1. Introduction

The aim of this project is to support a hostel's franchise with valuable information concerning the location where they should open new hostels in Porto, Portugal.

1.1 Background

Porto is a Portuguese northern city. It's an historically developed city that in last 20 years significatively increased tourism, national and foreign. Due to the growing number of tourists, there were a huge investment in business like restaurants, bars, cafes and of course accommodations, like hostels and hotels.

Due to the actual high demand of accommodations, there is a company that is interested to open some hostels in the city and the goal of this project is to suggest at what exact location they should open it.

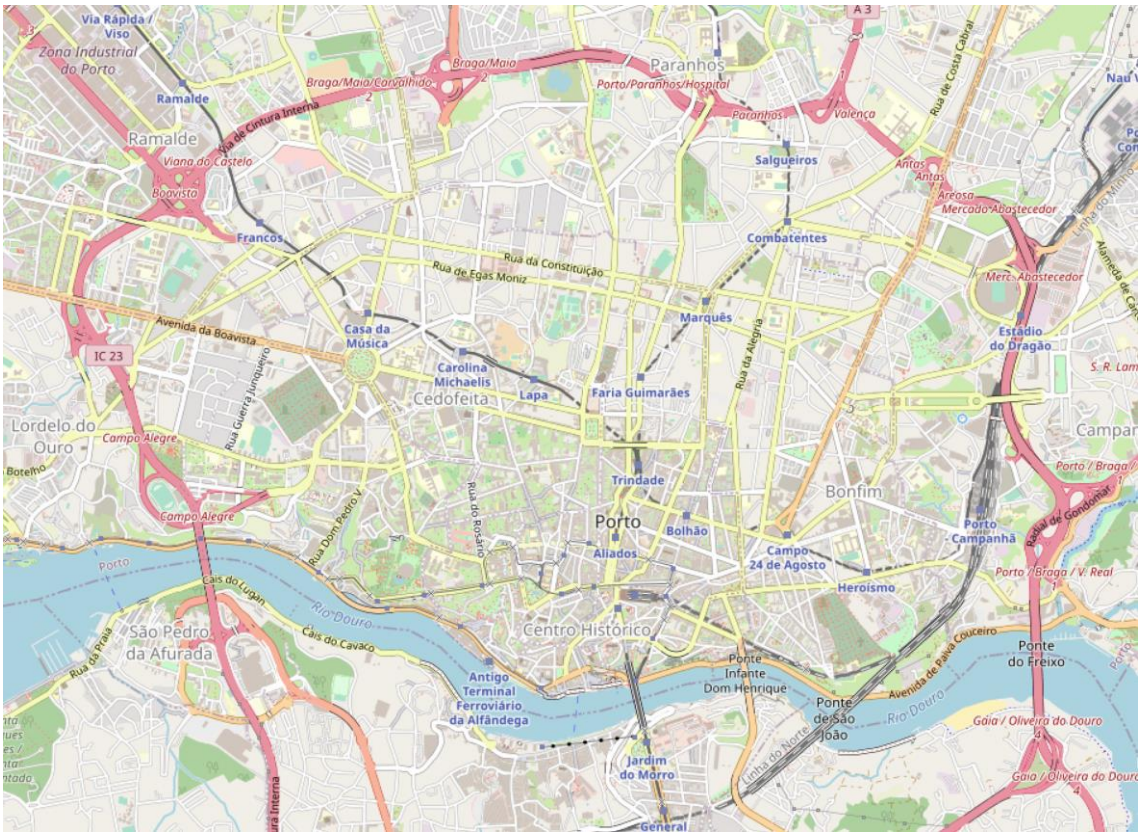

Figure 1 – Porto centre, Portugal.

1.2 Problem description

The company is interested to know what's the best and most profitable locations where they should open the hostels. So, our goal is to analyse datasets and using certain criteria make recommendations.

2. Data

To achieve this goal, we will be using foursquare data, namely the bars, cafes, restaurants, and the already existing hostels locations.

