

Tamara Babaian, PI, (CIS), Nathan Carter (Math), Alina Chircu (IPM)
Roland Hübscher (IDCC), Wendy Lucas (CIS), Sandeep Puroo (IPM), Jennifer Xu (CIS)

<http://cis.bentley.edu/RealViz/>

Motivation

Interactive visualizations have recently become widely available in home and consumer settings, e.g. newspaper websites, government agencies and demonstrations of data analytics. Interactive visualizations in these platforms help users zoom in, traverse and manipulate data elements and groups, identify relationships between parameters, and generate and test temporal and other patterns with a view to helping users gain insights.

Such visual approaches to user interfaces remain scarce in the workplace. We see embedded interactive visualizations as a significant opportunity to enhance software system effectiveness, lower users' perceptions of system complexity and increase user productivity. Achieving this goal requires the investigation of:

- **human factors,**
- **design principles,** and
- **technical methodologies**

for successfully integrating such visualizations into complex, real-life tasks in the workplace.

Challenge

The challenge is not one of merely developing new information presentation algorithms. In order to have a transformative effect on user productivity and satisfaction, visually-enhanced approaches must go beyond simply presenting information in an interactive fashion; they should be designed to support acting with and on the information to achieve the goals of a concrete user task.

Interested in collaboration

Companies – partner in workplace system usage and interface design studies - please take a flyer

Students – work on exciting visualization projects
Email tbabaian@bentley.edu, office: Smith 404

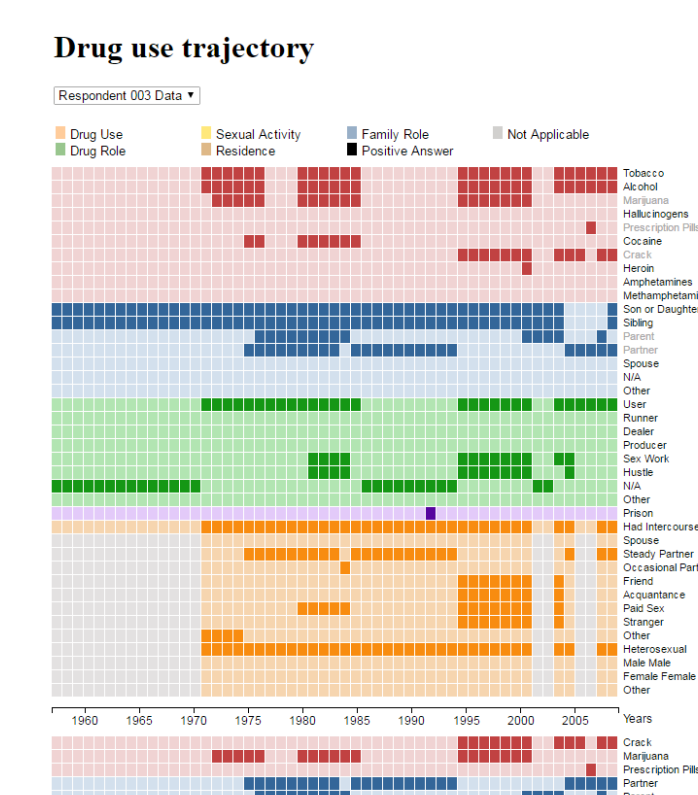
Ongoing Projects

Visual Design Patterns Catalog

Goal: create a new type of a self-organizing catalog of visual design patterns that is *searchable* and *navigable* and provides *recommendations* based on a rich set of parameters, including the description of the design pattern, user goal and history of simultaneous pattern access by the user performing the search, and other users. A prototype is under development, implemented as a **WikiMedia** instance.

