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CAPSTONE PROJECT:

TOP 10 NEIGHBORHOODS

FOR FAMILIES WITH KIDS IN

CALGARY

ABSTRACT

This report presents an analysis of Calgary communities to determine top 10 neighborhoods for families with kids.

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Introduction

The objective of this Capstone Project is to identify top 10 neighborhoods in Calgary for young families with kids, based on certain criteria such as, accessibility of schools, child care services, grocery stores, public transportation (e.g. bus stops and LRT/Subway stops), medical centers, recreational facilities (e.g. parks, aquatic centers, fitness & gym), food and restaurants, cultural facilities (e.g. libraries, museums, dance school etc.), stores and malls.

There are 185 neighborhood communities in Calgary as of 2019. For families with kids it is sometimes difficult to find the best neighborhood community to live in, since they have many considerations and things to keep in mind. For example, parents with small kids need to find available daycare that should be at a walking distance from their home. In case, there are older kids in a family, there also should be elementary/middle school nearby. As well as grocery stores and medical centers need to be in proximity. Availability of public transport and work commute is also very important. As a result, it might be challenging for some families to find a perfect place to live.

The goal of this Capstone Project is to analyze data for all 185 neighborhoods in Calgary based on selected criteria and identify top 10 best communities in the city.

Data

Main data for this project will be taken from an official government website data.calgary.ca. Below are some links to the data that will be used in this project:
1. Community Boundaries
2. Census by Community in 2018
3. Community Crime and Disorder Statistics
4. School Locations
5. Calgary School Ranking
6. Child Care Services 1
7. Child Care Services 2
8. Community Services

Community Boundaries data will be used to display neighborhood boundaries on the Calgary map.

Census by Community in 2018 data will be used to obtain the population and the location of the center of each neighborhood.

I also want to observe the correlation between the population and crime levels in Calgary communities, therefore I will use the Community Crime and Disorder Statistics data to obtain the number of crime incidents in each neighborhood. Based on this information, I want to filter out communities with least crime incidents number.

Finding a good daycare for kids is a number one priority, therefore it is important to identify childcare facilities available in Calgary. Data for daycares will be obtained from Child Care Services 2.

The next priority is to find a good school in Calgary. I will identify location of the schools and draw them on the map using School Locations data. Since there are more than 400 schools in Calgary, I am going to focus on schools with top ranking. I will use statistical data from https://www.fraserinstitute.org/. Unfortunately, there is no ranking data readily available for Calgary schools, so I will manually download statistics from the website and import it to the notebook. I will filter out best schools in Calgary with the Score 7 and higher and point their location on the map.

Third priority will be medical services in Calgary. I will identify location of medical services in Calgary, such as Community Health Centers and Hospitals using Community Services data.

The same data will be used to find location of all Calgary libraries. Libraries in Calgary are very special places for kids and their parents. They have a lot of useful resources, such as play rooms, toys, books, special entertaining programs etc.

And finally, I will use data from http://foursquare.com/ to find the common venues in each neighborhood and do the same analysis as we did for New York and Toronto neighborhoods. In the end, I will filter out neighborhood communities with the most common venues suitable for families with kids.

Methodology

This section will describe the work performed during this project. It will include analysis of different services mentioned in previous section. The first important step is importing required libraries.

Calgary map

Calgary map is produced using Folium library (Figure1).

Neighborhood data

The data for Calgary community neighborhoods is taken from data.calgary.ca. First, information about community neighborhoods in Calgary is imported from a csv file into a new dataframe. Non-essential information, such as residual, industrial neighborhoods, parks, community structure and community code, is filtered out. Next, community census csv file is imported from data.calgary.ca. From this file information about residents count in each neighborhood is taken and merged with the main dataframe for community neighborhoods.

Choropleth map displaying population of each neighborhood is also produced using Folium library (Figure2). Community boundaries json file is obtained from data.calgary.ca.

