Recommending a Location for a Lunch Restaurant in Memphis, Tennessee

David Sears

June 16, 2020

Table of Contents

Introduction

Background

After building a successful restaurant five years ago, an entrepreneur has an idea for a new restaurant that she would like open in Memphis, TN. She will be meeting with potential investors and is preparing her pitch for startup funding. In order to refine her idea and improve her presentation to investors, she has solicited the help of an analyst to recommend a neighborhood in Memphis for the restaurant. The entrepreneur plans to use the analysis and findings to inform her decision on the restaurant location as well as strengthen the investable story that she will present to prospective investors.

Business Problem

An entrepreneur is interested in opening a new restaurant in the Memphis, TN area and would like to determine a good location. Specifically, she would like to open a lunch restaurant that would appeal to workers on their lunch break. Typically, workers have a specific amount of time for lunch, and it is important to have dining options within close proximity to their workplace. The goal is to uncover a business opportunity in Memphis by finding an area with a significant number of workplaces and a relatively low number of food venues.

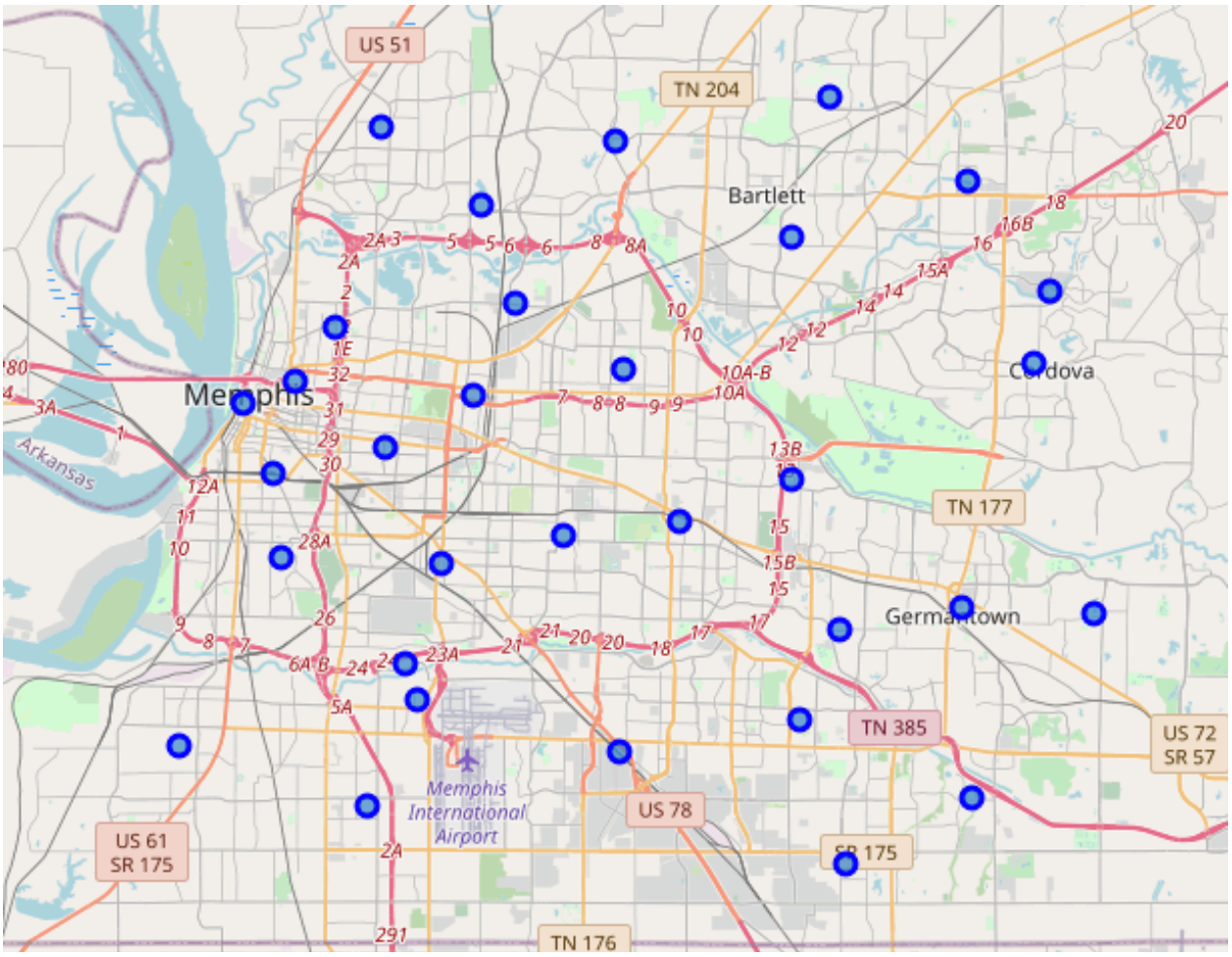
Interest