Contact: Carter, Hübscher

Drug Users' Life Trajectory

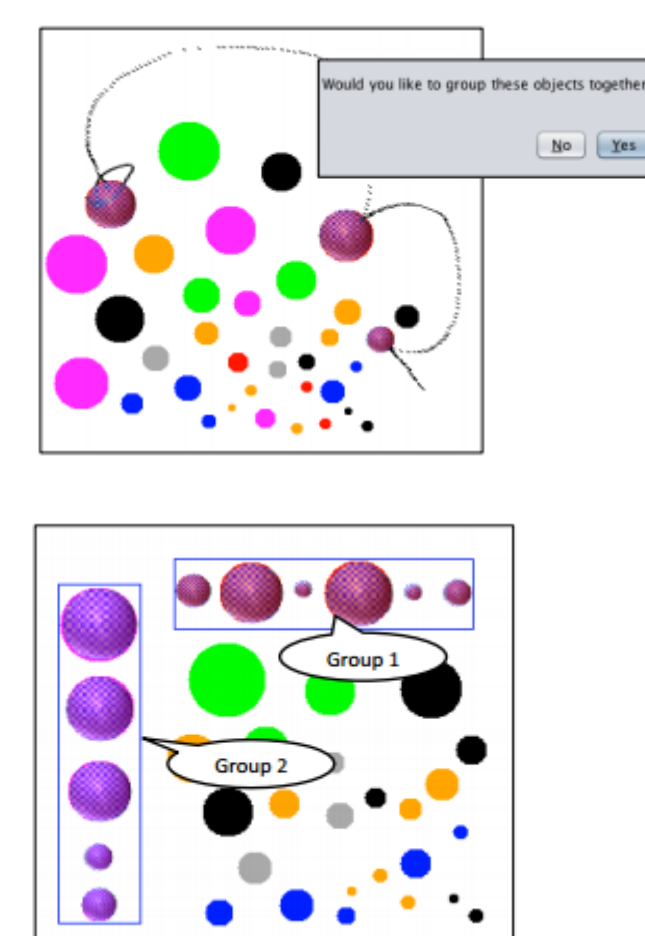


(with M. Boeri, Sociology)

An enhanced interactive version of a visualization of drug user life data allows to view several important parameters of personal history alongside the history of drug use, facilitating pattern detection and analysis.

Contact: Babaian, Boeri **Student (G):** G. Ligure (HFID)
Ref: M. Boeri et al., Drug use trajectory patterns among older drug users. *Substance Abuse and Rehabilitation*, 2011

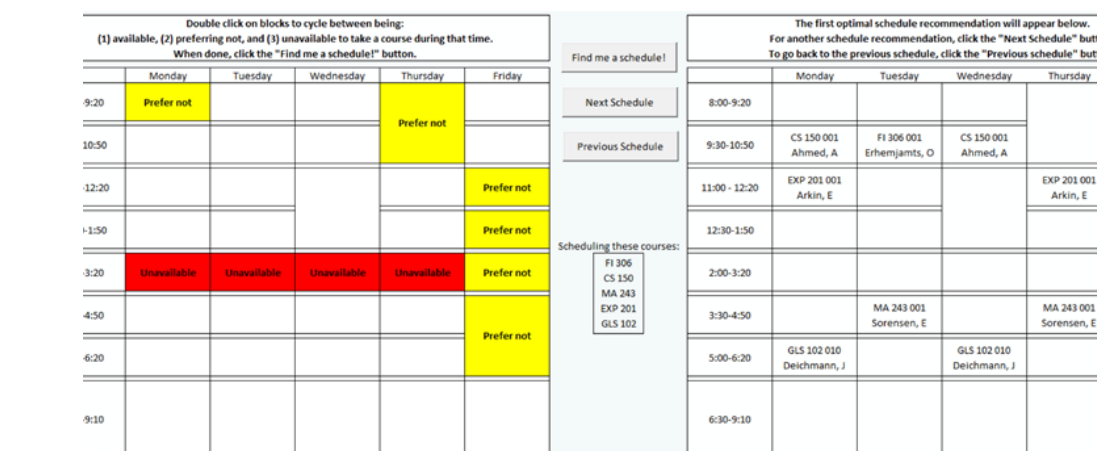
VisConstraints - techniques and algorithms for easy specification of graphical layout of data



This work aims to develop techniques for interacting with force-directed layouts. In our latest prototype, objects can be automatically grouped based on the value of one or more properties, with each property representing a different data variable. Applying different constraint strengths to those groups provides an effective means for identifying commonalities and patterns in multivariate data.

