ProtoSense – Interactive Paper Prototyping with Multi-Touch Tables

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1   Motivation

The design of user interfaces with the paper prototyping method allows software developers to identify the customer's design and workflow related requirements in an early and cost-efficient manner. The basic idea is to sketch ideas by paper work (e.g. by cutting-out and painting elements) to visualize a user interface design at a very early stage of the design process. The result is a prototype which is simple and whose development did not need much time. The advantages of paper prototyping are obvious: They are easy to use, allow extensive control over details of the design and encourage team design because many people can draw at the same time. The main disadvantage of those prototypes is that they are not executable (Szekely, 1994). Their workflow must be simulated to customers by the designer who changes between multiple paper views.

Inspired by paper prototyping with so called "low-fidelity" (Snyder, 2003), several digital interface builders allow the creation of digital (high-fidelity) prototypes that are rudimental executable. But, these solutions lack in the ease of use since only experienced programmers are able to use them in their whole functionality.

With the increasing availability of Natural User Interfaces (NUI), the borders between the physical world and IT systems disappear more and more. The ProtoSense system introduced in this poster is a NUI-based wireframe prototyping solution that allows the creation of simple and executable user interfaces without the skill of an experienced programmer.

2   The Protosense System

ProtoSense runs on a table-size display (Microsoft PixelSense) and allows teams the creation of simple paper prototypes in an intuitive manner. Elements can be easily placed by physical stamps and they can be arranged by hand gestures directly on the table. The resulting wireframes are executable and support developers in the presentation of their early work to clients. Figure 1 shows an example of a prototyping result created with the help of the Proto-Sense tool.

   Early evaluations with experienced interface developers already showed the practicability of this solution, but also the demand of more elements and degrees of freedom with ProtoSense. An evaluation with computer science students led to the finding that ProtoSense is overall helpful for learning paper prototyping in this target group, especially in lower semesters, but for now clearly behind the experience, quality and usability of original paper prototyping.
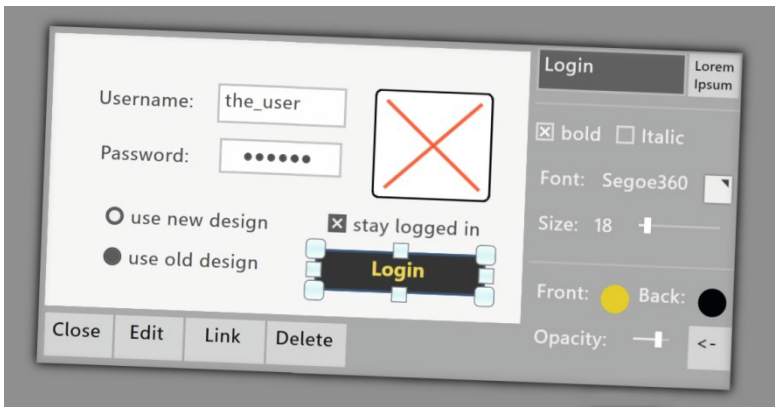

Figure 1: A sample prototyping project on the PixelSense table.

References

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Biographies

Christian Wegner completed his B.Sc. in the practical studies "IT Systems Engineering" at the HPI in Potsdam, Germany. Also, he studied "Design Thinking" at the d.school. In 2014, he achieved his M.Sc. in Computer Science.

Raphael Zender studied Computer Science at the University of Rostock, Germany. He wrote his Ph.D. thesis in Rostock and worked as scientific project assistant at the Chair of Computer Architecture. Today, he is scientific assistant at the Chair of Complex Multimedia Application Systems at the University of Potsdam, Germany.

Ulrike Lucke studied Computer Science at the University of Rostock, Germany. She finished her Ph.D. and habilitation on the development of IT infrastructures for research and education. Since 2010, she is Professor for Complex Multimedia Application Architectures as well as Chief Information Officer (CIO) at the University of Potsdam, Germany.