



**Coursera Capstone Project**

# **Evaluating the best Town in Ontario, Canada to immigrate to**

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# Introduction

- I plan on moving to Canada to start a life with my fiancé and future family
- This study focuses on using location data to evaluate some good candidates for Towns and Cities for us to consider moving to!
- Towns must be:
  - Within 70km of Smiths Falls, Ontario, Canada
  - Not in Quebec or the United States
  - Contain more than 2,500, and less than 50,000 residents
- Towns will then be ranked by:
  - The number of restaurants & bars
  - The number of fitness, entertainment, shopping venues and outdoor spaces
  - The distance from Smiths Falls.





# Data Aquisition

- The source data for this problem was acquired from [Distantias's location proximity tool](#)
- This was used to obtain data for all Towns with a population greater than 5 people, within a radius of 100km centered on Smiths Falls, Ontario, Canada.
- It was then filtered to remove Towns that did not meet the minimum criteria of the study.
- The Foursquare API service was then used for feature extraction and evaluation of each Town





# Data Analysis

Crunching the numbers





# Data Exploration



- In total, 19 Towns were found for further investigation

Out[278]:

	Town Name	Population	Distance KM	Latitude	Longitude
0	Almonte	4752	38.028704	45.2167	-76.2000
1	Arnprior	10099	65.290924	45.4333	-76.3667
2	Braeside	7178	69.748796	45.4667	-76.4000
3	Brockville	23354	44.015449	44.5833	-75.6833
4	Carleton Place	10013	27.503621	45.1333	-76.1333
5	Gananoque	5194	64.132199	44.3333	-76.1667
6	Greely	9049	53.156500	45.2600	-75.5700
7	Kemptville	3532	32.814443	45.0167	-75.6333
8	Manotick	4486	46.091498	45.2400	-75.6800
9	Merrickville	3067	14.564527	44.9167	-75.8333
10	Mississippi Mills	13163	52.496671	45.3333	-76.2833
11	Morrisburg	2756	65.644979	44.9000	-75.1833
12	Perth	6211	17.171658	44.8833	-76.2333
13	Prescott	4284	44.466064	44.7167	-75.5167
14	Richmond	3797	34.632997	45.1833	-75.8333
15	Rockport	2689	59.674327	44.3667	-75.9333
16	Russell	3759	65.162177	45.2600	-75.3600
17	Smiths Falls	9403	0.000000	44.9000	-76.0167
18	Stittsville	41350	39.702418	45.2500	-75.9167

# Foursquare Evaluation

- Foursquare returned 302 venue results for all 19 Towns
- These consisted of 82 unique venue categories.
- These specific venue category types were then converted into general classifications for further analysis:

```
: shortlist_venues['Venue Category'].unique()  
: array(['Restuarant', 'Other', 'Shopping Outlet', 'Bar', 'Fitness',  
       'Outdoor Space', 'Entertainment'], dtype=object)
```

```
shortlist_venues.groupby('Town').count()
```

	Town Latitude	Town Longitude	Venue	Venue Latitude	Venue Longitude	Venue Category
Town						
Almonte	7	7	7	7	7	7
Arnprior	20	20	20	20	20	20
Braeside	4	4	4	4	4	4
Brockville	48	48	48	48	48	48
Carleton Place	30	30	30	30	30	30
Gananoque	20	20	20	20	20	20
Greely	5	5	5	5	5	5
Kemptville	23	23	23	23	23	23
Manotick	16	16	16	16	16	16
Merrickville	6	6	6	6	6	6
Mississippi Mills	4	4	4	4	4	4
Morrisburg	8	8	8	8	8	8
Perth	12	12	12	12	12	12
Prescott	19	19	19	19	19	19
Richmond	4	4	4	4	4	4
Rockport	17	17	17	17	17	17
Russell	6	6	6	6	6	6
Smiths Falls	26	26	26	26	26	26
Stittsville	27	27	27	27	27	27

Check how many unique categories can be curated from all the returned venues

```
print('There are {} unique categories.'.format(len(shortlist_venues['Venue Category'].unique())))
```

There are 82 unique categories.

# Data Analysis

- The counts for each venue type were computed and place into a dataframe
- These counts were then converted into a points score for each Town.
- Finally, an appropriate 'weighting value' was applied to each score to give final scorings for each attribute across all 19 Towns.
- The weighting factors that were used to multiply the scores by were as follows:
  - High priority: Weighting of 2
  - Medium priority: Weighting of 1.5
  - Low priority: Weighting of 1 (i.e. no change)

