Tracking Public Opinion Towards the Paris Climate Accord Using Topic Modeling of Twitter Data

Preliminary Project Proposal by Bhargavi Ganesh and Felipe Alamos

Introduction

The Paris Climate Accord was the first effort to bring nations together to address and combat the effects of global climate change. The 2015 agreement came in response to the rising threat of climate change, and an acknowledgement that multinational efforts would be needed to bring down Co2 emissions worldwide. The agreement was historic, and included pledges from 196 representative parties to keep global temperature rise this century well below two degrees Celsius above pre-industrial levels.[1] While environmental activists and concerned parties lauded the efforts as "historic", many of the common criticisms of multinational instruments have arisen, particularly highlighting the fact that the provisions in the agreement are non-binding, and either the fact that they went too far in restricting the individual rights of countries, or did not go far enough in addressing escalating climate change[2]. In 2017, in a move that shocked the world, President Donald Trump announced that the U.S (a key contributor to summit under President Obama), would be withdrawing from the Paris Climate Accord. President Trump argued that the Paris accord is "very unfair at the highest level to the United States," adding that it would "effectively decapitate the [U.S.] coal industry."

The news of U.S. withdrawal prompted polls to point out that U.S. public opinion on this matter diverged from President Trump's actions.[3] These polls prompt an interesting question: do public opinion on climate change match the actions taken by global parties? To answer this question, we propose a project that analyzes public opinion towards the Paris Climate agreement. Social media platforms such as

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[1] https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

[2] https://journals.sagepub.com/doi/full/10.1177/1070496516631362

[3] https://www.theatlantic.com/science/archive/2017/05/most-americans-support-staying-in-the-paris-agreement/528663/

Twitter were very active following Trump's withdrawal from the agreement. Therefore, we are particularly interested in analyzing twitter data to study what subtopics have been discussed in relation to the Paris agreement. Previous literature on this topic has focused on climate change tweets in general.[4] We have chosen to look more specifically at the Paris climate agreement because of its symbolic representation of global climate policy on the whole.

This analysis could contribute to existing knowledge on this topic in two meaningful ways. One, uncovering public opinion on the Paris climate accord could inform future iterations of the multinational treaty. The member countries are supposed to meet every five years to discuss potential additional targets that could be reached. Public opinion on the agreement and climate change as a whole could factor into countries' willingness to drive a more ambitious climate agenda. In addition, looking at the U.S. specifically, the official withdrawal from the treaty can only happen after the 2020 election. If policymakers in the U.S. note a positive public opinion about the Paris climate accord, there may be political pressure to re-enter the agreement and officially ratify the treaty. Second, insights on public attitudes towards climate change more generally could provide an impetus for policymakers at a national level to suggest proposals and legislation related to climate change mitigation/adaptation.

Data

The data we plan to use is twitter data, which we plan to access using the twitter API. We plan to pull tweets according to specific keywords, including "Paris Climate Agreement", "Paris Climate Accord", "COP15", for example. We are also interested in understanding perspectives towards the Paris agreement over time. Particular snapshots of interest would be tweets in the lead up to the Paris deal (2013-2015), immediately after the final terms of the agreement were announced (December 12, 2015), and immediately after President Trump announced U.S. withdrawal from the treaty (June 1, 2017). More details/potential challenges in interacting with the Twitter API are presented below:

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[4] https://link.springer.com/article/10.1007/s13278-019-0568-8

- **Scope:** Since our subject matter is relatively narrow, we plan to use both tweets and retweets.

- **Keyword search:** We will be using the search functions within the "rtweet" package in R to find tweets according to the keyword criteria mentioned above.

- **Time Periods:** We would also like to compare topic models across different time periods as described above, and we plan to use the functions such as "search_30day" and "search_fullarchive" present in the "rtweet" package to do so. This is, however, contingent on us getting access to a premium Twitter developer account, which we may need to pursue funding for. In absence of such an account, we would only be able to see tweets from the last 4-6 days. If that ends up being our only option, we may need to modify the scope of our project slightly.

- **Additional considerations**: Based on the number of search results retrieved, we may decide to generate a random sample of tweets. If so, we would need to come up with a methodology to ensure that the sample is robust and unbiased.

Pre-Processing

Before conducting topic modeling on the data, we will need to pre-process it and ensure that we remove word stems, remove spaces and punctuation, so as to extract relevant words from each tweet. There are functions within the "rtweet" package that will be useful for this purpose, including the "plain_tweets" function. We may also have to create a few of our own functions to facilitate this process.

Methods

We plan to use topic modeling, particularly the Latent Dirichlet Allocation (LDA) method, to reduce the dimensionality of the data and allow subtopics to emerge from the twitter data[5]. We hope to

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https://medium.com/pew-research-center-decoded/an-intro-to-topic-models-for-text-analysis-de5aa3e72b
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visualize these topics in different ways, such as using dendograms to demonstrate clustering, for example. As we learn more about this method, we will update our methods section with more specifics.

Analysis

In addition to the time snapshots mentioned above, we would like to compare results across different countries, by pulling tweets from a set of countries seen as influential in the Paris climate talks. For example, this could include European countries such as France, Germany, the UK, and Italy, as well as China, Russia, and India. We would also like to potentially take a deeper dive into U.S. climate attitudes because we suspect that the U.S. is more polarized on this issue than most other countries. For this reason, it may be interesting to explore the difference between topics that come out of urban versus rural areas, for example. If time permits, we may also run a sentiment analysis on the tweets.

Potential Conclusions/Future Work

We believe that this study will provide a starting point for understanding global public opinions towards climate change, and provide an opportunity to assess the relative acceptance or lack of acceptance of the Paris climate accord among the general public. Future work might compare outcomes from this study to legislation in specific countries, to see if perhaps attitudes towards multinational treaties may be influencing national/local political agendas.

References:

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5. Kessel, Patrick van. "An Intro to Topic Models for Text Analysis." *Medium*, Pew Research Center: Decoded, 1 Aug. 2019, medium.com/pew-research-center-decoded/an-intro-to-topic-models-for-text-analysis-de5aa3e72bdb.