

Where to open your new restaurant in Sasebo

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A. Introduction

If you are planning to open your new restaurant, you may be interested in where you should open it. We must consider a lot of factors such as house prices, the neighborhoods' salary, the cost of materials, water, light, and gas, etc. In this paper, I focus on the population of the town and trend.

A.1 Background

These days, a lot of restaurant is having difficulty in running because of COVID-19. We are restricted to go out and We must do everything nearby my home. On the contrary, supermarket is very crowded because everybody stays home and must purchase foodstuffs at it. In this situation, I got thought that if a restaurant which deals with dishes to go or only dishes to go, like BENTO is in residential area, it is not influenced by the unpredictable accidents. Based on this assumption, I want to pick up the place that must be suitable for the restaurant.

A.2 Problem

I set the problem that one of my friends told that 'Please tell me where should open my new restaurant? Search the population of each town and tell where is looks good.' So, I must search the population and restaurants in each town.

B. Data

B.1 Sasebo

I chose the town: Sasebo, Nagasaki Pref. Japan, because it is my hometown. Sasebo has a lot of spot that is worthy of an eat and visit. Sasebo hamburger contains egg, bacon, tomato, lettuce, beef, spice and so on. It has affected by U.S. Military base. Sasebo has '99 islands' and we can see a beautiful sunset. One tip is that the number of '99 island' is not and 99 but 208. If you interested in Sasebo, please visit, and enjoy sightseeing.

B.2 Data URL

The Latitude and Longitude of town data(1st data) is [here](#). To download it, you must agree

with the rule. Population data(2nd data) is [here](#), and polygon data(3rd data) is [here](#). These sites are written in Japanese language and it may be hard to understand it. However, if you click download link or ‘ダウンロード’ button, you can download them.

B.3 Data Structure

1st data is csv file and 6th to 8th column is the name of neighborhoods, Latitude, Longitude.

2nd data is xlsx file and columns mean from right: KEY_CODE, population of neighborhoods, name of neighborhoods, population of man, population of woman, the number of households.

3rd data is geojson file and contains polygon data.

B.4 Data Preprocess

3rd data does not need preprocessing. I changed column name of 1st and 2nd data. I used 1st data of ['緯度', '経度', '大字町丁目名', '大字町丁目コード'] and rename them into {'緯度': 'Latitude', '経度': 'Longitude', '大字町丁目名': 'Neighborhood', '大字町丁目コード': 'code'}. I converted column name of 2nd data into ['KEY_CODE', 'population', 'Neighborhood', 'man', 'woman', 'households'].

C. Methodology

1. Get latitude and longitude data of towns from 1st data and explore around the town by using Foursquare API.
2. Using 2nd and 3rd data, cluster the town and plot Choropleth maps of population, households, people per household.
3. Take a cloth look at cluster.

D. Result

I show down three choropleth maps and a bar plot.