The entrepreneur in Memphis is interested in this project to improve the likelihood of success of her new restaurant and to improve her chances of securing startup funding for the venture. This project could also be of interest to entrepreneurs in other cities since it seeks to identify an area where there is low supply and high consumer demand.

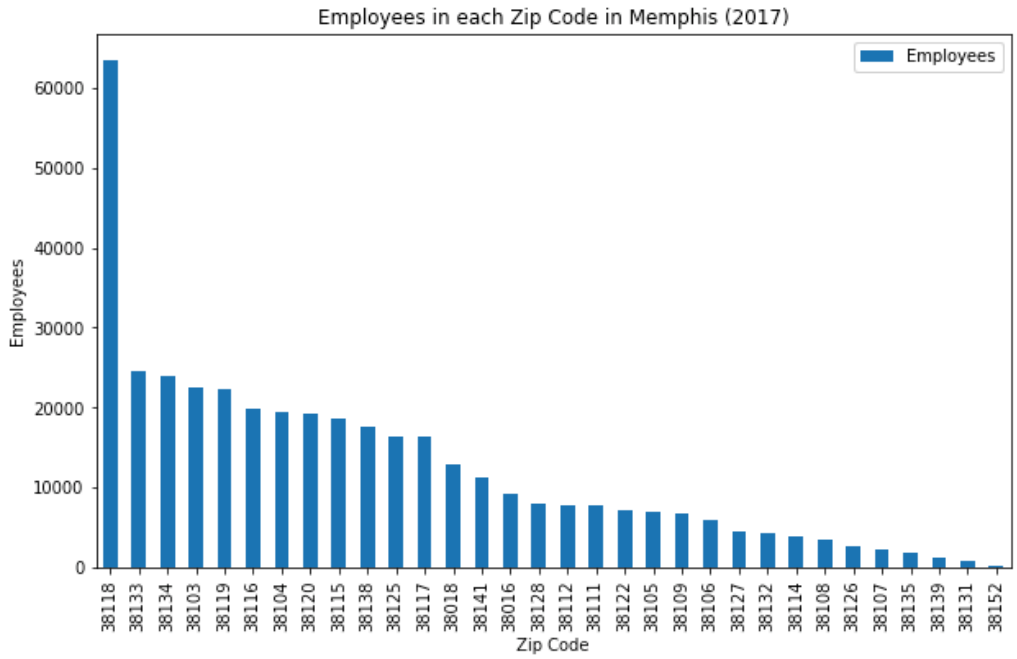
Data

Data Sources

A CSV file containing Memphis Zip Codes and geographic coordinates was downloaded from Opendatasoft (https://public.opendatasoft.com/explore/dataset/us-zip-code-latitude-and-longitude/table/?refine.state=TN). Below is a map of the geographic data with markers for each Zip Code.



The United States Census Bureau provides data on businesses with paid employees within the U.S. at the ZIP Code level (https://www.census.gov/data/developers/data-sets/cbp-nonemp-zbp/zbp-api.html). A JSON file was downloaded from the US Census Bureau with the number of establishments and employees in each Memphis area Zip Code. Below is a bar chart of the employment data.



The location and proximity data of food venues in Memphis, TN came from Foursquare's venue datasets. Foursquare's venue categories (https://developer.foursquare.com/docs/build-with-foursquare/categories/) includes the main category of 'Food' which contains many subcatgories of food venues. The Food category and subcategories data will be used to find food venues near Memphis Zip Codes. Below is a dataframe of the top 10 rows of the venue data.

