

Using machine learning to find a optimum location for opening a restaurant in Wayne county, Michigan.

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1. INTRODUCTION

1.1 Background: Location is one of the key factors for success of a restaurant, especially at the beginning. Many restaurants are popular because of their location. When looking for a restaurant location the one of the main factors to consider is the neighborhood. The key questions that need to be asked about the neighborhood are: Who is doing business in the neighborhood - successful businesses attract other successful businesses-? How many restaurants, similar as yours are in the neighborhood? How busy is the neighborhood? Other information that can be incorporated in selecting a neighborhood is the presence of other businesses that attract people to your restaurants. This includes sports stadium, major medical facility and theaters. For example, moviegoers often stop by to eat in restaurants before or after the show, therefore the presence of such attraction is a plus. The other factor that needs to be considered is the population size. The neighborhood should have enough people to support your restaurant. There should be enough people who live in or pass through the area regularly to keep you busy.

1.2 The problem: Having a successful restaurant depends on multiple key factors that goes beyond the quality of the food and the service. Choosing to open a restaurant without considering those key factors could possibly lead to a fail. One of the key factors for a successful is choosing the location.

1.3 **Target Audience:** Entrepreneurs who plan to open a restaurant in Wayne country in Michigan.

2. **Data:** The following data will be used with machine learning (k-mean) in identifying a potential location for a successful restaurant in Michigan.

- List of all neighborhoods and the population in Wayne Michigan from Wikipedia will be extracted.
- Latitude and longitude of those neighborhoods will be collected using Geocoder package.
- Venues (e.g Restaurants, theaters) in the neighborhood within a diameter of 1000 m will be extracted using Foursquare API.
- K-mean machine learning will be used to cluster the neighborhood and neighborhoods with high number of venues (e.g. restaurants) and more populated will be identified as an optimums location to open a restaurant.