DSCI 310: Historical Horse Population in Canada

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1 Aim

This project explores the historical population of horses in Canada between 1906 and 1972 for each province.

2 Data

Horse population data were sourced from the Government of Canada's Open Data website (Government of Canada, 2017a and Government of Canada, 2017b).

3 Methods

The Python programming language (Van Rossum and Drake 2009) and the following Python packages were used to perform the analysis: pandas (McKinney 2010), altair (VanderPlas et al. 2018), click (Click Development Team 2020), as well as Quarto (Allaire et al. 2022). *Note: this report is adapted from Timbers (2020).*

4 Results

Figure 1: Horse populations for all provinces in Canada from 1906 - 1972.

We can see from Figure 1 that Ontario, Saskatchewan and Alberta have had the highest horse populations in Canada. All provinces have had a decline in horse populations since 1940. This is likely due to the rebound of the Canadian automotive industry after the Great Depression and the Second World War. An interesting follow-up visualisation would be car sales per year for each Province over the time period visualised above to further support this hypothesis.

Suppose we were interested in looking in more closely at the province with the highest spread (in terms of standard deviation) of horse populations. We present the standard deviations in Table 1.

Table 1. Standard deviation of historical (1906-1972) horse populations for each Canadian province.

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Province	Std
Saskatchewan	377266
Ontario	266435
Alberta	266063
Manitoba	122404
Quebec	111411
New Brunswick	22019.5
Nova Scotia	19879.3
British Columbia	14945.7
P.E.I.	11355.7

Note that we define standard deviation (of a sample) as
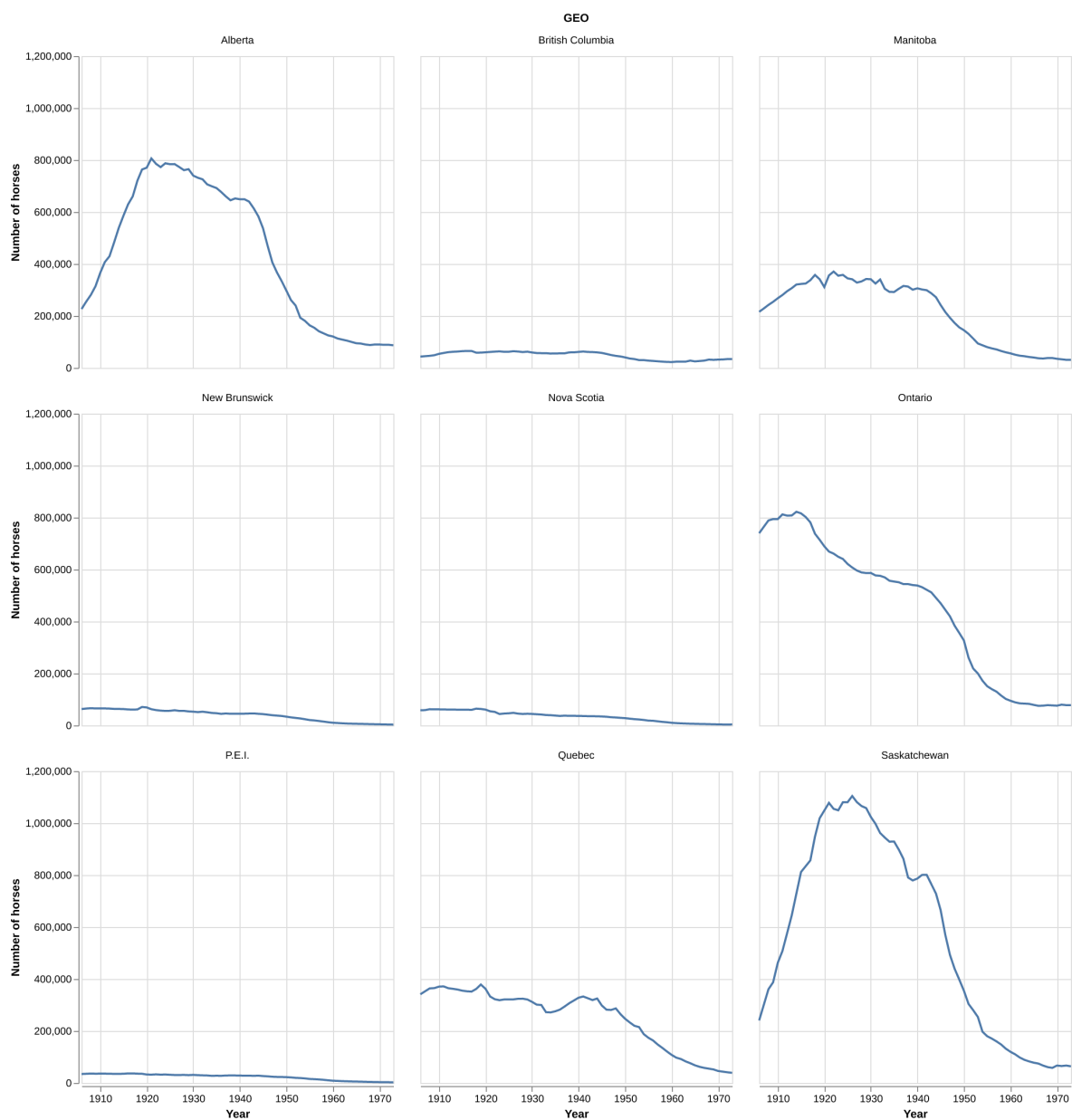
Figure 1: Horse populations for all provinces in Canada from 1906 - 1972.

