

Nonlinear Visualization Techniques

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Problem

- **With traditional visualization techniques of massive datasets, the user is either too zoomed in (so that the overall context of the data is lost), or too zoomed out (so that the details of the data are unavailable).**
- **This information management problem is common to many domains, especially those that involve analyzing intelligence data and achieving situation awareness.**

Background

imagery analysis



detail




overview



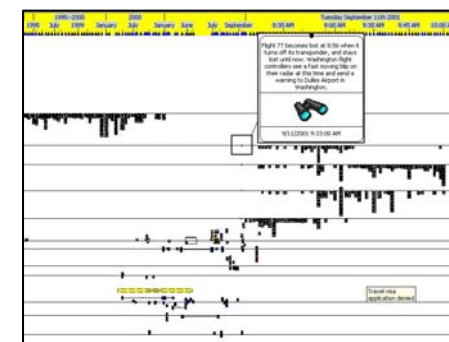
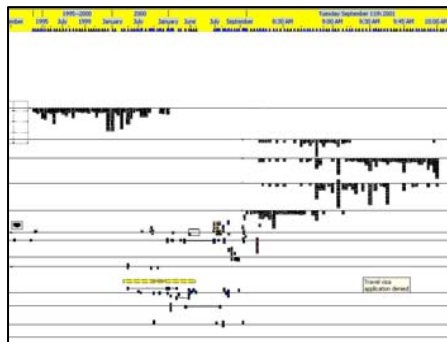
NLVis: detail+overview

Flight 77 becomes lost at 8:56 when it turns off its transponder, and stays lost until now. Washington flight controllers see a fast moving blip on their radar at this time and send a warning to Dulles Airport in Washington.



9/11/2001 9:33:00 AM

timeline analysis



The need to simultaneously obtain detailed information while preserving the context

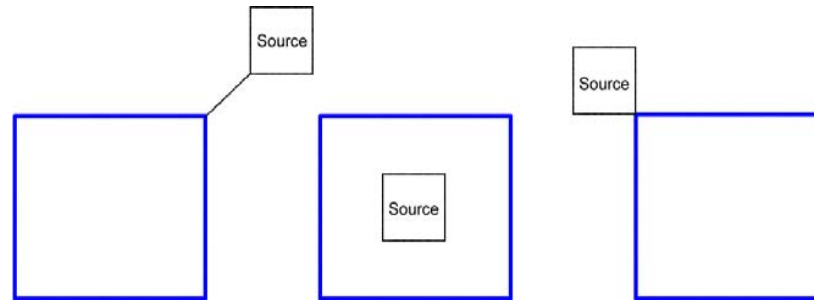
Objective

- Investigate nonlinear techniques for visualization of graphical data, with specific emphasis on semantic lensing strategies
- Experiment with these new visualization techniques to determine if decision makers can complete tasks with greater speed and accuracy

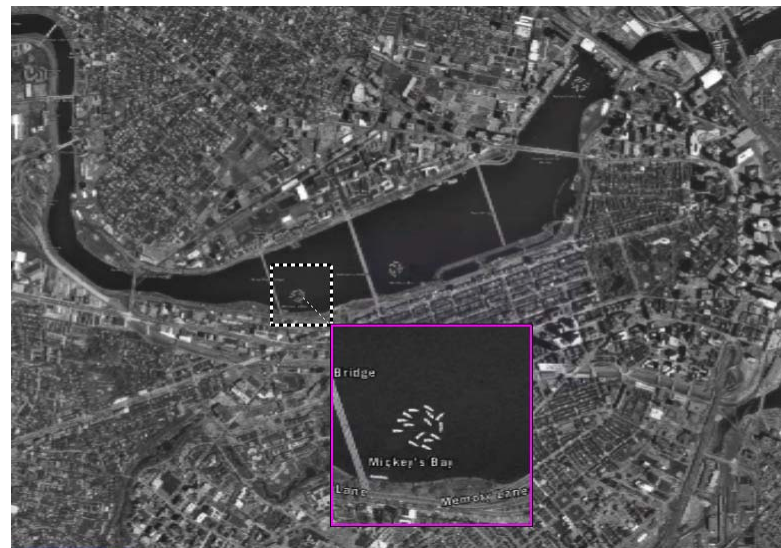
Activities

- **Planning an experiment to determine the benefits of semantic lenses**
- **Conducting user studies with GIS analysts**
- **Determining ways to effectively visualize link analysis charts on spatial data with semantic lenses**
- **Investigating geo-temporal lenses**
- **Investigating Web-based semantic lenses**