	Zip	Zip Latitude	Zip Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
0	38016	35.177475	-89.776835	Mothers Home Cooking	35.174643	-89.784228	Fried Chicken Joint
1	38018	35.157681	-89.782490	Pacific Fusion Buffet & Grill	35.156362	-89.793242	Asian Restaurant
2	38018	35.157681	-89.782490	G. Alston	35.156372	-89.777670	Restaurant
3	38018	35.157681	-89.782490	Cafe Cordova	35.156260	-89.777590	American Restaurant
4	38018	35.157681	-89.782490	Wasabi Sushi & Sake Bar	35.155331	-89.792775	Japanese Restaurant
5	38018	35.157681	-89.782490	Mikado Sushi & Sake Bar	35.155233	-89.792956	Sushi Restaurant
6	38103	35.146131	-90.053400	Flight Restaurant and Wine Bar	35.144260	-90.053297	Tapas Restaurant
7	38103	35.146131	-90.053400	Maciel's Tortas & Tacos	35.144000	-90.053038	Mexican Restaurant
8	38103	35.146131	-90.053400	McEwen's	35.144030	-90.052621	American Restaurant
9	38103	35.146131	-90.053400	The Little Tea Shop	35.144443	-90.054051	Southern / Soul Food Restaurant

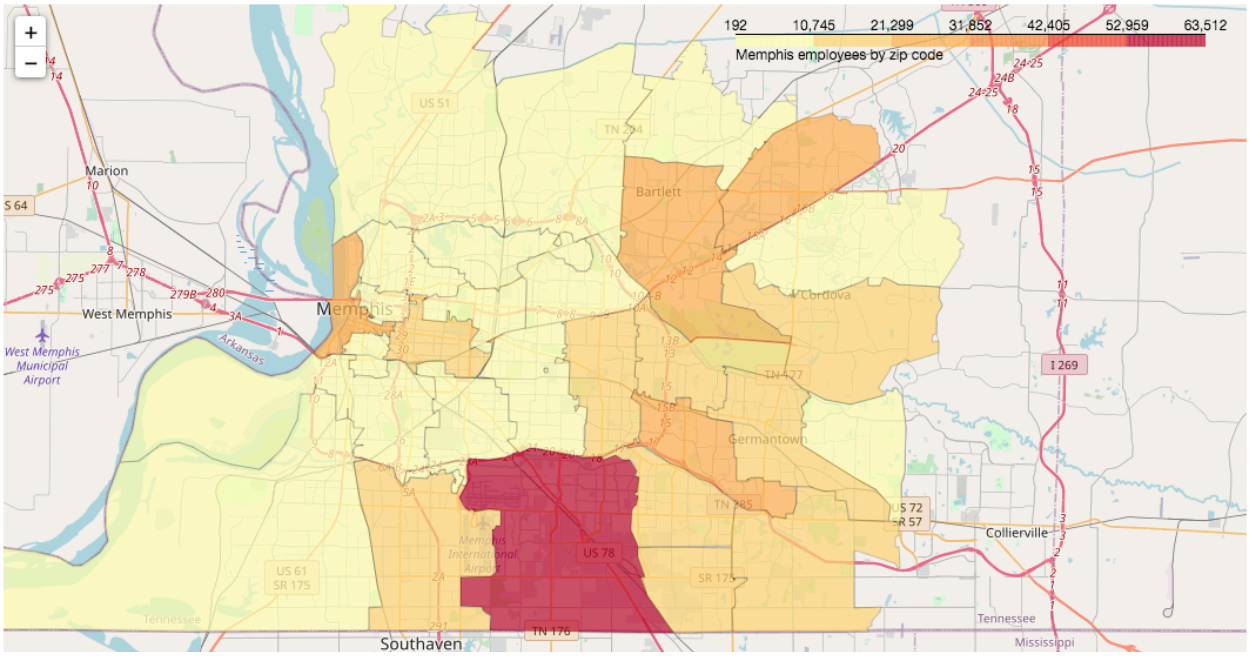
Methodology

In order to recommend a good location for a lunch restaurant, the goal is to find an area with a high number of employees and relatively low number of food venues. Although not all employees work the same schedule, it is assumed for the purposes of this project that most employees reflected in the data work a regular daytime schedule.

