YORK U
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Sustainable Transportation: Toronto

ECCE APP CHALLENGE 2017
TEAM: ATLAS

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1.0 Mission Statement

The primary goal of the application is to strive for sustainable transportation in the City of Toronto to reduce the impact of green-house gas emissions to the earth by providing a gradient map that displays neighborhoods with all possible bus stop and bike rack locations. This map will give users the ability to find bus stop and bike rack locations in their neighborhood that are close to their frequently visited places such as schools, place of worship, shopping, restaurants, and museums.

2.0 Statement of characteristics

2.1 Appealing

The App is simple to use and has a straight forward interface that is user friendly. The user can search their address using a simple address bar and common locations will appear for the user to select. The map displayed is very simple and easy to pan from different locations and there are specific markers with specific symbols to identify significant locations such as schools, place of worship, shopping, restaurants, and museums, and the bus stops and bike racks.

2.2 Utilities

This app is useful for Toronto residents, city planners as well as Toronto Transit Commission (TTC). Toronto residents can look up which neighborhoods have adequate bus stop locations, enabling them to select areas to live based on the provided statistics. Residents who enjoy cycling to work, school or shopping locations can determine whether a specific neighborhood is ideal for their lifestyle. TTC and urban planners can determine which neighborhoods would need more bus stops and which locations have the most service. Urban planners can further use this app to determine where to build schools, restaurants and other points of interest based on transportation services.

3.0 Data Used

Table 1: Description about the Open Data used for this Project

Data Type	Data Name	Data Provider	Description
Toronto Neighborhoods	TSNS 2020 NEIGHBOURHOOD EQUITY INDEX	City of Toronto	Originally prepared for Strong Toronto Neighbourhoods Strategy 2020
Bike Rack Locations	Bicycle Parking on Street	City of Toronto	Provides information about the locations of bike parking facilities across the city
Bus Stop Locations	TTC Routes and Schedules	Toronto Transit Commission (TTC)	Data contains scheduling information including stop locations. Provided in a General Transit Speed Specification File. Data was organized into a shapefile using ArcMap.
Points of Interest	1) Places of Interest 2) Cultural Hotspot	City of Toronto	Both files provide information about the locations of cultural importance such as museums, libraries, restaurants, etc. The files were merged into one master file using ArcMap.
School Locations	SCHOOL	City of Toronto	Data contains location of all the schools in Toronto

The Toronto Neighborhoods file originally provided the Name and Area of the polygon region. In order to determine the number of Bike Rack Locations, Bus Stop Locations, School Locations and Points of Interest within each Neighborhood Polygon, the *Join Data* function in ArcMap was used.

In this way, the count of each data file falling within the corresponding neighborhood (based on the spatial location) was stored in newly created fields. The updated Neighborhoods file was pushed to ArcGIS Online as a feature layer and shared openly. Finally, the Service URL was used to host the layer on the Web Mapping Application.
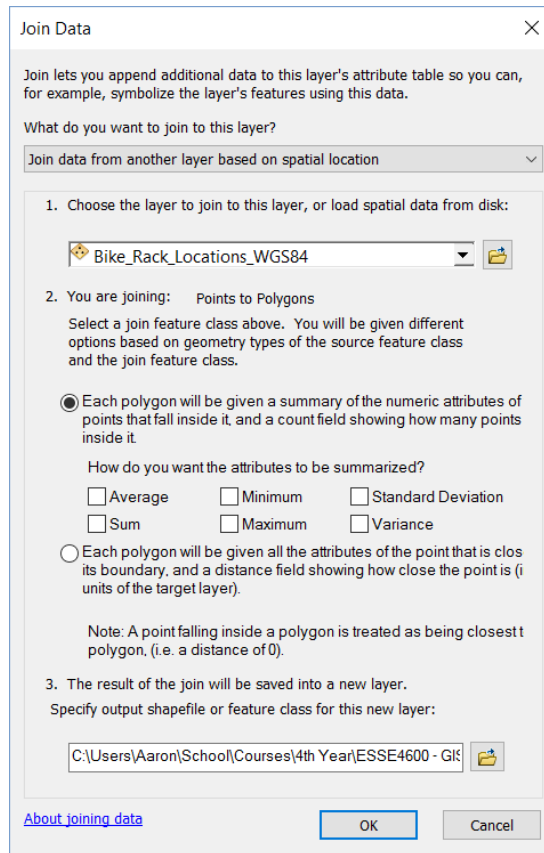

