



ITS Workshop DEXIS 2015: Visual Data Exploration on Interactive Surfaces

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Topic of the Workshop

We focus on the use of interactive surfaces for visual data exploration. The workshop topics are situated at the intersection of Interaction and Visualization research, and we ask for contributions from members of one or both communities. Our main goal is to call for the development of more dedicated research on visualization systems for interactive surfaces ranging from small screen smartphones to medium-size tables to large wall-size displays. The workshop is meant to provide a space for visualization and interaction researchers to meet, discuss, advance the state-of-the-art, and refine research agendas.

Author Keywords

Visualization; Data Exploration; Interactive Surfaces.

Relevance to ITS

This workshop is motivated by the fact that visualization systems are, by design, well-suited candidates for deployment on interactive surfaces. In information visualization, scientific visualization, and visual analytics, useful insights primarily emerge from an interactive data manipulation experience. Nevertheless, interaction research to date in these domains has largely focused on mouse-based interaction and the research community still has not paid enough attention to how interactive data exploration can benefit from interactive surfaces [2]. Yet, we assert several apparent benefits of interactive surfaces for visualization systems:

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1. As interactive displays become more ubiquitous, data can be accessed and analyzed anywhere and at any time (e. g., on phones and tablets, in meeting rooms, or on public displays);
2. Interactive surfaces offer research opportunities on novel interaction paradigms that can encourage alternative forms of data exploration;
3. Novel visualization designs and interaction experiences promote visualization use even for non-experts;
4. Large interactive surfaces offer the possibility of depicting and interacting with much larger visualization spaces than previously possible; and
5. As data analysis is increasingly turning into a collaborative process, interactive surfaces offer novel research possibilities on dedicated collaborative visualization platforms.

While many benefits exist to combining interactive surface and visualization research, much remains to be learned about the effects of providing a visual data exploration experience on interactive surfaces. For example, we need to learn more about (a) how to re-design desktop- and mouse-based systems for alternative forms of input, (b) when people would conduct data exploration in novel vs. traditional interfaces, and (c) how novel input modalities, on a higher-level, change the ability of viewers to understand data and draw insights from it. In addition, interactive surfaces often come in the forms of larger screens, smaller screens, more screens, higher pixel counts, and multiple simultaneous inputs, all of which create additional challenges for visualization designers.

In an effort to explore this research space, we would like to organize this workshop to give researchers and practitioners with a dual interest in interactive surfaces and visualization

a chance to exchange ideas and perspectives on these challenges and to discuss how emerging devices can be used as new platforms for visualization research, data analysis, and data exploration. The workshop will be the second iteration of the first DEXIS workshop held at ITS 2011 [1, 3].

Topics Covered in the Workshop

We concentrate on discussing issues pertaining to the design of information visualization, scientific visualization, and visual analytics systems on interactive surfaces. Topics of interest include, but are not limited to:

- the design of information visualization, scientific visualization, or visual analytics interfaces and environments for interactive surfaces,
- the design of interactive visual representations for collaborative work on interactive surfaces,
- the design of multi-display environments for data analysis,
- the use of interactive surfaces to visualize and interact with information and data,
- guidelines and best practices for visualization and analysis environments on interactive surfaces,
- visual analysis and exploration for a wider range of audiences using emerging display technology,
- aspects of cognition in interactive visualization and visual analysis environments,
- evaluation of interaction in single- or multi-user visualization systems on interactive surfaces,
- collaborative visualization and visual analytics systems with interactive surfaces,
- collaborative sensemaking and its connection to interactive displays, and
- comparative experiences of visualization on desktop and on interactive surfaces.

Time	Event
09:00–09:10	Introduction & overview of the workshop structure
09:10–09:30	Minute Madness
09:30–10:00	Open Discussion
10:00–11:00	Design space characterization
11:00–12:00	Breakout sessions based on specialized topics such as multimodal interaction, varying requirements for information visualization, scientific visualization, and visual analytics, etc.
12:00–13:00	Consolidate workshop discussion and identify research agenda to address identified research challenges

Table 1: Proposed schedule.

Nature of the Workshop

The main goal of the workshop is to bring together researchers with shared interests on the topics named above. Together, we will identify and discuss challenges in the field, exchange experiences about ongoing research and best practices, and gather ideas about how interactive surfaces can be combined best with visualization systems.