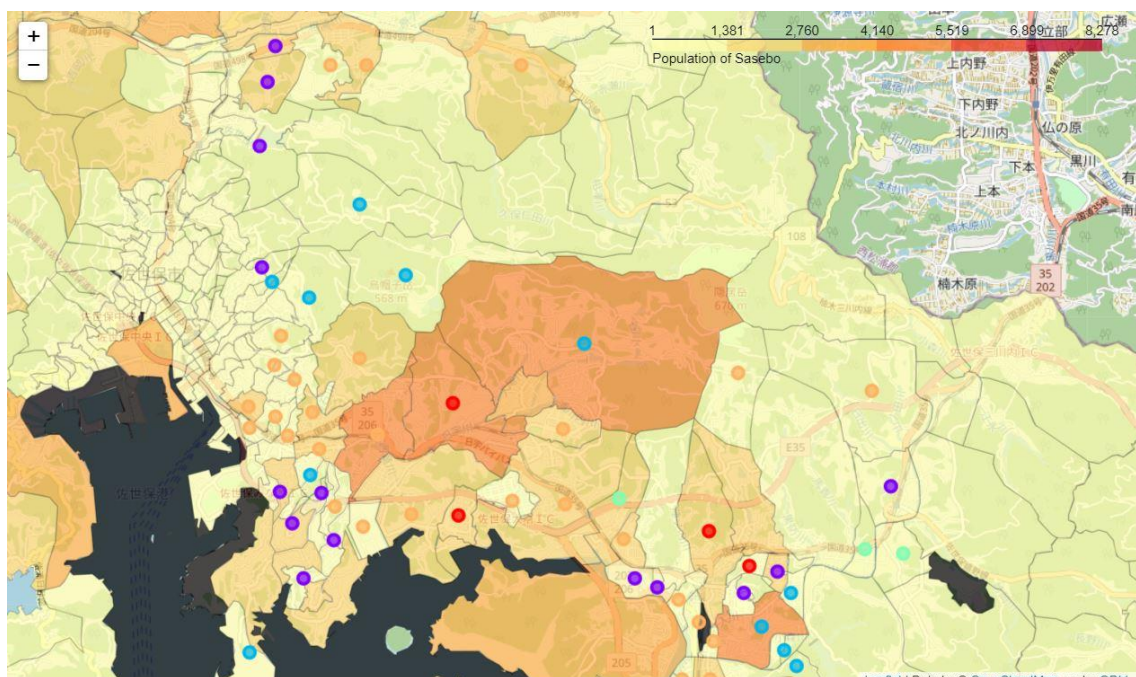


Fig 1 People per town

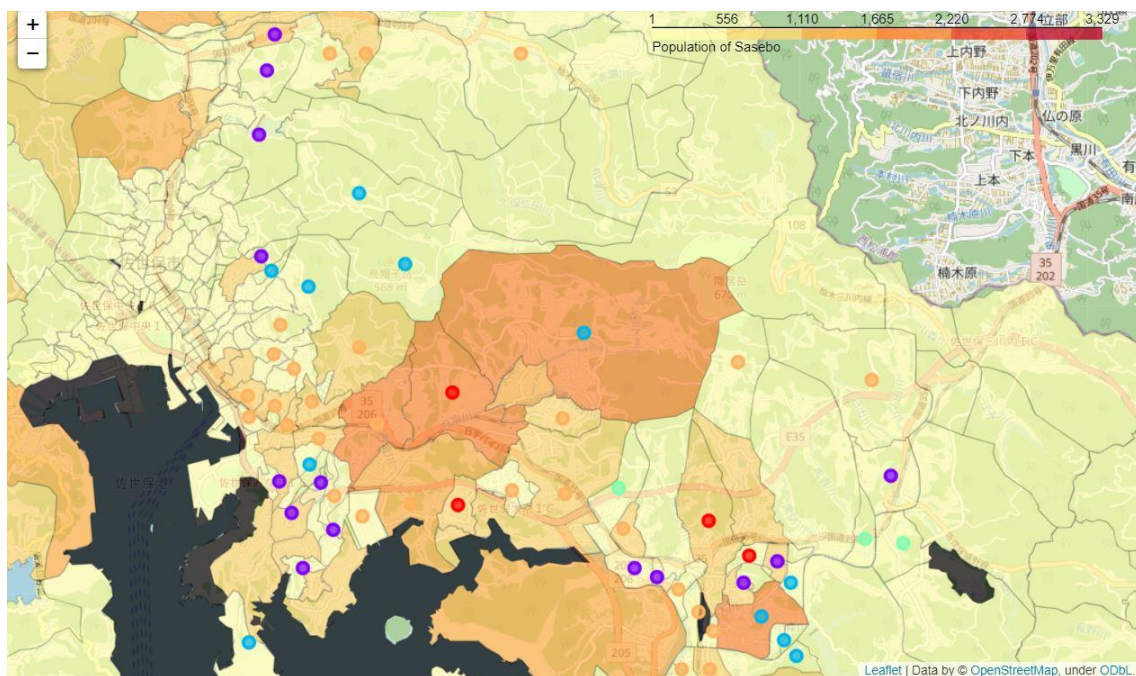


Fig 2 Households per town

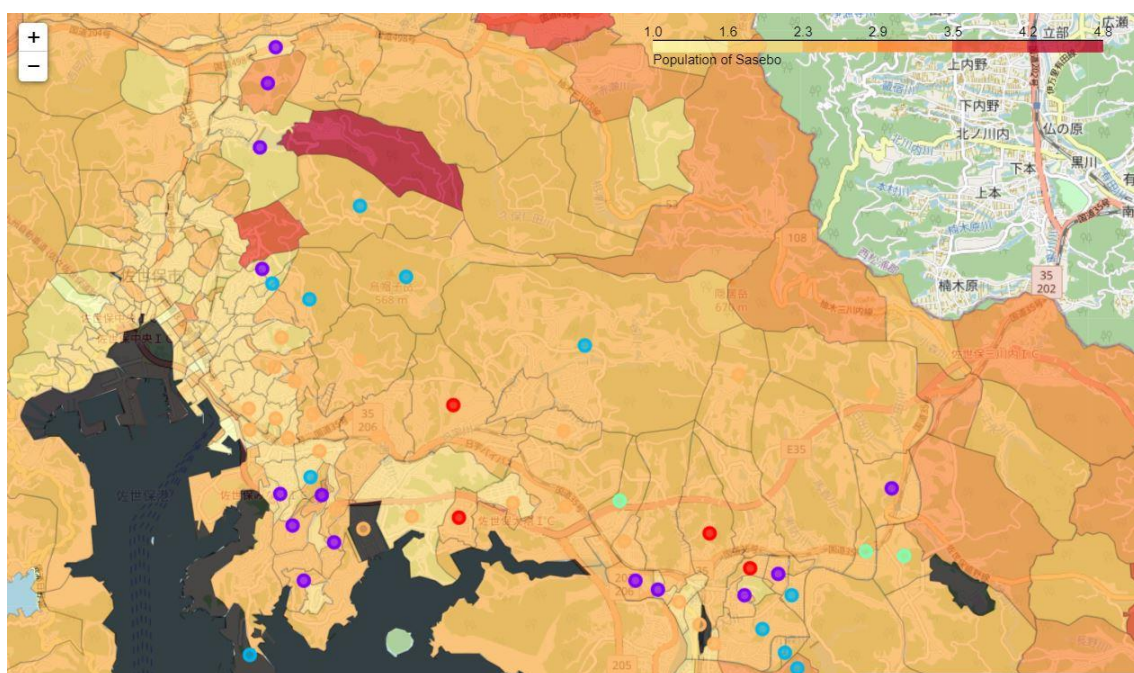


Fig 3 The number of people per town

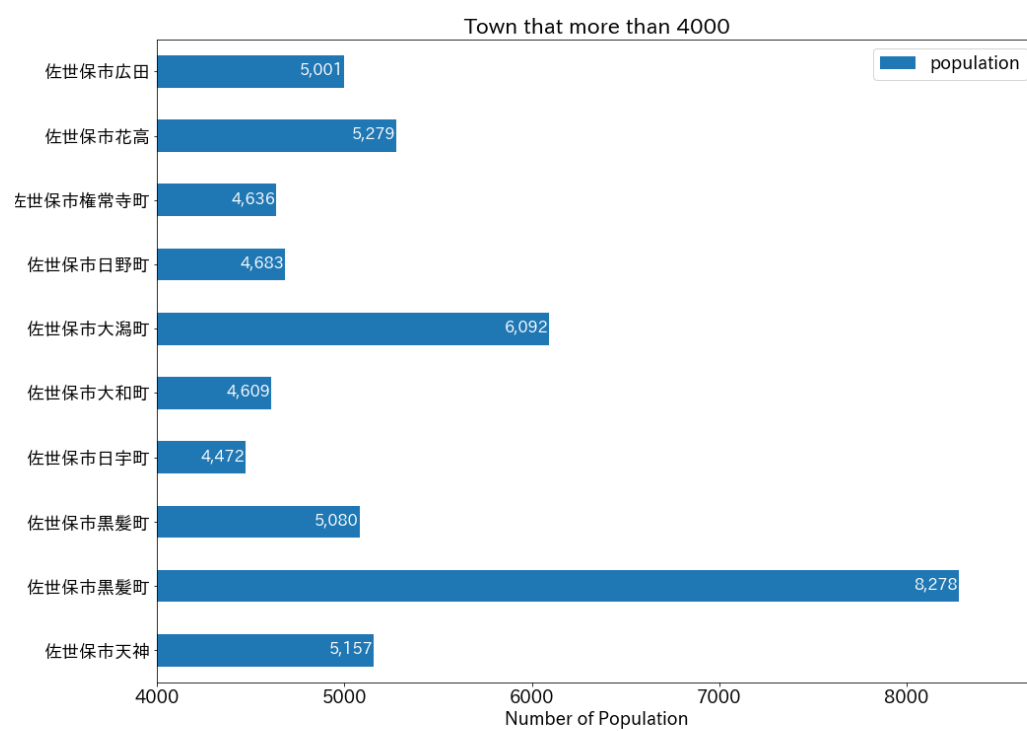


Fig 4 Town that more than 4000 population

The cluster color is 1. red, 2. purple, 3. blue, 4. yellow green, 5. orange.

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
51	大岳台町	Cosmetics Shop	Restaurant	Café	Yoshoku Restaurant
110	早苗町	Café	Convenience Store	Pharmacy	Yoshoku Restaurant
218	花高二丁目	Café	Convenience Store	Grocery Store	Food & Drink Shop
227	日宇町	Café	Yoshoku Restaurant	Farmers Market	Department Store

Table 1 Cluster 1 (Red Marker)

