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Capstone Project Week 5

Battle of the Neighborhoods

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Concentration of Medical Facilities in Colorado Cities

Introduction

Graduation can be an exciting time in one's life. It is the end of one chapter, and the beginning of another. The possibilities available to new graduates can be overwhelming. Often new graduates have a general idea of where they want to live and work after their education is complete, but are unsure about the specific opportunities available to them.

The goal of this report is to assist new graduates in understanding which types of medical facilities exist in which major Colorado cities. Ten Colorado cities were examined, comparing the types of medical facilities that are present in each city. This information will allow the new graduates to make an informed decision about what job opportunities are available in those areas.

Target Audience

The target audience for this report is graduating nursing students looking to relocate to the state of Colorado. Other interested parties would be anyone seeking employment in a medical facility in the state of Colorado. Knowing the concentration of different types of medical facilities in cities in Colorado will help them focus their job search and relocation efforts to an area with the most relevant opportunities.

Data

This report used venue information directly from FourSquare. FourSquare is a company that offers free access to location information via API calls. Desired location information is centered around a given place, and may be limited to a specific type of venue.

The Colorado cities examined were: Denver, Colorado Springs, Lakewood, Thornton, Arvada, Westminster, Centennial, Aurora, Pueblo, and Fort Collins. These areas were chosen due to their higher population, according to the World Population Review (https://worldpopulationreview.com/states/cities/colorado). Location coordinates were retrieved from Nominatim, a free service that provides latitude and longitude for given place names. For each city location, the FourSquare API was called to find venue information for that city.

The desired venue category type was limited to "Medical Center", or a category ID of "4bf58dd8d48988d104941735". Note that this category includes multiple sub-categories, such as "Hospital", "Emergency Room", and "Urgent Care". Within each city, the breakdown of medical facilities was examined.

Methodology

The medical facility venue data was extracted from FourSquare using http requests, limiting the venues to a five-mile radius from the city. Next, a list of unique category names was created, to learn the possible types of medical facilities that FourSquare reports (see Table 1 below).

Acupuncturist	Dentist's Office	Herbs & Spices Store	Medical School	Pharmacy
Alternative Healer	Doctor's Office	Hospital	Mental Health Office	Physical Therapist
Assisted Living	Drugstore	Marijuana Dispensary	Office	Rehab Center
Chiropractor	Emergency Room	Maternity Clinic	Optical Shop	Spa
Community Center	Eye Doctor	Medical Center	Pet Service	Urgent Care Center
Daycare	Gym / Fitness Center	Medical Lab	Pet Store	Veterinarian

Table 1. Medical Center Sub-Categories

Next, venue data from a single city, Denver, was explored and mapped (see Figure 1 below).
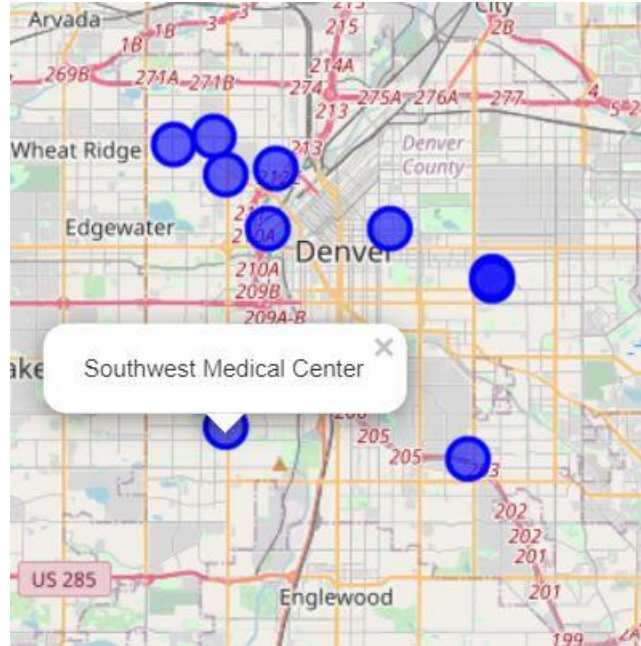

Figure 1. Ten Medical Facilities Near Denver

More exploratory data analysis included getting the counts of each type of medical facility for each city. Figure 2 below shows the tail of the created DataFrame.

	City	CategoryName	Count
128	Westminster	Hospital	1
129	Westminster	Marijuana Dispensary	3
130	Westminster	Medical Center	3
131	Westminster	Medical Lab	1
132	Westminster	Mental Health Office	1
133	Westminster	Optical Shop	2
134	Westminster	Physical Therapist	3
135	Westminster	Spa	1
136	Westminster	Urgent Care Center	2
137	Westminster	Veterinarian	3

Figure 2. Tail from DataFrame of Counts by City and Category Name

To narrow the focus to those city and category combinations with a significant number of facilities of a particular type, rows with fewer than five of any facility type in a city were dropped. This narrowed down the overall unique category types to just six: Chiropractor, Dentist's Office, Doctor's Office, Hospital, Medical Center, and Veterinarian.

Other data fields from FourSquare were explored, such as user reviews. Unfortunately, FourSquare did not have enough additional information on the medical center venues to provide useful information.

Finally, visualizations were created to summarize the association between the six most prevalent types of medical facilities and the ten chosen cities. Please see the Results section below for these visuals.