One criterion used to understand the possible location for new hostels was to be close to restaurants, bars, and cafes. Besides taking a walk and explore the city, people are also interested to have fun and eat good food and have it close to their accommodation is always a good idea.

Other criterion used to study the new hostels locations are the analysis of the actual hostels that are already installed in city and its always a good opportunity to open a hostel where there are none.

So, using foursquare API and the search query option it was obtained data of all the restaurants, bars, cafes and hostels in the centre of Porto with the search radius of 3000. There were analysed a total of 78 restaurants, bars, and cafes. Also, there were analysed a total of 50 hostels.

The useful data that was extracted from the datasets were the location coordinates (latitude and longitude) and the name of the businesses. Then, all the data were projected in the map with the proper identification to get insights and better understand the best locations for the new hostels.

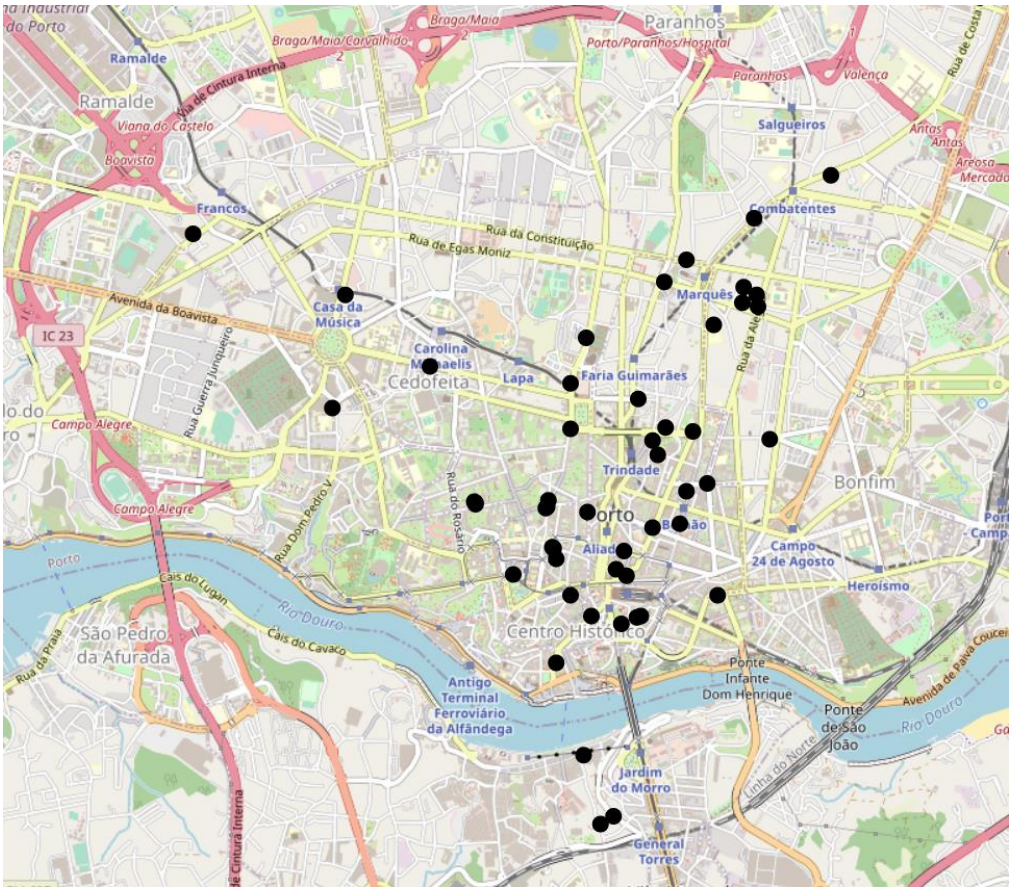

Figure 2 – Hostels in the centre of Porto. (Data extracted from Foursquare)

