

Identifying Opinion Change and Knowledge Levels of Deliberative Groups (Natural Language Processing) *

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1. Introduction

Deliberative Polling asks, “What do people think if they are given information and circumstances to the discuss policy issues?” (Stanford University Center for Deliberative Democracy, n.d.) Stanford Professor Jim Fishkin and the Center for Deliberative Democracy (CDD) conduct Deliberative Polls where people come together for a weekend where they are polled on their opinions, spend the weekend deliberating in groups, and are polled afterwards about their opinions. Fishkin finds that people change their opinions after deliberations.

In this project, I will combine transcripts and survey results from Deliberative Polls to answer:

Can we build an NLP model that predicts whether a group will change their opinions?

If time permits, I hope to deploy this model to predict opinion change on some deliberative group such as a town hall.

This project was inspired by previous research on attitude change in the “Change my View” subreddit (Priniski and Horne 2018).

2. Dataset/Features/Preprocessing

Although there have been dozens of Deliberative Polls conducted across the world, many are not in English, have not been translated into English, or do not have high-quality English transcriptions. I requested all datasets that have high-quality English transcriptions from the CDD. I am anticipating at least three datasets from:

*Code and data available at: github.com/rossdahlke/cs_230_project

1. Ghana
2. Stanford Undergraduates
3. American High Schoolers

In each of these datasets there are transcripts from about 20 groups and their survey responses. In total, I anticipate having about 60 examples of transcripts and survey results before and after deliberation. Of these 60 examples, I plan to use 51 as a training set, 6 as a test set, and 3 as a validation set.

Preprocessing will include all of the standard NLP preprocessing such as padding, truncation, and tokenization. Since I will be primarily using transformers, I will experiment whether text standardization such as punctuation, capitalization, and stop word removal improves the accuracy of the models.

3. Challenges

The biggest challenges of this project will be dealing with the small number of training examples. I will use pre-trained transformers to try to alleviate this issue.

4. Methods

I will first try LSTM on the dataset to establish a baseline. However, given the small dataset that I'll be using, I primarily use transformers. I will test multiple models, including:

- XLNet
- BERT
- GPT-2
- CTRL
- Longformer

My hypothesis is that the detection of opinion change will not be based **how** people talk instead of **what** they talk about. I will experiment with different methods to capture this change in **how** people talk by adding in linguistic features. Early work has shown that incorporating sentence dependency features into one's model can improve performance (Komninos and Manandhar 2016), but I hope to extend this work by incorporating sentence dependencies and other linguistic features such as average length of uninterrupted talking.

5. Evaluation

Quantitatively, I will evaluate on a discrete label of whether the group changed their opinion or not by using a confusion matrix to calculate recall, precision, and overall accuracy. Qualitatively, I will examine training data that is incorrectly classified to see if there are specific problems with that example such as anomalous lengths or deliberation content.

References

Komninos, Alexandros, and Suresh Manandhar. 2016. "Dependency Based Embedding for Sentence Classification Tasks." *Proceedings of NAACL-HLT*, June, 1490–1500.

Priniski, John Hunter, and Zach Horne. 2018. "Attitude Change on Reddit's Change My View." *Conference: Proceedings of the 40th Annual Meeting of the Cognitive Science Society, Madison, Wisconsin*. https://www.researchgate.net/publication/333175400_Attitude_Change_on_Reddit's_Change_My_View.

Stanford University Center for Deliberative Democracy. n.d. "What Is Deliberative Polling®?" *CDD*. <https://cdd.stanford.edu/what-is-deliberative-polling/>.