

## Analyzing Political Polarization in Canada's Parliament

### Background:

Political polarization has been shown to reduce the effectiveness of governments and increase the occurrences of bad policies [1]. Research has therefore been conducted to try to measure political polarization in various countries, often leveraging the transcripts from government proceedings and outcomes of votes. The Canadian Hansard dataset [2] contains the transcripts of all debates in the Canadian Parliament (both the House of Commons and the Senate). The full transcripts of each Member of Parliament and Senators' speeches, questions and responses are recorded every day that the parliament is in session, and has been collected from January 1994 to present. The Hansard Index, a list of each individual MP/Senator's speeches for a given session, was also maintained between January 1994 and November 2005. The results of parliamentary votes are recorded both within the Hansard document for a given day and a separate Votes database [3]. This database contains records of all votes from October 2004 onwards.

In 2021, Alsinet et al. [4] developed metrics for evaluating the political polarization of Reddit users as a substitute for the general population. Hanretty et al. [5] used statistical regression techniques to analyze the left-right split of UK Members of Parliament based on their voting results, while Goet [6] analyzed the UK's Hansard dataset to estimate dyadic representation<sup>1</sup> in various historical periods. Research has been done into analyzing dyadic representation in Canada [7], however no analysis has been performed on the political polarization present within Canada's Parliament and its change over time.

### Research Questions:

This thesis project will analyze the transcript and voting data contained in the Hansard datasets to try to answer the following questions: Are Canadian politicians more polarized in the periods leading up to elections compared to immediately after elections? Furthermore, has Canada become more politically polarized over the period covered by the Hansard dataset?

### Methods:

To investigate the first research question, a large language model such as BERT [8] will be trained to perform sentiment detection (as per [9]) and polarized language detection (as per [6]) on the Hansard dataset. Since polarization leads to an increase in hostility between people of differing political backgrounds [10], it is presumed that sentiment detection will be accurately able to model political polarization. The results of parliamentary votes will then be analyzed for correlation with the polarization levels detected via analysis of the textual data, allowing for conclusions to be drawn on the overall polarization of Canada's Parliament over the course of a single session.

The information collected when analyzing the first research question can then be applied to the second question. These results can be combined to obtain a "polarization score" for each session, which can then be compared across parliamentary sessions to determine if Canada has become more politically polarized over the past decades.

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<sup>1</sup> "Dyadic representation means how well the sitting legislator acts as an agent for the constituency on legislative decisions" [11]

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