Tools For Collaborative Visual Analytics (Yang and group)

ManyInsights – Asynchronous Collaborative Visual Analytics
Jing Yang, Chen Yang, and Scott Barlowe have been collaborating with Ye Zhao and Alsakran at Kent State University on supporting effective common ground construction in asynchronous collaborative visual analytics [4]. We have developed a novel visual analytics approach named ManyInsights. It automatically gathers, organizes, and summarizes insights to form common ground with reduced human effort. The rich set of visualization and interaction techniques provided in our approach allows users to effectively and flexibly control the common ground construction and review, explore, and compare insights in detail. A working prototype of the approach has been implemented and evaluated. We believe that this system will provide new opportunities for homeland security analysts to work closely with each other without the limitation of locations and time. The following figure presents a view of ManyInsights.

Figure 1: Comparative analysis on insights generated from different datasets by different users.

Tools For Broadcast Video and Online News Analytics (Yang and group)

StreamIT – Exploring fast evolving news collections
Jing Yang, Chen Yang, and Scott Barlowe have been collaborating with Ye Zhao and Alsakran at Kent State University on visualizing fast evolving online news streams. The resulting tool, named StreamIT [1][2][3], integrates a novel dynamic force-directed model, automatic Topic Modeling Analysis (TMA) techniques, and a rich set of interactions such as dynamic cluster construction, temporal evolution animation, and selection and detail examination. It allows users to observe burst of topics in a news stream and dynamically cluster a news collection according to keywords or topics of interest, as shown in the following figures.
Figure 2: A screen shot of StreamIT. Left: the dynamic visualization window; Top right: the weight control and color assignment panel from where users can interactively change the weights of the keywords to cluster the news articles according to drifting information needs. They can also color the news articles to track articles with interesting keywords. Bottom right: article tables for accessing the original news articles.


Our most recent extension of StreamIT, named Live Tag Cloud, will allow analysts to examine the semantics evolution of a collection directly in a dynamic tag cloud. The following figure shows an example on news documents.
Figure 4: (a), (b), and (c) show how the semantics evolves in a talk on Libya given by President Obama on March 18.

Newdle – Visual analysis of online news

Jing Yang, Dongning Luo, Yujie Liu, and Scott Barlowe have been developed Newdle [7]. Newdle allows users to visually explore online news collections through their RSS feeds. It provides novel visualizations and interactions to allow users to conduct a rich set of visual analytics tasks, such as browsing hot topics, investigating hot topics, search relevant keywords, search articles by keywords, comparing topics and keywords, and conducting extended reading for articles of interest. Newdle is a visual analytics approach. Its visualizations and interactions are supported by underlying automatic article relation analysis and article network construction and analysis. It automatically extracts hot topics from a large collection through clustering analysis on the article network. The following figures show some examples screen shots of Newdle.

Figure 5: Hot topics in the New York Times World News from 12/19/2009 to 1/17/2010.
Figure 6: Hot topics with more details. The original news articles can be accessed by clicking their titles.
Figure 7: Comparing the keywords "Yeman" and "Abdulmutallab, Umar Farouk"

**EventRiver - Broadcast News Video Visual Exploration**

Jing Yang and Dongning Luo have collaborated with Bill Ribarsky as well as Dr Daniel Keim and his students at the University of Konstanz, Germany to develop EvenRiver [6]. EventRiver allows users to interactively explore broadcast news videos collections. It first uses an incremental clustering algorithm to capture hot topics in the form of a series of events. It then intuitively conveys the semantics of the events within their temporal context via visualization using a river metaphor. It provides users with a rich set of interactions for interactively browsing events in the collection, retrieving events of interest, and conducting detailed visual analysis. Figure 7 gives an example screenshot of EventRiver.

![EventRiver Screenshot](image)

Figure 8: An event overview of CNN news from Aug. 1 to 24, 2006 (29,211 news reports) with less significant events filtered out. Each icon represents an event. The x-axis is the time axis. The width of an event along the y-axis indicates its significance. The events in the same color form an event group showing a developing topic. Several representative events of significant topics are annotated using dual-labels, where labels in white background convey context information while those in yellow convey unique contents of the events.
PIWI - Online news exploration through keyword networks

Jing Yang, Yujie Liu, and Scott Barlowe have developed PIWI and used it to explore online news collections through their keyword networks [5]. PIWI is a general graph visualization tool that can be used for not only news retrieval, but also other applications where large graphs need to be analyzed. It allows users to explore a graph with thousands of labeled nodes without any clutter. It also allows users to select a large number of nodes with desired structural features and attributes effectively. Our case study and user study demonstrated that it can be used in online news retrieval tasks. In a user study we conducted, we compared PIWI with the official websites of New York Times. The results showed that PIWI provided better support to users for information collections tasks. PIWI is illustrated using the following figures.
Plan for Next Year:
Our focus of the next year will be to develop visual analytics approaches for analyzing large text collections that can be applied to small portable devices.
Papers Published, Submitted and in Preparation this Year:


Personnel

UNCC
Dr. Jing Yang and her group: PhD student: Yang Chen, Yujie Liu, Dongning Luo, and Scott Barlowe.