

Visualization and Analytics for Decision Support and Operational Management, and Scientific Discovery

David S. Ebert
Purdue University
ebertd@purdue.edu

Thomas Ertl
University of Stuttgart
Thomas.ertl@vis.uni-stuttgart.de

Kelly Gaither
University of Texas
kelly@tacc.utexas.edu

The topic of this minitrack will have applications in a broad range of situations where human expertise must be brought to bear on problems characterized by massive datasets and data that are uncertain in fact, relevance, location in space and position in time. Examples include environmental science and technologies, natural resources and energy, health and related life sciences, safety and security (aircraft safety, law enforcement, antiterrorism, disaster relief) and business processes. This year we focused on extending the areas of use to include a broader range of analytic tasks such as science and technology, public health, business intelligence, financial analysis, and other domains where interactive visualization systems may be used to improve human decision making.

Key research challenges of interest in this area include studies of visual analytics and decision support in the context of an organization (e.g., communication between analysts and policy-makers), how to successfully address and tailor analytic systems to solve real-world problems and integrate efficiently into workflows, perceptual and cognitive aspects of the analytic task, novel interaction and visual representations, and collaborative analysis using visual information systems.

The focus in this minitrack is on going beyond analytics followed by visualization both of which are rich, powerful techniques for turning data into actionable information. However, rich, interactive visual analytic environments offer even greater power and promise to solve big data problems for data that is “big” in any of the dimensions of variability, velocity, or volume.

This minitrack builds upon earlier HICSS minitracks on visual analytics, mobile computing, and digital media at scale focusing more decision analytics in various applications from business to science, engineering, public safety, and policy. One paper selected for this minitrack, “Towards a Visual Analytics Framework for Handling Complex Business,” tackles the problem of developing a visual analytic environment that can integrate heterogeneous data from complex business processes

into an effective and efficient decision making environment. A second paper focuses on the cognitive science and design principles for designing effective visual analytic environments for realtime data monitoring and analysis. The paper reports on a design study concerning the effective use of animation for social media data monitoring and analysis in emergency management. The final paper, “Retaining Interactivity in a Visual Analytics System for Massive Public Transportation Data Sets” introduces a novel visual analytics framework for analyzing large data volumes, which remains responsive and keeps the analyst informed on and in control of pending operations. It combines background processing and task-oriented resource allocation to provide intermediate results and progress estimation and it demonstrates its effectiveness for the visual analysis of huge public transport data.

These papers show a wide range of applications of visualization and analytics in complex decision making environments and provide valuable insights into the design, production, and deployment of visual analytics applicable to most decision and discovery tasks across a broad spectrum of applications. Moreover, they clearly demonstrate effective ways to harness and tame big data for discovery, insight, management, and action. We hope you will join us for interesting presentations and lively discussions on new visual analytics techniques and solutions for Big Data.