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
64	勝海町	Convenience Store	Bus Station	Motorcycle Shop	Dumpling Restaurant
107	桜木町	Convenience Store	Trail	Park	Bus Stop
108	指方町	Convenience Store	Shop & Service	Japanese Restaurant	Farmers Market
164	瀬戸越一丁目	Convenience Store	Supermarket	Historic Site	Athletics & Sports
165	瀬戸越二丁目	Convenience Store	Japanese Restaurant	Burger Joint	Sushi Restaurant
170	大黒町	Convenience Store	Gym	Farmers Market	Department Store
174	高梨町	Hotel	Shrine	Park	Convenience Store
187	天神一丁目	Department Store	Memorial Site	Convenience Store	Park
189	天神三丁目	Convenience Store	Department Store	Sake Bar	Bakery
190	天神四丁目	Convenience Store	Diner	Cosmetics Shop	Department Store
191	天神五丁目	Convenience Store	Sushi Restaurant	Grocery Store	Department Store
210	早岐三丁目	Convenience Store	Hotel	Intersection	Luggage Store

Table 2 Cluster 2 (Purple Marker)

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
29	烏帽子町	Park	Bus Stop	Yoshoku Restaurant	Farmers Market
82	黒髪町	Coffee Shop	Park	Candy Store	Yoshoku Restaurant
96	小佐世保町	Park	Shrine	Yoshoku Restaurant	Electronics Store
102	権常寺町	Restaurant	Diner	Park	Electronics Store
106	崎辺町	Park	Bus Stop	Yoshoku Restaurant	Farmers Market
149	須佐町	Hotel	Park	Shrine	Electronics Store
178	田代町	Bus Stop	Yoshoku Restaurant	Farmers Market	Department Store
203	中原町	Park	Lake	Yoshoku Restaurant	Farmers Market
220	花高四丁目	Park	Bus Stop	Yoshoku Restaurant	Farmers Market
230	東山町	Park	Grocery Store	Bus Stop	Yoshoku Restaurant
240	広田町	Park	Lake	Yoshoku Restaurant	Farmers Market

Table 3 Cluster 3 (Blue Marker)

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
113	塩湊町	Intersection	Yoshoku Restaurant	Fast Food Restaurant	Department Store
144	新替町	Intersection	Yoshoku Restaurant	Fast Food Restaurant	Department Store
182	田の浦町	Intersection	Italian Restaurant	Yoshoku Restaurant	Farmers Market
223	針尾中町	Intersection	Yoshoku Restaurant	Fast Food Restaurant	Department Store
225	針尾東町	Intersection	Yoshoku Restaurant	Fast Food Restaurant	Department Store

Table 4 Cluster 4 (Yellow Green Marker)

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue
10	稲荷町	Bus Stop	Convenience Store	Dessert Shop	Japanese Restaurant
24	浦川内町	Motel	Yoshoku Restaurant	Farmers Market	Department Store
53	大宮町	Kids Store	Bus Stop	Video Store	Restaurant
55	沖新町	Noodle House	Department Store	Pastry Shop	Shopping Mall
60	卸本町	Convenience Store	Restaurant	Thrift / Vintage Store	Italian Restaurant
74	木風町	Italian Restaurant	Bakery	Yoshoku Restaurant	Fast Food Restaurant
80	口の尾町	Golf Course	Yoshoku Restaurant	Farmers Market	Department Store
101	権常寺一丁目	Train Station	Convenience Store	Yoshoku Restaurant	Tea Room
105	崎岡町	Noodle House	Japanese Restaurant	Yoshoku Restaurant	Farmers Market
114	潮見町	Hotel	Convenience Store	Train Station	Japanese Restaurant
139	白木町	Convenience Store	Supermarket	Deli / Bodega	Pharmacy

Table 5 Cluster 5 (Orange Marker)

Discussion

First, we can find that there are population gap between towns. This means that They have different features.

In addition, the number of people per household become less near the main road.

Cluster 1 has a Café in their town. Cluster 2 has a Convenience Store. Cluster 3 has a Park and a variety range on population. Cluster 4 is located near an Intersection.

Let's focus on Cluster 3 (Blue Marker). I group up them into 3 group: Northeast, Southeast, and the other group. First, the other group is unclear. Second, northeast group has very large area and huge population. However, it does not have Super Market or Convenience Store. It looks like good place to start new restaurant. One tip is, because they have very large area, we must carefully search estate and traffic volume. Southeast group have less population than

Northeast group, but it is easy to search around because they have small area. Compared to the other group, Northeast and Southeast group can be said that is more desirable choice.



Conclusion

It became easy to be able to predict where is suited for newly opening restaurant by using town position data, polygon data, and plotting a bar chart and choropleth maps. However, this is not enough to decide the place. I must take count on other factors: land price or rent price, utility charges, average salary of the town, convenience of transportation, and so on. It is important to search from other aspects. Then I must decide where is the best.

Preference

1. 西九州させぼ広域都市圏オープンデータポータルサイト <https://odcs.bodik.jp/sasebo-toshiken/>
2. 国土交通省 国土数値情報、位置参照情報、国土調査（土地分類・水基本調査）成果 <https://nlftp.mlit.go.jp/index.html>