Yoga Studio Business Opportunity in Philadelphia

I.   Introduction
   a.   Yoga has been an emerging health trend in the United States and revenue has been on the rise over the last 10 years. Philadelphia is the fifth largest city in the United States and may offer an opportunity to open a new yoga studio. An entrepreneur interested in opening a new yoga studio in Philadelphia would be able to utilize this data to determine the best neighborhood to open a new yoga studio. Clustering was utilized to identify neighborhoods in Philadelphia with similar venue distribution compared to neighborhoods that currently have a yoga studio.

II.   Data Acquisition
   a.   Philadelphia neighborhood coordinates were obtained from opendataphilly.org. Neighborhood center coordinates were based on the average of the boundaries of the neighborhood. Foursquare database API was utilized to access venue data for neighborhoods.

III.   Methodology
   a.   The two current yoga studios in Philadelphia are described in Table 1 and are displayed as red dots in Figure 1. Yoga studio and gym frequencies in Philadelphia neighborhoods are described in Table 2. Centers of Philadelphia neighborhoods are displayed in a map in Figure 1 as blue dots and the current locations of the two yoga studios are displayed on a map utilizing folium.

Neighborhood	Neighborhood Latitude	Neighborhood Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Market East	39.952551	-75.161743	Dhyana Yoga	39.949882	-75.167990	Yoga Studio
Southeast	39.924798	-75.155809	Wake Up Yoga	39.927125	-75.166722	Yoga Studio

Table 1. Yoga Studios of Philadelphia

Neighborhood	Gym	Yoga Studio
Brewerytown	0.000000	0.00
St. Hughs	0.000000	0.00
Point Breeze	0.000000	0.00
North Central	0.000000	0.00
Lawncrest	0.000000	0.00
Kingsessing	0.000000	0.00
Germantown	0.000000	0.00
Elmwood	0.000000	0.00
Eastwick	0.000000	0.00
Haddington	0.000000	0.00
Swampoodle	0.000000	0.00
Hawthorne	0.010000	0.00
Market East	0.010000	0.01
Penrose	0.020000	0.00
Southeast	0.020000	0.01
Hartranft	0.023810	0.00
Kensington/Harrowgate	0.038462	0.00
Strawberry Mansion	0.040000	0.00
Frankford	0.068966	0.00

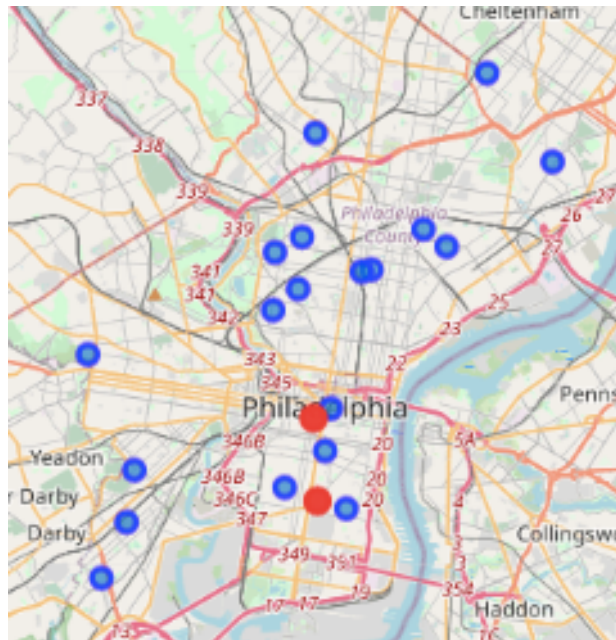Table 2. Frequency of gyms and yoga studios in Philadelphia neighborhoods.

Figure 1. Map of Philadelphia (blue dots are the centers of Philadelphia neighborhoods and red dots are current locations of Philadelphia neighborhoods.

The total number of venues in Philadelphia neighborhoods were calculated from the Foursquare database up to a maximum of 100. The number of venues per neighborhood are displayed in Figure 2.
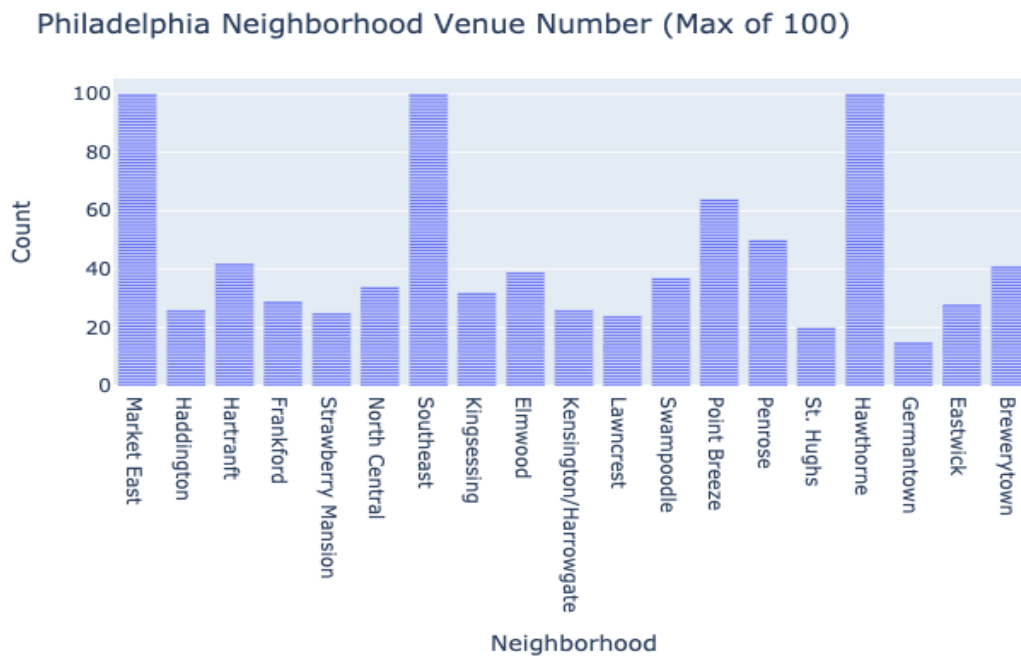

Figure 2. Total Venues in Philadelphia Based on Neighborhood.

