

## **Jigsaw: Facilitating Investigative Analysis Through Visualization**

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### Project Scope:

Investigative analysis often involves discovering clues and gaining insight from large collections of text reports. We present Jigsaw, a visualization tool to deal with this information overload and make the analytical process more effective. Our system provides a collection of useful visualizations that each portray different aspects of the reports. We focus on identifiable important entities mentioned in these reports and create visualizations to reveal the connections between these entities.

### Recent Progress:

Important entities mentioned in intelligence reports usually fall into one of these categories: person (in the form of a name), place (in the form of address, city, state or country), date and organization (in the form of a name). Two entities are considered to be connected if they appear in the same report. Preliminary textual processing is used to extract these entities and structure them in an xml file. This data file is used as the input for Jigsaw.

Jigsaw provides four distinctive visualizations, which we call views, to portray the relationships between the entities in different perspectives; hence the ideal setup for Jigsaw would be a multi-monitor computer where the views can be displayed in ample pixel space without cluttering. The views include:

- ◆ a *connections* view containing reorderable lists of entities where connections between entities are shown by highlighting connected entities and drawing links between them
- ◆ a *semantic graph* view showing the connections between entities and reports in a node-link visualization, allowing analysts to dynamically explore the reports by showing and hiding links and nodes
- ◆ a *scatter plot* view giving an overview of the relationship between any two entity categories, a closer investigation over a smaller region is supported by range sliders
- ◆ a *text* view displaying the original reports with entities highlighted

A query interface is also provided in our system to allow users enter entities and the views are updated with the query results. User interaction on one view is translated to an event and communicated to the other views which update themselves appropriately. Through such communication, different aspects of the reports can be examined simultaneously.

### Future Plans:

Future evaluation of the system will focus not only on usability, but also on its utility in supporting analytical tasks such as reducing analysis time, increasing productivity, helping

hypothesis formation and gaining insights. In addition, we will create authoring views where analysts can describe and document their mental model of the information in the reports.