CIND 820 – Big Data Analytics Project – W2022

Kavin Paul

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Abstract:

Agencies under the broader public sector in Ontario are required to report energy use and greenhouse gas emissions under Ontario Regulation 507/18 made under the electricity Act, 1998. Under this regulation municipalities, their service boards, school boards, post-secondary educational institutions, and public hospitals are all required to report. The reports are summarized to include energy consumption, water, sewage, and greenhouse gas emissions. Reporting agencies are also required on every 5th anniversary of July 1, 2019, to submit and publish plans to the public for energy consumption, forecasted results, results achieved and changes to be made to reach the forecasted results.

The objective of this project is to look at the data for 6 years and see what this regulation has accomplished in that time. It will look at energy consumption and emissions by sector and agency and see who the major contributors are, then it will look at the changes by sector and agency over the 6-year period. Based on the changes and patterns that may exist visualization models will be created to show what the energy consumption and GHG emissions looks like in the broader public sector of Ontario. It will then look at what we can expect in terms of consumption and emissions for the following year based what has been observed over the previous 6 years.

This project will focus on the data that has been reported for the years 2014 to 2019 available on the Ontario Government data catalogue (https://data.ontario.ca/en/dataset/energy-use-and-greenhouse-gas-emissions-for-the-broader-public-sector). After detecting any anomaly and cleaning the data, classification models will be used for data visualization over the 6-year period which will include the biggest to smallest contributors by year. It will look at regression and/or correlation for predicting the consumption and emissions for the year 2020 based on what is observed in the data. The analytics and modelling will be done mainly on python using pandas and other libraries with some visualization done on R. Overall, this work will determine whether there have been any significant changes and if the regulation is on track to accomplishing its goals of reducing the energy consumption and greenhouse gas emissions by agencies under the Ontario broader public sector.