Mapping the pulse of shopping behavior: Black Friday, economic geography, and Cyberspace

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Since resources are always limited, socioeconomic events would have been concentrated in different regions but evolving in accordance with the changing market and environment. While place-based public policy has been efficient, location-based information is difficult and expensive to retrieve. Timely and rigorous analysis of emerging socioeconomic events opens up a rich empirical context for the social sciences and public policy research. Such highly topical subjects, however, increase the challenge and difficulty to obtain effective, validated, and convincible information through intellectual inquiry and survey. Traditional survey solution tends to be labor-intensive and time consuming, and therefore is only suitable for analysis at a small scale. Additional, when it takes a considerable amount of time to collect and manually process the survey results, the outcome may not be meaningful and significant to the decision-makers who need to understand the contemporary situation and the nature of the ongoing events. The emerging social media network and the advanced information retrieval technology becomes critical and helpful to understand the impact of and response to certain socioeconomic policies and events in a timely fashion. Most previous studies on Black Friday have largely relied on the data of survey or sale data by case studies of specific cities, which are subject to relative frequency and lack of spatial-temporal granularity. The recent development of location-aware technologies has enabled what Goodchild described as "humans as sensors", and as a result voluminous volunteered geographic information with explicitly spatial and temporal tag have been contributed. Mining these rapidly-growing and timely Exabytes of human sensor data in the context of space-time synthesis provides a new perspective for understanding the pulse of shopping behavior. In our research, we analyze Black Friday patterns and trends in USA using a dataset retrieved from Twitter. Since its launch in 2006, Twitter is a real-time short text messaging service and a medium for over 500 million registered users to interact, exchange ideas and sharing experience in the Cyberspace with build-in Global Positioning System. This revolution in tracking human and other motion in digital form enables the collection of multiple attributes at the finest spatial and temporal scales of observation. This emerging geospatial technology thus retrieved large raw georeferenced data over time. In short, locations in tweets can be rooted in space and time. Through these new and more efficient personalized devices. This kind of information is especially useful to both researchers interested in economic and business analytics. For example, an economic analyst could create an application to collect real-time shopping behavior data from twitter and visualize shopping patterns in a specific area. Then, a business owner could use this resource to monitor venues with the aim to improve their sale. Through an intensive data retrieval process, we have collected approximately 6 million twitters worldwide about Black Friday during the 2012 Thanksgiving shopping season (from November 13rd and December 6th). Among the 6 million tweets, 72k tweets that were geolocated and were reported from the US were selected to conduct the space-time analysis. We try to find whether there is a digital divide across city size, race, gender and ages in terms of adopting this new technology in shopping.