Crime statistics

Crime statistics for Calgary neighborhoods is obtained from Community Crime and Disorder Statistics csv file. Relevant information containing neighborhood name and crime records is extracted into new dataframe and merged with coordinates for each neighborhood center. To visualize crime incidents in Calgary, bubble map is produced using Folium library. For bubble map, only first 1000 crime records were used due to computational and time constraints (Figure3).
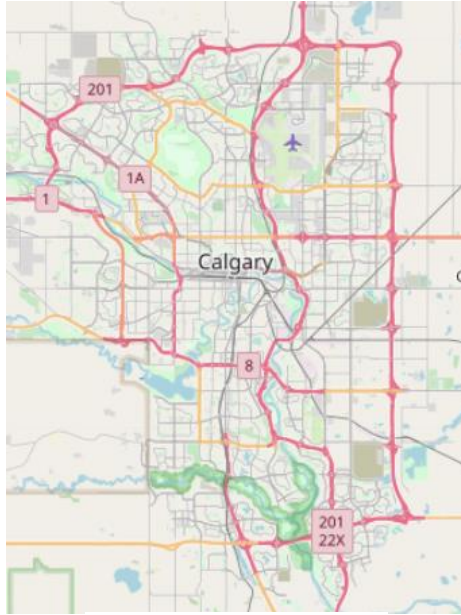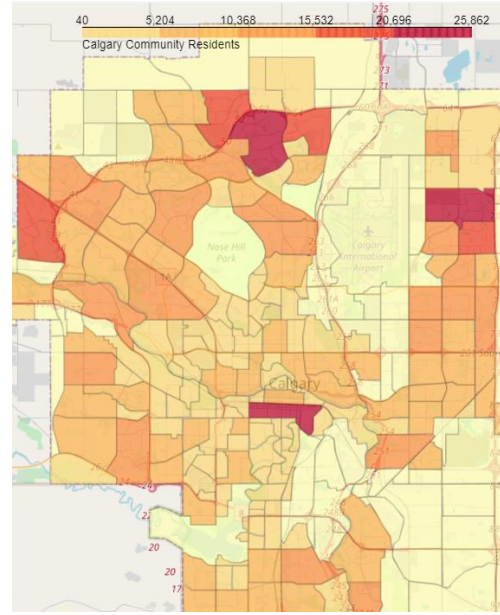
Figure1. Calgary map
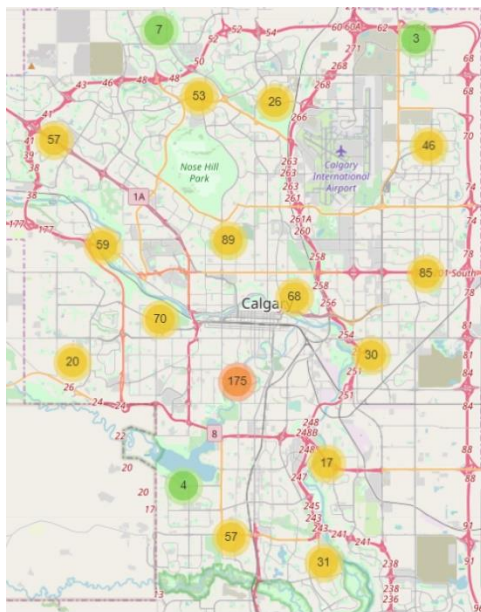

