features were selected :

- *borough* -> Borough
- *Name* -> Neighborhood
- *Coordinates* -> Latitude, Longitude