The Link Between Geographic Polarization and the Tone of Social Media Interaction

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Background

Twitter, like many other social media platforms, has become an increasingly important medium in which political discourse occurs. This is never more present than in the election cycle. In the United States election cycles have become points of social tension with social media as the arena in which many political debates rage, commentary arises and is shared.

Many studies have shown that politics and government in America have become increasingly polarized over the past few decades, but can the same be said for political discourse among citizens? States are large geographic entities, often with diverse political interests. Can these political differences be represented and this regional diversity categorized? With the rise of social media and natural language processing, we have a way to record, measure and quantify tone of conversation between people across the world. While the tone of social media interactions about politics can often take on a confrontational tone, can this tone be quantified and can it be related to this political and geographic diversity? Does the tone of political discourse change between those who come into regular contact with those who disagree with them and those that do not?

This Study

In the last full national election in 2012, the neighboring Wisconsin and Minnesota both voted for victorious Democratic president Barack Obama and Democratic Senators (Tammy Baldwin and Amy Klobuchar) by significant majorities. However, both states hold significant conservative minorities and a closer look at the results reveals two very divided Midwestern states. There are huge clusters of highly Democratic regions and highly Republican regions. Many of the people in these regions can feel like they are living in different states, rarely coming into contact with the opposition in person. However, that geographic divide is in theory removed in social media. Thus the research question for this study concerns whether the tone of political conversation on social media changes for those that live on the borders of these partisan strongholds or in outlier areas.

Methods (Precincts)

Analysis for this study was based on precinct delineations and precinct-level data from the 2012 general election. Data was procured and analyzed according to a ‘Percent Democratic’ variable:

Percent Democratic is an attempted generalized, binary representation of a precinct’s partisan preferences. It is an attempt to both remove the impact of non-major party candidates as well as the complicating factors of specific candidates. The formula is as follows:

\[
\text{Percent Democratic} = \frac{\text{DEM_PRES_VOTES}}{\text{DEM_PRES_VOTES + GOP_PRES_VOTES}} + \frac{\text{DEM_SEN_VOTES}}{\text{DEM_SEN_VOTES + GOP_SEN_VOTES}} + \frac{\text{DEM_HOUSE_VOTES}}{\text{DEM_HOUSE_VOTES + GOP_HOUSE_VOTES}}
\]

From there, two different spatial analyses were performed. Hotspot Analysis (left) was used to find the most strongly Democratic and Republican areas, as a preliminary measure and visual representation of divides. Next, Local Moran’s I Cluster Analysis (below and left) was performed to find outlier precincts which were mapped and combined without regard for the partisan lean of the polarization.

Precincts Analysis:

As can be seen (left), the most intensely polarized locations exist mainly in suburbs of these major cities and remote locations away from population centers.

Twitter:

Because most of the tweets were not geocoded beyond the Town level (mostly based on user-listed locations which rarely if ever specify the precinct), both data was dissolved into county and official town (where applicable) layers and then batched and analyzed accordingly.

The overall results showed a slight positive tone (.060) in the tweets, but drastic differences based on the search keyword (see far right). As for geographic results, the tweets were fairly spread across the country but unsurprisingly tended to cluster around the areas of high population.

For the geographic correlation, results, as can be seen in the graph (above right), did not show a strong correlation (-.088) between the variables of geographic political polarization and positivity of tweets. Thus it appears, at least for these states and this week, there is little verifiable link between geographic political polarization and the tone of political discourse on social media.

Methods (Twitter):

To gather tweets a number of steps were taken. First, a dictionary of election-related terms was created. These 57 keywords ranged from generic “election” or “politics” to key issues like “immigration” and “social security.” It also included each of the presidential candidates’ names, many variations on the party names and even common hashtags like ‘feellikebern’ & ‘nevertrump.’

From there, a smallest possible circle was drawn around the two states (as seen above), and the origin and radius were used to establish a query using Twitter’s search by_location feature.

As the tweets were collected for the week from May 3rd-10th 2016, vaderSentiment Analysis was used to find the tone (on a scale from -1 to 1) of the tweets’ text and, where possible, the coordinate or place information were recorded. For the vast majority of tweets that included no specific location information, the ‘location’ given in the user profile was used and geocoded. In all, around 50,000 tweets were able to be geocoded (above), of which 26,538 were within the sample area. These tweets were mapped and coded (below).

Acknowledgments

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Libraries/APIs Used

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