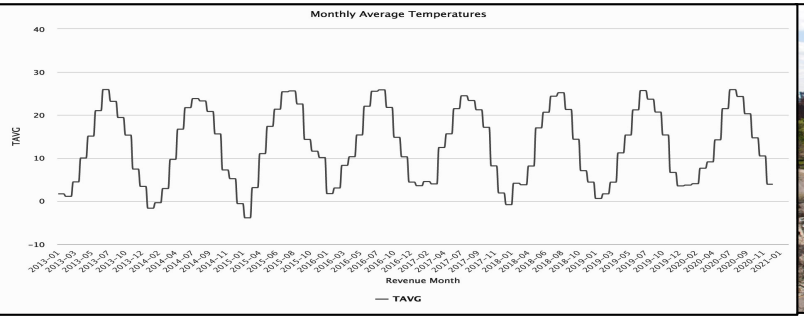
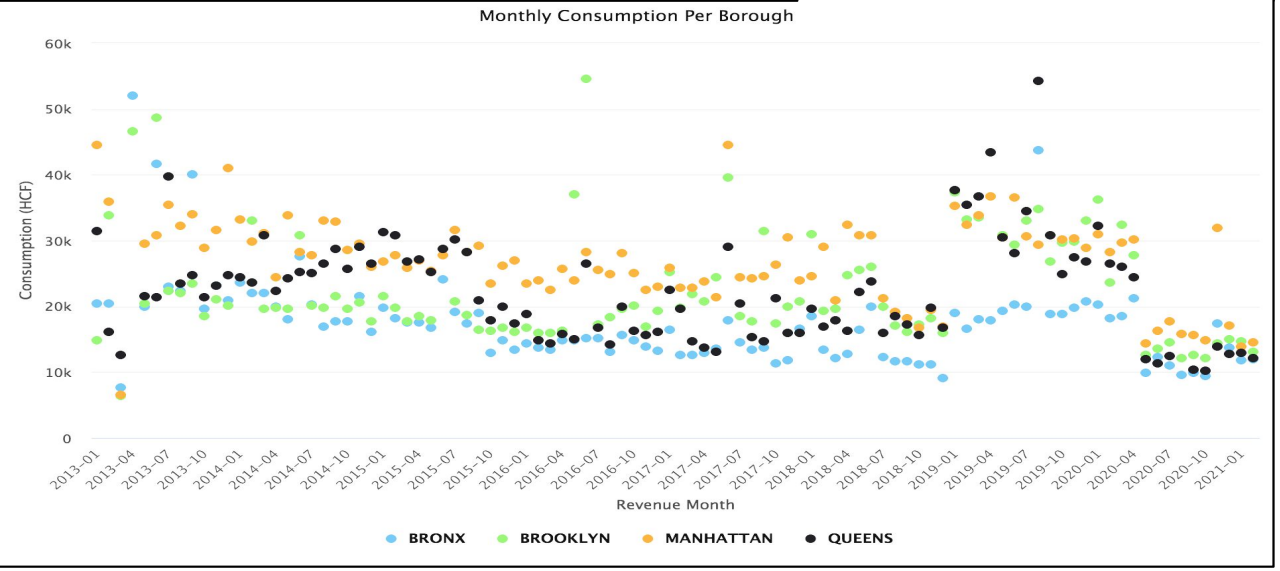
Predicting Water Consumption and Detecting Leakage — Investigating Water Networks





Alex Brisbois, Shayesteh Haghdan, Joe Young, Mohammad Amini
(Professor Mazdak Nik-Bakht, Concordia University)

What is it?

Our project aims to predict the water consumption of a municipality as well as to determine potential leaks in the water distribution network. This type of model would be useful for municipalities in terms to repair assets prior to major breakages, and ensure that the water system is equipped to handle forecasted consumption demand.

What is new and distinctive about your project?

This model to predict water consumption and detect leakages would enable cities to repair the problem area before excessive water is wasted. These minor leaks are often undetectable underground until a catastrophic failure.

Historical water consumption data is often difficult to obtain through open sources. By using the data that is publicly available, this project demonstrates the potential for this type of modeling on a larger scale, with greater access to water consumption data.

How it works?

The model that has been developed uses classification on municipal characteristics to predict the consumption trends. These characteristics include population density, income, demographic, weather patterns and total areas occupied by buildings. These are all used to predict the amount of water consumed in locations based on population. Clustering models are also used to identify consumption data points that do not fit with other clusters, which can be investigated as potential leakage anomalies.

Outcomes

Implementing a real-time version of this model on live water consumption data could help detect small leaks before they become noticeable. This would prevent deterioration of infrastructure and reduce water wastage. This type of modeling could also enable Montreal to better forecast water consumption and improve strategic planning to meet water demand and expand water system infrastructure.

The outcomes anticipated by the model would be to address the areas where possible leaks may happen and ensure that no water is wasted in a water distribution network. Addressing the problematic areas prior to a burst or break would in turn reduce the water footprint.