Results

Looking at Figure 3 below, it is clear that the most common type of facility with five or more locations in an area is a doctor's office. This makes intuitive sense. Less common facilities, such as chiropractors, as well as larger facilities with fewer per area, such as hospitals, do not appear in all cities. Someone looking to work in a veterinarian's office should consider Fort Collins or Lakewood.
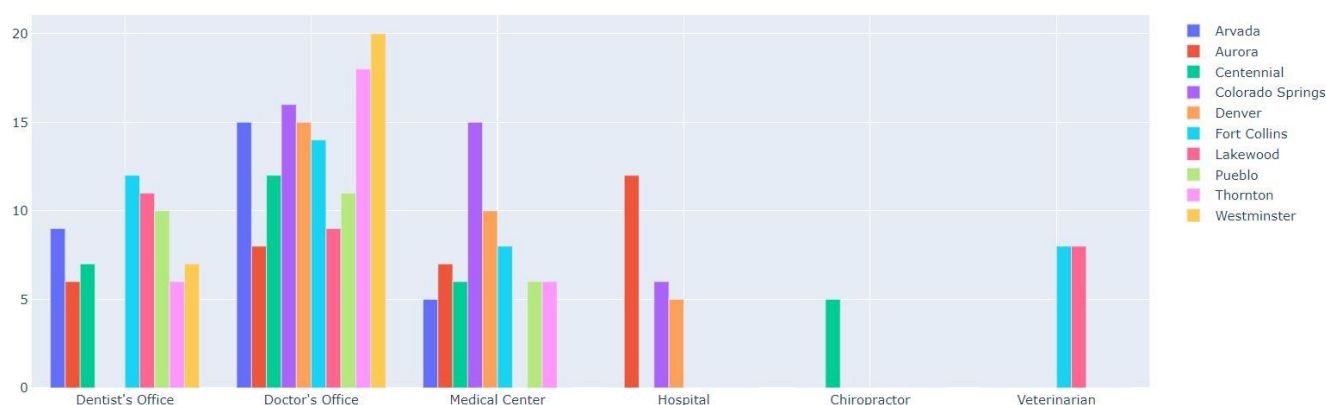

Figure 3. Breakdown of Locations per Facility Type

Looking at the data from the perspective of each individual city, in Figure 4, Fort Collins has the most overall facilities of the studied types. Graduates wanting to work in Thornton, however, would not expect many opportunities at a Chiropractor's office or hospital. Remember that we filtered the data to include a minimum of five for any facility type, so there could be one to four of those types in the city. Future analysis may want to take a different approach for more precision.
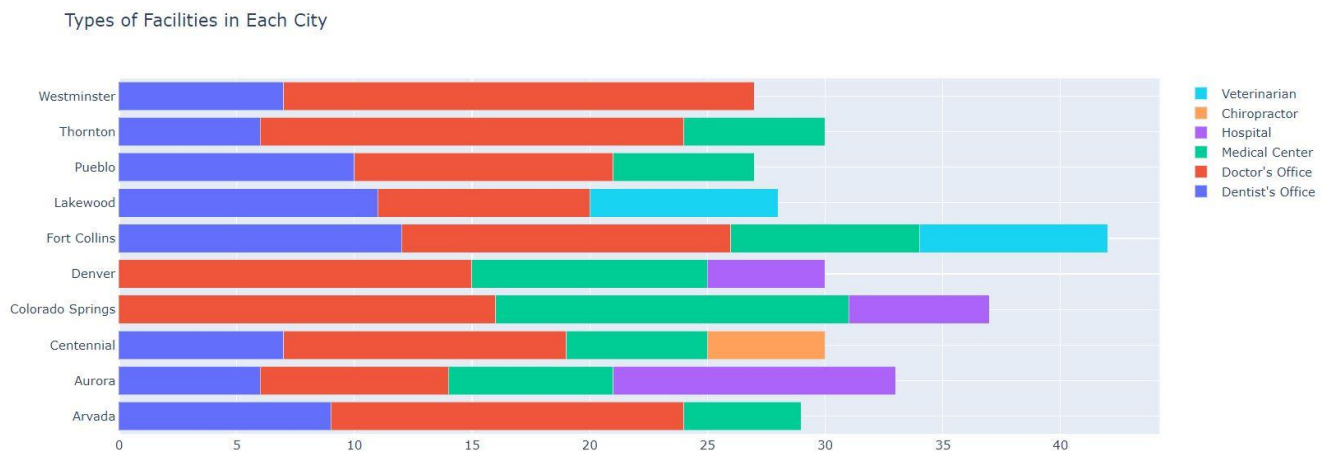

Figure 4. Types of Facilities in Each City

Discussion

The data provided by FourSquare gives only a high-level picture of potential job opportunities in a region. Supplementing this information with other statistics, such as crime rates or school rankings, would provide a more robust picture of each area. That is beyond the scope of this "battle of the neighborhoods" assignment, but could prove useful. Including additional facility types may also be helpful, particularly if someone wants to work in, say, an emergency room. The categories of hospital, chiropractor and veterinarian are in more limited locations, while dentist and doctor offices are plentiful.

Conclusion

The ten largest cities in Colorado provide many medical center facilities for potential employment opportunities. FourSquare data gives a general overview of the types of medical venues available near each location. Further study with additional types of data such as crime rates and school rankings would be helpful for providing a more robust picture of each city. Graduates looking to work in a more narrow field, such as in a chiropractor's office, would be best served to live near Centennial. Someone looking for the most overall opportunities should consider Fort Collins.