engage! and converse! - Designing Interactive Creative Spaces

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ABSTRACT

Looking at early examples of Human-Computer Interaction (e.g. Sutherland's Sketchpad 1964 or Bolt's Put-that-there 1980), we see a strong connection between technology and the support for creative practices. These examples contrasted absolutely with common computer use at that time, which required systematic development of programming solutions to well specified problems. However, the ongoing shift from desktop- to ubiquitous computing, has again put the focus on designing not just individual functions and features, but interactive creative spaces.

At ICT AG, we are excelling in creating such spaces as brand experiences for companies such as Audi, Siemens, or Mercedes-Benz. Thereby, my talk about our work will give a brief glimpse into how the future of interactive creative spaces might develop and which challenges are still on our way.

Author Keywords

Interactive Surfaces; Interaction Design; Interactive Collaborative Environments

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

INTRODUCTION

When we take a look at the role of Interactive Surfaces and interactive creative spaces from an industry perspective, we see that such large format touch devices have started to become a commodity product for many potential customers and users alike. This means that the expectations and requirements have changed to a point, where customers just expect things to work. However, productivity applications are still the exception to the rule and instead of having a set of standard applications available, a market has evolved featuring many small developer studios and agencies, who build custom-made applications for Interactive Creative Spaces. However, these require a lot of conceptualization and involvement of the customer in the design phase and are difficult to integrate into real world productivity processes. Besides, requirements broaden to include roll-out and deployment of systems to multiple locations instead of having tailor made solutions for individual spots. Therefore, maintenance and being ready for future adaptations are becoming much more important.

This talk will give an overview of three different scenarios which showcase how industry requirements for interactive creative spaces can be met (Figure 1). For this, we at ICT have developed a software suite called smartPerform, which allows us to design and create interactive creative spaces. An important aspect here is that smartPerform provides a standard platform which allows designing applications for Interactive Creative Spaces within clear platform boundaries.
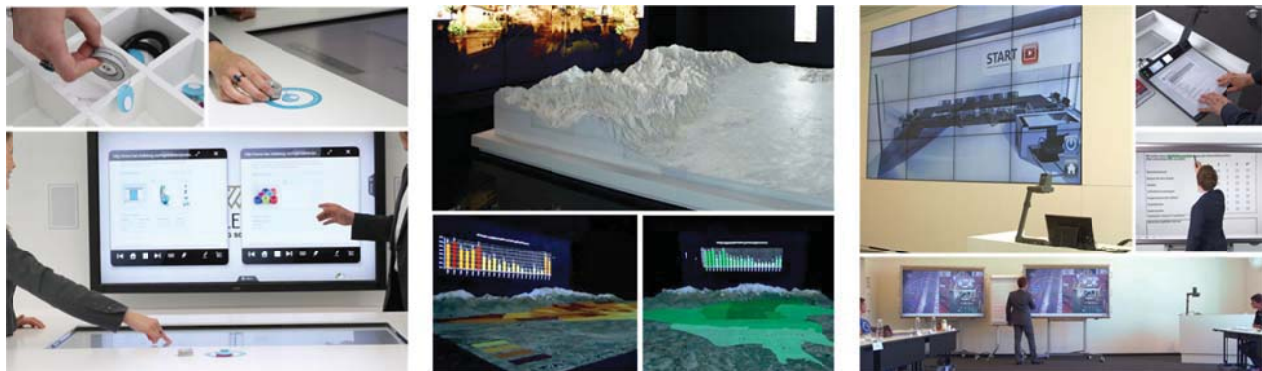

Figure 1: Usage Scenarios for Interactive Creative Spaces: Product Explorer (left), Urban Observatory (middle), and Training Facility (right).

Compatibility of such applications with the evolvement of the platform is provided, which means that these can always benefit from new functionality while ensuring backwards compatibility. While this seems natural from a software engineering perspective, the domain for interactive creative spaces has been lacking such a clear approach and has instead, as mentioned before, focused on individually developed solutions. Besides,

smartPerform incorporates an "End User Development" approach [7] to make sure that customers don't depend on individual programmers for future maintenance and extension work. For this, the platform combines a WYSIWYG UI Composer with a powerful event-driven Logic Designer – both of them working purely on a graphical and configuration level. smartPerform, while being a commercially available product, has its roots in ongoing research work. R&D therefore is constantly injected by both the latest developments and innovations from industry and from research.

The basic idea for the smartPerform platform stems from the research around the ZOIL framework [4]. One of its main goals was to put away those "mazelike" interfaces, as Raskin puts it [8], which are the result of cluttered information across multiple applications and in abstract hierarchies, such as the file system. These put "a great cognitive load for navigating, finding information, or managing windows" on the user [4]. The ZOIL approach tackles these issues with a zoomable, object-oriented interface style (see Figure 2).

Figure 2: Zoomable User Interface (ZUI)

The smartPerform platform pushes that forward, as the UI Composer (UIC) allows the creation and design of zoomable information spaces without any programming skills in a What You See Is What You Get manner (Figure 3).

Figure 3: WYSWG UI Composer (UIC)

Besides, the smartPerform platform has been influenced by the research around visual data-flow programming interfaces [6]. This is represented in the platform's event-based Logic Designer (ELD), which allows the implementation of complex application behaviors, network and sensor communication (Figure 3).

