Beyond the Ballot: Harnessing AI to Unravel Voters' Political Leanings

Furkan Kadıoğlu

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Summary of the Proposal

This research proposal aims to evaluate the capability of Large Language Models (LLMs) in identifying individuals' political leanings from their responses to various political issues, leveraging recent advancements in political science and computational social science (CSS). By formulating questions on LLMs' understanding of political discourse, their ability to capture political parties' policy positions through media visibility, and their potential to accurately infer individuals' political inclinations from survey responses, the project seeks to cultivate an LLM that functions as a discerning analyst in the political domain. The methodology involves a four-stage plan: a literature review on LLMs, fine-tuning with political discussion datasets from platforms like Reddit, extracting policy positions using news sources and the V-Party dataset, and analyzing political survey responses from the European Social Survey. This comprehensive approach intends to harness LLMs for sophisticated analysis of political orientations, contributing to the broader understanding of electoral dynamics and policy preferences.

Background

Understanding voters' political orientations and behaviours is fundamental in political science for several reasons, each contributing to a comprehensive grasp of electoral dynamics, policy preferences, and the functioning of democracy itself. Seminal works in this area provide foundational insights, empirical findings, and theoretical frameworks. For instance, [4] introduces the Michigan model of voting behavior, emphasizing the role of party identification in predicting electoral outcomes. [5] discusses how voters' issue preferences are related to their political behaviours. The analysis by [3] argues that the American electorate has become increasingly polarized in terms of political affiliation and ideology.

Further researches explore collectively elucidate the multifaceted interactions between political orientations and behaviors, including their relationship with civic engagement [20], the modulation through electoral frameworks [15, 17], the shaping of media selections [13], the strategic utilization by political entities for self-serving agendas [14], and the evolution towards an issue-centric paradigm within advanced industrial democracies [8]. These references serve as a strong foundation for research or academic work in political science, offering a mix of theoretical discussions and empirical analyses on the importance of understanding voters' political orientations and behaviours.

From another perspective, recent investigations into the utility of pre-trained abstractive summarization models and LLMs reveal nuanced capabilities and limitations in their application to specialized fields such as legal case judgement summarization. Deroy et al. [9] underscore that these models necessitate a human-in-the-loop approach for effective use in legal domains, indicating that fully automated deployment is premature due to issues with inconsistencies. Moreover, insights from developmental psychology, as discussed by Frank [12], suggest that understanding the cognitive abstractions LLMs employ can enhance our comprehension of their operations, potentially offering novel insights into cognitive science. In the realm of CSS, Ziems et al. [24] identify LLMs' potential to augment research pipelines, particularly in zero-shot data annotation and creative task generation, while Wu et al. [21] demonstrate their efficacy in estimating politicians' latent ideological positions. Collectively, these studies highlight both the transformative potential and current limitations of LLMs in advancing social science research.

Research Questions and Goal

In the context of recent developments, this research project seeks to determine if a Large Language Model (LLM) can discern individuals' political leanings and affiliations based on their responses to political issues such as immigration, LGBT rights, and trust in the police. To address this question, we formulate the following research questions:

- To what extent can an LLM understand political discourse?
- Can LLMs capture the policy positions of political parties through their media visibility?
- How accurately can an LLM infer individuals' political inclinations from their responses to political surveys?
- Can an LLM deduce the political positioning of individuals and parties by staying informed about the political climate?
- Rather than perceiving a Large Language Model (LLM) merely as a voter [7], might we refine its capabilities to serve as a bespoke expert, adept at forecasting the nuances of individual political leanings and affiliations?

This research aims to develop a Large Language Model (LLM) capable of comprehending the up to date political context, extracting political parties' positions, and identifying individuals' standings within this positioning framework.

Research Milestones and Datasets

To address the research questions outlined in the previous section, we propose a four-stage research plan incorporating specific methods and datasets:

1. **Literature Review and Benchmark Analysis**
   We plan to conduct a comprehensive review of the current Large Language Model (LLM) surveys [16] and benchmarks to identify the strengths and weaknesses of existing models. This phase will involve summarizing studies on LLM evaluation [6], explainability [23], and instruction tuning strategies [22], setting the foundation for initial prompt design considerations.