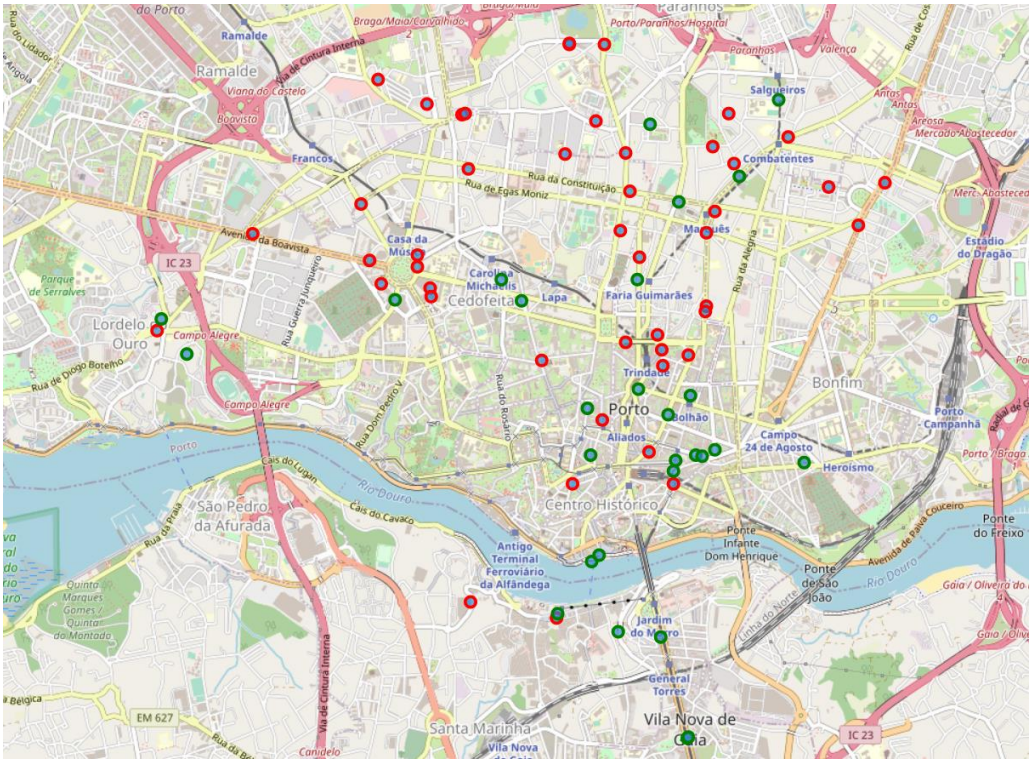

Figure 3 – Bars/Cafes (green) and restaurants (red) in the centre of Porto. (Data extracted from Foursquare)

3. Exploratory Data Analysis

In this section will be described the exploratory data analysis done to achieve the goal to identify the best locations to open new hostels.

After extracting and cleaning the data, it was time to use Folium maps to get better insights of bars, cafes, restaurants, and hostels locations. The main goal of these visualizations was to identify the locations where could be an opportunity to open new hostels. In figure 4, presented next, we can observe a map containing bars, cafes, restaurants, hostels.

