Aesthetic Expectations for Information Visualization

Anna Ursyn, University of Northern Colorado, USA

ABSTRACT

This article explores the landscape of creative endeavors in the new media art and reflects on aesthetics of information visualization. When using computer based information visualization to show data interactively in many dimensions, the user can navigate across big data sets, find patterns, relationships, and structures that would be invisible if presented numerically. The authors also explore ways of combining information visualization techniques with the principles of creative design, enhancing artistic influences on the technical implementations, and raising the level of training in design. Finally, the authors offer suggestions for creating knowledge visualizations with the use of art and graphics to strengthen the readiness of computer scientists to fulfill aesthetic expectations and gain recognition from art world specialists for factual solutions done in visualization projects and new forms of art.

Keywords: Computer-Based Instruction, Computer Mediated Communication, Information Visualization, New Media Arts, Visual Thinking and Learning, Visualization Aesthetics

INTRODUCTION

Generally speaking, an opinion is now well established that art, graphic design, visual storytelling, and the use of signs and metaphors support visual communication by combining creative imagery with the analytic rationality of conceptual diagrams. Computer graphics are often used to translate into pictures data about events and processes, so the data is easier to understand. A fisheye view, a tree-map, or a pile metaphor may serve as examples of classic representations used for pictorial data presentation. By the way of illustration, a BumpTop prototype for desktop organization is a pile metaphor that integrates interaction and visu-

alization techniques optimized for pen input (Aragawala, 2006).

Despite advances in information visualization it remains difficult to locate information and explore its structure. For example, the linkage structure of the World Wide Web would be valuable to understand but is extremely difficult to visualize. Consider also that despite billions of bytes of video data sharing Internet sites such as YouTube and Hulu, that understanding and exploring within the content is still near impossible. Visual presentation of large data sets is in demand because Web became the main carrier of information. When we use the search engine, too much data must be scrolled on the screen, so new browsers are necessary to present information visually. It can be done with the use of information visualization, data

mining, and semantic Web. It seems reasonable to assume that merging verbal and visual ways of communication makes the central part in scientific visualization and simulation, virtual reality environments, Web based environments, Web graphics, game design, visualizations of big sets of data, semantic Web, data mining, and many other tasks and areas of interest. (Visualization can be described as the creation and algorithmic manipulation of graphic images directly from the 1D, linear, 3D world, and multidimensional data. Information visualization is usually defined as the presentation of pictures showing easy-to-recognize objects, which are connected through some well-defined relations, to amplify cognition. It is usually done with the use of computer supported, interactive, sensory (mostly visual) representations of abstract data (Card et al., 1999; Bederson & Shneiderman, 2003). In knowledge visualization, it is generally accepted that visual representations are used to improve the creation and transfer of knowledge between people. In contrast to information visualization that supports the retrieval and organization of large data sets about facts and numbers, knowledge visualization helps to augment communication about knowledge-related relations and principles).

The following text comprises some issues concerning art and aesthetics in the context of information visualization domain and the new media art. First, it discusses the changing landscape of creative endeavors in new media art and information visualization: the decisive role of visual literacy and visual science, application of metaphorical thinking about concepts and data, and the position of aesthetics in new media art and information visualization. Secondly, it analyzes some ways of enhancing artistic influence on the technical implementations by combining knowledge visualization techniques with the principles of creative design and insights of cognitive neuroscience, as well as some tools that may support such endeavors. In the third place, this article offers suggestions about creating knowledge visualizations with the use of art and graphics. Proposals for visual problem solving in displaying information and

data comprise several kinds of activities aimed to improve one's power of conveying meaning with images, along with conclusions coming from the research and direct observation done in the educational setting.

THE CHANGING LANDSCAPE OF CREATIVE ENDEAVORS

A wide variety of available technologies may allow people from various disciplines strive to unite the artistic content of a work with presentation and organization of the data. How both are solved graphically and aesthetically, poses an important question. The evolving presence of computer graphics created many opportunities for people not necessarily trained in visual arts. Visualization projects are mostly done by specialists in computer science having small amount of background in art or design, while artists and designers often work on visualization without much knowledge in computer science (Kosara, 2007). According to Kosara, a minimal set of requirements for any visualization comprises an image based on data that is readable and recognizable.

Information visualization specialists, software programmers, scientists, musicians, system architecture developers, and many other technology-oriented people find their production intertwined with the visual flow of their thoughts. They acquire means to communicate knowledge by changing tacit knowledge into explicit one—as mental representations and images, and then by finding meaningful patterns and structural relations in graphical displays of data. However, computer scientists may not receive the level of training in design that artists and architects do.

Some hold that art background is not important because there may be cooperation with artists. As artists often demonstrate quite different frame of reference, acquiring one's own sufficient level of visual literacy and skills might appear more satisfying. For scientists, collaboration with visual artists opens new opportunities, while others strive to develop their

19 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/article/aesthetic-expectations-information-visualization/41709

Related Content

From Spherical Photogrammetry to 3D Modeling
Wissam Wahbeh (2016). *Handbook of Research on Visual Computing and Emerging Geometrical Design Tools (pp. 96-115).*
www.irma-international.org/chapter/from-spherical-photogrammetry-to-3d-modeling/149302

The Dark Web of Urban Data: Fitness Data Ecosystems, Urban Design and Privacy in the Modern City
Dermott John James McMeel (2018). *International Journal of Art, Culture and Design Technologies (pp. 12-25).*
www.irma-international.org/article/the-dark-web-of-urban-data/222785

Continuous Line Drawings and Designs
Hua Liand David Mould (2014). *International Journal of Creative Interfaces and Computer Graphics (pp. 16-39).*
www.irma-international.org/article/continuous-line-drawings-and-designs/120640

Interface Tesseracto UI and the Hologram: A Zero UI Proposal
Marcos Luiz Mucheroni (2019). *International Journal of Creative Interfaces and Computer Graphics (pp. 56-64).*
www.irma-international.org/article/interface-tesseracto-ui-and-the-hologram/236638

The Essence of Smart Homes: Application of Intelligent Technologies towards Smarter Urban Future
Amirhosein Ghaffarianhoseini, Ali Ghaffarianhoseini, John Tookey, Hossein Omrany, Anthony Fleury, Nicola Naismithand Mahdiar Ghaffarianhoseini (2016). *Creative Technologies for Multidisciplinary Applications (pp. 334-376).*
www.irma-international.org/chapter/the-essence-of-smart-homes/148575