**Introduction: Anti-Gravity Yoga Studio Location**

**Background**

"The data tells a compelling story," says Carin Gorrell, editor-in-chief of Yoga Journal. In recent years, the number of yoga practitioners has increased to more than 36 million, while annual spending on yoga classes and related accessories has risen to $16 billion. Yoga is a thriving, growing industry.

My client is a professional yoga mentor and wishes to tap into his entrepreneurial instincts to create an entire brand around his teaching style and philosophy. He specializes in aerial yoga - an artform of gravity-defying poses in a silky sling-like hammock that supports full body weight and aids in accomplishing more than one can do with regular yoga. This technique is relatively new and the territory unexplored so far in the United States.

**Problem**

My client wishes to set up an aerial yoga studio but creating a niche in an already established industry is a big challenge. My client feels that to introduce these out-of-the box workouts, there is no better place than Chicago downtown. Chicago is divided in community areas by direction where central side has core business offices and North side, west side, south side. Client from his experience and research, came up with North side which is a densely populated with middle-class and upper-class demographics. This brings us to the biggest obstacle of finding the perfect location in the North side neighborhood where it is already swarming with yoga studios and gyms. Since the existing workout centers are a competition to my client's entrepreneurial venture, it is best that we find a location in neighborhoods where there are none to minimum number of such fitness studios and densely populated.

**Target Audience/ Stakeholders**

This project benefits all entrepreneurs who wish to make their mark in the Yoga industry with their unique style of this discipline. There are 11 types of yoga and innumerable hybrid forms that make this domain open to budding businesses. This project guides them through the process of overcoming the biggest hurdles - finding the perfect location with minimum competition.

## Data Description

### Sources

Data used in this project is retieved from the following two sources:

1. Chicago area information from [https://en.wikipedia.org/wiki/Community\_areas\_in\_Chicago](https://en.wikipedia.org/wiki/Community_areas_in_Chicago%20)
2. Population data downloaded from <http://robparal.blogspot.com/2013/07/chicago-community-area-and-zip-code.html> as csv file
3. Foursquare location data

### Using Data

Data from the Wikipedia is scrapped using beautiful soup and loaded table. It is then cleaned to keep the desired features – North side neighborhood and their respective community areas. Next, we pass these neighborhood's latitudes and longitudes into the Foursquare search url. Our search query is for yoga or gym in the radius of 500 meters of these coordinates and limit is set to 100 results for each neighborhood. Search query gives us 1203 results which includes, gyms, yoga centers, pilate studios, and other fitness centers in all the neighborhoods of Manhattan. Response includes: Venue names, location address, location geographical coordinates, postal codes, country, state, formatted address,. are relevant to our problem. For example,

<[{'categories': [{'icon': {'prefix': 'https://ss3.4sqi.net/img/categories\_v2/shops/gym\_yogastudio\_',

'suffix': '.png'},

'id': '4bf58dd8d48988d102941735',

'name': 'Yoga Studio',

'pluralName': 'Yoga Studios',

'primary': True,

'shortName': 'Yoga Studio'}],

'hasPerk': False,

'id': '4d657823601d88bfcb19c3bb',

'location': {'address': '480 South Michigan Ave.',

'cc': 'US',

'city': 'Chicago',

'country': 'United States',

'distance': 30,

'formattedAddress': ['480 South Michigan Ave.',

'Chicago, IL',

'United States'],

'labeledLatLngs': [{'label': 'display',

'lat': 41.875839,

'lng': -87.624405}],

'lat': 41.875839,

'lng': -87.624405,

'state': 'IL'},

'name': 'Yoga @ Roosevelt University',

### Visualizing Data

Using Folium, a visual is obtained to see the spread of all the fitness centers in Manhattan neighborhoods. The graphic image is interactive and shows the name and type of fitness centers. We get an overview of neighborhoods where the density of these studios is intense and where they are sparse.

For further precise information on the location with minimum competition, we apply KMeans to cluster the neighborhood based on population and distance. The process gives us clusters with minimum density and further information about these neighborhoods is used to select the perfect location to start our Anti-Gravity Yoga Studio.

**Methodology**

Using Folium, a visual is obtained to see the spread of all the fitness centers in Chicago north side neighborhoods. The graphic image is interactive and shows the name and type of fitness centers. We get an overview of neighborhoods where the density of these studios is intense and where they are sparse. We also call for results, using folium, for yoga centers and gyms separately. Using different colors for yoga centers, gyms, we can visualize them on the same map. This gives us an idea of the spread of these centers in the area.

For further precise information on the location with minimum competition, we apply KMeans to cluster the neighborhood on the basis of population and distance. The process gives us clusters with minimum density and further information about these neighborhoods is used to select the perfect location to start our Anti-Gravity Yoga Studio. The clusters are mapped to give a visual of five sets of Manhattan neighborhoods with all types of fitness centers that exist there. We further examine each cluster for details on the neighborhoods of interest.

**Discussion of Results**

The results are examined at three levels:

1. We conducted a search query for all types of fitness centers and yoga studios in each neighborhood coordinate with a radius of 10km and enough limit to cover all possible types of activity centers that exist there. The data frame is used to show all the results (1203) with all the details of interest including name, address, distance and geographical coordinates. A count of these fitness centers is obtained to see the total number of these centers in each Chicago neighborhood. An ascending ordered list by counts gives us neighborhoods with minimum occurrences of any type of fitness centers first and so on. This gives us a list of neighborhoods with minimum to maximum density of activity centers.
2. Finally, we apply the machine learning technique of KMeans Clustering to refine our results from the above two actions. We have the neighborhoods with minimum density, but we are looking for areas closest possible to Chicago as well. Applying KMeans clustering gives us 5 clusters of fitness centers. Cluster 1: Consists of the activity centers, in northern area, and closely packed with each other. Cluster 2: Consists of activity centers relatively less distance. Cluster 3, 4, & 5 do a better job of isolating neighborhood with desired attributes.

**Observations and Recommendations**

The results of our search query clearly isolate Logan Square where the density of activity centers is minimum and relative more distance with large population. Based on observation of the results, we have the following recommendations:

1. Consideration of more features to identify the best location for our clients' startup business. Inclusion of per-family-income by neighborhoods is recommended. More affluent neighborhoods are likely to try new yoga styles like the aerial yoga.
2. The retail apocalypse, in recent years, is a blessing for small startup businesses. Increasing number of store closures has forced landlords to allow short-term leases for pop-up businesses. A factor that ropes in store closures can further enhance our search for a perfect location for our Anti-Gravity Yoga Studio.

**Conclusion**

From the extensive exploration of the Chicago north neighborhoods, less dense activity centers and larger population is:

Logan Square, with Population of 73595 and only 20 activity centers. Next Contender is Avondale community with Population of 39262 and only 27 activity centers