The Zip Code geographic data was obtained from Opendatasoft. The employment data was acquired from the United States Census Bureau. The location and proximity data of food venues came from Foursquare. Dataframes were then used to explore and clean the data in order to conduct the analysis.

Data analysis will be used to find which Zip Codes have a relatively low number of food venues per number of employees. This will be determined by grouping the venues within 1000 meters of each Zip Code to find the total number food venues for each Zip Code. The total food venues will then be divided by number of employees for each Zip Code and then multiplied by 2500. This formula will show the number of food venues per 2500 employees for each Zip Code.

The Zip Code with the lowest number of food venues per 2500 employees will be a top candidate to recommend as a business opportunity for a new lunch restaurant. The choropleth map below was generated from the employment data in each Zip Code. Before making a final recommendation, this map will be reviewed in light of the findings.



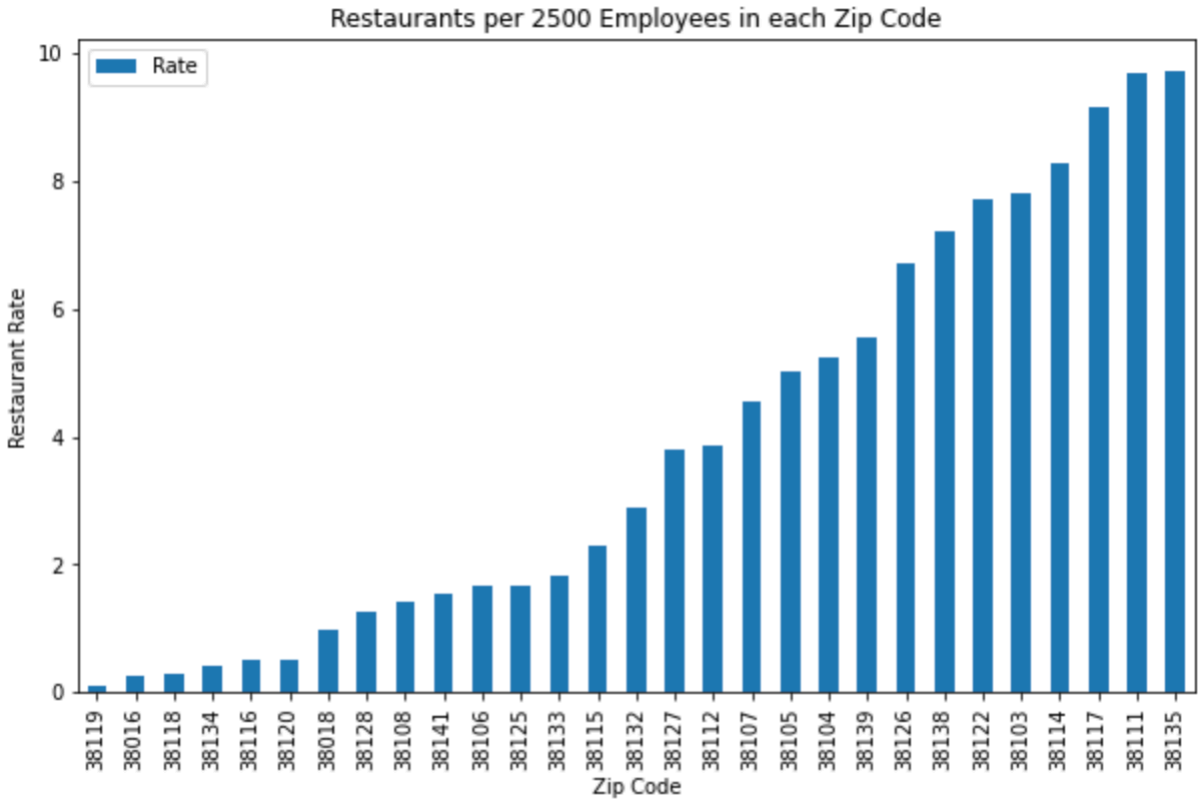
Analysis

The first step in the analysis is to group the venues for each Zip code into a new dataframe to see the total number of food venues for each Zip Code. This dataframe is then joined with the employees dataframe to prepare to calculate the restaurants per number of employees. The image to the right shows the top five rows of the joined dataframe. The total number of food venues is then divided by number of employees and then multiplied by 2500 for each Zip Code. This formula gives the number of food venues per 2500 employees for each Zip Code.