Figure2. Calgary population by neighborhood

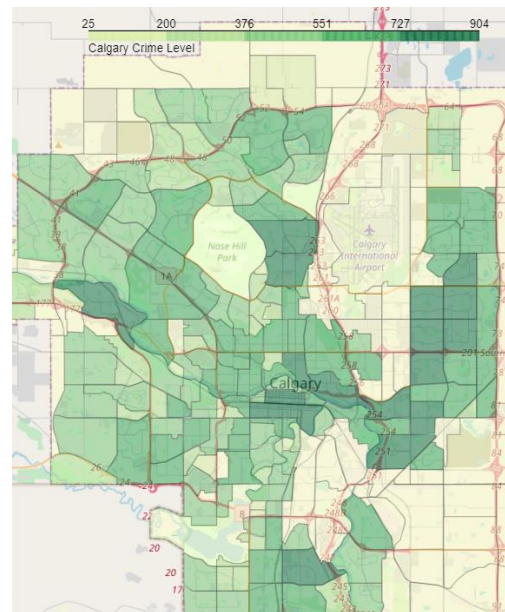Figure3. Crime incidents bubble map

Figure4. Crime incidents number by neighborhood

Correlation between population and crime level in each neighborhood

In order to have an idea about crime levels in Calgary and their correlation to population in each neighborhood, I calculated number of crime records and crime density in each neighborhood and obtained a regression plot using Seaborn library (Figure5).
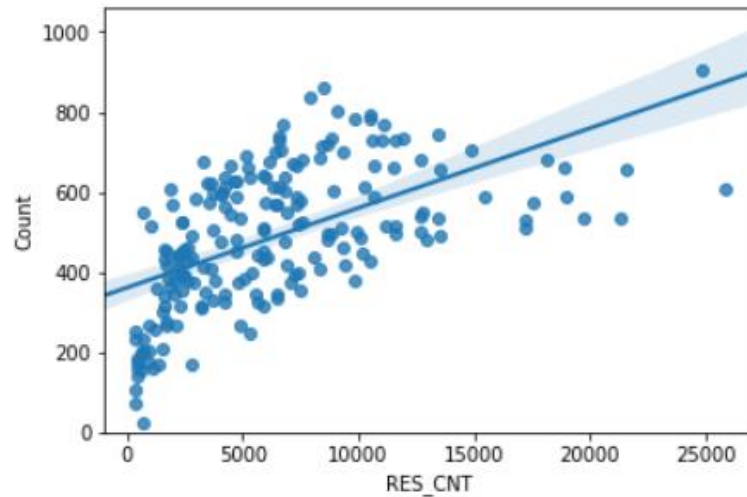
Figure5. Correlation between population and number of
crime incidents in each neighborhood

As we can observe, there is a positive correlation between the residents' number and crime incidents in the Calgary neighborhoods. To identify neighborhoods with lowest crime levels, we need to look at the crime density. Table below represents some of the neighborhoods that have lowest crime density (less than 0.05).

Table1. Neighborhoods with low crime density (<0.05)

	Neighborhood	Count	RES_CNT	crime_density
0	BELTLINE	903	24887.0	0.036284
20	MARTINDALE	704	14905.0	0.047232
27	MCKENZIE TOWNE	679	18186.0	0.037336
35	TARADALE	663	18929.0	0.035026
37	SADDLE RIDGE	658	21567.0	0.030510
38	SIGNAL HILL	655	13488.0	0.048562
52	PANORAMA HILLS	610	25861.0	0.023588
59	CRANSTON	589	18980.0	0.031033
62	EDGEMONT	587	15442.0	0.038013
66	COVENTRY HILLS	575	17527.0	0.032807
75	DOUGLASDALE/GLEN	549	12769.0	0.042995
78	BRIDLEWOOD	539	12708.0	0.042414

Analysis of Child Care Facilities

Beautiful Soup library was used to import data for childcare Facilities in Calgary. The data was first manually downloaded from https://www.canadachildcaredirectory.com/AB_Calgary.htm website and then put on GitHub. GeoPy Nominatim library was used to find location coordinates for each daycare. Figure6 shows locations of all daycares on the Calgary map.
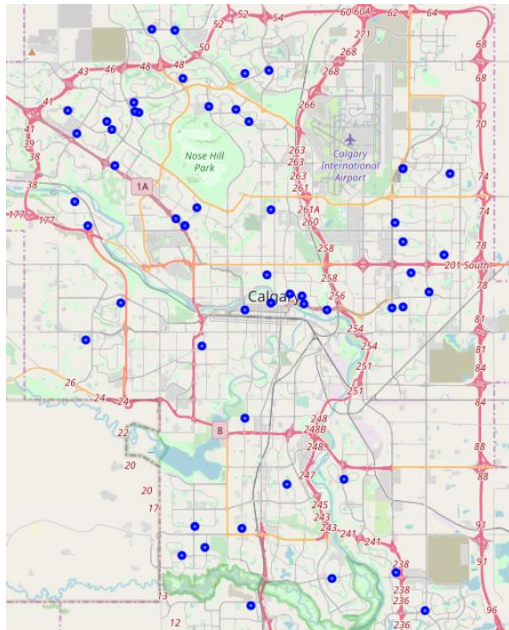
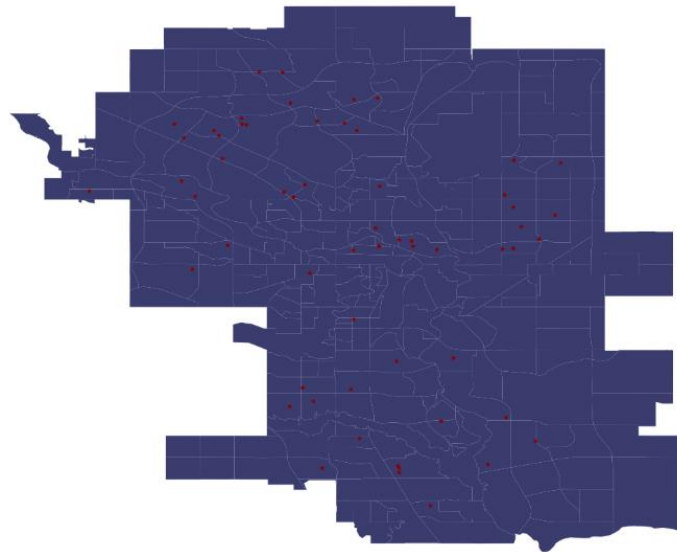Figure6. Location of childcare facilities in Calgary

