Planning, Policy, and Programming

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Project Title:
Analyzing Spread of Influence in Social Networks for Transportation Applications

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Analyzing Spread of Influence in Social Networks for Transportation Applications

This project developed software that can identify influencers in social media communications about specific transportation topics in California.

WHAT IS THE NEED?

Facebook, Twitter, YouTube, Instagram, LinkedIn, and ResearchGate are popular examples of social media platforms. Here, users share aspects of their personal life, pass on or report news and other information, voice their opinions on a current topic, and ask for or offer advice about a product or service. Participants of social media form virtual communities and networks of people with similar interests and goals. The Pew Research Center has conducted a study of social media usage from 2005 to 2015 resulting in numerous statistics that show social media's ubiquity. That is why social media is an immense venue for entities (e.g., individuals, groups, large organizations) to exert their influence, whether intentional or not, upon other users. With tweets, blogs, videos, and images, influential users can affect other users to change their opinions or adopt a new behavior. In fact, there are even services to compute for a person's influence such as Klout and PeerIndex. Hence, identifying an influencer and the associated message can be exceptionally valuable to Caltrans and the transit agencies in promoting sustainable transportation. Currently, the study of the spread of influence in social media is in theoretical stage, and there are various researchers that have offered good solutions to maximizing the influence of an entity to an event (e.g., CicLAvia), activity, or idea. However, all of these are still in theory and need experiments to discover an actual benefit from the procedure.

WHAT WAS OUR GOAL?

Our goal was to identify social media users who/which are able

to exert influence on others. We intended to know their opinions on transportation-related topics and if these perceptions were in line with the ultimate goal of promoting sustainable transportation such as public transit, biking, and walking.

WHAT DID WE DO?

With the Twitter API (application programming interface), Google Maps API, and other supporting open-source programs, we developed a tool for generating a list of potential influential individuals and/or organizations for particular transportation-related topics in Twitter. Using keywords such as #caltrans, California freight, and fastrak California, we have been capturing live tweets from Twitter continuously since we deployed our web application. Although papers in the current literature propose many different measures of influence using both contrived and real data, mentions and retweets are the most reliable measures of influence in Twitter. Retweet is associated with the value of the content of the tweet, while mention is related to the importance of the user's name. Therefore, our tool counts the number of mentions of a specific Twitter user and also counts the number of retweets of a particular tweet.

WHAT WAS THE OUTCOME?

The users (e.g., individual, non-profit, newspaper) with the most number of mentions and retweets separately are considered the most influential for a particular transportation-related topic (e.g., California high speed rail). The first 10 users with the highest numbers of mentions and retweets are shown in the web application with the associated tweets. Their locations are indicated in Google Maps. The tool has several strengths. The software captures only relevant tweets that are continuously accumulating. The code is easy to

modify. For example, the number of influencers shown can be changed and additional keywords can be added. However, only tweets with locations can be harvested. In addition, for less popular keywords, the mentions and retweets may have a low count and the associated users can hardly be called influencers.

WHAT IS THE BENEFIT?

The following are the potential uses of the ready-to-use tool we developed.
- Limiting the spread of misinformation about a new practice (e.g. FasTrak)
- Identifying and using celebrities to promote sustainable transportation
- Changing negative publicity (e.g., San Francisco-Oakland Bay Bridge)
- Knowing the initial perception of a proposed action (e.g., road charge)
- Assessing the success of social media efforts of Caltrans (e.g., #IwillRide is a hashtag that promote the acceptance, support, and future use of the California high speed rail)
- Promoting a good image of Caltrans and the transit agencies (If they are viewed positively, the public will likely support their objectives one of which is to generate revenue for maintaining transportation-related assets. Some income-generating projects may require the vote of the electorate.)

LEARN MORE

http://www.cpp.edu/~engineering/faculty/labellera.shtml

http://www.ucconnect.berkeley.edu/node/104

To view the evaluations:
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DRISI

Caltrans Division of Research,
Innovation and System Information

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Research Results

IMAGES

#caltrans	California trains	#expresslanes California
caltrans	California freight	fastrak California
California transportation	high speed rail California	transponder California
California traffic	#hsr California	#bicyclelanes California
California cars	bullet train California	bicycle lanes California
California rail	expresslanes California	

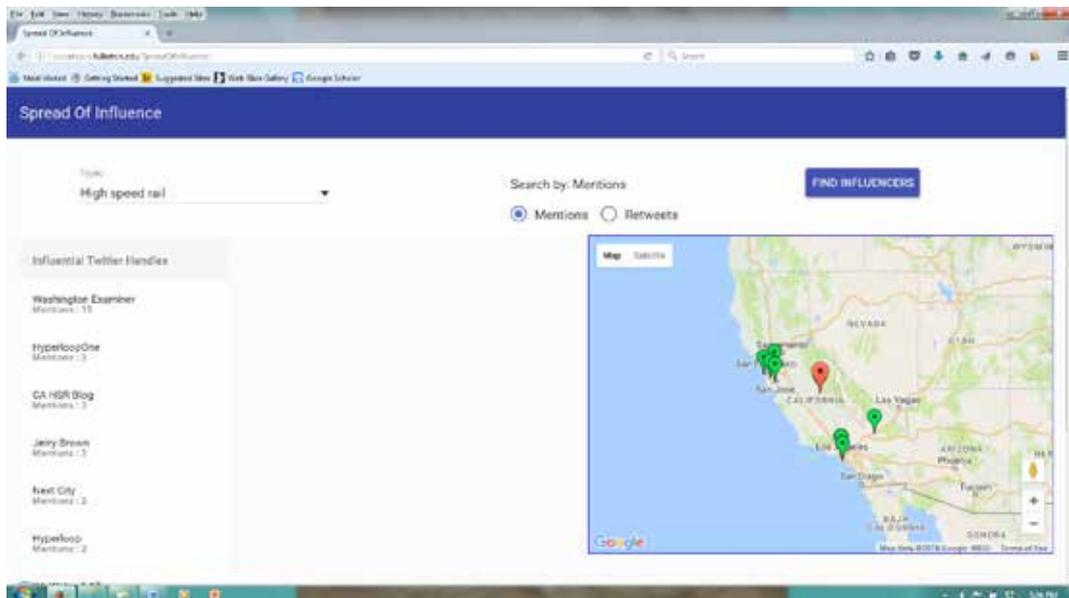Table 1: Keywords used to capture the live tweets from Twitter

Figure 1: Result of searching for mentions for the topic "High speed rail"