Figure 1: Join Data Function in ArcMap

4.0 Instructions for running the Application

This Web Application makes use of various openly shared resources including BootStrap (Calcite Maps) and ESRI hosted data such as Basemaps. In order to view the application, one must either make use of a server to host the app folder or run it locally if a local server is set up.

Setting up a Local Server

There are various ways to go about it. Our team used **Xampp** to view and debug the application. The following steps indicate how to get the local server working using Xampp.

1. Download Xampp: https://www.apachefriends.org/index.html
2. Install Xampp (use default settings)
3. After installation, launch the application and start the Apache and MySQL services

4. Navigate to the installation folder of Xampp
5. Find the "*htdocs*" folder
6. Copy and paste the app folder into the "htdocs" folder. Now the app is ready to be viewed using any browser.
7. Open an internet browser. Type the following address: http://localhost/mytoronto/index.html
8. Now the app can be viewed locally.

Similarly, if someone has a web server ready-to-go, the app folder can simply be copied to the desired path and accessed using the corresponding URL, ensuring that the index file is ultimately referred to (.../mytoronto/index.html).

5.0 About the Application

The app provides information about the sustainable modes of transportation in Toronto by comparing the availability of services provided across the different neighborhoods in the city. The sustainable transportation methods considered here include Public Transportation and Cycling. The application uses data regarding locations of schools and points of interest and compares it against the density of bus stops and bike rack locations in respective regions.
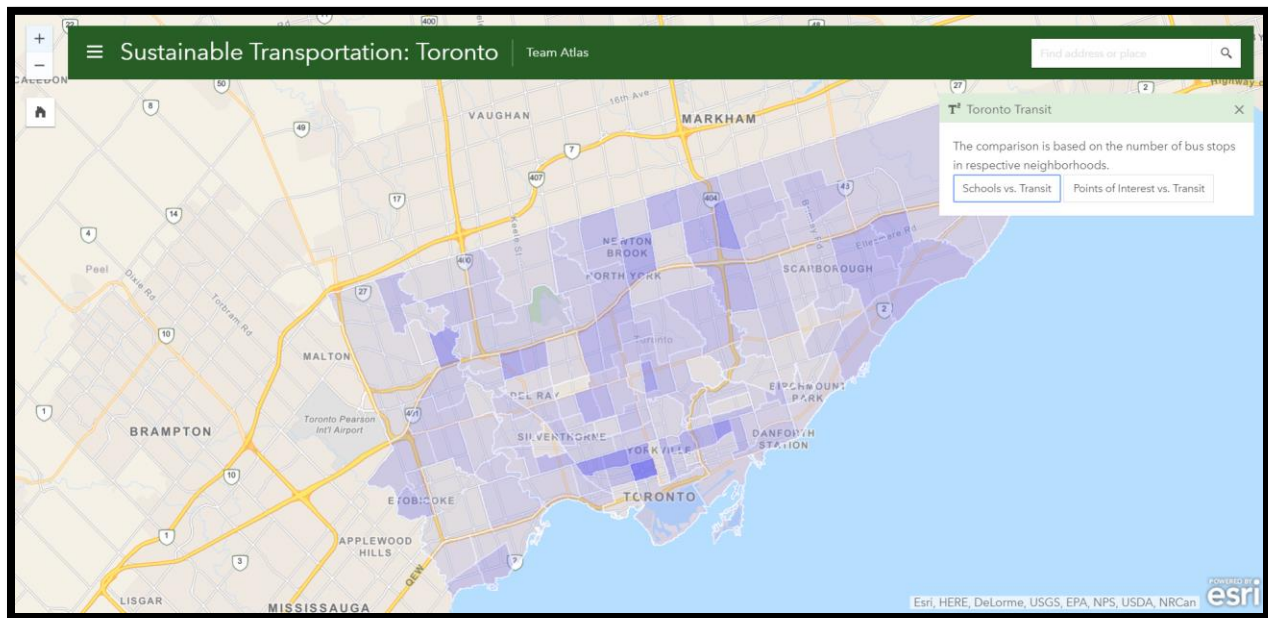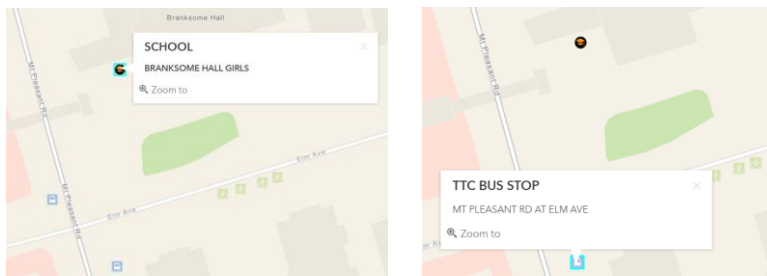