Figure7. Location of childcare facilities plotted by Geopandas

In order to determine neighborhoods where childcare facilities are located, I converted location coordinates into Points using Shapely library. Next, I downloaded KML file with neighborhood boundaries information in a form of multipolygons. Using Shapely library, I was able to identify multipolygons (neighborhoods) that contained points (childcare coordinates) and display them using GeoPandas libary (Figure7).

Analysis of Calgary Schools

Data on Calgary schools was obtained from data.calgary.ca. Relevant information containing names of the schools and location coordinates were extracted into new dataframe. Calgary schools were displayed using Folium library (Figure8).

There are 457 schools in Calgary. As it can be seen from the map, schools are densely located in almost each neighborhood, which makes it difficult to identify best neighborhoods in Calgary. Therefore, I decided to focus on top ranking schools. Ranking statistics from fraiserinstitute.org was downloaded manually and uploaded to GitHub. Beautiful Soup library was then used to import data into this notebook. Figure9 presents location of top-ranking schools in Calgary.

Similarly to childcare facilities, the same algorithm was performed to identify neighborhoods where schools are located.
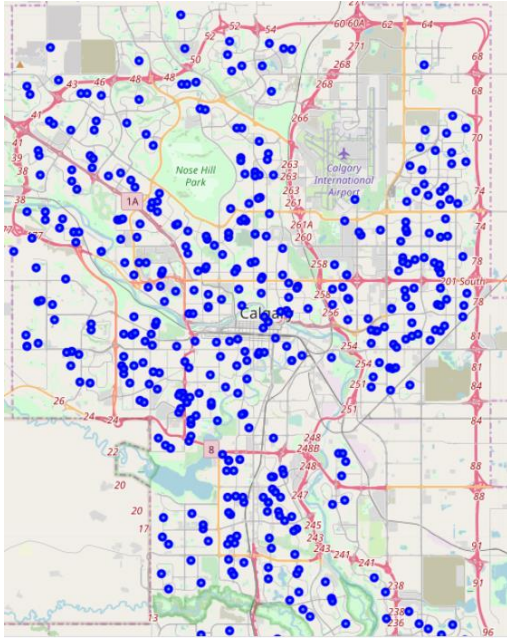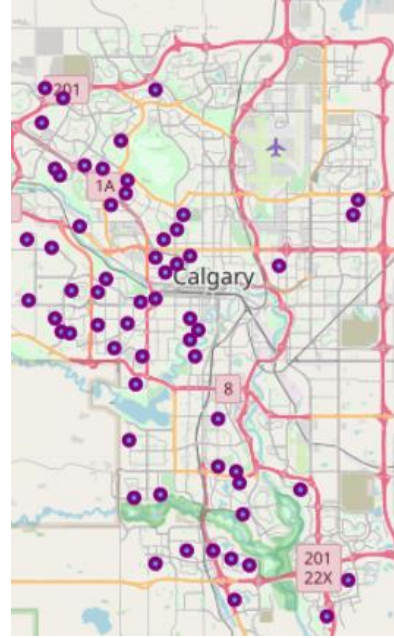
Figure8. Location of schools in Calgary

Figure8. Location of top-ranking schools in Calgary

Analysis of Calgary Services

Data about Community Health Centres and Hospitals was obtained from data.calgary.ca. After displaying them on the Calgary map I used Shapely algorithm to determine neighborhoods they are located in. In similar way I found locations and neighborhoods for libraries. Figure9 shows locations of medical facilities and Figure10 presents locations of libraries in Calgary.
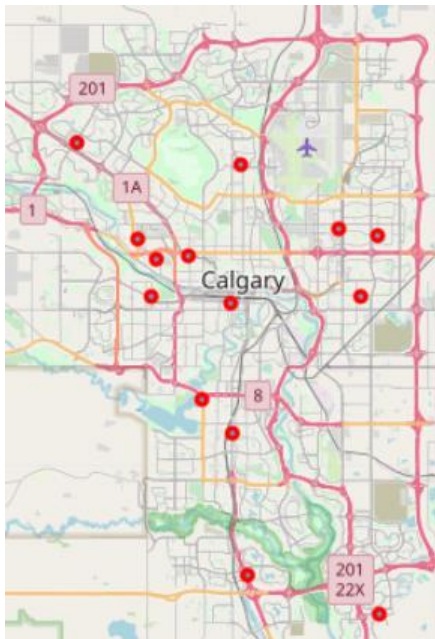