In order to select neighborhoods K-means clustering was performed to identify neighborhoods that have similar venue distribution. The cluster groups were considered to have similar venue distribution and therefore a similar opportunity for a successful yoga studio.

IV. Results
a. The neighborhoods of Philadelphia were clustered (n=5 clusters) using K-means clustering to identify neighborhoods with similar venue distributions. Results of clusters are listed in Table 3. The clusters are visualized in a map in Figure 3 with each color representing a cluster and the green dots representing the current yoga studios.

Neighborhood	Cluster Labels	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue
Eastwick	0	Fast Food Restaurant	Pizza Place	Discount Store
Market East	1	Hotel	Sandwich Place	Italian Restaurant
Hawthorne	1	Pizza Place	Mexican Restaurant	Coffee Shop
Point Breeze	1	Pizza Place	Bar	Discount Store
Lawncrest	1	Vietnamese Restaurant	Fast Food Restaurant	Supermarket
Southeast	1	Bar	Bakery	Pizza Place
Brewerytown	1	Park	Discount Store	Café
Germantown	2	Intersection	Coffee Shop	Discount Store
Swampoodle	3	Intersection	Breakfast Spot	Grocery Store
Strawberry Mansion	3	Intersection	Grocery Store	Park
North Central	4	Deli / Bodega	Intersection	Park
Kingsessing	4	Discount Store	Pizza Place	Grocery Store
Elmwood	4	Pizza Place	Donut Shop	Chinese Restaurant
Frankford	4	Bus Station	Donut Shop	Gym
Hartranft	4	Fast Food Restaurant	Discount Store	Metro Station
Penrose	4	Intersection	Train Station	Discount Store
St. Hughs	4	Spanish Restaurant	Bus Stop	Baseball Field
Haddington	4	Light Rail Station	Pharmacy	Snack Place
Kensington/Harrowgate	4	Pharmacy	Diner	Discount Store

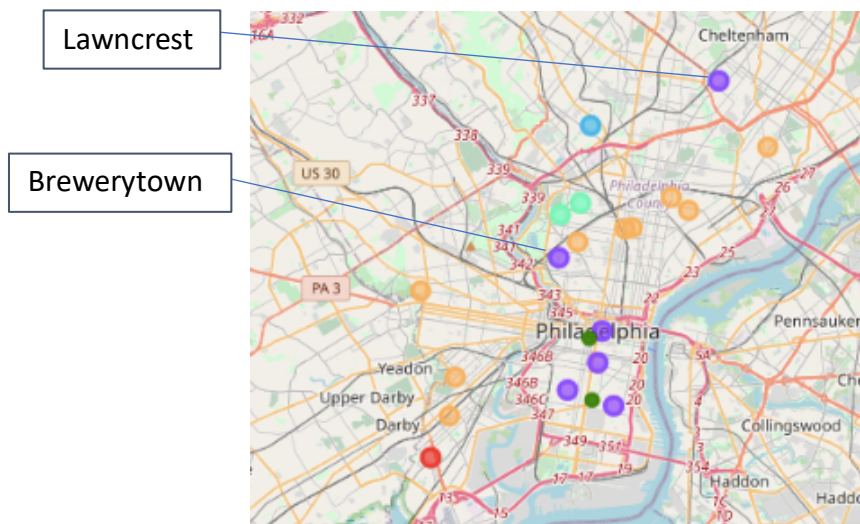Table 3. Neighborhoods clustered with their top three venue types.

Figure 3. Neighborhoods of Philadelphia displayed as their appropriate cluster with the green dots representing the current yoga studio locations in Philadelphia.

Figure 4. Venue categories in Brewerytown as percentage of neighborhood venues.

V. Discussion
    a. Brewerytown and Lawncrest are two neighborhoods in the same cluster as neighborhoods that currently have yoga studios in close proximity, but these two neighborhoods currently have no yoga studios or gyms, as described in Table 2. Their venue distribution being similar to areas with yoga studios suggests these neighborhoods would be a suitable neighborhood to open a new yoga studio. Brewerytown has almost double the amount of venues in its neighborhood, which suggests that Brewerytown may have more revenue opportunities and may be a more suitable top choice.

VI. Conclusion
    a. In this study, I analyzed the neighborhoods of Philadelphia to consider a new yoga studio. I clustered Philadelphia neighborhoods based on venue distribution. This report can useful in helping business entrepreneurs identifying neighborhoods to open a new yoga studio. Brewerytown would be a top neighborhood to open a new yoga studio based on its venue distribution being similar to Market East and Southeast Philadelphia, but currently having no yoga studio. Lawncrest would be a second option as an opportunity to open a yoga studio.