Sensing the Invisible and Mapping the Future: Use Social Media and Big Data to Monitor Human Dynamics.

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Big Data provide untapped potential for discovering and analyzing dynamic human problems, including disease outbreaks, traffic jams, urban growth, disaster responses, and environmental changes. Social media, as one of the major sources of Big Data, can help scientists and researchers to monitor and analyze invisible human communications and activities by tracing the digital footprints of human beings from mobile devices and smart phones. This talk will highlight this new research trend in spatial information science and discuss their potentials and challenges with real world case studies.

The first part (sensing the invisible) will focus on how to sense the invisible world of human communications and activities by combining traditional GIS methods and data science analytic tools, including machine learning, linguistic analysis, social media application programming interfaces (APIs), and data noise filtering. Two case studies in monitoring flu outbreaks and wildfire disaster responses will be presented.

The second part (mapping the future) will highlight the web-based data analytic and visualization tools developed by the Center for Human Dynamics in the Mobile Age. The web-based Social Media Analytics and Research Testbed (SMART) dashboard can provide real-time surveillance and geo-targeted trend analysis for various topics (http://vision.sdsu.edu/hdma/smart). The Geo-targeted Event Observation (GEO) Viewer is a web mapping application which enables users to track real-time messages, pictures, and locations from GPS-tagged social media messages (Twitter) for disaster response and assistance efforts (http://humandynamics.sdsu.edu/GeoViewer.html).

Finally, this talk will emphasize the importance of transdisciplinary collaboration for this new Big Data Analytics research field and how build a new transformative research agenda for future development of spatial information science and technology.