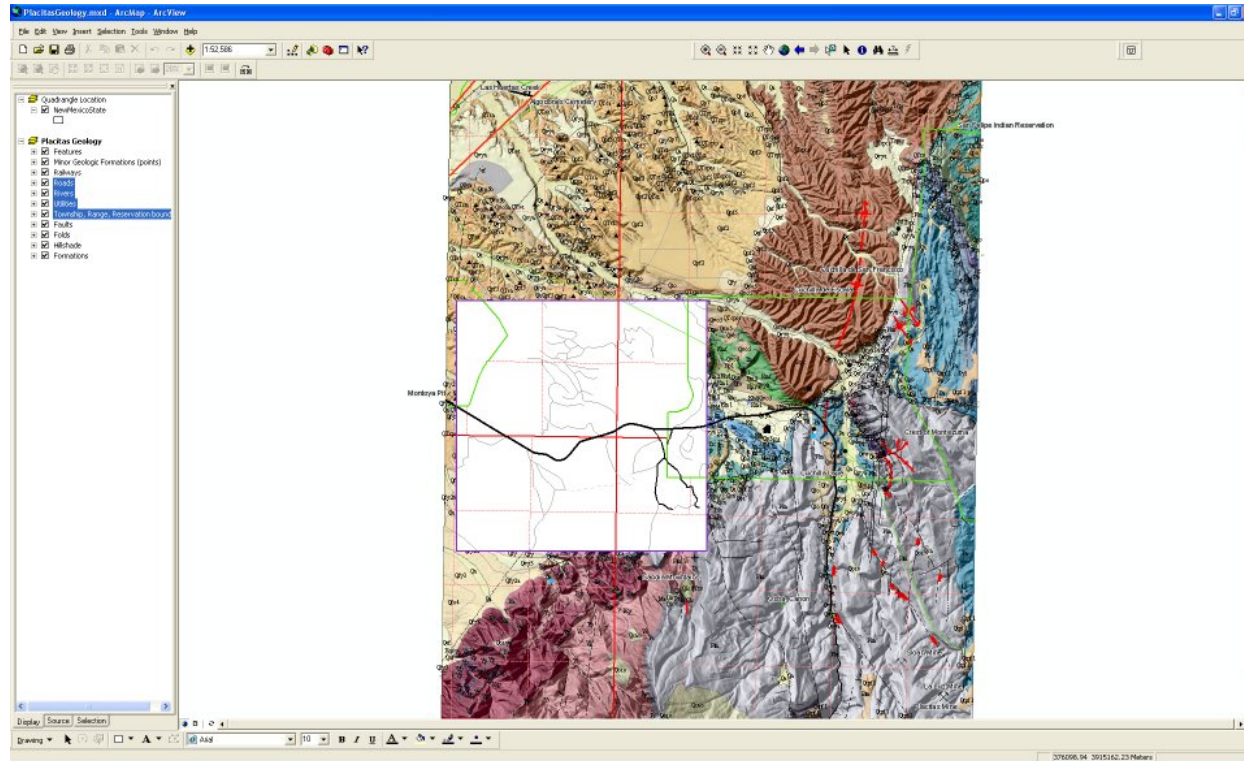
Highlight



Examined degree of lens offset and its impact on imagery analysis



Demonstration



A semantic lens can quickly reduce visual clutter in a user-specified region.

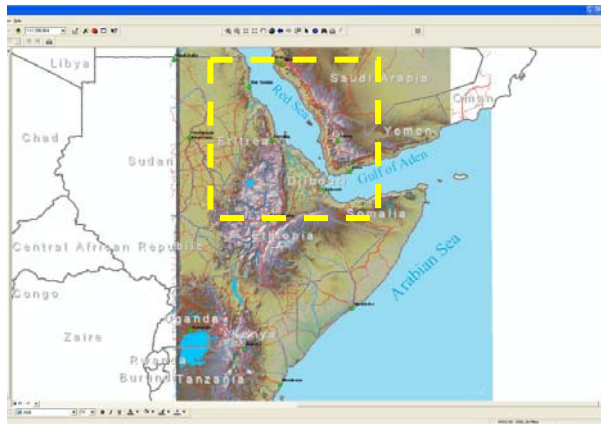
Impacts

- Presented findings of FocusTree experiments at ACM Computer-Human Interaction and Usability Professionals Association conferences
- Presented findings of degree of lens offset work at IEEE InfoVis conference
- Developed a semantic lensing plug-in to ESRI ArcGIS that will be presented at the ESRI International User Conference
- Transitioning the semantic lensing concepts to other vendors

Future Plans

Collaborative Lenses

User A



User B



A has an indication of what *B* is seeing; *B* sees *A*'s view in the selected region.

Can lenses improve collaboration between two or more users?