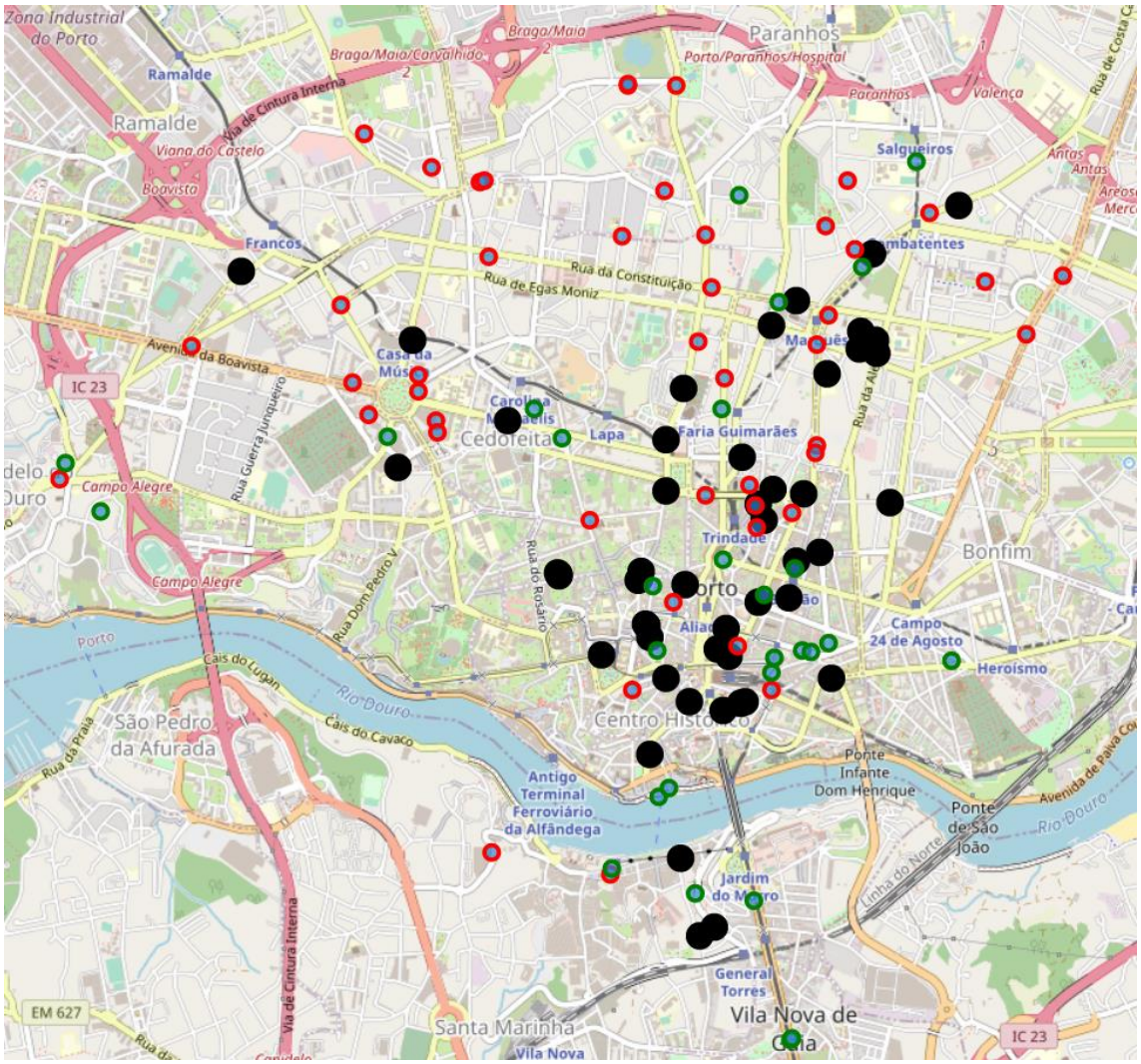

Figure 4 – Bars (green), restaurants(red) and hostels (black) in Porto centre.

By observation we can conclude that there are some areas that have highly concentrated hostels installation (close to river in the historic centre of Porto) and also there are areas with low or non-existent hostels network. As it was mentioned earlier,

one criterion we use to get a location for opening new hostels is the bars and restaurants presence nearby.

So, the next steps were to cluster (using K-Means Neighbours) the bars and restaurants by geographical locations.