We will follow the general contextual frame of “Past, Present, and Future”—we will discuss past research on visualization for interactive surfaces (presented by the participants), define the present design space with its technical characteristics and design options, and develop a future research agenda. The main focus of the covered topics in these discussions will depend on the submissions received.

As outcomes of the workshop, we expect

- to discuss success stories of using touch-enabled surfaces for practical visualization applications and to perhaps jointly collect these in a website—as already started here: <http://goo.gl/6a0zH>.
- to identify open challenges for information visualization, scientific visualization, and visual analytics applications using interactive surfaces with a focus on one joint topic (e. g., mobile visualization, touch interaction, increasing or reducing pixel counts, visualization redesign, . . .),
- to extract ideas for novel input modalities for visualization tools, and thus,
- to shape a research agenda for the use of surface computing and novel input paradigms in the visualization domains for the next years.

A first research agenda for visualization on interactive surfaces was published by participants and organizers of the DEXIS 2011 workshop [3]. This workshop should also to

lead to a publication that, however, will be more focused on a highlighted topic. For example, visualization for mobile devices is an extremely interesting and promising area which could (pending interested by workshop attendees) be a focus topic.

The outcome of the breakout groups will be published along with the workshop papers in a technical report format to make it more widely available.

Format of the Workshop

Position Statements

We will invite position papers of up to four pages in length which will be reviewed by the program committee (PC). Accepted papers will be published on the workshop web site prior to the event after authors' finalization. Position papers can discuss past research in the area, provide a discussion of the design space for a specific subfield of visualization for interactive surfaces, or define a preliminary research agenda.

Agenda

The workshop will be structured as follows (Table 1).

We will start with a short overview of the day and give an introduction to the workshop topic. This introduction will be followed by a minute madness session in which participants will quickly present their position statement followed by a short open discussion. The next hour will be devoted to intense discussion of the design space of visualization systems for interactive surfaces.

We will break out into several smaller groups to draft the design space for specific topic areas. In addition to investigating the different requirements of information visualization, scientific visualization, and visual analytics, we

will look at common aspects. Specifically, we will discuss how to support not only the most common interactions that are essential to the given visualization domain but also less common ones.

This design space and focus on one main topic of interest. The goal is to develop a clear view on this topic and how visualization and surfaces meet (e. g., with respect to mobile devices). We will use the discussion to identify the role of visualization systems, discuss what is missing from current types of systems, what visualizations can offer, and how to build and deploy useful data exploration environments. The outcome of this discussion should provide us with a refined research agenda along with pressing research challenges.

Participants and Workshop Attraction

To achieve a diversity of participants, we will actively advertise the workshop to people with backgrounds in the relevant fields. The target size of the workshop is about 20 participants (including organizers) in order to assure at least three breakout groups while making a plenary discussion feasible. We will select participants according to a number of criteria, which include:

- originality and controversy of position paper,
- complimentary nature of research background, and
- quality of previous publications related to the workshop.

Program Committee

We will ask a mixture of HCI and visualization researchers from the three areas (InfoVis, SciVis, and Visual Analytics) to join our PC and review 2–3 position papers. Our potential candidates are:

Mehdi Ammi, *CNRS (France)*
Craig Anslow, *Middlesex University (UK)*
Anastasia Bezerianos, *Univ. Paris Sud (France)*
Raimund Dachselt, *University of Dresden (Germany)*
Steven Drucker, *Microsoft Research (United States)*
Niklas Elmqvist, *University of Maryland (United States)*
Chi-Wing (Philip) Fu, *Nanyang Tech. Univ. (Singapore)*
Michael Haller, *Upper Austria Univ. of Applied Sciences (Austria)*
Daniel F. Keefe, *Univ. Minnesota (United States)*
Narges Mahyar, *University of British Columbia (Canada)*
Stacey Scott, *University of Waterloo (Canada)*
Chia Shen, *Harvard (United States)*
John Stasko, *Georgia Tech (United States)*
Christian Tominski, *University of Rostock (Germany)*
Melanie Tory, *University of Victoria (Canada)*
Wesley Willett, *University of Calgary (Canada)*
Anders Ynnermann, *Linköping University (Sweden)*

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