Introduction to the Special Session on Visual Languages for Human-to-Human Communication

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Abstract

The world-wide connectivity of the Internet and the high-quality graphical capabilities of today's personal computers are fostering a growth of new software that permits people to communicate with others in a variety of visual ways. The papers in this session illustrate several examples of these approaches. In some cases the focus of the communication is on the computational properties of objects or systems. In other cases, the communication is not about computation, but the computer technology supports that communication.

1 Introduction

Visual languages were originally for human consumption only. Aside from cave paintings, hieroglyphics, art, and all the other non-computer-related images and diagrams, visual representations for computing such as flowcharts and Nassi-Schneiderman diagrams were for people. They documented the structure of FORTRAN programs so that other people, not computers, could understand them. Today, when we use visual languages to control computers, we use them not only because we may be able to express ideas more easily with them, but because the resulting documents are usually easier for other people to understand, too.

The papers in this session are about computer-based visual languages and visualizations for human-to-human communication. While perhaps all visual languages can serve people-to-people as well as people-to-computer communication, our emphasis here is not on controlling the computer but on education or the give and take among people.

2 Themes

Within our general topic, three subthemes emerge from the particular papers in the session: (1) education, (2) algorithm animation, and (3) a variety of patterns of collaboration.

Education is a prime application for web-based visual languages and visualizations for human-to-human communication. While perhaps all visual languages can serve people-to-people as well as people-to-computer communication, our emphasis here is not on controlling the computer but on education or the give and take among people.

3 Communicating about Computation

The subject matter in this session spans a range from computation (a big focus especially since many of the first Java programmers have been computer science students) to general narrative and town policy.

In "Animation of User Algorithms in the Web," J. Haajanen, M. Pensonius, E. Sutinen, T. Terasvirta, and P. Vanninen, of the University of Helsinki, and J. Tarhio, of the University of Joensuu in Finland, describe JELIOT, a web-based algorithm animation service. Their approach to animation is object-oriented, based on a drama metaphor, and various details of their Java implementation are likely to be of interest to others who are developing web-based visual languages.

The second paper is entitled, “Staging Software Visualizations on the Web.” It is by J. Domingue and P. Mulholland at The Open University in the United Kingdom. Their Internet Software Visualization Lab not only provides a means to visualize Prolog programs in execution, but it provides for students the ability to record a movie of a particular execution that they can send to their tutor to explain a problem they are having.
M. Brown, M. Najork, and R. Raisamo are the coauthors of the third paper, which is entitled, "A Java-Based Implementation of Collaborative Active Textbooks." It represents work done at the DEC Systems Research Center that extends the work they presented in their award-winning paper at VL'96. Collaborative textbook authors can now present their algorithms in Java and can view the documents with standard web browsers. The architecture of their JCAT system is highly modular (a collection of Java applets) and provides an exemplary model for distributed educational visualization/animation systems.

4 Telling Stories
While computation has been the focal subject for much of the innovative visualization systems, the Internet is increasingly being used for everyday textual communication. As it becomes a network for video and entertainment, an important question is, "What can Visual Languages do for authoring of traditional narrative stories?" Kevin Brooks of the M.I.T. Media Lab's Interactive Cinema Group presents an analysis of the narrative writing process, and he suggests visual tools for this problem and the related problem of writing nonlinear hypertext.

5 Collaborative Learning
The final paper in the special session was submitted as a case study/application. Its title is "Mr. Rogers Sustainable Neighborhood: A Visual Language Case Study for Community Education," and its coauthors are C. Perrone, S. Spencer, and E. Arias all of the University of Colorado. It describes the use of WebQuest and Visual AgenTalk, both supported on the Agentsheets visual-language platform to create a electronic board game. The game supports a community of players learning about town policy.

6 Issues for Discussion
The themes that emerge in this session's papers—algorithm animation, education, story narration, collaboration and community building—suggest several questions. My hope in conducting this session is that we can begin a dialog that addresses them.

1. What features, if any, of a visual language are needed specifically to support education?

2. Communicating algorithms vs communicating people's understanding of algorithms: what's the difference?

3. Are we ready for standardization of any of the visual representations for algorithms?

4. What do algorithm animation and story animation have in common?

5. What are the features of a general animation engine that could support both algorithm animation and animation of stories?

6. How should the model of collaboration affect the design of the visual language, visualizations, or communication tools?

7. How can visual languages promote the formation of online communities and help them be productive?

Finally, I would like to thank the conference organizers and all the special session's authors and reviewers for making this session possible.