Identifying demand in New York to start gym and fitness centers
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1. Introduction

1.1 Background

With the rise in obesity rate and various diseases related to lack of body fitness, every American has now understood the importance of Gym and fitness. Awareness about body fitness and exercise is widely spread among all age groups similarly. People are finding some time from their busy schedule and are visiting the nearest Gym fitness center to maintain their body fitness. Hence the demand for such types of fitness centers is rapidly growing and there is huge potential to enter in Health and Fitness business.

1.2 Problem

One popular fitness brand wants to start its fitness center in New York. But the real problem is, to know, in which neighbourhood they should open the center. In order to bring higher 'Return on Investment' (ROI), there should be sufficient number of people who want to join the center. How can they know in advance, which neighbourhoods are best to start their business in order to gain more customers?

1.3 Interest

To acquire knowledge about potential demand, fitness brands are dependent on geolocation data analysis and conclusion obtained from it. Hence this analysis serves vital importance to find out neighbourhoods with potential demand and type of "demand segments" they are in.

2. Data acquisition

2.1 Data source

The New York City neighbourhood data are available and can be downloaded from the link https://geo.nyu.edu/catalog/nyu_2451_34572. This data contains data of 5 boroughs and 306 neighbourhoods with latitudes and longitudes. This data forms the foundation of geographical analysis of New York City, since entire New York City can be perceived as formed of these neighbourhoods. This database answers the part of the question, "Which place in New York City".

Secondly, venue data are obtained from Foursquare API. This data helps us to explore the neighbourhoods further. By providing Foursquare credentials and version, data can be requested for every neighbourhood in New York City. For the purpose of analysis, I am obtaining venue data for 100 top venues that are in every neighbourhood given in a neighbourhood database within a radius of 500 meters. This data contains venue name, venue category, venue latitude and venue longitude. Venue category comprises of various categories like 'Accessories store', 'Restaurant', 'Gym/Fitness Center'.

2.2 Use of data to serve the purpose of analysis

By using venue data, I will find out most commonly populated categories at every neighbourhood in New York City. This information can be used as a proxy to assess the demand of interested category (Gym/Fitness Center) in the selected neighbourhood. The underlined principle is, the obvious demand

or need from the given neighbourhood for the set of specific venue categories, encourages commencement and establishment of those categories in that particular neighbourhood.

Based on this information about commonly populated categories, neighbourhoods will be segmented in various 'demand segments' which in turn, will be useful to find out what other supportive categories to Gym/Fitness center are demanded in the same neighbourhood. For example, the more the demand for health and fitness related supportive categories like Health Food, Yoga/Meditation centers, more the scope for growth in the demand of Gym/Fitness category.

Apart from this, extent of penetration (in percentage) in the neighbourhoods of Gym/Fitness Centers will be found out to assess the extent of existing competition. This information will be aggregated at segment level to assess the existing competition at segment level.

2.3 Features extracted from data
- **Most commonly populated categories** - Top 10 categories in the neighbourhood based on distribution of venues.
- **Related demand** - It is a derived feature based on the percentage distribution information of most commonly related categories like Health Food, Health Clubs, Meditation, Yoga etc.
- **Extent of demand** - It is the percentage distribution of Gym/Fitness center venues in the neighbourhood.