**Frequent Pattern Mining and Anomaly Detection of Service Requests to Identify Major Community Concerns**

COMP 4710-A01 Group 6

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**Motivation**

Residents in different neighborhoods may experience varying levels of municipal services. Mining service requests can help identify which neighborhoods face higher levels of service disruptions or delays. Additionally, detecting unusual patterns in service requests, such as sudden increases in water leaks or pest complaints, enables municipalities to quickly address unexpected infrastructure problems or environmental hazards. By analyzing frequent service request patterns and identifying major community concerns, the government can proactively plan improvements, allocate resources efficiently.

Previous work on related topics such as the 2021 paper "Distributed Big Data Computing for Supporting Predictive Analytics of Service Requests" by Tianlei Wang et al., analyzed frequent and seasonal service requests in Winnipeg. Our project aims to enhance this analysis by identifying not only frequent patterns but also unusual anomalies in service requests and concerns. We seek to add value by helping to address these issues proactively. Additionally, we will explore whether concern and service request trends have changed in Winnipeg by studying more recent data.

**Our Group Contributions**

For our project, we plan to use a combination of frequent pattern mining and anomaly detection to analyze service request data, providing valuable insights into major community concerns. By implementing the FP-Growth algorithm, we will identify common service request patterns across various neighborhoods, determining the areas that require infrastructure improvements or additional resources. Concurrently we will use anomaly detection algorithms (e.g., Isolation Forest, Local Outlier Factor) to find outliers in the data, highlighting unusual or unexpected service issues that may need immediate attention or further investigation.

**Datasets:**

Dataset 1:  311 request Dataset provided by the City of Winnipeg (<https://data.winnipeg.ca/Contact-Centre-311/311-Requests/u7f6-5326/about_data>)