Durham Art and Culture Venues Project

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Making people aware of the possibilities for cultural activities in an area is always an ongoing problem. I work with the local Historical Society here in Whitby, Durham Region, Ontario, Canada. We want to put an interactive map on our website that shows the location of our museum and other museums, art galleries, and live theater venues in Durham region. This would provide these institutions, who are almost all non-profit organizations, with more exposure and allow users who have made their way to our website to find other art and culture locations in their area.

The map will cover all of Durham Region. It will be interactive. Clicking on a marker on the map will provide the user with the name, address, and phone number. The markers will be colour coded for each of the three categories.

I may need to gather the data from several places. Hopefully Foursquare will have many if not all the venues. I can also use the Durham Region website for names and addresses as well as the websites of the individual locations and art associations.

Data Sources and Examples

Art Galleries, Museums, and Live Theater

1. **List of Communities in Durham, Ontario, Canada**
2. **Foursquare Data**
3. **Data from Web Search**

Art Galleries, Museums, and Live Theater

We want to provide the user with the venues for art galleries, museums, and live theater. These all have permanent venues that can be located on a map. Other art and culture activities often use various venues such as churches and schools so we cannot provide a definite location for

them. We intend to set up a database for those activities without a home but that is outside the scope of this project.

1. List of Municipalities in Durham, Ontario, Canada

I found the eight municipal regions in Durham by a web search. In the data collection code I made a list of them and used that to get the latitude and longitude for each area.

```
municipalities =['Ajax', 'Brock', 'Clarington', 'Oshawa', 'Pickering', 'Scugog', 'Uxbridge', 'Whitby']
```

2. Foursquare Data

I downloaded venue data from Foursquare and created dataframes for all eightmunicipality regions. The columns selected were:

```
filtered_columns = ['name', 'address', 'city', 'categories', 'lat', 'lng']
```

These eight dataframes were concatenated into one dataframe with 429 rows.

Because the radius was set wide enough to get all of the rural areas there was some overlap of the radius in the communities close together and also some Toronto venues were picked up. The data was processed to remove duplicate rows and any venues with Toronto as the city. This left 402 venues.

There were 110 unique categories included in the dataframe. After looking at the list of categories I found only three relevant ones: Art gallery, Museum, and Theater.

From 402 venues only four had those category values.

	name	address	city	categories	lat	lng
25	Oshawa Community Museum	1450 Simcoe St. South	Oshawa	Museum	43.863789	-78.827205
14	The Robert McLaughlin Gallery	72 Queen St	Oshawa	Art Gallery	43.895015	-78.865704
94	Station Gallery	1450 Henry Street	Whitby	Art Gallery	43.860443	-78.935325
1	Oshawa Little Theatre	62 Russett Ave.	Oshawa	Theater	43.930277	-78.880503

3. Data from Web Search

After a search of the web I found 29 more venues in Durham that were in the three categories. I created a CSV file with the same columns as the above dataframe plus one more, Phone. The data from the web search and from Foursquare was entered in the CSV file and the file was used to create another dataframe after getting the latitude and longitude for each row. A few venues' addresses did not result in coordinates so they were removed.

name	address	city	categories	lat	lng	Phone
Blue Willow Studio	19 Patricia Avenue	Oshawa	Art Gallery	43.90155258	-78.84953387	905 435-0575

There were now 29 venues which were used to populate the map.

Methodology

Because Foursquare had only four venues that were in the three categories of Museum, Art gallery, and Theater it was necessary to find the data elsewhere. Raw data acquisition turned out to be the most time consuming part of the project. However it did mean that another column, Phone, could be added to the dataframe.

A CSV file was created with the columns for latitude and longitude empty. The file was read and converted to a dataframe. Then the coordinates were retrieved from geopy.geocoders and added to the

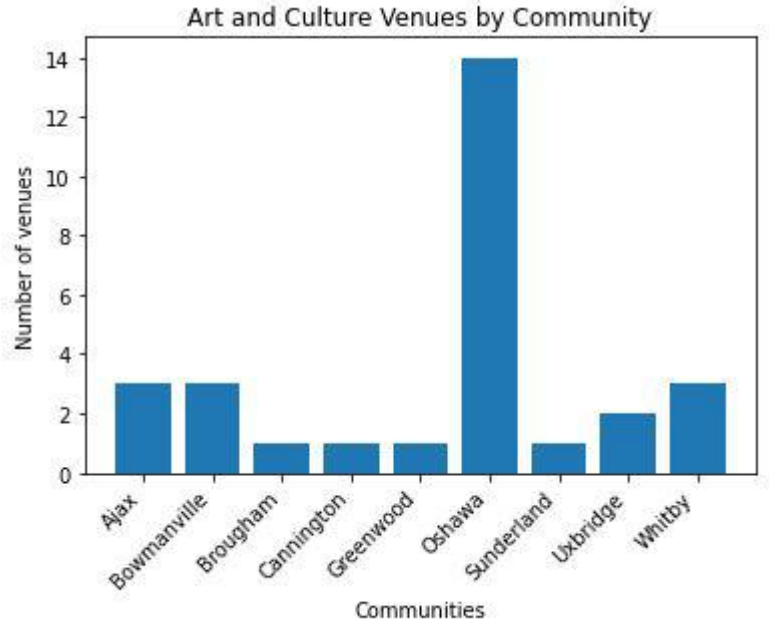
dataframe. This was all the information needed to create the markers for the map.

