Position Paper:
Elastic Presentation Space Libraries

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For the Workshop on
"Information Visualization Software Infrastructures"
at IEEE 2004 Visualization,
Organized by Katy Börner, Indiana University, USA and Jean-Daniel Fekete, INRIA, France

Part I

I.1) What functionality should a general InfoVis infrastructure provide?

There are three categories of functionality that would be useful in a general InfoVis software infrastructure. These are: data structures, representations, including spatial layout variations, and interaction techniques for information manipulation, exploration and navigation. For example a tree in a common computational data structure that is of considerable use in InfoVis. Its many visual representations cone trees, treemaps, etc are also core functionality. Interaction techniques would include such things as drilldown, filtering and spatial adjustments and local magnification techniques. The tree is just one example. Already the amount of software infrastructure that would be useful is considerable and as research in InfoVis expands this will become an increasing challenge.

I.2) What do you see as the main technical challenges for creating a central but flexible and universally useful (information) visualization software infrastructure (as opposed to 100 different ones)?

I think the main challenge, and this of course has technical manifestations, is promotion of flexibility and creativity. I will try to explain. I first decided to develop elastic presentation as a library to simply make it possible for people to work with it without having to reprogram it. This first version of the library provided the functionalities that I have previously developed. It was immediately clear to me that this was less then I had intended. I had hoped that the library would work like a scaffolding in a creative sense. That is, that people using the library would be empowered by the library to develop new ways of using it. Using the existing to enable something that is a step beyond what had been done before. First re-writing made considerable steps in this regard. With the second version students started to create all kinds imaginative variations.

Part II

II.1) Project Name: Elastic Presentation Space Libraries
Web Address:

II.2) Core Team Members
Team leader: Sheelagh Carpendale, sheelagh@cpsc.ucalgary.ca
Contact person, developer: Eric Pattison, ericp@cpsc.ucalgary.ca
Previous developer: John Light, john.light@Intel.com
Previous developer: Cathy Montagnese

II.3) Project Start Date: 2001

II.4) Targeted User Group: academics, students, and artists

II.5) Supported User Tasks: a great variety of local magnification capabilities and interpolates between them including:

- *Insets and detail-in-context presentations.*
- *Repositioning in separate views and detail-in-context presentations.* Separate views provide freedom of re-positioning. EPS extends detail-in-context presentations to include re-positioning of foci or *folding*. Folding allows spatially separated focal regions to be repositioned while maintaining their information content and without disconnecting them from their context.
- *Full-zoom and detail-in-context presentations.* Adjusting the degree to which the distortion function affects a particular dimension provides interactive alternation between a detail-in-context lens and a viewer-aligned full-zoom and back again.
- *Radial and orthogonal detail-in-context presentations* Basing the distance function on Lmetrics provides a continuum between radial and orthogonal layout. In practice we find that L-one (diamond shaped), L-two (radial) and L-1 (orthogonal) are of most interest

For more details see following publications

M.S.T. Carpendale, J. Light, E. Pattison (2004). Achieving Higher Magnification in Context. To appear in *Proceedings of the ACM Symposium on User Interface Software and Technology*, October 24-27, Santa Fe, NM, USA.

A Framework for Unifying Presentation Space

M.S.T. Carpendale and C. Montagnese. In *Proceedings of ACM Conference on User-Interface Software Technology, UIST'01, CHI Letters Vol. 3 Issue 2*, p 61-70, ACM Press, 2001.

Three-Dimensional Pliable Surfaces: For effective presentation of visual information,

M. S. T. Carpendale, D. J. Cowperthwaite and F. D. Fracchia

in *UIST'95: Proceedings of the ACM Symposium on User Interface Software and Technology*, pages 217-226, ACM Press, Pittsburgh, USA, 1995.

II.6) Major Features of the System Architecture (see above)

II.7) Algorithms Provided (see above)

II.8) Snapshot of the Interface: This is a library and is to be used inside code. As such it does not have a GUI interface.

II.9) Development Platform: the development platform is C++. It has been wrapped as a COM object and can be used in any language in visual studio and visual studio.net.

II.10) Supported Operating Systems: Windows and Linux

II.5) Software Dependencies/Required Libraries: None. This was an important design decision. The library does not make assumptions about what the representation is or, if it is visual, how it is to be drawn. This has allowed people to use the library to apply local changes in volume to sound.

II.5) Current License: on request, not for commercial purposes

II.5) Number of Users/Downloads: Internally, it has been used extensively in upper level HCI classes. Externally there have been a relatively small number of downloads, in the order of several dozen, though no accurate count has been kept. There is one CHI publication from a user who downloaded it.

II.5) Pros and Cons: This library has gone through three fairly extensive re-implementations. Each one has considerably improved the API – based on user comments. The last one also considerably improved the

algorithmic speed (in the order of 20 times). Both of these aspects seem to be ones that can be continually improved.

II.5) Planned Work: Make a more easily accessible web site and incorporate recent research into the library.

Part III

Please describe your main interest in participating in the workshop

Definitely the point you have made is one of my main interests: Determining the feasibility of combining efforts to create one common, shared IV infrastructure as opposed to 100s of underfunded or proprietary toolkits, platforms and frameworks. Scouring for ideas for a common data protocol for communication between plugins. Eliciting feedback about the IVC software architecture with regard to extensibility and ensuring that it is future-proof.

Also would like to explore the idea of developing infrastructure that supports new uses as well as providing for existing ones.

Please use no more than 4 pages, in this HTML format if possible.
Send the completed paper ***by Sept. 30, 2004*** *to* *katy@indiana.edu and Jean-Daniel.Fekete@inria.fr*.