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COMMENTARY

Visual analytics: why now?

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Abstract
An emerging field of study, visual analytics, is briefly described, including its motivations and the emerging partnerships that are bringing the best talents and technologies to missions such as homeland security and human health.
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This special issue of Information Visualization IVS is focused on recent updated papers presented at the IEEE Symposium on Visual Analytics Science and Technology (VAST) in Baltimore, October 2006. Why is there so much interest in what is being called visual analytics? Let us first address the term visual analytics. Visual analytics is defined as the science of analytical reasoning facilitated by the visual interface. People use visual analytics tools and techniques to synthesize information and derive insight from massive, dynamic, ambiguous, and often conflicting data; detect the expected and discover the unexpected; provide timely, defensible, and understandable assessments; and communicate assessment effectively for action.

Visual analytics was defined to represent a new envisioned suite of technologies and resultant field of study by a team of approximately 40 experts with representation from government, academia, industry, and national laboratories. The need for visual analytics was driven by an ever increasing amount of data to analyze; increasing complexity and uncertainty in the data; decreasing amount of time to analyze the data; and a lack of methods, technology, or tools available today or perceived on the horizon.

This demand, while initiated by needs from the Department of Homeland Security, was quickly echoed by other domains such as human health and commerce. The needs also defined new basic sciences studies, applied sciences with functional prototypes with testbeds, and a new suite of lightweight commercial, fully deployable tool suites.

Based on recent successes with model technology suites such as IN-SPIRE, http://in-spire.pnl.gov/about.html, we are now convinced that the human mind can deal with much larger and more complex information spaces and analysis than we previously believed, if people are given the right visual and interaction paradigms. IN-SPIRE is not the only tool enabling the vision for visual analytics, but it does provides the vision and belief that the time is right for a better science, a better method for dealing with the masses of data is required, and a better suite of tools is possible.

This is not about another visualization. This is about a discourse for discovery and verification to detect the expected and discover the unexpected. The interaction will likely dominate the distinguishing features of

future technology and systems. It is time for a new science of interaction at the logical and analytic level. A science of interaction that enables the science of analytical reasoning is what we hope for.

For example, today when each of us starts to analyze data, whether from a web search, from databases, or on data streams such as news, we mostly conduct keyword searches again and again, until we find something close to our information space to analyze. We may have a concept of what is in that information space but no clue what is *not* there – a key part of discovering the unexpected.

Today we fill our screens with complex visuals including geospatial representations, detailed linked diagrams, cluster maps, and many other representations, yet analysts and doctors are interested in information focusing on their problem of interest, not just accessing masses of information. The situation is clear and compelling; we need new methods, new technology, leading us into the next century. Visual analytics alone will not address all these challenges but will be the point of end-user engagement providing the bridge between the human mind and their information resources.

To bring a worldwide, focused effort toward visual analytics, the National Visualization and Analytics Center™ (NVAC™) (see http://NVAC.pnl.gov) was formed at the Pacific Northwest National Laboratory by the U.S. Department of Homeland Security. NVAC is a collaboration point for academia, industry, and other government agencies working together to bring the best technologies and enable the development of the best talents (Figures 1 and 2).

The partnerships include five Regional Visualization and Analytics Centers: Stanford University, University of North Carolina at Charlotte and Georgia Institute of Technology, Purdue University, Pennsylvania State University, and University of Washington. We also are forming partnerships with other government agencies called Government Visualization and Analytics Centers

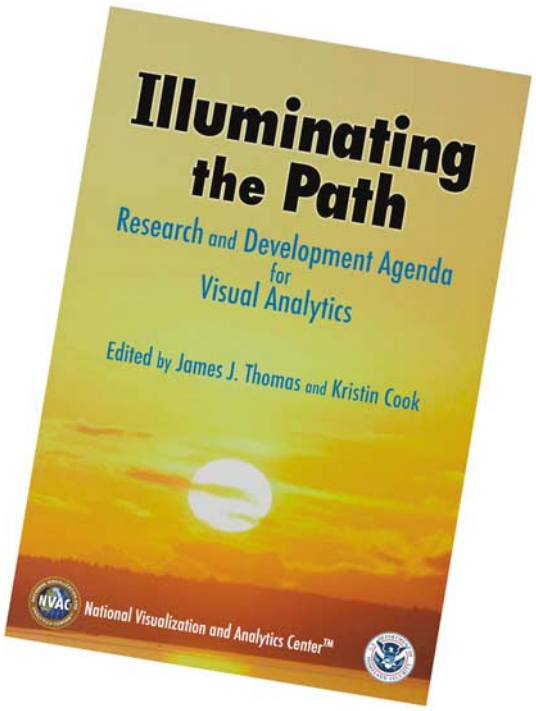

Figure 1 Illuminating the Path is available for download at http://nvac.pnl.gov/agenda.stm.

Figure 2 To bring a worldwide, focused effort to visual analytics, NVAC has formed partnerships with universities, industry, and government agencies.

(GVACs). Industry is developing major efforts called IVACs, and other countries are forming centers – for example, the Canada-based CVAC. We expect and hope to continue forming partners. Each partner has committed significant resources and interest towards aspects of the visual analytics portfolio of mission needs and technology development.

In addition, two consortium meetings each year bring partners and interested parties to a common ground to analyze current needs and emerging technologies. The VAST symposium is a primary vehicle for formal peer-reviewed publications.

We welcome other interests. Please feel free to contact us through our website.