The following must be completed by the student and submitted for marking by Wednesday, 5 April 2024 by midnight.

Modeling Social Unrest in Canada

Project Goal: To model and predict protests across Canada based on data from the last two years through the use of simulation methods.

Details: Protests are an important exercise in freedom of speech, but they can also be indicative of broader social unrest. The dataset you will work with counts the number of protests per month per province across Canada in 2022 and 2023. One way to model counts data is to use the Poisson distribution. Given a statistical model, use simulation methods from this course to test for significance of parameters and predict the expected number of protests across Canada in 2025.

Tasks to consider:

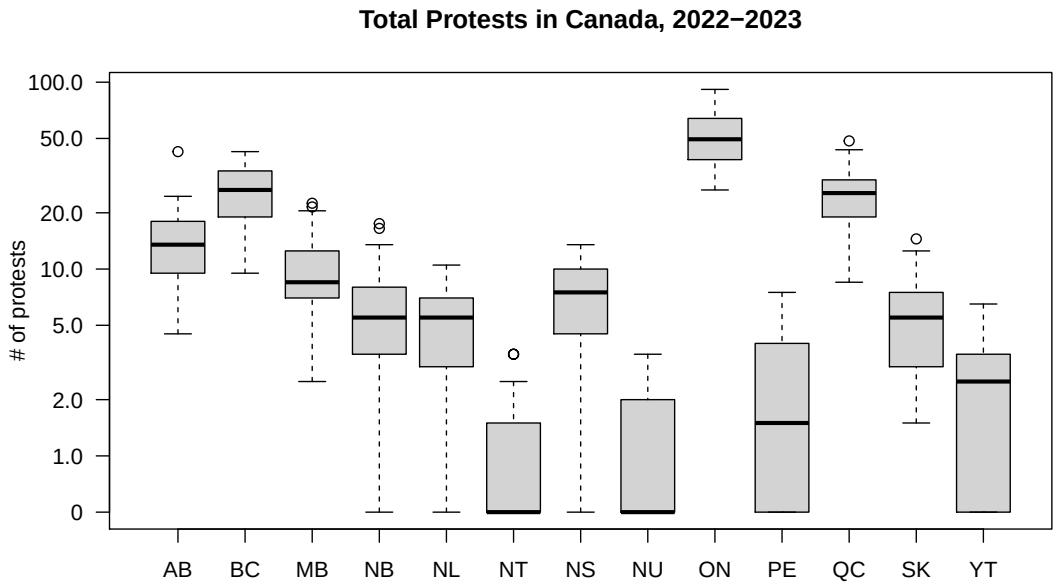
1. Pick a model for this data. You can select your own, but we will discuss some choices in class like the over-dispersed Poisson, zero-inflated Poisson, and negative bionomial model.

2. Use bootstrap methods to determine the most significant model parameters and how they affect protests.

3. Use Monte Carlo simulation to construct 95% prediction bands for each province in 2025.

Bonus! Data science often requires one to find additional data from alternative sources. Try to find other data to include in this modeling problem.

Data Source: The Armed Conflict Location & Event Data Project (ACLED), https://acleddata.com/ and Statistics Canada for provincial populations


Total Protests in Canada, 2022−2023
# of protests
100.0
50.0
20.0
10.0
5.0
2.0
1.0
0
AB
BC
MB
NB
NL
NT
NS
NU
ON
PE
QC
SK
YT