	Town	Final Restaurant Score	Final Bar Score	Final Fitness Score	Final Entertainment Score	Final Outdoor Score	Final Shopping Score	Final Distance Deduction
0	Almonte	0.571429	1.0	0.00	0.000	0.000000	0.083333	-1.090448
1	Arnprior	0.714286	0.0	0.75	0.375	0.000000	0.500000	-1.872174
2	Braeside	0.142857	0.0	0.00	0.000	0.000000	0.250000	-2.000000
3	Brockville	2.000000	2.0	1.50	1.500	0.642857	1.000000	-1.262114
4	Carleton Place	1.714286	2.0	0.00	0.000	0.000000	0.750000	-0.788648
5	Gananoque	1.000000	2.0	0.00	1.125	0.428571	0.333333	-1.838948
6	Greely	0.142857	0.0	0.00	0.000	0.214286	0.250000	-1.524227
7	Kemptville	1.428571	1.0	0.00	0.000	0.000000	0.416667	-0.940932
8	Manotick	0.571429	2.0	0.00	0.375	0.428571	0.250000	-1.321643
9	Merrickville	0.428571	1.0	0.00	0.000	0.214286	0.083333	-0.417628
10	Mississippi Mills	0.000000	0.0	0.75	0.000	0.000000	0.083333	-1.505307
11	Morrisburg	0.428571	0.0	0.00	0.000	0.000000	0.166667	-1.882326
12	Perth	0.857143	1.0	0.00	0.000	0.214286	0.166667	-0.492386
13	Prescott	0.714286	1.0	0.00	0.375	0.000000	0.416667	-1.275035
14	Richmond	0.285714	0.0	0.00	0.000	0.214286	0.083333	-0.993078
15	Rockport	0.142857	1.0	0.75	0.375	1.500000	0.083333	-1.711121
16	Russell	0.142857	0.0	0.75	0.000	0.000000	0.250000	-1.868482
17	Smiths Falls	0.714286	1.0	0.75	0.000	0.000000	0.916667	-0.000000
18	Stittsville	1.714286	0.0	1.50	0.375	0.000000	0.416667	-1.138440





# Results

Let's dive in





# Final Results

- A 'Total Score' column was added and the values summed for each Town.
- They were then sorted in descending order to see the top-ranked Towns.
- The top three towns for us to consider moving to when I immigrate were found to be as follows:
  1. Brockville
  2. Carleton Place
  3. Smiths Falls

	Town	Final Restaurant Score	Final Bar Score	Final Fitness Score	Final Entertainment Score	Final Outdoor Score	Final Shopping Score	Final Distance Deduction	Total Score
0	Brockville	2.000000	2.0	1.50	1.500	0.642857	1.000000	-1.262114	7.380744
1	Carleton Place	1.714286	2.0	0.00	0.000	0.000000	0.750000	-0.788648	3.675638
2	Smiths Falls	0.714286	1.0	0.75	0.000	0.000000	0.916667	-0.000000	3.380952
3	Gananoque	1.000000	2.0	0.00	1.125	0.428571	0.333333	-1.838948	3.047957
4	Stittsville	1.714286	0.0	1.50	0.375	0.000000	0.416667	-1.138440	2.867512
5	Manotick	0.571429	2.0	0.00	0.375	0.428571	0.250000	-1.321643	2.303357
6	Rockport	0.142857	1.0	0.75	0.375	1.500000	0.083333	-1.711121	2.140069
7	Kemptville	1.428571	1.0	0.00	0.000	0.000000	0.416667	-0.940932	1.904306
8	Perth	0.857143	1.0	0.00	0.000	0.214286	0.166667	-0.492386	1.745709
9	Merrickville	0.428571	1.0	0.00	0.000	0.214286	0.083333	-0.417628	1.308562
10	Prescott	0.714286	1.0	0.00	0.375	0.000000	0.416667	-1.275035	1.230918
11	Almonte	0.571429	1.0	0.00	0.000	0.000000	0.083333	-1.090448	0.564314
12	Arnprior	0.714286	0.0	0.75	0.375	0.000000	0.500000	-1.872174	0.467112
13	Richmond	0.285714	0.0	0.00	0.000	0.214286	0.083333	-0.993078	-0.409745
14	Mississippi Mills	0.000000	0.0	0.75	0.000	0.000000	0.083333	-1.505307	-0.671974
15	Russell	0.142857	0.0	0.75	0.000	0.000000	0.250000	-1.868482	-0.725625
16	Greely	0.142857	0.0	0.00	0.000	0.214286	0.250000	-1.524227	-0.917084
17	Morrisburg	0.428571	0.0	0.00	0.000	0.000000	0.166667	-1.882326	-1.287088
18	Braeside	0.142857	0.0	0.00	0.000	0.000000	0.250000	-2.000000	-1.607143

# Discussion

## Brockville is the best candidate

With an overall score of 7.38, Brockville has double the number of points as the next best candidate Town.

## Is the population data valid?

This data is dated from 2011, meaning it is now possibly out-of-date and not very reliable.

## Is the Foursquare data reliable?

Some restaurants and amenities which I have personally visited were not present in the Foursquare data

## Considerations for the next study:

- House Prices
- Venue Ratings
- Proximity to government services
- Socio-economic factors



# Conclusion

In this study I evaluated some good candidates to consider moving to when I immigrate to Canada. I obtained the source data from the Distantias location proximity search tool and analyzed the applicable towns in this dataset using the Foursquare API service.

The three top rated Towns for us to consider moving to are **Brockville**, **Carleton Place** and **Smiths Falls**, however more research will be needed on these specific areas to give a better overall 'human' assessment of the suitability of each area.

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