Spatiality, temporality, and contexts: Geosocial data as evidence of social interactions and networks

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My interest in and contributions to this specialist meeting stem from two strands of my past research: my long-term focus on the use of geospatial technologies at the grassroots, by laypersons; and more recent work on volunteered geographic information and qualitative GIS.

From these perspectives, I read the call for participation as implicitly pointing to the latest in a series of developments through which the Internet has dramatically altered human communication and social networks: The rising use of online social networking sites, especially those that include a geographic component. Specifically, I refer to services that document network members' presence in or preferences for particular places or locations (as in FourSquare's "check in" function), or that enable geolocating of user-generated content shared through a social networking service (as in Twitter's geoAPI). As these services have proliferated and the data streams flowing from them exponentially increased, there is growing interest in how these data might be used for a variety of purposes— improving real-time emergency response, investigating new forms of social life and social capital, or fighting terrorism to name a few.

Using these new forms of socio-spatial data will require understanding their unique characteristics, especially as compared to more conventionally-sourced and represented geospatial data. I would argue that these new forms of geosocial data—by which I mean data from social networking that have a geographic component—illustrate some of the fundamentally different spatio-temporal characteristics of social networks/interactions in the age of Web 2.0 and the geoweb and introduce some new challenges with respect to how we can understand social networks and interactions vis-à-vis space and time.

With respect to space, working with geosocial data is complicated by the fact that these data may encode two kinds of spatialities simultaneously—(primary) digital or virtual interactions and connections, as well as (secondary) documentation of embodied or interpersonal interactions in the "real" world. For researchers, this introduces all sorts of complexities. The first is a primary form of data, the second a secondary form. Both types may be present within a single data set (geo-tagged tweets, for example, could be either kind). Within a single social group, both kinds of interactions may be occurring with mutual influence on the content of both and the social ties that emerge from them. At an epistemological level, these issues are rooted in a basic hybridity of geosocial data: these data both *represent* and *constitute* social networks and they do so in both *virtual* and *material* worlds.

Another key challenge with respect to the spatiality of geosocial data is rooted in a tension between how social networks or interactions are represented and analyzed, and the richer ways that they exist in the world. That is, many of the metrics used for social network analysis are explicitly spatial—centrality, between-ness, closeness, cohesion, density, reach, etc—and they are represented and analyzed using Cartesian and arithmetic representations. Yet these approaches always give us somewhat abstracted, a-contextual, or flattened representations of the more complex social world. This is not to suggest that since these metrics should be rejected because they cannot get at the full sense of a social network and interaction. Rather, I suggest we must ask how these metrics might be enriched, or new ones explored, to allow us to get a richer sense of contemporary social networks. For starters, computational social science, scientific information visualization, semantic web research, and GIScience ontologies work would all seem to hold some promise for analyzing complex, unstructured, and shifting relationships and interactions.

With respect to their temporality, data from geosocial networking introduce new opportunities and challenges. One fundamental issue is the tension between the durability of a digital data artifact—perhaps "true" at the moment it was created—and ongoing changes in the social world.

A social connection mediated through an online social network leaves a durable digital trace that becomes separated in time from the moment when it was created, and at some time X in the future, may no longer exist, or may not have the same content and meaning to its members. A pressing issue then, is to understand what principles, social and computational, might help us assess how reliable geosocial data may over time, if we are using them as evidence of social interactions or networks.

Finally, a basic challenge to understanding social networks and interactions through geosocial data is the inevitably abstracted nature of digital data and digitally-mediated interactions and their removal from immediate embodied times/places. User-generated and social networking data will always suffer a certain degree of de-contextualization. Yet I would argue that context is critical to interpretation and understanding what these data are telling us. That is, relatively a-contextual techniques will easily highlight spatio-temporal patterns and anomalies in the data, yet we will almost certainly need to re-construct something about context if we are to understand and interpret the meaning of these patterns and anomalies.

For instance, we may discern that thousands of members of a geosocial networking service of a particular age or place of residence 'checked in' from the downtown area during large public gatherings after a recent election, yet what does this tell us about the nature of the political event that might or might not be occurring and the motivations of those present? Context is also essential to interpreting whether a spatio-temporal anomaly in the data is cause for concern. If my elderly grandfather deviates from his usual space-time trajectory, what other events or conditions must also be present before I become concerned that something is amiss? I would argue that if we can develop systematic ways of exploring

the geosocial data themselves, their richness, volume, and quotidian nature may enable us to get at some of these contextual issues, with an eye toward more robust interpretation and explanation.