

Interact 2011 Workshop

Building Bridges – HCI and Visualization

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Abstract. The fields, HCI and visualization, are usually practiced as two separate disciplines by researchers with different backgrounds and capabilities. However, these two disciplines, HCI and visualization, could complement each other and leveraging on the differences and complementary features of the two research fields could be beneficial for both. In this workshop, we are going to discuss the different approaches and capabilities of these two disciplines and layout a road map for a unified approach of research using both.

Keywords: HCI, Visualization, Standardization.

1 Workshop objectives

Whenever discussing the relation between HCI and visualization in general or when presenting research results in these areas, questions arise about the differences between these research fields. Aren't both fields just the same? And if not, where is the common ground? Can we combine the separated viewpoints and paradigms in a unified and complementary approach, or are we forced to choose one or the other? How can we provide the general public (the developers and users of visualization and HCI and the engineers implementing our designs) a precise and practical enough idea about what's happening in these fields and what's not? What are the consequences of the answers on the previous: how and what should we teach? What will be the future? This dilemma is a topic of frequent discussion around the water cooler, lecture halls, as well as in the board room.

One of the major issues is that it is not easy to precisely define the terms visualization and HCI and that there are many interpretations of these two fields that appear to be distinct.

ACM SIGCHI tries to give people a working definition for HCI: “Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.” [1] However, at the same time the applicability of this definition is significantly limited by adding that it “at least permits us to get down to the practical work of deciding what is to be taught”.

Similar imprecise descriptions can be found for visualization. One possibility is the classical definition given by ACM SIGGRAPH: “visualization is [...] the formation of mental visual images, the act or process of interpreting in visual terms or of putting into visual form” [2], though the visualization subcommittee of the SIGGRAPH Education Committee in 1997 provided an alternative: “a computer generated image or collection of images, possibly ordered, using a computer representation of data as its primary source and a human as its primary target” [3]. Foley [4], in 1994, states “A useful definition of visualization might be the binding (or mapping) of data to a representation that can be perceived. The types of binding could be visual, auditory, tactile, etc. or a combination of these”. Kosara [5] tries to better conceptualize the term visualization by defining some criteria forming a minimal set of requirements for any visualization: “visualization is based on (non-visual) data, produces an image, and results in a readable and recognizable output”. Finally, some definitions are approaching the concept from the point of view of computing: “Visualization is a method of computing. It transforms the symbolic into the geometric, enabling researchers to observe their simulations and computations. Visualization offers a method for seeing the unseen. It enriches the process of scientific discovery and fosters profound and unexpected insights. In many fields it is already revolutionizing the way scientists do science” [6].

As already mentioned, questioning similarities, differences, and correlations of HCI and Visualization form an important part of our daily work life. In order to better (or at all) answer these questions, in our workshop we want to discuss topics like:

- What is HCI? What is Visualization? What is a working description that is practical highlighting the special features of each of the fields?
- Are there other disciplines involved in this struggle (e.g., Visual Analytics)?
- How can we take advantage of the two fields and how can we find ways for people with different inclinations to collaborate and take advantage of the strengths of each other?
- What are the similarities of the disciplines? What are the major differences?
- Do we need to really split the domains? Or do we need to join them and provide a joint curriculum for studying and practicing them?
- Can we give definitions that are better applicable in real situations?
- Does one need to further research the ways to make people take advantage of both disciplines in designing interactive visual systems? In that case, what are the research agenda(s) and what are the Top 10 Research Challenges?

2 Key organizers

The team of organizers is comprised of representatives of both university and industry, giving them a wide multi-disciplinary expertise. They all have significant experience in the main disciplines (HCI and visualization), as well as in related areas and application domains.

Some of the organizers have already worked together in many workshops of the HCIV series [7]. HCIV is a major program in Human Computer Interaction and Visualization. The aim of that initiative was to establish a study and research program that combined the knowledge of both science and practice in the fields of HCI and Visualization. One of the main steps in organizing that program was a workshop series with world-renowned experts in both fields as well as application domains. The gained expertise and large number of members will be of a great value for successfully advertising this workshop.

Achim Ebert is professor and co-chair of the Computer Graphics & HCI lab at the University of Kaiserslautern. His research topics include information visualization, immersive scenarios, and human-computer interaction. His current research focuses on the efficient usage of large displays and the application of new device technologies in HCI. Achim is a member of the IFIP Technical Committee on Human-Computer Interaction and is chairing the IFIP Working Group WG 13.7 on "HCI & Visualization" [7].

Gitta Domik is professor of "Computer Graphics, Visualization and Image Processing" at the Institute of Computer Science, University of Paderborn, Germany. She is the sub chair for visualization at the SIGGRAPH Education Committee and member of the Editorial Board at IEEE Computer Graphics and Applications. Her current research interests are in volume visualization of medical data, controlled experiments to measure the benefit of visualizations, Serious Games, and transdisciplinary education. She is a member of IEEE and ACM.

Nahum Gershon works on combining creative expressions like storytelling, film, social media, and visual and interactive design with when appropriate. Nahum is a Senior Principle Scientist at the MITRE Corporation where he focuses on research and practical applications of presentation and visualization of data and information, as it relates to perception, society, storytelling, culture, and new media (social, mobile, real time, community organizing). In his free time, Nahum, among other things, participates in a number of national and international committees.

Gerrit van der Veer moved from cognitive psychology, through cognitive ergonomics, to user centered interaction design. Currently he is a professor of human-computer Interaction at the Dutch Open University, School of Computer Science and a professor of interaction design at the Faculty of Architecture, University of Sassari, Italy. His research is on task modeling for internet-based service design. He is a member of IEEE Computer Society, of the European Association of Cognitive Ergonomics, IFIP WG 13.7, and of ACM SIGCHI.

3 Targeted audience

We welcome participants from various backgrounds interested in research and application of HCI and visualization, including designers, artists, researchers in visualization, interaction, psychology, and usability, and people from all application fields.

4 Workshop organization and duration

The intended length of the workshop is one day. Prospective attendees will submit open position papers from their own areas of interest and also provide short answers to two pro forma questions asking for (i) the participant's views on the most important existing knowledge in the area, including a position statement on possible definitions, and (ii) key research challenges related to HCI and Visualization issues. These will form a start point for open-discussions during the workshop.

The first half of the workshop will include:

- Introduction of the issues that are relevant for this workshop and overview of planned schedule (given by the session organizers)
- Short self-introductions of participants
- Short talks of selected attendees

After lunch, we intend to break into groups to brainstorm about common ground, definitions, research agenda, and top 10 research questions.

Back into a plenary session we will schedule:

- Short presentations of the group results
- Comparing and merging the results
- Discussions: Lessons learned? Next steps?

After the workshop, all minuted results will be transferred into a summarizing report that will particularly include a first version of a research and development agenda.

5 Expected outcomes

Beside the position papers submitted by the workshop attendances, we will use the already existing HCIV web domain [7] as a starting point for future actions. In parallel to this more or less just informative media we will start an interactive blog in order to continue the discussions of the workshop. For a better visibility of our actions and progresses made, we will also distribute and discuss them using means of social media like Facebook groups and Twitter. Furthermore, the results of the discussions should form common ground for at least one high-quality conference or journal paper.

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