$$s = \sqrt{\frac{\sum_{i=1}^{N}(x_i - \overline{x})^2}{N-1}}$$

Additionally, note that in Table 1 we consider the sample standard deviation of the number of horses during the same time span as Figure 1.
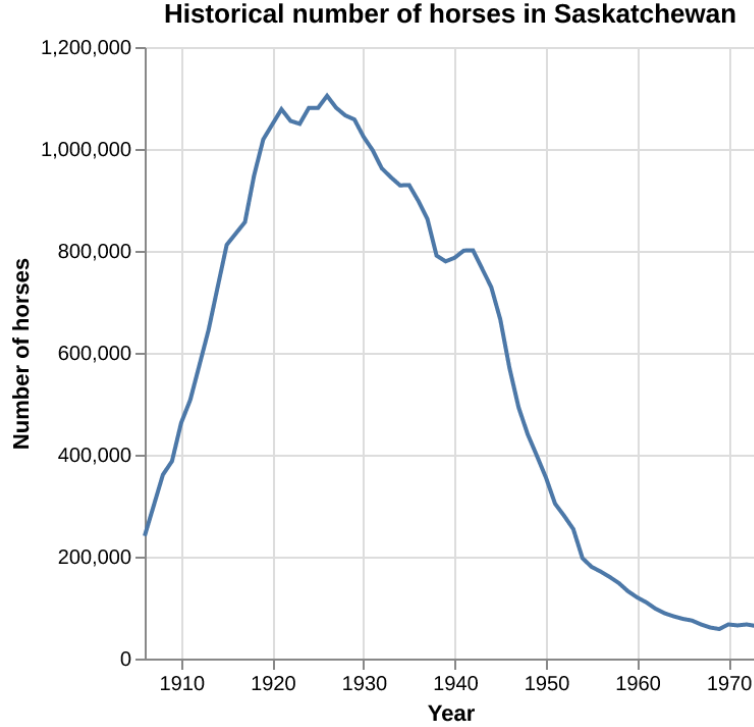
Historical number of horses in Saskatchewan

Figure 2: Horse populations for the province with the largest standard deviation

In Figure 2 we zoom in and look at the province of Saskatchewan, which had the largest spread of values in terms of standard deviation.

References

Allaire, J. J., Charles Teague, Carlos Scheidegger, Yihui Xie, and Christophe Dervieux. 2022. "Quarto." https://github.com/quarto-dev/quarto-cli.

Click Development Team. 2020. "Click: Command Line Interface Creation Kit." https://click.palletsprojects.com/.

McKinney, Wes. 2010. "Data Structures for Statistical Computing in Python." *Proceedings of the 9th Python in Science Conference*, 56–61.

Van Rossum, Guido, and Fred L. Drake. 2009. *Python 3 Reference Manual.* Scotts Valley, CA: CreateSpace.

VanderPlas, Jacob, Brian Grout, Nicholas Cherian, Ariel Rokem, Scott Colbert, Tal Yarkoni, Joe Hamman, et al. 2018. "Altair: Interactive Statistical Visualizations for Python." *Journal of Open Source Software* 3 (32): 1057.