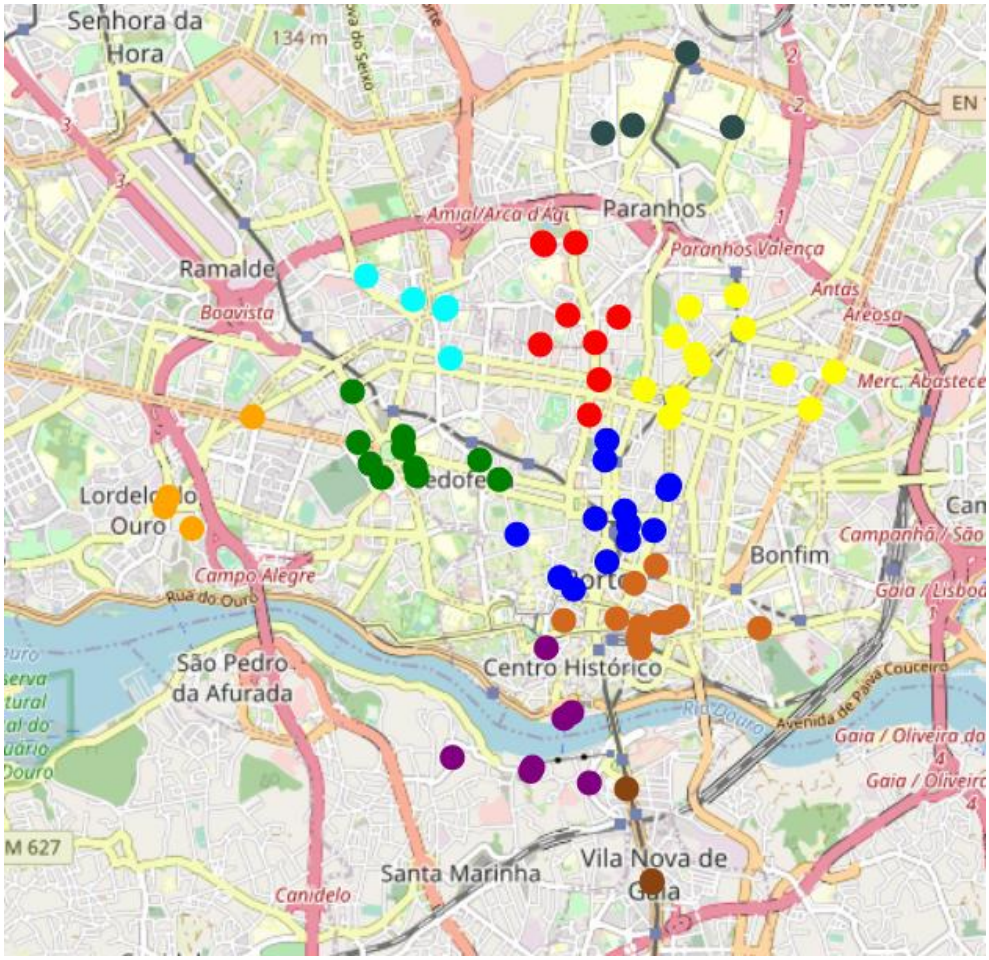

Figure 5 – Bars and restaurants clustering (10 clusters).

This clustering information will help us when we add the hostels locations because it will clearly show us where are the regions that have a lack of hostels and consequently can be an opportunity to open new hostels. In the next figure, we can see the superposition of clustered restaurants and bars with the hostels locations.

