Din Tai Fung’s competitors in Seattle

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## Background and Business Problem

Din Tai Fung is one of the most famous dumpling places around the world. Nowadays, Din Tai Fung has branches in Japan, the United States, South Korea, Singapore, China, Hong Kong, Indonesia, Malaysia, Australia and Thailand.

In Seattle, for example, there are already 4 branches of Din Tai Fung. Customers are wondering about the dumpling restaurants that might be as good as or even better than Din Tai Fung. Who are Din Tai Fung’s competitors in Seattle? Can we cluster them into different tiers?

To answer these questions, we get Din Tai Fungs’ and their nearest dumpling restaurants’ branch numbers and ratings within 30km of distance from Foursquare API, and their specialty (Pork/Chicken Dumpling)’s price from menus posted by customers on Google. We use all these data to perform the K-means Clustering and identify the key competitors.

Identifying these competitors can help Din Tai Fung conduct better competitor analysis in order to improve their competitiveness in Seattle and make Seattle dumpling lovers aware of other great dumpling restaurants.

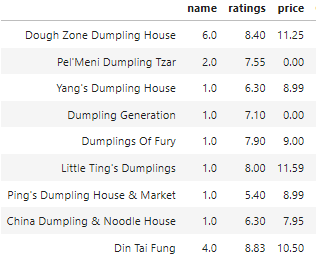
1. Data acquisition and cleaning

First, we want to get each Din Tai Fung branch’s rating in Seattle from Foursquare API and calculate the average rating of Din Tai Fung in Seattle. It is 8.825.

To get the numbers of competitors around each Din Tai Fung branch, we set the distance to be 30km. We drop off the duplicate values and get the rating for each competitor. There are some dumpling restaurants that do not have any ratings, we’d assume that these are not that popular and are not worth considered to be Din Tai Fung’s major competitors. We also count the number of branches for some chain dumpling restaurants.

We also want to consider the general pricing for each dumpling restaurant. We’d assume that each dumpling restaurant’s specialty is pork/chicken dumplings (this is also the major reason why people go to Din Tai Fung), and its price can represent the general pricing for the restaurant. We get the prices from the menus that customers uploaded on Google. We set some price to zero of some nearby dumpling restaurants because they do not have any related dumpling dishes like Din Tai Fung’s even though they are categorized as Dumpling Restaurant on Foursquare API.

We merge the all the information, and we get this table.



where Name stands for the number of branches, Ratings stands for the average rating of all the branches for a restaurant, and Price is the specialty dish’s price in a restaurant.

1. Methodology

1. Exploratory Data Analysis

Let’s leave out the number of branches in the table for a while, by creating the visualization of just ratings and price, we would like to see clusters of similar restaurants.

![A close up of a map

Description automatically generated](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RDuRXhpZgAATU0AKgAAAAgABAE7AAIAAAAMAAAISodpAAQAAAABAAAIVpydAAEAAAAYAAAQzuocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAEdsb3JpYSBUYW5nAAAFkAMAAgAAABQAABCkkAQAAgAAABQAABC4kpEAAgAAAAM0NwAAkpIAAgAAAAM0NwAA6hwABwAACAwAAAiYAAAAABzqAAAACAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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From the above graph, we can tell Din Tai Fung is very close to Dough Zone Dumpling House, Dumplings of Fury, and Little Ting’s Dumplings. They might be clustered as a group with Din Tai Fung and be considered as the biggest competitors with Din Tai Fung. However, further information still needs to be considered, such as the size of the brand.

2. K-Means Clustering

K- Means Clustering is used in this problem because we want to know the feature similarity of the dumpling restaurants and group the similar ones together. The features we are considering are the number of branches, average rating of all the branches, and pricing. Here, we set that K is equal to three. Of course, the restaurants who belong to the same cluster as Din Tai Fung (Cluster 0) are its biggest competitors, who needs to be paid close attention to.

1. Results

![A screenshot of a cell phone

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As we can see from the table, Dough Zone Dumpling House is the only one that is clustered in the same group as Din Tai Fung, it makes sense because they have very similar numbers of branches, ratings and pricings. Cluster 1 can be left out because they do not have relevant products as Din Tai Fung, so cannot be considered as direct competitors. Cluster 2 is also worth noting, because even though all of them have only 1 branch, they still have their competitive advantages in either lower price or decent rating.

In the below discussion session, we will focus mostly on Dough Zone Dumpling House, given its significant similarity with Din Tai Fung.

1. Discussion and Concerns

Din Tai Fung can improve their business in the following ways:

1. Expand their business in Seattle since they have already done a good job providing high quality food and service with an average rating of 8.83
2. To gain more profits, Din Tai Fung can increase their general pricing level slightly higher than their current level but no more than Dough Zone Dumpling House’s pricing level.
3. From the tips on Foursquare API for these two restaurants, they are both very popular and the wait time is usually 20-30 min. Shortening the wait time is also a good way to attract more customers and compete against Dough Zone.

Based on the results, it seems that Din Tai Fung outperforms Dough Zone Dumpling House with its lower pricing and higher ranking, but given the very small sample sizes, we can not conclude if these are statistically significant or not.

Another concern is that, given the limited data access, the selected features might not be totally representative and comprehensive. If more information can be disclosed such as revenues and the number of dumplings provided in each serving, the model would be more precise.

1. Conclusion

In this study, we identify Din Tai Fung’s competitors in Seattle from Foursquare API data. We select the number of branches, average rating of all the branches, and pricing as our features, and conduct K-means Clustering on these competitors. We conclude that Dough Zone Dumpling House is Din Tai Fung’s biggest competitors, who Din Tai Fung should keep an eye on. Din Tai Fung so far has done a very good job amongst all the competitors, but things can still be improved to maintain their competitiveness and improve their profitability such as brand expansion, price increase, and wait time shortening. This study would be beneficial for Din Tai Fung as a business in the way that it gives information about its key competitors in Seattle and helps prepare for the future challenges that its competitors might bring on.