2. **Political Discourse Fine-tuning with Political Discussion Datasets**
   We aim to fine-tune LLMs using datasets from political discussions on platforms like Reddit [2]. This approach was specifically chosen to ensure that the Large Language Model (LLM) captures and reflects the nuanced impact of contemporary political developments on voter behavior. The goal is to align the model's decision-making processes closely with the way individuals' opinions and actions are shaped by the current political climate.

3. **Policy Position Extraction Using News Sources**
   The plan includes extracting political parties' policy positions on issues such as minority rights and gender equality by analyzing news from various politically oriented media outlets. For this stage, the V-Party dataset [19] will serve as the ground truth for parties' policy positions, offering comprehensive data on global political parties' ideologies, structures, and practices.

4. **Analyzing Political Survey Responses**
   In the final phase, we intend to use data from the European Social Survey (ESS) [1, 11] to understand individuals' proximity to political parties based on their responses in political surveys. The ESS provides valuable insights into public opinion across more than 30 European countries, making it an essential resource for assessing societal trends and political orientations.

This structured approach, leveraging diverse datasets such as Reddit Political Discussion dataset, V-Party by V-Dem, and the European Social Survey, aims to develop an LLM model adept at navigating the political landscape, understanding policy positions, and pinpointing individuals' political leanings with accuracy.

Research Timeline

Table 1: Research Timeline

Weeks	Activity	Duration
1-2	Examining the course materials *Deep Learning for NLP* [18]	2 weeks
3-4	Engaging in reading activities to familiarize with political science methodologies	2 weeks
5-9	Conducting a review of relevant literature and benchmarks	5 weeks
10-13	Refining political discourse analysis with datasets from political discussions	4 weeks
14-17	Identifying policy stances through analysis of news content	4 weeks
18-21	Investigating political leanings from surveys	4 weeks
22-23	Preparing documentations and presentation	2 weeks

Alignment of Project Proposal with *Societal Computing* Course

In this project proposal I've outlined, it's clear that taking the course *Societal Computing* [10] would be incredibly beneficial for me. Here's why, in simpler terms:

My project, "Beyond the Ballot: Harnessing AI to Unravel Voters' Political Leanings," dives deep into how Large Language Models (LLMs) can identify individuals' political leanings through their responses on various political issues. This is a complex task that intersects political science, computational social science, and the application of AI in understanding societal behaviors. The course's focus on societal computing perfectly aligns with the skills and knowledge I need to successfully carry out my project.

For starters, the course promises to teach how to use human-centered data to uncover patterns and test theories about societal behavior. This is exactly what my project aims to achieve by analyzing political discussions and survey responses to understand voters' political orientations. Learning how to effectively use this data could significantly enhance the accuracy and depth of my project's findings.

Additionally, the course covers how to consider social contexts and ethical concerns in data analysis. Given my project's reliance on sensitive political opinions and affiliations, understanding how to navigate these ethical considerations is crucial. It ensures that the research respects participants' privacy and the broader implications of revealing political leanings.

Moreover, the course offers an introduction to fundamental concepts and practical skills from societal computing, incorporating insights from social science, machine learning, AI, and more. Since my project involves fine-tuning LLMs with political discussion datasets and extracting policy positions from various sources, the interdisciplinary approach taught in the course could provide me with a solid foundation in both the technical and theoretical aspects needed for my research.

Learning in a systematic, rigorous, and responsible manner, as promised by the course, is exactly what's required to navigate the complexities of my project. By understanding how to solve problems in societal computing and engage in research critically, I can ensure my project not only contributes to academic knowledge but does so with integrity and reliability.

Essentially, it lays down the foundational and advanced tools I require to methodically approach my project's objectives, ensuring my research on voters' political inclinations is both profound and impactful.

References

[1] ESS Round 10: European Social Survey Round 10 Data, 2020. Data file edition 3.0.

[2] Analyzing the political discourse of reddit's subreddits. https://www.kaggle.com/datasets/thedevastator/analyzing-the-political-discourse-of-reddit-s-su, 2023. Accessed: 2023-03-17.

[3] Alan I. Abramowitz and Kyle L. Saunders. Is polarization a myth? *The Journal of Politics*, 70:542 – 555, 2008.