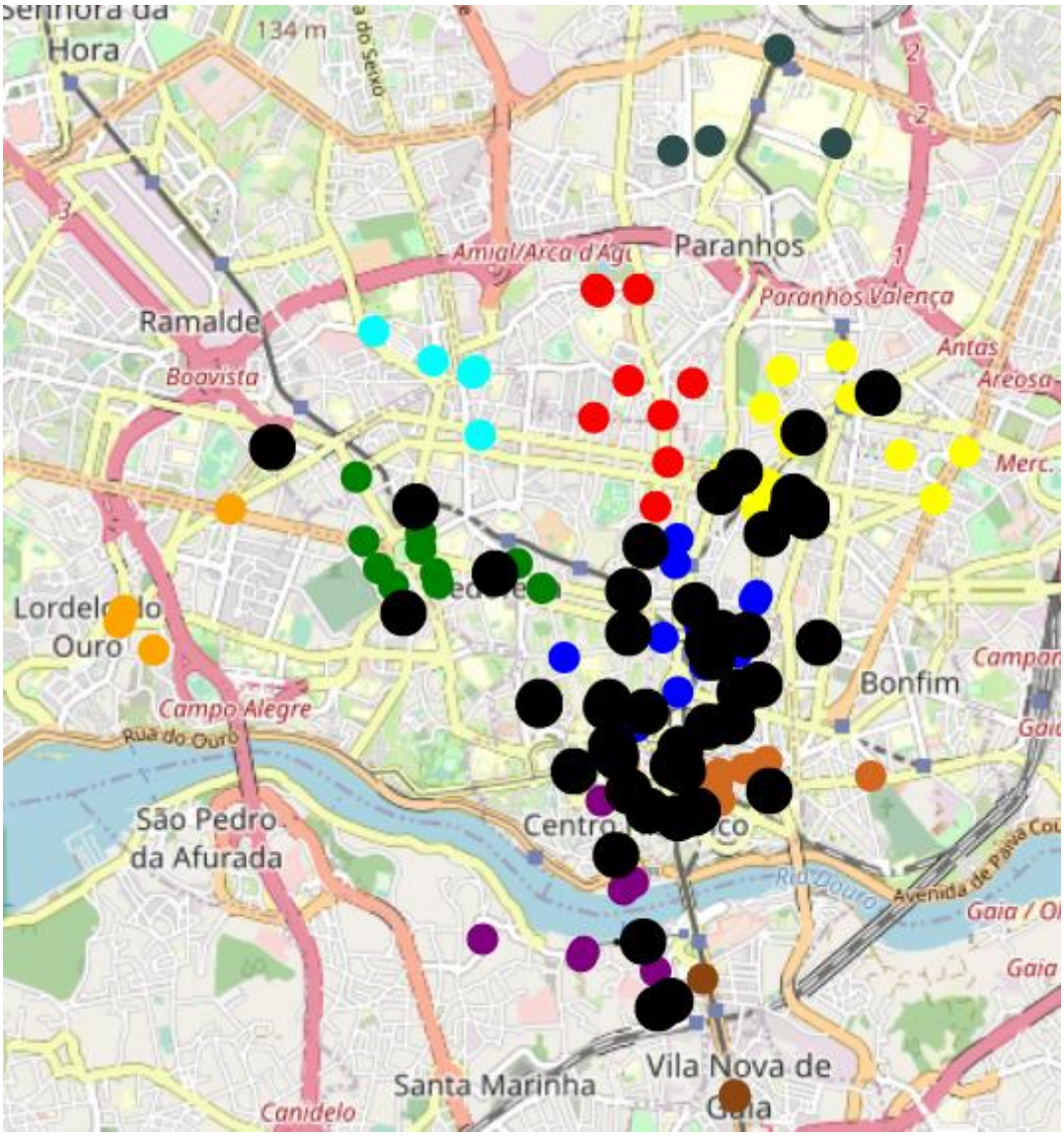

Figure 6 – Clustered restaurants and bars (coloured points) and Hostels (black points).

In this figure we can see the high density of hostels in the Porto historic centre, so maybe opening a hostel there wouldn't be the best idea. On the other hand, we also see some regions (orange, light blue, red and dark grey) that don't have any hostel nearby. So, let's focus on these regions, discussing these topics in next section.

4. Results discussion

In this section we will discuss the results and recommend the best locations to open new hostels in Porto centre.

In next figure we can observe the 4 possible locations to open new hostels.

