GradGrub Oxford

Full Report

The Battle of Neighborhoods assignment for

IBM / Coursera Data Science course

Introduction

Description of business problem and background

An entrepreneurial university student wants to launch a mobile food outlet called GradGrub that is targeted at other students. GradGrub's brand promise is cheap, healthy food that is both affordable for students and nutritious. With that aim, GradGrub will focus on healthy hamburgers, both of the meat variety and plant-based (vegetarian) variety. All ingredients are fresh.

The budding entrepreneur wants to test the first outlet in Oxford, England, an historic university city. Oxford was chosen because it's a relatively small city (population approx. 150,000) and has lots of university students.

Critically, the University of Oxford consists of 45 individual colleges and halls that are located mostly in or near the city center. Almost all of the colleges and halls have residential accommodation for students. The mobile food outlet – a truck with a kitchen – must be placed in an ideal location that is closest to as many of the colleges as possible.

Before launching GradGrub, the budding entrepreneur wants two key questions answered:

First, what is the optimum location to locate the food truck?

Second, what are the competitor hamburger outlets in Oxford?

Oxford has many restaurants, cafes, and other food outlets. Many of them are located in the city center and in nearby East Oxford. Our entrepreneur needs to survey the competition for hamburgers to ensure that GradGrub wins on price, product, and convenience of location.

Data

Description of the data and how it will be used to solve the problem

This project uses two key data sets to solve the problem.

1. University of Oxford's Colleges and Halls

This is a list of Oxford's 45 colleges and halls that is taken from the URL https://www.ox.ac.uk/about/colleges. The data is inputted manually into a csv file. The csv file is then downloaded to IBM Watson Studio in order to work with it within a Jupyter Notebook.

The addresses and postcodes for each of the colleges and halls are used to find the latitude and longitude coordinates for each of the colleges and halls. These geographical coordinates are then used to create a map of Oxford that is marked with the colleges and halls.

These coordinates are formed into a statistical cluster. The mean of the coordinates is then calculated to determine the center point of the cluster. This center point is the optimum location for the GradGrub food truck, in terms of convenience to students living in the colleges and halls.

2. Foursquare

The Foursquare database is used to investigate GradGrub's competition in Oxford for hamburgers.

Foursquare's complete list of categories are available at the URL https://developer.foursquare.com/docs/build-with-foursquare/categories.

This project identifies three subcategories under the main category of Food that are relevant to this investigation. The subcategories are: American Restaurant, Burger Joint, and Food Truck.

The project then explores each of these subcategories in order to determine the range and characteristics of GradGrub's competition.

Methodology

1. Import the necessary libraries from python and folium.
2. Define my Foursquare client ID and secret to access the Foursquare location database.
3. Find Oxford city's latitude and longitude coordinates with the Nominatim tool.
4. Download the csv file of Oxford colleges' names and addresses (see Data section for background).
5. Apply the latitude and longitude coordinates to each of the colleges and create a dataframe. Two of the colleges (Jesus and St Stephen's) have bad coordinates data ('None' and inconsistent, respectively), so these colleges are deleted from the dataframe.
6. Create a map of Oxford with all of the colleges marked.
7. Find the geographical center point of the colleges by calculating the mean of their coordinates. This requires importing more tools – StandardScaler and KMeans – as well as matplotlib. This center point shows the optimum location for the GradGrub mobile food truck.
8. Create a map of Oxford showing the optimum location for the GradGrub mobile food truck, which is directly outside St John's College on St Giles road.
9. Investigate GradGrub's competitor food outlets in Oxford using the Foursquare database. The investigation uses three subcategories: American Restaurant, Burger Joint, and Food Truck.

Results

Question 1: What is the optimum location to locate the GradGrub food truck?

Answer: Directly outside St John's College on St Giles road.

Question 2: What are the competitor hamburger outlets in Oxford?

Answer: Foursquare data suggests there are 12 direct competitors that specialize in burgers. There are several more direct competitors that specialize in food trucks. In addition, there are numerous indirect competitors that specialize in American food.

Discussion

Foursquare's subcategory of Burger Joint provides the most reliable data for this investigation. However, its list of 12 burger joints is not completely accurate, as one item, Debenham's, is a department store. Nevertheless, GradGrub appears to have 11 existing burger joint competitors in Oxford.

An examination of one, the independent Gourmet Burger Kitchen, shows a good rating of 7.2 and 17 tips. So clearly the competition is strong.

Foursquare's subcategory of Food Truck is far less reliable. The list suggests 30 food trucks in Oxford, but most of the list consists of supermarkets. However, the list does contain some genuine food trucks and could be utilized for further analysis.

In comparison, Foursquare's subcategory of American Restaurant is slightly more reliable than Food Truck, but less accurate than Burger Joint. Nevertheless, the American Restaurant list is useful for explore indirect competitors to GradGrub.

Conclusion

GradGrub could carve out a niche as the only mobile food outlet offering hamburgers to students in Oxford.

Although it has considerable direct competition with numerous burger joints, GradGrub has two distinct advantages: 1) being centrally located to the colleges; and 2) carrying lower overheads as a food truck (compared to a business renting a shop).