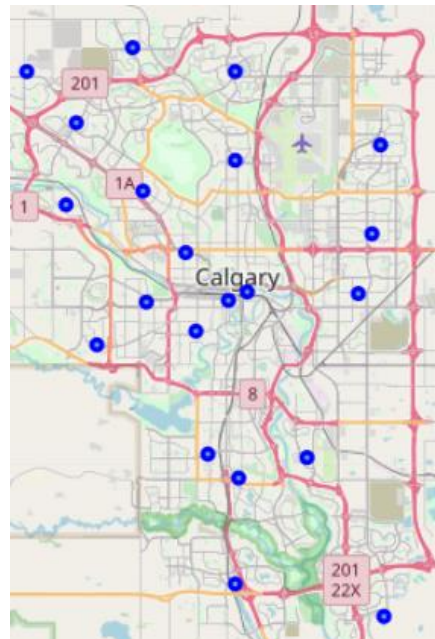
Figure9. Location of medical facilities in Calgary

Figure10. Location of libraries in Calgary

Analysis of Popular venues in each neighborhood

I used Foursquare API to obtain information about popular venues in each neighborhood. This information can be optionally used to identify best communities. Table below presents first 5 rows of the dataframe that contain information about 5 most common venues in each neighborhood.

Table2. 5 most common venues for each neighborhood in Calgary

	Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
0	ABBEYDALE	Filipino Restaurant	Convenience Store	Café	Sandwich Place	Food & Drink Shop
1	ACADIA	Burger Joint	Furniture / Home Store	Business Service	Sandwich Place	Clothing Store
2	ALBERT PARK/RADISSON HEIGHTS	Restaurant	Sandwich Place	Pharmacy	Liquor Store	Light Rail Station
3	ALTADORE	Dog Run	Ice Cream Shop	Sandwich Place	Sporting Goods Shop	Breakfast Spot
4	APPLEWOOD PARK	Arts & Crafts Store	Warehouse Store	Coffee Shop	Park	Liquor Store

Results

Shapely algorithm was used to determine neighborhoods that had low crime density, daycares, schools, medical facilities, and libraries.

Neighborhoods with lowest crime density are*: Aspen woods, Auburn bay, Beltline, Bridlewood, Chaparral, Citadel, Copperfield, Coventry hills, Cranston, Douglasdale, Edgemont, Evanston, Evergreen, Hamptons, Hawkwood, Hidden valley, Legacy, Livingston, Mahogany, Martindale, Mckenzie lake, Mckenzie towne, New brighton, Panorama hill, Rocky ridge, Royal oak, Saddle ridge, Signal hill, Skyview ranch, Springbank hill, Taradale, Tuscany, and West springs.*

Daycares are in the following neighborhoods: *Acadia, Albert park, Arbour lake, Beddington heights, Bowness, Braeside, Brentwood, Bridgeland, Bridlewood, Charleswood, Chinatown, Country hills, Crescent heights, Dalhousie, Deer ridge, Douglasdale, Edgemont, Evanston, Forest heights, Hawkwood, Hidden valley, Highland park, Macewan glen, Marlborough park, Mckenzie lake, Mckenzie towne, Meadowlark park, Panorama hills, Pineridge, Ranchlands, Richmond, Riverbend, Sage hill, Southwood, Springbank hill, Strathcona park, Walden, Westwinds, Whitehorn, Woodbine, and Woodlands.*

Schools are in *Acadia, Arbour lake, Aspen woods, Auburn bay, Bowness, Bridlewood, Cambrian heights, Capitol hill, Chaparral, Citadel, Cougar ridge, Cranston, Dalhousie, Douglasdale, Edgemont, Elbow park, Elboya, Glamorgan, Glenbrook, Hidden valley, Hillhurst, Hounsfield heights, Killarney, Lake bonavista, Lakeview, Lincoln park, Mayland heights, Midnapore, Oakridge, Parkland, Rideau park, Rosedale, Rosemont, Royal vista, Scarboro, Shaganappi, Shawnessy, Signal hill, Silver springs, Springbank hill, Strathcona park, Sundance, Temple, Upper mount royal, Varsity, Westgate, Wildwood, Willow park, Woodbine, and Woodlands.*

