Analyzing User behaviors via Data Visualization Techniques

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Abstract
Understanding user behaviors is one of the most important research tasks in both computational social science and data science. Analyzing these behaviors not only helps with finding the common communication patterns adopted by the public, but more importantly facilitates the detection of anomalous behaviors occurred under different situations such as in a disaster or an emergency. Recently, the increasing availability of social media data such as Twitter provides a proliferation of opportunities to help researchers make a deeper understanding of differed behaviors. Many analysis approaches have been developed, which usually produce statistical results with behavior details and the corresponding context information unclear, thus making the results interpretation difficult. Visualization technique is an effective approached for addressing this issue. It visually summarizes data the corresponding context in an intuitive representation that help with data comparison and interpretation. Together with interactions, a visual analysis system keeps users in an analysis loop which leverages users' domain knowledge and experiences to supervise the analysis procedure based on their own judgments and decisions. In this tutorial, we will introduce what are information visualization and visual analysis and will also introduce visualization techniques that are developed for illustrating and analyzing user's behaviors.

Organizers

Nan Cao, Ph.D
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Nan Cao's primary expertise and research interests are information visualization and visual analysis. He is specialized in producing novel visualizations to represent and analysis complex relationships of heterogeneous multidimensional data via various types of graph visualization techniques. His recent works focus on visualizing and understanding anomalous user behaviors in social media platforms such as Twitter.

Yu-Ru Lin, Ph.D
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Dr. Yu-Ru Lin is interested in studying social and political networks, as well as computational and visualization methods for understanding network data. Her work has focused on large-scale community dynamics, high-dimensional (rich-context) social information summarization and representation. She has been using massive social media data and anonymized cellphone records to understand the collective responses with respect to political events and under exogenous shocks such as emergencies.

Tutorial Outline:

Part I: Introduction (1 hour)

1. What are Information Visualization and Visual Analysis?
   By Dr. Nan Cao
2. Basic Design Principles and Philosophy
   By Dr. Nan Cao
3. The state-of-the-art techniques
   By Dr. Nan Cao
4. Open Source Tools
   By Dr. Nan Cao

Part II: Visualizing User Behaviors (2 Hours)

1. **Visualizing Collective Behaviors (1 Hour)**
   By Dr. Yu-Ru Lin
   Whisper, Fluxflow, SocialHelix
2. **Visualizing Ego-Centric Behaviors (1 Hour)**
   By Dr. Nan Cao
   Episogram, TargetVue

Expected Audience

Researchers who have the backgrounds in the computational sciences: computer science, engineering, and other mathematically oriented disciplines, as well as the researchers in behavioral and social scientists who are interested in using visualization in their own research.