How social media big data helps us better understand social dynamics

March 10 2023, by Carly Bowling

Credit: Pixabay/CC0 Public Domain

If tweets are measured in characters and a picture is worth a thousand words, what do you get when you combine and examine thousands or even millions of social media posts at once? The answer is a lot of data

and researchers at The University of New Mexico use it to study social dynamics and human behavior.

Dr. Xi Gong, assistant professor in the Department of Geography & Environmental Studies and founder of the Spatially Integrated Social Science (SISS) Lab at UNM, uses big data from social media to do just that. His lab has studied topics ranging from sports fan behavior to crisis communication.

"The beauty of social media is it provides a more cost-effective way to observe and analyze a large sample of human activities and behaviors than traditional measures, like surveying or interviewing a population," Gong said. "What originally drew our team to social media research were the advantages of it and that it matches our research into social dynamics very well."

It all starts with a post. You're watching your favorite basketball team win or lose a game in real time and you fire off your thoughts on social media. If your team won the game, you might post, "We won!" on social media; but if the team lost, surely it was caused by bad calls from the referees, at least, that's your interpretation.

These behaviors— using your team's win as your win or derogating the opposing team, fans and the referees— known as Basking in Reflected Glory and Blasting, respectively, are just two tactics that people use to manage their social image. Gong wanted to investigate the behaviors using tweets from the 2019 NBA Finals.

More than 11 million tweets were collected for the study titled "Exploring dynamics of sports fan behavior using social media big data," published in *Applied Geography*, and more than 240,000 of those included geotags. The tweets and associated data like the time they were posted and how much engagement they received are all downloaded.

"With that large data set of those geotagged [social media posts](#), we can actually investigate the spatial and temporal changes of human attitudes and behavior, what they are saying or ups and downs of emotions associated with the game process and outcome," he said.

In the NBA Finals study, Gong and his research partner, Yong Wang, were able to observe and support a number of existing social theories about how fans perceive themselves as part of their favorite team and will blame external forces when faced with negative information about the team.

In 2021, Gong and Dr. Xinyue Ye published "[Governors Fighting Crisis: Responses to the COVID-19 Pandemic across U.S. States on Twitter](#)" in *The Professional Geographer*. The pair utilized Twitter data to examine how U.S. state governors used the platform for crisis communication during the COVID-19 pandemic.

He used spatial-temporal analysis, network analysis, and text mining to see whether state governments communicate with the public efficiently, which governments collaborated, how tweet frequency aligned with pandemic severity, and how dynamics differed between political parties, etc.

The study provided suggestions for how government agencies and officials can leverage social media in the development of future crisis communication plans. Tips included following more public accounts and listening to their concerns consistently, organizing crisis communications with hashtags, tweeting more about policies and updates, and following and retweeting peer governors' accounts more often.

"I'm interested in the spatial-temporal dynamics of human society, but social media is not the only data we are looking at, " Gong said. "We are also combining social media data with data from other sources."

Most recently Gong used U.S. georeferenced Twitter data from 2018 and 2019 to better understand people's attitudes toward fracking. A multiscale geographically weighted regression (MGWR) was used to examine county-level relationships between percentages of negative tweets and factors like demographics, economic development, environmental impacts and more. Millions of tweets were used in the study, "Understanding public perspectives on fracking in the United States using social media big data," published in *Annals of GIS*.

Researchers found that shaping factors of people's attitudes towards fracking varied in different regions and scales in the U.S. People living in Eastern and Central U.S. counties with higher unemployment rates, counties east of the Great Plains with less fracking sites nearby, and Western and Gulf Coast region counties with higher health insurance enrolments are more likely to express fewer negative opinions toward fracking activities.

Findings from studies utilizing social media may make it easier to understand public perception of certain topics and help policymakers make decisions on policy adjustments.

Gong recognized social media studies have pros and cons. Though it can be a great way to reduce research costs, there are certain considerations that must be made.

"It has limitations. Different social media platforms have different age groups of users, a single platform may not fully represent the entire population. Therefore, combining information across social media platforms to generate a more holistic view of social dynamics is needed in future studies ," Gong said.

"Traditional methods could also have potential bias in samples — surveys, interviews. Compared to those, social media data is available at

a much lower cost, faster speed and larger amount. Also it is open source, because people voluntarily share the data to the public," he said.

Opportunities to utilize social media big data stretch beyond what has been explored so far.

"I welcome any potential collaborations with other disciplines. Social media data is not only for geographic information scientists or computer science researchers," Gong said.

"The high-volume, geo-referenced, and open-source social media data, as a type of emerging spatial big data, provide an unprecedented opportunity for uncovering the spatial-temporal patterns of social dynamics at a large scale, which can be used to investigate a lot of things in different disciplines."

More information: Xi Gong et al, Understanding public perspectives on fracking in the United States using social media big data, *Annals of GIS* (2022). DOI: 10.1080/19475683.2022.2121856

Provided by University of New Mexico