Figure 4: Event-Based Logic Designer (ELD)

SCENARIOS OF USE

The functionalities of the UIC and the ELD complement each other allowing a new way to implement heterogeneous usage scenarios. The range of possible implementations is manifold, starting with interactive table-top devices, e.g. as walk-up-and-use devices for trade-shows, corporate reception areas, retail stores, or museums; goes on to large, interactive and orchestrated brand environments and eventually ends in productive environments, such as training and meeting facilities. We have picked three example scenarios to illustrate how the combination of UIC and ELD work in practice and showcase the benefits these provide. All scenarios are based on real world projects which have been carried out with the smartPerform platform.

Product Explorer

In our scenario, a company would like to welcome its customers and guests in a modern, interactive environment which should be used to hold meetings and explain about the companies' products and services. As the company produces physical products, it aims at blending the analogue and digital world – still showcasing the real product but enhanced with digital information. A table-top device is chosen in combination with a vertical display to have both, user engagement as well as a presentation environment unified (see Figure 1, left).

With the smartPerform platform, the UIC is used to build up an application which showcases all products enhanced with media, such as images, videos, and tech specs. The ELD on the other hand is then used to connect an RFID input to the application. Thereby, putting the real product, tagged with an RFID chip, on a certain spot of the table-top, zooms the application to the corresponding area of the interface, showcasing the digital information. The UIC allows the company to edit the content available for each product and also add new products. The ELD allows a flexible configuration of the available RFID chips. Thereby, the application can easily be extended with new chips for new products or further customized to be brought into different environments. For example, the company would like to use it on a trade show in the US with just a handpicked number of products available on site.

Since the ELD is tightly integrated with the UIC, it also opens up the design space for using the same technology differently, for example providing sales personal with RFID chips to authenticate themselves at the table-top and provide access to just those products each user specializes.

Urban Observatory

In our second scenario, a city would like to create a working and presentation environment, which allows them to improve their urban development and planning processes – an urban observatory. In this environment, different applications which give access to a variety of data streams and visualizations should be available. A large touch-enabled video wall should be used to visualize all the information. A physical model of the

city's topography allows different data layers to be projected on its surface, e.g. the city's energy network or crime rate distribution (see Figure 1, middle). The smartPerform platform provides the tool to unify all the applications and interactions. First, all the different applications can be started from within the smartPerform platform, so that it serves as the portal to all the information available. Second, the UIC is used to create presentation applications which features some selected graphs and results from the analysis process, so that they can be presented and discussed with an audience. Third, the smartPerform platform is tightly coupled via the ELD with the projection system for the physical model of the city. Thereby, accessing a certain graph will tell the projection system to display the corresponding information layer on the model. This makes the presentation of the analyses results a smooth and fascinating experience. For remote operation, a tablet device is also equipped with smartPerform and the ELD is used to synchronize the tablet and the video-wall. Thereby, the interaction on the tablet is forwarded and replicated on the video wall – a fast and robust remote control.

Training facility

In the last scenario, a corporate provider of business training courses and seminars is about to launch a new building with roughly 50 training rooms. They expect 1000 different lecturers a year and more than 20000 students. All rooms are equipped with state of the art A/V technology, including 80" screens with multitouch for presentation, digital visualizers, and digital room control systems for lighting and blinds.

The smartPerform platform is used to create an application which gives the lecturer an easy way to control all the technology while also being able to access their content and use interactive annotation in every second (see Figure 1, right). With the UIC, the overall design of the application is created and static content is integrated, e.g. general event information. Live video sources from the A/V system are integrated as well, allowing the user to access the screen of their laptop or of a digital visualizer by the press of a button. The smartPerform platform provides annotation capabilities for all content and sources, thereby creating a powerful interactive whiteboard.

The ELD component allows synchronizing certain containers on the interface with the file system on a server. Thereby, preloaded-content from lecturers is available on the interface without any further manual integration. Besides, smartPerform uses its real-time XML interface to connect to the room and event booking system, thereby getting the information which digital devices are available for the lecture or which additional rooms are connected. The ELD then dynamically adjusts the commands it sends to the A/V system to control the routing of the A/V signals connected in the room. A central smartPerform server allows managing and updating both the interface via the UIC and the logic via the ELD; therefore, reducing operating costs and

maintaining the flexibility to change or enrich the A/V equipment.

For the lecturers and the students, smartPerform provides a unifying interface which allows managing and enriching the whole lecture in a novel and unmatched way.

CONCLUSION

Our practical experience has shown that the market for Interactive Creative Spaces is moving on from individually designed and specialized presentation places to operational business areas, where productivity, maintenance, and integration into existing processes play an even bigger role. We think that the four domains of designing Blended Interaction [5], as presented by Jetter et al. 2014, can serve as guidance to further tailor software tools for Interactive Creative Spaces. Those four domains cover the areas of 1.) individual interaction, 2.) social interaction, 3.) workflow, 4.) physical environment. While 1.) and 2.) have been addressed in a variety of research works, 3.) and 4.) still provide a challenge. Supporting business workflows for example requires developers and interaction designers alike to consider the whole process chain which includes many different systems and activities, many of them which cannot be altered. Therefore, Interactive Creative Spaces have to blend seamlessly into those workflows. In our third example for training facilities, we faced similar challenges, as the technology had to blend into the individual teaching workflow of each lecturer, including much more activities than just interacting with technology. Considering and designing for the physical environment will prove to be equally important, as technology becomes more and more ubiquitous. Therefore, systems need to have open interfaces to communicate with and react upon each other as well as on the users [3]. Similar to our second example, the Urban Observatory, the experience and productivity does not stem from one individual interactive system but from all systems working in concert within the physical environment. But what is specifically designed as a neat effect today will be expected by the user as a typical and smart application behavior tomorrow.

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