Figure 2: An example showing the comparison of location of schools versus density of bus stops

What makes the application even more interactive is that one can view the various bus stop locations/bike rack locations and schools/points of interests by zooming into specific regions. Moreover, analytical information about each region can be found by simply clicking on the required region as follows:
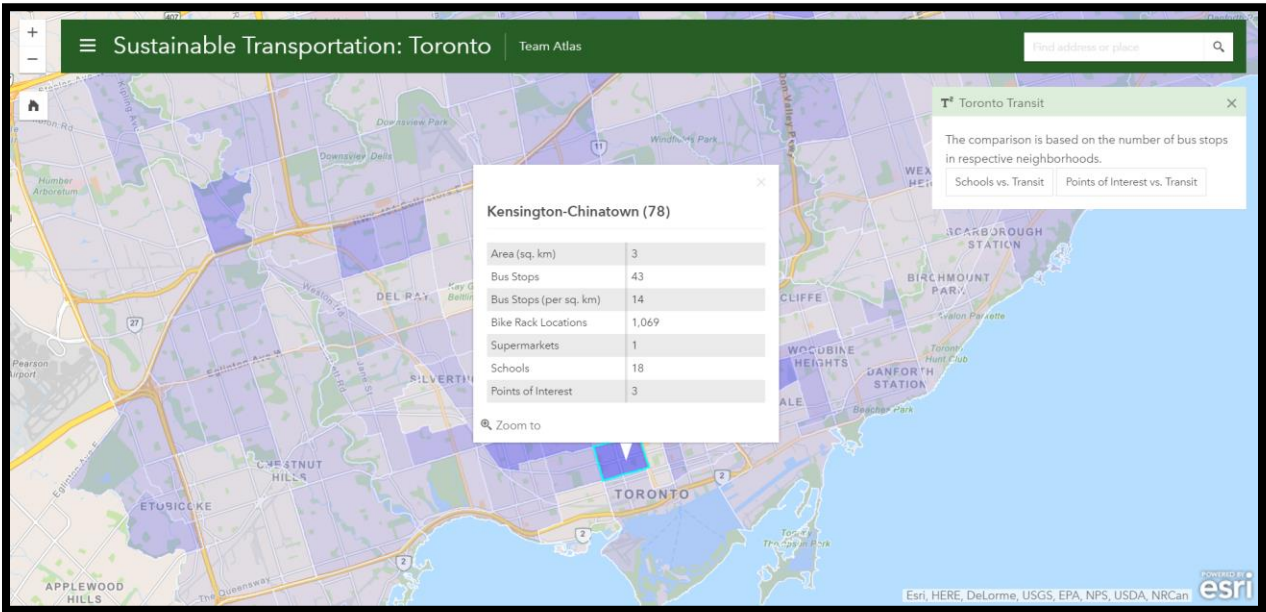

Figure 3: Analytical information of regions

Video Demonstration: https://youtu.be/0pxC1qw4Vrk