Visualizing the Data

There were 9 unique communities listed in the dataframe.

```
number of communities:  10
communities are:  ['Oshawa' 'Ajax' 'Sunderland' 'Brougham' 'Uxbridge' 'Bowmanville' 'Whitby'
 'Cannington' 'Greenwood']
```

Then the number of venues in each community was displayed in a bar chart.



It was obvious that Oshawa had many more venues than the other communities, with 14 out of 29 venues.

Creating the Popup Labels

Finding the address and phone numbers of venues from websites is often difficult. We wanted that data to be readily accessible. The popup labels were created to show all the information: name, address, and phone number.

```
    #create the text for the popup labels
if phone == 'none': #there is no phone number
    lab='''{},<br>
```

```
        {}, {}'''.format(name, address, city)

    else: #there is a phone number
        lab='''{},<br>
        {}, {}<br>
        {}'''.format(name, address, city, phone)

    iframe = folium.IFrame(lab,
                           width=150,
                           height=150)

    popup = folium.Popup(iframe,
                         max_width=200)
```

Creating the Legend

Each marker was colour coded for the category it was in, blue for the Art galleries, red for the Museums, and green for the Theaters.
The legend for this was imported as a png image and added to the map as a folium FloatImage.

```
From folium.plugins import FloatImage
Image_file = 'legend.PNG'
FloatImage(image_file, bottom = 75, left = 80).add_to(map_durham)
```

Creating the Title

The title for the map was placed at the top of the map.

```
loc = 'Durham Art and Culture Venues'
title_html = ''' <h3
                  align="center"
                  style="font-size:18px">
                 <b>{}</b></h3> '''.format(loc)

map_durham.get_root().html.add_child(folium.Element(title_html))
```

Deploying the Map

Converting the map to a HTML format was simple. Folium has a built in function that does the job.

```
map_durham.save(outfile = 'Durham map.html')
```

The map web page will be added to the Whitby Historical Society's website and a link to it will be added to the home page.

Setting Up Maintenance Code

The code works through accumulating venues, adding coordinates and then generating the map. In order to simplify the process when adding to or correcting venue listings the final dataframe with the complete data was stored in a CSV file.

A new program was created that generates the map using data from this CSV file rather than a newly produced list of coordinates. Code was added that gets the coordinates for one address and then adds it to the dataframe and stores it to the CSV file.

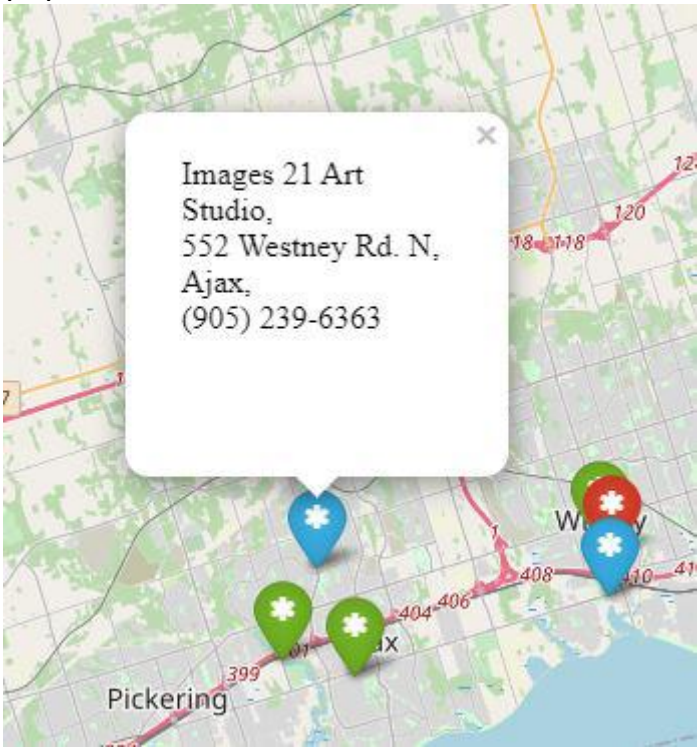
Minor alterations to the information is currently manually entered in the CSV file on a spreadsheet.

Results

The map to be added to the Historical Society's website:

- 29 venues marked
- Each marker colour coded by category
- Legend to explain the colour coding
- Title to describe the purpose of the map

One of the popup labels:



- Name of venue or organization, address, and phone number all easily accessed.

Discussion

The Bar Chart

The bar chart illustrated a surprising result. The number of venues in Oshawa was more than was expected. Oshawa is indeed a city of Art and Culture and Durham Region is well served by the vigorous cultural life of its communities.

The Map

The initial zoom variable is set to a distance that allows all of Durham to be seen at once. This is to ensure that the venues in the north are not overlooked.

The cluster of markers around Oshawa at that zoom level make it difficult to pick out one venue to click on. The user has to zoom in quite a bit to see the individual venues.

Further Work

A major problem with maps like this is maintaining the accuracy of the data. Contact information and addresses should be updated regularly. A program should be created that will update the Durham data CSV file and then regenerate the map with the updated data. This should have a simple user interface so that the map can be maintained by someone with little or no programming experience.

It would be advantageous to add links to the web pages of all the groups. As well an active search for more organizations to add to the map should be a continuous project.

Conclusion

Although Foursquare did not have many venues related to art and culture an internet search resulted in more venues than was expected.

The inclusion of phone numbers on the map's popup labels will allow users to contact the organization and find out the programs and activities they provide.

Web users have become used to using maps to find locations. The map provides the organizations on it with more exposure to the public. Too many times we have heard "I didn't even know that there was a museum in town!" This seems to be a good way to familiarize people with the various choices they have in the Durham Region.