Contact: Lucas **Student (U):** T. Gordon (CIS)
Ref: W. Lucas and T. Gordon. User Control of Force-Directed Layouts. *ICSOFT*, 2016.

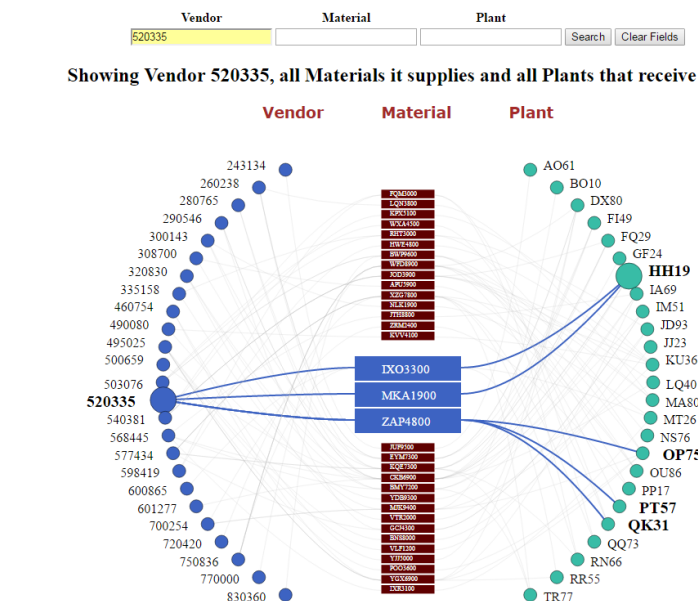
Visual Interfaces for Course Registration - ClassGrid



A prototype interface implementing course ranking and selection based on students' degree requirements, course history, and time preferences. Implemented using Excel, Visual Basic. **Honors Project by K. Wood**

Contact: Carter **Student (U):** Wood (MATH)

Association Map – interactive visual alternative to tables



Compared to the traditional, three-column grid-based representation of data, the Association Map visualization makes it easier to explore data, focus on individual items and connections, while making it more exciting to interact with the data. The latest version was developed following a series of evaluations with users in side-by-side comparison with tabular interfaces.

Contact: Babaian, Chircu, Lucas, **Student (G):** L. Gu, M. Li (MSIT), Y. Xiao, R. Zhang (MSBA)
Ref: Babaian, T., Lucas, W., Chircu A. and Power N. Extending an Association Map to Handle Large Data Sets, *HCI 2017, Springer*

Dynamic Task Map - an informed task navigation interface



Interactive graph, derived from **usage logs**, showing

- Tasks that were performed (in an organizational unit or within a specified history),
- Connections to related tasks (that co-occur or follow)
- Additional task info shown alongside the main display

Contact: Babaian, Lucas, **Student (G):** R. Zhang (MSBA)
Ref: Babaian, T., Zhag, R., Lucas, W. DTMi – a New Interface for Informed Navigations. *HCI 2017, Springer*

RealViz Talk Series

Videos available online at cis.bentley.edu/RealViz/talks

2017



Matthew Brehmer,
Microsoft Research,
Human-Computer
Interaction group

*Timelines Revisited:
Considerations for
Expressive
Storytelling*

2016



Martin Wattenberg,
Google's "Big
Picture" data
visualization group

*Big Picture
Visualizations*



John Stasko,
Georgia Institute of
Technology
*The Value of
Visualization for
Exploring and
Understanding Data*



Remco Chang,
Tufts University
*Big Data Visual
Analytics: A User-
Centric Approach*