How climate activism impacts climate change sentiment online

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Motivation

Recently, organizations have boosted climate change awareness via impactful actions, like Greta Thunberg's Climate Strikes and the Fall 2022 soup-throwing protest by Just Stop Oil.

The influence of these actions, which garner support and outrage, on societal perspectives and their efficacy in promoting issue importance or potentially causing harm, requires further study.

What is the impact of throwing soup on a painting ?

Dataset

We have ~40k tweets in 3 datasets:
- 20 days around March '19 Climate Strike
- 20 days around Sept '19 Climate Strike
- 28 days around Oct '22 SoupGate

For each tweet we have:
- A stance classification.
- A sentiment classification.
- An aggressiveness classification.
- The tweet location

```
,,Weather Extremes,0.5004789794921876,neutral,male,,aggressive
,,Weather Extremes,0.43281606390476224,neutral,male,,aggressive
,,,Importance of Human Intervantion,-0.09042840938568113,neutral,male,,aggressive
,,,Seriousness of Gas Emissions,-0.28346698954105376,neutral,male,,aggressive
```

Methods

Data augmentation

Our research utilizes a dataset of 1.5 million climate change tweets from 2006-2019, drawn from an earlier study.

We also amassed 350,000 original tweets, targeting the terms "climate change" and "global warming", captured around the notable October 14, 2022, soup-throwing event.

The analysis employs a subset of these data.

Classification

We improve the stance classification using zero-shot learning with GPT3.5.

We use two prompts (see footnote):
- Using text only (more accurate)
- Using text and author description

The final prompt is chosen based on how more performant it is on the 1.5M dataset compared to the BERT model they used

Metrics

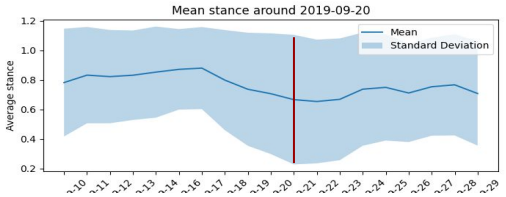
For each period we compute and aggregate daily:
- The mean/std stance
- The mean/std aggressiveness
- The mean/std sentiment

We aggregate them daily to observe their time evolution and compare their values before and after the events. We also study the evolution of stance for users who tweeted before and after, the "usual posters". We use a t-test to assess significance.

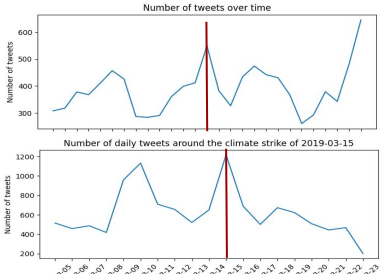
Results

Metric / Model	Original BERT	GPT3.5 Prompt 1	GPT3.5 Prompt 2
Accuracy	**0.78**	**0.87**	**0.80**

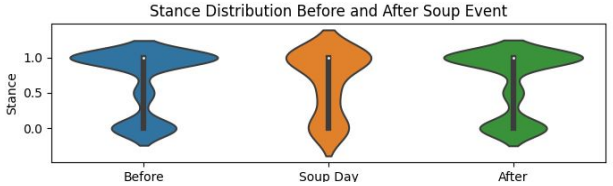
On a sample annotated by the author, we compare the results of the stance classification models (prompt 1 in bottom-left)



Closer to the event, the stance drops and std grows larger



On political event days, tweet posting doubles



On the day of the soup, the stance is closer to denial for usual posters

In the 14 days before and after, no significant difference (p = 0.42)

I want you to classify these tweets as coming from believer or denier. For each tweet, give me:
- The tweet id \n - A number between 0 and 1: 1 if the author likely to be a climate change believer, 0 if it's likely to be a denier, 0.5 if you're unsure.
- A reason for your classification, in maximum 10 words.Give me the results as a list of lists, with no line jumps, like this:
[[tweet_id, stance, reason], [tweet_id, stance, reason], ...] tweet_id is an integer, stance is either 0, 0.5 or 1, reason is a string surrounded with the "" quotes.If you cannot classify a tweet, give it a stance of -1 and give the reason why.