# A New Gym In Town

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## 1. Introduction

### 1.1 Background

[Denver](#), dubbed the Mile High City, is the commercial, financial, and transportation capital of the Rocky Mountain region. A concentration of federal government offices makes it the administrative center of this area as well. Denver's history has included frequent boom periods, but redirection and economic diversification became necessary during the late 1960s through the early 1980s. The city is undergoing a renaissance, with downtown development paving the way for Denver's projected ascendance in high-technology industries as the nation's population shifts southwestward. Set in a verdant plain at the foot of the Rocky Mountains, Denver is noted for its quality of life and the blending of modern innovation and Western tradition. In addition, Denver is a hub for outdoor activities such as hiking, biking, mountin climbing and skiing in the winter. Denver is major attraction for those who seek a healthly lifestyle, more and more healthy lifestyle businesses have been poping up in Colorado. Due to this, a contractor is looking to open a gym to take advantage for the healthy lifestyle trend.

### 1.2 Problem

A contractor wants to open a gym in an area where there is not a lot of competing gyms. It will also help that the gym to be located close to popular areas. The project aims at exploring the city of Denver and finding the most suitable place to start up a gym based on the client's needs.

## 2. Data Acquisition

### 2.1 Data Structure

The information regarding Denver neighborhood was not in a structred form and scattered around the internet. The first step was to identify all Denver neighborhoods from Wikipedia and Google then, find their respective latitude and longitude in order to use the Foursquare API.

After aquiring all the necessary data, it was put into a csv file and began began the codding process to gain insight on the neighborhoods of Denver. This process took the most time in the project.

## 2.2 Data Cleaning

Some of the neighborhood in Denver were taken off the list due some of the areas where considered "unoffical" neighborhoods. Some areas were also taken off the list simply because no recreational businesses were not allowed to opperate within the neighborhood such as Denver International Airport neighborhood. Other neighborhoods were taken off simply because there was a conflict between the sources on the coordinates of the neighborhoods and could not confirm one source with great certinty.

# 3. Exploratory Data Analysis

## 3.1 Method

The main method used for analyzing and representing the data was the Pandas library and the Foursquare API to gain insight on Denver's neighborhoods. First, the data had to be in a structured format in order to utilize Pandas library, the information found on Wikipidia and Google about Denver neighborhoods were put into a csv file and structures as Borough, Neighborhood, Latitude , Longitude respectively.

Afterwards, the Foursquare API was used to explore the venues and the trending spots in each Denver neighborhood. The key is to look for areas where there are a lot of venues and find the best possible spot for a gym. In addition, neighborhoods where clustred in with their most common places then used to gain further insight on the neighborhood.

## 3.2 Analysis

The first thing to look for are neighborhoods with the most venues, because tipically, those areas have more foot traffic and hence more popular spots to open up a business. It was noticed during the analysis that most neighborhoods do not have gyms. Table 1 shows the top three neighborhoods with the most venues. See notebook for full table.

| Neighborhood | Number of Venues |
|---|---|
| Union Station | 69 |
| Cherry Creek | 64 |
| Capitol Hill | 54 |
| Central Business District | 47 |
| North Capitol Hill | 47 |

Table 1. Top five neighborhood with most venues

Exploring those neighborhoods deeper to find their most popular venues and if there are gyms in those areas. Table 2 shows the 4 most common venues in these areas.

| Neighborhood | Most Common | 2nd most common | 3rd most common | 4th most common | 5th most common |
|---|---|---|---|---|---|
| Union Station | American Resturant | Mexican Resturant | Sports Bar | Coffee Shop | Resturant |
| Cherry Creek | Cosmetics Shop | Coffee Shop | Mexcian Resturant | Home Store | Asian Resuturant |
| Capitol Hill | Pizza Place | Nightclub | Coffee Shop | Sandwich Place | Gym |
| Central Business District | Hotel | Art Gallery | Pub | Exhibit | Gym |
| North Capitol Hill | Gym | Zoo | Dog Run | Food | Flower Shop |

Table 2. Top five most common venues

It appears that the three of the top five neighborhoods have gyms as their most common venues of choice. Therefor, it is best to avoid opening a new gym as it may not be feasible.

Another approach is to examine areas close to the popular neighborhoods and find a neighborhood without a gym as their most common venue. This allows the contract to be near foot traffic and opne in a spot without much competition. One way to do this is to explore the map and find neighborhoods in the same cluster without gyms. The results yielded three neighborhoods listed in Table 3.

| Neighborhood | Number of Venues | Number of Closest Popular Neighborhoods |
|---|---|---|
| Congress Park | 8 | 2 |
| Lincon Park | 14 | 3 |
| Highland | 44 | 2 |

Table 3. Neighborhood without Gyms

It appears that the best location that combines the a high number of venues and a close proximity to popular neighborhood is Highland, this would be the best of both worlds.


## 4. Recommendation

This study analyzed the most popular neighborhoods and their most common venues. The analysis was made to look for places with the a lot of foot traffic with venues as an indication. Then find a recommended spot for opening a new gym. This paper recommends that the contractor avoids three of the top five neighborhoods in Denver Capitol Hill, Central Business District and North Capitol Hill. Instead, look open the gym in an area between the top five neighborhoods where a gym is not a common venue. This recommends Highland due its location being close to an area with the most foot traffic and a hub for public transit, Union Station.