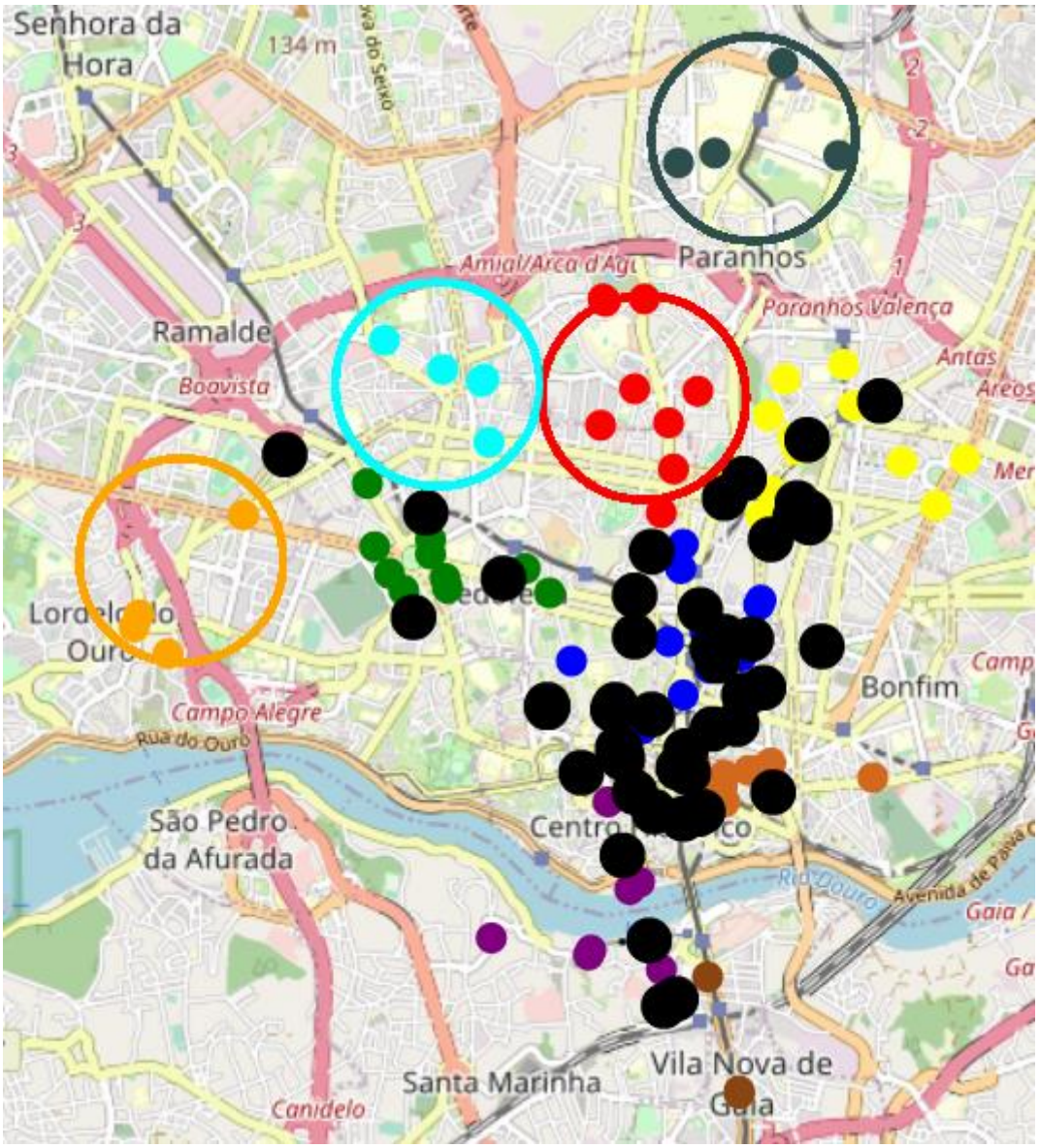

Figure 7 – Clustered regions as opportunity to open Hostels.

In this figure we can see 4 regions identified with big circles. If we observe closely, we can see that the red region is the densest in restaurants and bars, so it may be a good idea open a new hostel there. We also see the light blue region with no hostels nearby, despite there are only 4 restaurants in the region, its close to green and red regions (red don't have any and green only have 4 hostels) so it also may be a good idea to open a hostel there. In the end, we have the orange and dark grey regions, that unfortunately only have 4 restaurants there, so our recommendation is not opening or opening a small one.

5. Conclusion

Using python programming and Foursquare databases to analyse restaurants, bars, and hostels locations in Porto city centre, it was possible to recommend to our client where to open new hostels.

The analysis concluded that there are 2 strongly recommendable regions to open hostels and 2 regions that weakly recommended.