The University of Chicago Computer Science Department

PRESENTS:

“Behavior-Driven Optimization Techniques for Scalable Data Exploration”

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Abstract:

An increasing number of physical and biological sciences are becoming data driven, often due overwhelming quantities of data collected from imagers, sequencers, and other sensors. One of the key issues for scientists who work with large datasets is efficient visualization of their data to extract patterns, observe anomalies, and debug their workflows. Though a variety of visualization systems exist to help people make sense of their data, these systems do not scale to the level that many scientific applications require.

My work blends optimization techniques from database management systems and visual analytics in order to build scalable visual exploration systems. In this talk, I will first discuss ForeCache, a visual exploration system that learns user exploration patterns automatically, and exploits these patterns to pre-fetch data ahead of users as they explore. I will show that ForeCache's pre-fetching techniques provide significant performance benefits compared to existing systems. I will then discuss an ongoing project, which combines data-prefetching with incremental data processing and visualization-focused caching optimizations. The aim of this project is to avoid wasting computational resources, while still providing a fluid, interactive exploration experience for users.

Bio:

Leilani Battle is a Computer Science Ph.D. candidate in the CSAIL Database Group at MIT, advised by Prof. Mike Stonebraker. Her research interests lie at the intersection of data management, user interface design, and visual analytics, with the aim of building intuitive and scalable database exploration tools. She was a National Science Foundation Graduate Fellow from 2011 to 2013. She obtained a M.S. from MIT in 2013, and a B.S. in Computer Engineering from the University of Washington in 2011.

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