	Zip	Employees	Venue
0	38118	63512	7.0
1	38133	24576	18.0
2	38134	24005	4.0
3	38103	22431	70.0
4	38119	22368	1.0
5	38116	19910	4.0

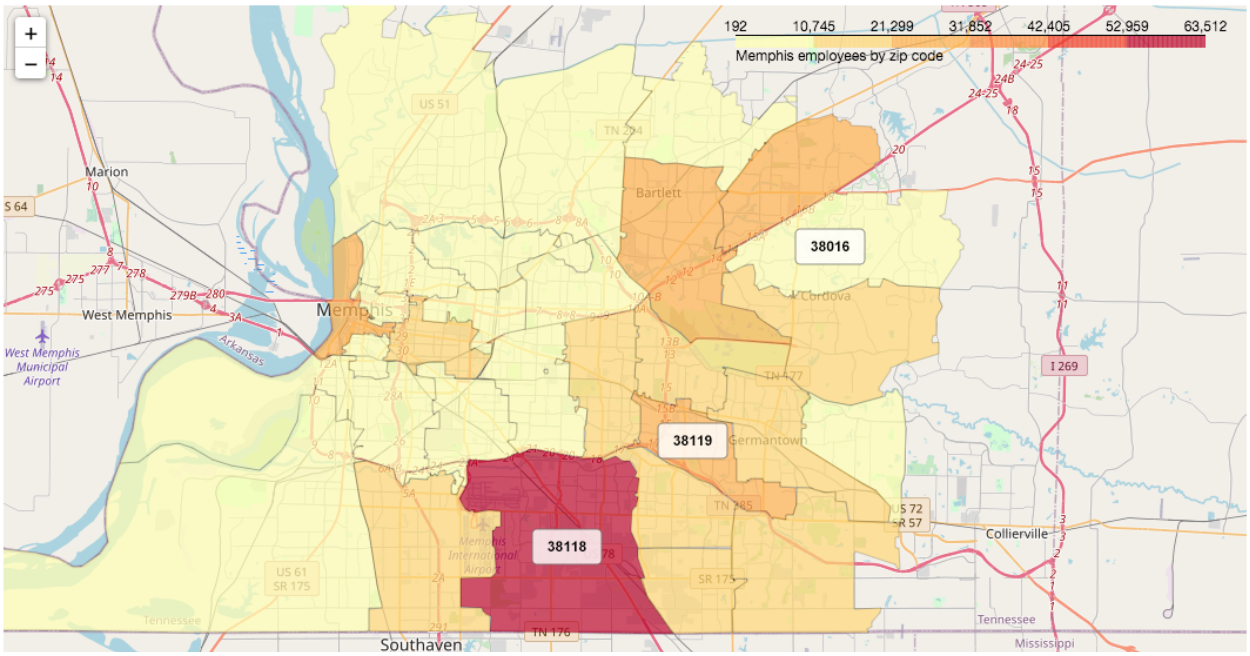
Results

The following bar chart shows the results of the analysis. **38119** has the lowest number of restaurants per 2500 employees.



Discussion

Although **38119** is the top candidate, let's revisit the choropleth map in light of this finding.



38016 and **38118** also have low numbers of restaurants per 2500 employees. Let's look at where those Zip Codes are located as well as the density of employees in adjacent Zip Codes.

38016 has a relatively low number of employees. Although the adjacent Zip Codes have more employees; it becomes more rural towards the Eastern part of the Zip Code. For these reasons it doesn't appear to be a better candidate than **38119**.

38118 has the highest number of employees but is spread over a large area. It also looks more rural towards the Southern part. Although it doesn't appear to be a better candidate then **38119**, the North Eastern quadrant of **38118** would make a good second choice.

Conclusion

The goal of this project is to identify a business opportunity for an entrepreneur to open a lunch restaurant in Memphis, TN. After applying the methodology above and conducting the analysis, **38119** is recommended due to its low number of restaurants per number of employees working in this area.

Availability of commercial real estate and pricing are other factors that will need to be weighed. If either of these factors are a problem in **38119**, the North Eastern quadrant of **38118** would be a good alternative location to consider.