Geographic Human-Computer Interaction

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Abstract
Geography is playing an increasingly important role in areas of HCI ranging from social computing to natural user interfaces. At the same time, research in geography has focused more and more on technology-mediated interaction with spatiotemporal phenomena. Despite the growing popularity of this *geographic human-computer interaction* (GeoHCI) in both fields, there have been few opportunities for GeoHCI knowledge sharing, knowledge creation or community building in either discipline, let alone between them. The goal of this workshop is thus two-fold. First, we will seek to sum up the state of GeoHCI knowledge and address GeoHCI core issues by inviting prominent researchers in the space to share and discuss the most important high-level findings from their work. Second, through our interdisciplinary organizing committee, we will recruit participants from both fields, with the goal of laying the groundwork for a community that works across intra- and interdisciplinary boundaries.

Author Keywords
Geography, geospatial, Geo UX, location-based, sustainability, urban issues

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Workshop Topic

Once the domain of specialized experts [12], geographic technologies have undergone an extensive democratization. This sea change has led those in social computing (e.g. [9]), ubiquitous computing (e.g. [8]), natural user interfaces (e.g. [10]) and other areas of HCI to increasingly leverage geographic methods, adopt geographic use cases and ask geographic research questions. Within the field of geography, the opposite has occurred; geographers do more and more research that overlaps with HCI-related topics.

Because geospatial perspectives are relatively new to human-computer interaction, most geographic research in HCI tends to adopt the framework of more traditional HCI domains such as those listed above. In fact, despite the increased interest in geospatial topics, none of the 100+ keywords in the SIGCHI reviewing system allow authors to indicate the geospatial nature of their research [4]. As a result, other than our CHI 2011 SIG on which this workshop builds [4], opportunities for explicit or implicit discussion along the geospatial dimension within HCI have been quite limited. Unsurprisingly, the reverse is true in geography with regard to HCI-related methods, research questions, and use cases.

Consider, for example, the series of papers on the role of geographic distance in online community interaction. Within HCI and related fields, this topic has been investigated using perspectives ranging from social network analysis to privacy to location prediction (e.g. [1, 6, 7]) and leveraging data from services including Facebook, Twitter, and Foursquare. However, the focus of this work has largely been limited to each of these siloed domains and datasets. By viewing this literature with an overarching geospatial lens, one can compare results across siloes. This would facilitate the development of generalized findings about how geography affects online communities.

While the above example highlights the importance of bringing together researchers in HCI whose work relates to geography, it also demonstrates the necessity of incorporating geographers into the conversation. Geographers have studied offline spatial interaction for decades [3], incorporating robust theoretical approaches and methodologies into their work (e.g. gravity models, space-time prisms). More recently, geographers have been applying this knowledge to the study of online communities. Integrating these literatures would provide theoretical context for new findings, context that is currently quite absent. It would likely also engender new research questions (e.g. effect of borders, socioeconomic status) and help to develop a consistent qualitative and quantitative methodological framework informed by best practices in geography.

Many other problem spaces in HCI could benefit from improved intra- and interdisciplinary collaboration around common geographic research questions, methodologies, and use cases. For example, making cities more sustainable – an area receiving interest in both academia and industry [11, 13] – is an inherently geospatial undertaking. HCI researchers and practitioners working in areas ranging from sustainable energy use to public bike and ridesharing must consider geospatial factors like sense of place in neighborhoods, transportation networks, and demography. Members of the HCI community interested in sustainable cities would benefit from sharing knowledge about this

geospatial common ground. They would also gain a great deal by consulting with experts in geography, which has entire mature subfields – e.g. urban geography, transportation geography, and cultural geography – dedicated to relevant topic areas.

Workshop Goals and Issues to be Addressed

The overarching goal of our workshop is to provide a much-needed venue for knowledge sharing, knowledge creation, and community building among those in HCI who adopt geospatial perspectives and geographers interested in HCI-related topics. We expect that our participants will benefit considerably from learning about the work of (and getting to know) like-minded researchers and practitioners. We anticipate the sharing of literature, tools, datasets, and best practices to be particularly helpful in this respect.

We will also make progress as a community on critical basic questions and issues in geographic HCI, many of which remain almost entirely unaddressed. For instance, we do not know the broad principles of what "makes spatial special" within the GeoHCI domain (e.g. What properties of interaction in location-based social networks like Foursquare are different than those in other online social networks? How does volunteered geographic information differ from general user-generated content?) Enumerating and, critically, *synthesizing* that which "makes spatial special" will help identify where geospatial approaches are useful and how best to leverage them. Mapping the boundaries of GeoHCI will also aid us in understanding where adopting other frameworks may be more appropriate.

We additionally will begin to answer important questions surrounding the development of methodological standards in GeoHCI. Currently no such standards exist, let alone those that incorporate fundamental geospatial properties like spatial autocorrelation and the tendency for geospatial phenomena to have different manifestations at different scales. We will also spend time as a community identifying grand challenges and addressing issues related to poor intra- and interdisciplinary communication.

Specifically, we will encourage participants to speak to some subset of the following points in their talks and, as a group, in subsequent discussion:

High-level Questions

- What is 'special about spatial' in your area?
- What are, in your view, some fundamental GeoHCI principles?
- What are the most important open GeoHCI-related questions in your area?

Methodological Questions

- What are the geospatial methods that you have found most valuable in your work?
- What are the datasets and tools you use in your work, and how have they helped you?

Interdisciplinary Questions

- Are there findings, methods, tools or datasets that you suspect exist across the disciplinary boundary that would help you with your work?
- What fundamental principles of your field are most missing from the other field's research?
- How can we foster more intra- and interdisciplinary collaboration?

Given our goals for the workshop, we will invite participants to present high-level findings from their

research as opposed to the work-in-progress approach taken by some workshops. For instance, a researcher involved with local search may share his/her key findings related to adapting search algorithms to a local context. A crisis informatics researcher might give a talk about technology that best leverages social media in disaster management. A GeoUX specialist working on a major online mapping product may communicate critical insights about map design for mobile devices. It is our hope that such an approach will (1) allow participants to gain an understanding of the state-of-the-art across a variety of topic areas in GeoHCI and (2) facilitate brainstorming on the fundamental GeoHCI issues above.

As broad participation will be crucial to the success of our workshop, a great deal of effort will be dedicated to recruiting attendees from most GeoHCI topic areas within *both disciplines*. Our organizing committee spans the spectrum from pure geography to pure HCI, with several organizers having backgrounds in both. We will leverage this disciplinary diversity to enlist researchers and practitioners who ask geospatial questions in areas including location-based systems, location-based social networks, citizen science, crisis informatics, geowikis, volunteered geographic information (VGI), neogeography, cartography, public-participation geographic information systems (PPGIS), geodesign, Geo UX, and geovisualization. Moreover, we will make a particular effort to elicit participation from those in the sustainable HCI featured community, in which there have been calls for more engagement with disciplines (like geography) that have experience in core sustainability issues [2]. Indeed, *human-environment interaction* is one of the 'five themes' of geography [5].

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