Looking for the optimal place for a new restaurant in Barcelona

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Introduction: Discussion of the problem and background

Barcelona is one of the European capitals with the greatest tourist attraction in the world. The combination of a good climate with the Spanish culture and its people make Barcelona an ideal destination for all kinds of people: friends, families, business trips...

New leisure establishments are constantly opening and competing fiercely with each other in order to survive the hard beginnings and make a name for themselves in the city. In the world of gastronomy, there is a wide variety of establishments: from bars that simply serve beer and tapas to luxurious restaurants that prefer to deal with a more selective and demanding clientele. Let's suppose we wanted to build a new restaurant in Barcelona. The strategy to be implemented has already been defined: the food to be served has been decided, as well as its prices. We have also determined the opening hours and the workers needed to correctly develop the different services that will be offered. The golden question here is: where should I locate my premises and why?

The location of the premises is one of the key aspects for a new establishment to be able to compete with the rest of the market taking advantage of the attributes of the surrounding area. There are many variables to consider: price of the area, size of the premises, population density…

To perform this exercise, we will basically focus on two of those attributes:

- The existing population density in each one of the neighborhoods of Barcelona.

- The similarity of the neighborhoods comparing them according to the main places of interest.

With these two variables we can place our premises in a neighborhood where the population density is high, making sure that as many people as possible enter our restaurant and, at the same time, avoiding those neighborhoods where the density of restaurants is too high so we can have less competition.

Data description

In order to carry out the analysis described above, the first step is to determine the data required to carry it out. For this purpose, the following repositories have been consulted:

- Data on the different neighborhoods in each district of Barcelona[1]: the city of Barcelona is divided into 10 districts, which in turn are divided into a total of 73 neighborhoods. In order to be able to add the postal code to each of the districts I had to do a manual work on the file as I could not find such information already added.

- Population density in Barcelona segregated by neighbourhood[2]: the repository contains information on the surface area of each neighborhood in Barcelona, as well as its population density (both gross and net). I have selected only the attribute corresponding to the number of habitants per unit area of the city of Barcelona (gross population density) and linked it to the previous repository, because it considers the effect of the tourism, and not only the residential density.

- I found a .json file in Github[3] that contains the coordinates of each of the neighborhoods of Barcelona, which we will use to view our results on a map.

- Finally, I have used Foursquare API for looking for the main places of interest of each neighborhood, as well as Arcgis to determine the latitude and longitude of each neighborhood.

Thus, our main repository will contain the following attributes:

- Postal code referred to every neighborhood in Barcelona.
- Name of every neighborhood of Barcelona.
- Poblation: it will always be Barcelona.
- Population density: number of habitants per unit of surface in Barcelona.
- Latitude of each neighborhood.
- Longitude of each neighborhood.

Finally, we will add the venue data of each neighborhood using the Foursquare API.

Using every neighborhood of Barcelona and its common venues, we will perform a K-Mean algorithm and look for those neighborhoods whose most common venues aren't also restaurants, so we can set our new restaurant in a neighborhood without too much competence. At the same time, we will perform a choropleth map using the population density so we can set our restaurant location in a neighborhood that, considering the previous condition, has the highest population density.

References:

1. https://opendata-ajuntament.barcelona.cat/data/es/dataset/20170706-districtes-barris/resource/4cc59b76-a977-40ac-8748-61217c8ff367
2. https://opendata-ajuntament.barcelona.cat/data/en/dataset/est-densitat/resource/c2377d82-774c-4d54-8e56-6c8978189df9
3. https://github.com/martgnz/bcn-geodata/blob/master/barris/barris_geo.json