# Overview of the Bike Share Program

(<https://open.toronto.ca/dataset/bike-share-toronto/>)

The Bike Share Toronto program provides 6850 bikes, 625 stations with 12,000 docking points. The most up-to-date information varies (see below) but it’s similar in the ballpark. The station locations cover Toronto, East York, Scarborough, North York, and Etobicoke, so all broad-stroke regions of Toronto are included.

The database that houses the program data conforms to GBFS (General Bikeshare Feed Specification):

* Open data standard for shared mobility
* Intended as a specification for real-time, read-only data
* Designed with the concept of providing the status of the system live

# Sources

## Summary for the system

<https://ckan0.cf.opendata.inter.prod-toronto.ca/dataset/2b44db0d-eea9-442d-b038-79335368ad5a/resource/5c1c2c06-d27f-47b7-ae82-926a6d23d76f/download/bike-share-json.json>

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* Updated live as indicated by the Epoch time with clickable links
* ‘system regions’ and ‘system\_information’ provide a summary of the bikeshare system. The latter shows, as of the timestamp, a total of 6622 mechanical bikes, 525 e-bikes, and 655 station counts.
* ‘station\_information’ provides station information, which is somewhat static and can offer useful information needed for mapping ridership datasets using Leaflet. The station updates (installation, relocation, removal) do occur: related information can be found on <https://bikesharetoronto.com/network-info/> (dates only back to May 2022) and past twitter posts (https://twitter.com/BikeShareTO).
  + The question to address here: how much error would we introduce if we project current station information onto, say, the ridership dataset from 2022?
* ‘station-status’ provides live data, much like the CitiBike project in class, and a live service map is already available at <https://bikesharetoronto.com/system-map/>.
* ‘system\_pricing\_plans’ is a summary of the different payment options available.

## Live station information

<https://tor.publicbikesystem.net/ube/gbfs/v1/en/station_information>

* Can be requested and jsonified
* Highlight of properties: station\_id, name, physical configuration (regular or electric bikes), lat, lon, altitude, address, capacity
* Should be cleaned and stored in GeoJSON format as its own table (part of the database)

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## Ridership data

<https://open.toronto.ca/dataset/bike-share-toronto-ridership-data/>

Ridership data is available from 2014 to 2022. It’s noted on the site that there is variation between the information included in 2014/2015 vs 2016 & ongoing due to a change in software providers in July 2016 and the data collection/report methods used.

* 2014-2015 can be excluded from our study due to inconsistent data structure with missing data.
* 2016 only contains Q3 and Q4 data.
* 2017 missing stations IDs for Q3 and Q4.
* Data provided quarterly between 2014 and 2019 but monthly from 2020 and beyond.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Trip id | Start Time | End Time | Duration | Start  Station Name | Start Station ID | End Station Name | End Station ID | User Type | Bike ID |
| 2016 | ✔ | ✔ | ✔ | ✔ | ✔ |  | ✔ |  | ✔ |  |
| 2017 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔\* | ✔ | ✔\* | ✔ |  |
| 2018 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |  |
| 2019 - 2022 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |

# Analysis

Thoughts on the dataset

* 600 something markers for stations (should be manageable by the browser)
* Addition and removal of stations are alright, but relocations need to investigated in terms of how the station ids change with regard to name.
* Need to narrow down on the scope big time since there is so much data!

Questions to answer

* Spatial
* Temporal
* How are members and casual riders using the bike share system differently?
  + Temporal presentation (aggregate by time of day, time of year, etc)

# Technical Challenges

* Remove data inconsistency

https://jwasilgeo.github.io/Leaflet.Canvas-Flowmap-Layer/docs/comparison/