Supporting Situation Awareness in Collaborative Tabletop Systems with Automation

Betty Chang, Stacey Scott, Mark Hancock (University of Waterloo)

As with other areas of computing, it can be useful to incorporate automation and computer intelligence into surface computing applications in order to assist in human decision-making. In a previous SurfNet collaborative project with Nick Graham and his student Joey Pape from Queen's University, we investigated the use of automation in a digital tabletop board game setting (SurfNet Newsletter, Nov/Dec 2011). This investigation revealed that collaborative tabletops introduce usability challenges for incorporating automation. Automated changes in system state can be easily missed by people using the system due to a table's large size, as well as interaction with other people at the table. It became clear that commonly used notification techniques, such as animations of state changes, were insufficient for helping people maintain awareness of changes introduced by automation in this software context.

In this follow-on project, we developed an interactive event timeline that enables exploration of historical system events, using a collaborative digital board game as a case study. We conducted a user study to examine two factors: 1) placement of timelines for multiple users and 2) location of awareness feedback. The study investigated the impact of these factors on players' situation awareness during game play. In the study, interaction with the timeline was correlated with improved situation awareness. Also, player's preferred when the timeline feedback was displayed on both on the game board and on the timeline itself. Though our case study focused on a gaming task, the interactive timeline concept may also be useful in other collaborative scenarios that involve automation, such as command and control and emergency response, as they are designed to provide a persistent, interactive view of system changes.

This work will be presented at the upcoming 2014 ACM Conference on Interactive Tabletops and Surfaces (ITS) held in Dresden, Germany on November 16-19, 2014. We hope to see you there!

In This Issue:

Mark your calendars: SurfNet Industry Open House: THURSDAY, OCT. 9TH! University of Calgary

Flooding in the Bow River Basin

Rahul Kamal Bhaskar, Mahshid Marbouti, Frank Maurer & Leland Jackson (University of Calgary)

In July 2013, there was a catastrophic flood in Calgary that caused an estimated $5 Billion damage. Can science help avoid or at least minimize the damage caused by such events? Recent technological improvements to analyze and handle large datasets has made it possible to combine different data to identify interesting patterns and trends. Retrospective analyses and predictive models can help understand disaster occurrence and predict events to proactively respond and potentially reduce negative impacts.

To address these challenges, researchers from Computer Science and Biological Sciences at University of Calgary have collaborated since September 2013 to develop a prototype application to support water management in the Bow River Basin. The resulting web-based application visualizes water-related information to support monitoring water levels effectively. It helps organize complex environmental data to find hidden trends from data on weather and water flow in Bow River basin. The prototype application displays a map with Bow river geospatial features like watershed regions, weather, and gauge stations. For displaying environmental data it uses time series and multi-dimensional visualizations in a separate popup available for each stations.

Our application visualizes historic trends over time for temperature, rainfall, and discharge at gauging stations throughout the Bow River basin. Next, we will use data mining techniques to determine which attributes most impact changes in river water height. The long term goal is to couple predictions of river height with watershed elevation to forecast future floods.

System url: http://watermanagement.cpsc.ucalgary.ca/WMA
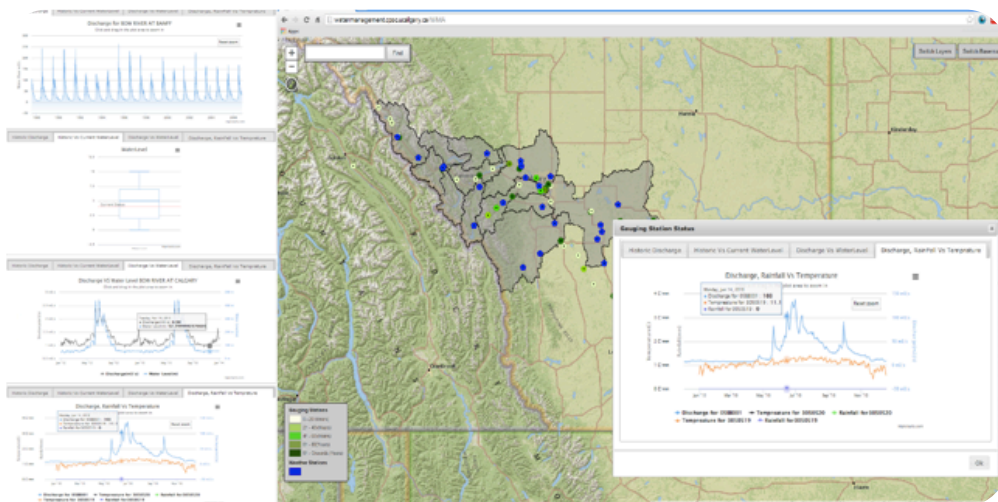
SurfNet News / MARK YOUR CALENDARS:

The SurfNet Workshop 2014 will be held at the University of Calgary from October 7-10, 2014, along with our Industry Open House scheduled for Thursday, October 9th. The open house is free, but does require registration (RSVP BY OCTOBER 6, 2014). We look forward to seeing you there! https://surfnetindustryopenhouse.eventbrite.ca

Canada 3.0 / Canadian Energy Supply Chain Forum are also hot on our heels. Please join SurfNet at our booth in the Technology Innovation section, October 28-30, 2014. Register here: https://www.regonline.com/Register/Checkin.aspx?EventID=1501147.

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