Neighborhoods where medical centers located are as follows: *Huntington hills, Hounsfield heights, Beltline, Pineridge, Forest lawn, Acadia, Sundance, Spruce cliff, Ranchlands, St. Andrews heights, Sunridge, University district, Seton, Eagle ridge.*

Neighborhoods with libraries are: Country hills village, Southwood, Douglasdale, Shawnessy, Huntington hills, Forest lawn, Seton, South Calgary, Brentwood, Sage hill, Rosscarrock, Martindale, Arbour lake,

Bowness, Downtown east village, Hounsfield heights/Briar hill, Pineridge, Beltline, Willow park, Signal hill.

Based on analysis of daycares, schools, medical centers, and libraries I identified top 10 neighborhoods. I used inner join to determine which dataframes have similar neighborhood names. My priority was to find the inner join between daycares and schools, since it is very important for a family to have daycare and school available in one neighborhood. Since there were only 10 neighborhoods that have both daycare and school, I considered these neighborhoods as Top 10 in Calgary for families with kids.

As a result of the analysis performed during this project, I was able to identify top 10 neighborhood communities in Calgary for families with kids. Table3 represents top 10 neighborhoods with 5 most common venues.

Table3. 5 most common venues for top 10 neighborhoods in Calgary

Neighborhood	1st Most Common Venue	2nd Most Common Venue	3rd Most Common Venue	4th Most Common Venue	5th Most Common Venue
ACADIA	Burger Joint	Furniture / Home Store	Business Service	Sandwich Place	Clothing Store
ARBOUR LAKE	Fast Food Restaurant	Coffee Shop	Café	Bank	Breakfast Spot
BOWNESS	Arts & Crafts Store	Garden Center	Bar	Coffee Shop	Hardware Store
DALHOUSIE	Liquor Store	Bank	Miscellaneous Shop	Chinese Restaurant	Shopping Mall
DOUGLASDALE/GLEN	Vietnamese Restaurant	Fast Food Restaurant	Gift Shop	Golf Course	Other Repair Shop
EDGEMONT	Trail	Gas Station	Gym	Asian Restaurant	Fried Chicken Joint
SPRINGBANK HILL	Grocery Store	Martial Arts Dojo	Indian Restaurant	Spa	Coffee Shop
HIDDEN VALLEY	Intersection	Arts & Crafts Store	Gym / Fitness Center	Park	Coffee Shop
STRATHCONA PARK	Liquor Store	Kids Store	Gas Station	Grocery Store	Bank

Discussion

This section of the report presents discussion of the analysis performed during this project. First, I want to start with crime statistics. Overall, Calgary is a safe place to live. Crime categories are *street robbery, theft of vehicle, theft from vehicle, commercial break & enter, social disorder, assault (non-domestic), residential break & enter, physical disorder', violence other (non-domestic), commercial robbery.* We can conclude that there are no serious crime incidents happening in Calgary neighborhoods, therefore I decided not to take them as a first priority.

Instead, the top priority were daycares and schools. It was difficult to find complete information on all daycares in Calgary. I must admit that I need to find a better data regarding daycares.

When I displayed schools with score higher than 7 on the map, I observed that they are located mostly on the western part of the city. This is probably because western neighborhoods are older than eastern neighborhoods in Calgary. Schools on the west are older and have a good ranking.

Moving on to medical facilities, I took into consideration only Community Health Centres and Hospitals. Families go to Community Health Centres for immunization of their kids and might need to go to Hospital in case of emergency. I did not take data for other health clinics, since they are many of them available in every neighborhood and there is no problem to find a family doctor or a walk-in clinic.

Libraries in Calgary are essential services. Families often visit libraries during the week and on the weekends. Therefore, I decided it is important to include libraries into our analysis.

And finally, after analyzing popular venues in each neighborhood, I observed that most of the neighborhoods have good venue categories that are suitable for families with kids.

Conclusion

Analysis of crime level, population, daycares, schools, medical centers, libraries ad popular venues in Calgary neighborhoods helped to determine top 10 communities for families with kids. This report presents step by step description of the analysis performed in this project. The resulting top 10 neighborhoods are: Acadia, Arbour Lake, Bowness, Dalhousie, Douglasdale/Glen, Edgemont, Springbank Hill, Hidden Valley, Strathcona Park.