Visual Analytics

Information Visualization
July 7, 2008
Carsten Görg

Housekeeping

• Assignment 5 today
• Project reports due on July 23 (postponed for one week)
• Final exam
  – This Wednesday, 12:15 – 13:45, HS 001, E1 3
  – Bring ruler, calculator, and colored pencils
  – Material on webpage
Visual Analytics

Tight integration of visual and automatic data analysis methods with database technology for a scalable interactive decision support.

Visual Analytics

The sense-making loop for Visual Analytics.
Visual Analytics

Visual analytics integrates scientific disciplines to improve the division of labor between human and machine.

Machine
- Statistical Analysis
- Data Mining
- Data Management
- Compression & Filtering

Human
- Human Cognition
- Perception
- Human-centered computing
- Information Visualization
- Design
- Decision Making
- Theory

'S06 – Baltimore, MD
'S07 – Sacramento, CA
'S08 – Columbus, OH

Summer term 2008
Discuss Assignment

• Materials used:
  – Table
  – Graphs (social networks)
  – Maps
  – Timeline

Jigsaw

Sensemaking across Text Documents:
Human-Centered, Visual Exploration

Information Interfaces Research Group
School of Interactive Computing & GVU Center
Georgia Institute of Technology
Our Goals

- Assist analysts (police/intelligence, lawyers, reporters, scientists) confronting “information overload” problems while doing exploratory data analysis
- Assist analysts in information foraging and sense-making given a multitude of documents (reports, emails, blogs, abstracts, etc.)
Problem Addressed

• Help analysts discover plans, plots and connections embedded across the individual documents in large document collections.

Example Document

REPORT: 20090510-4_16
MAY 14 2009

VANCOUVER, British Columbia – A Canadian immigration panel is considering whether accused environmental activist Tce Arrow can apply for refugee status in Canada.

Arrow, 39, who is wanted for fire bombing logging and cement trucks in Oregon, asked the Canadian authorities to remain in Canada as a political refugee at a hearing in Vancouver on Tuesday.

A key issue will be whether Arrow is affiliated with a terrorist group, which would immediately disqualify him from receiving refugee status in Canada, authorities said.

The Immigration and Refugee Board is scheduled to decide by May 31 whether Arrow is affiliated with the Earth Liberation Front, a group the FBI considers a terrorist organization responsible for scores of attacks on property over the past dozen years.
Our Focus

• Entities within the documents
  – Person, place, organization, phone number, date, license plate, etc.

• Thesis: A plot/story within the documents will involve a set of entities in coordination

Entity Identification

• Must identify and extract entities from plain text documents
  – Crucial for our work

• Not our main research focus – Collaborate with or use tools from others
Entities Identified

Source:
Date: May 14, 2004

VANCOUVER, British Columbia - A Canadian immigration panel is considering whether accused environmental saboteur Tom Arrow can apply for refugee status in Canada.

Arrow, 30, who is wanted for firebombing logging and cement trucks in Oregon, asked the Canadian authorities to remain in Canada as a political refugee at a hearing in Vancouver on Tuesday.

A key issue will be whether Arrow is affiliated with a terrorist group, which would immediately disqualify him from receiving refugee status in Canada, authorities said.

The Immigration and Refugee Board is scheduled to decide by May 31 whether Arrow is affiliated with the Earth Liberation Front, a group the FBI considers a terrorist organization responsible for scores of attacks on property over the past dozen years.

Connections

- Entities relate/connect to each other to make a larger “story”
- Connection definition:
  - Two entities are connected if they appear in a document together
  - The more documents they appear in together, the stronger the connection
Jigsaw

- Multiple visualizations (views) of documents, entities, & their connections
- Views are highly interactive and coordinated
- User actions generate events that are transmitted to and (possibly) reflected in other views

“Putting the pieces together”
The Need for Pixels
Jigsaw Video

Console
a Canadian immigration panel is considering whether accused environmental activist The Arrow can apply for refugee status in Canada.

The Arrow, 30, who is wanted for fire-bombing logging and cement trucks in Oregon, asked the Canadian authorities to remain in Canada as a political refugee at a hearing in Vancouver on Tuesday.

A key issue will be whether The Arrow is affiliated with a terrorist group, which would immediately disqualify him from receiving refugee status in Canada, authorities said.

The Immigration and Refugee Board is scheduled to decide by May 8 whether The Arrow is affiliated with the Earth Liberation Front, a group the FBI considers a terrorist organization responsible for scores of attacks on property over the past dozen years.
Graph View

Scatterplot View

Summer term 2008
Calendar View

Report Cluster View
What It Does & Does Not Provide

• Is not a “theme” view

• Is a visual index onto documents and entities

• Must read the reports!

Contributions

• Individual view representations and interactions – focus on entity connections

• Advocacy/illustration of using multiple views and large screen space

• Relatively simple UI interactions

• Synthesis into a working system providing investigative analysis capabilities
**Future Work**

- Entity Identification
- Evaluation
- Collaborative version
- Themes/concepts
- Enhanced evidence marshalling
- Present/browse investigation history
- Scalability issues
- Wikipedia
- Geospatial View
- Connectivity search
- Reliability/uncertainty
- Other types of data
- Web search & situational awareness
- Display wall?
- Deployment

**Issues/Questions/Reflections**

- **Visual Analytics**
- All those views!
- Where do I start?
- Entity Identification, entity identification, entity identification, entity identification...
- Straightforward UIs matter!
To Learn More

- http://www.gvu.gatech.edu/ii/jigsaw