[4] Angus Iain Lionel Campbell, Philip E. Converse, Warren E. Miller, and Donald E. Stokes. The american voter. *American Journal of Psychology*, 74:648, 1960.

[5] Edward G. Carmines and James A. Stimson. The two faces of issue voting. *American Political Science Review*, 74:78 – 91, 1980.

[6] Yupeng Chang, Xu Wang, Jindong Wang, Yuan Wu, Linyi Yang, Kaijie Zhu, Hao Chen, Xiaoyuan Yi, Cunxiang Wang, Yidong Wang, et al. A survey on evaluation of large language models. *ACM Transactions on Intelligent Systems and Technology*, 2023.

[7] Eric Chu, Jacob Andreas, Stephen Ansolabehere, and Dwaipayan Roy. Language models trained on media diets can predict public opinion. *ArXiv*, abs/2303.16779, 2023.

[8] Russell J. Dalton. Citizen politics: Public opinion and political parties in advanced industrial democracies. 1996.

[9] Aniket Deroy, Kripabandhu Ghosh, and Saptarshi Ghosh. How ready are pre-trained abstractive models and llms for legal case judgement summarization? *ArXiv*, abs/2306.01248, 2023.

[10] Jana Diesner. Societal computing. https://campus.tum.de/tumonline/ee/ui/ca2/app/desktop/#/slc.tm.cp/student/courses/950760618, 2024. Technical University of Munich (TUM), Summer Semester.

[11] European Social Survey. ESS-10 2020 Documentation Report. Documentation report, European Social Survey Data Archive, Sikt - Norwegian Agency for Shared Services in Education and Research, Norway for ESS ERIC, Bergen, 2023.

[12] Michael C. Frank. Baby steps in evaluating the capacities of large language models. *Nature Reviews Psychology*, 2:451 – 452, 2023.

[13] Shanto Iyengar and Kyu S. Hahn. Red media, blue media: Evidence of ideological selectivity in media use. *Journal of Communication*, 59:19–39, 2009.

[14] Lawrence R. Jacobs and Robert Y. Shapiro. Politicians don't pander: Political manipulation and the loss of democratic responsiveness. 2000.

[15] Arend Lijphart. Patterns of democracy : government forms and performance in thirty-six countries. *CrossRef Listing of Deleted DOIs*, 30:117, 2000.

[16] Shervin Minaee, Tomas Mikolov, Narjes Nikzad, Meysam Chenaghlu, Richard Socher, Xavier Amatriain, and Jianfeng Gao. Large language models: A survey. *arXiv preprint arXiv:2402.06196*, 2024.

[17] Pippa Norris. Electoral engineering: Voting rules and political behavior. 2004.

[18] Statistical Learning Data Science Team at LMU. Deep Learning for Natural Language Processing. https://slds-lmu.github.io/dl4nlp/, 2024. Accessed on: 17.03.2024.

[19] Varieties of Democracy (V-Dem) Project. V-party dataset. https://v-dem.net/data/v-party-dataset/, 2022. Accessed: 17.03.2024.

[20] Sidney Verba, Kay Lehman Schlozman, and Henry E. Brady. Voice and equality: Civic voluntarism in american politics. 1996.

[21] Patrick Y. Wu, Joshua A. Tucker, Jonathan Nagler, and Solomon Messing. Large language models can be used to estimate the ideologies of politicians in a zero-shot learning setting. *ArXiv*, abs/2303.12057, 2023.

[22] Shengyu Zhang, Linfeng Dong, Xiaoya Li, Sen Zhang, Xiaofei Sun, Shuhe Wang, Jiwei Li, Runyi Hu, Tianwei Zhang, Fei Wu, et al. Instruction tuning for large language models: A survey. *arXiv preprint arXiv:2308.10792*, 2023.

[23] Haiyan Zhao, Hanjie Chen, Fan Yang, Ninghao Liu, Huiqi Deng, Hengyi Cai, Shuaiqiang Wang, Dawei Yin, and Mengnan Du. Explainability for large language models: A survey. *ACM Transactions on Intelligent Systems and Technology*, 15(2):1–38, 2024.

[24] Caleb Ziems, William B. Held, Omar Shaikh, Jiaao Chen, Zhehao Zhang, and Diyi Yang. Can large language models transform computational social science? *ArXiv*, abs/2305.03514, 2023.