End-User Development of Cross-Device User Interfaces

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ABSTRACT

The goal of the XDUI 2016 workshop is to bring together leading and upcoming researchers in the area of multi-device interaction where many different cross-device systems and tools have recently been investigated. This workshop marks a shift from thinking about the technical issues of distributed user interfaces to thinking about the users and enabling cross-device use of existing applications and interfaces. We will discuss the issues specific to end-user development of cross-device user interfaces and develop a research agenda that tackles these issues with solutions suitable for non-technical users. We target both new and established researchers in the area—new researchers will quickly get an overview of the state of the art, while established researchers can bring in their expertise and knowledge of existing cross-device techniques.

Author Keywords

cross-device interfaces; end-user development.

WORKSHOP AIMS AND GOALS

For a long time, multi-device interface research has focused on enabling designers and developers to create distributed user interfaces that can execute on multiple devices used in sequence or in parallel. Domain-specific languages [14, 18, 20], different frameworks [10, 11, 15, 17, 24] and developer tools [1, 3, 16] have been proposed to support development of cross-device interactive applications. More recently, however, the focus has started to shift on enabling non-technical end-users to create or participate in the design of cross-device user interfaces based on direct manipulation [5, 7, 8, 9, 13] and user-friendly scripting techniques [2, 4].

EICS 2015 hosted a first workshop with a focus on systems and tools for cross-device user interfaces. For EICS 2016, we will keep the focus on the engineering challenges associated with cross-device interfaces, which is very appropriate for EICS, but widen the scope by working towards enabling non-technical users, including user experience designers and the end-users themselves, to customize and adapt existing single-device user interfaces for cross-device use.

The workshop seeks to establish a set of technical and design requirements and develop a research agenda to support end-user development of cross-device user interfaces. This will include *(a)* a systematic review of existing systems and tools regarding their suitability and potential for end-user development, *(b)* collection and analysis of the concepts and techniques appropriate for non-technical users to create cross-device interfaces, and *(c)* discussion of participatory design methods and how they need to be adapted for cross-device interface design. Specifically, the workshop will revisit the concept of a user-derived interface [6] and consider how the evolving research on user-driven elicitation [12, 21, 23], which has so far been limited to gestural interfaces, can be extended to cross-device interfaces. The main outcome of the workshop will be a review paper on end-user development of cross-device user interfaces coauthored by all participants.

FORMAT OF THE WORKSHOP AND TARGET AUDIENCE

This one-day workshop brings together both new and established researchers in cross-device interfaces. To foster discussion among participants, the idea for this workshop is not to have a mini conference, but to have a hands-on, discussion-heavy event in which participants can actively contribute their knowledge and expertise in cross-device user interface prototyping and design. The workshop is structured into two parts.

The first part will focus on reviewing the state of the art in cross-device user interfaces. After briefing each other and collectively producing a list of cross-device systems and tools with the help of both workshop organizers and participants, participants will work in teams each led by one of the organizers focused on a particular solution and carry out a systematic review of the potential to support end-user development. The review will consider the technical aspects using Paternò and Santoro's multi-device development framework [19] as well as the design and user experience aspects based on Wäljas et al.'s multi-device user experience framework [22].

The second part is then a discussion moderated by the organizers to identify the key issues and important future directions with the goal of defining a common research agenda. This part of the workshop provides an important opportunity for new researchers interested in the topic to ask questions and for already active researchers to discuss a possible research agenda focusing on end-user development of cross-device interfaces. In particular, the workshop's discussion addresses the following issues and research questions:

- **Promising concepts and techniques for end-user development of cross-device user interfaces**: Based on the par-

ticipants' reviews, what are suitable metaphors and appropriate tools for non-technical users to play an active role in the cross-device interface design process? What needs to change in current systems and tools to empower the end-users themselves and allow them to customize existing applications and interfaces without developer intervention?

- **The new role of designers and developers**: If we give more power to end-users and allow them to create cross-device interfaces themselves, how does this impact the role of designers and developers in the larger process? Which design tasks can be directly accomplished by end-users and what remains to be done by designers and developers?

- **Future research agenda**: What are the direct next steps that need to be investigated in research and what are the long-term goals in cross-device user interface research? How to incorporate important related issues such as privacy and security that have not received sufficient attention?

This workshop is not seeking research or position paper submissions. Instead, only a short statement of interest describing the background and interest in the topic needs to be submitted. Prior experience in designing cross-device user interfaces needs to be made explicit and will help the organizers in formulating qualified teams with a good mix of participants.

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