
Design and Adaptation for Cross-Device, Context-dependent User Interfaces

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Abstract

This tutorial aims to help user interface designers and developers to understand the issues involved in multi-device, context-dependent interactive applications, which can be accessed through wearable, mobile and stationary devices even exploiting different interaction modalities. It will provide a discussion of the possible solutions in terms of concepts, techniques, languages, and tools, with particular attention to Web environments. The tutorial will deal with the various strategies in order to adapt, distribute, and migrate the user interface according to the context of use.

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ACM Classification Keywords

H.5 Information Interfaces and Presentation; H.5.2 User Interfaces.

Introduction

Our lives are a multi-device experience where people are surrounded by different types of devices through which they can connect to networks in different ways. However, one big potential source of frustration is that user interfaces are often not able to exploit well the changing interaction resources when users move about and devices available dynamically change, thus generating several issues. In general main issues in multi-device UIs are: poor adaptation to the context of use, lack of coordination among tasks performed through different devices, inadequate support for seamless cross-device task performance. There is a need for better understanding concepts, methods and tools to support designers and developers to obtain user interfaces able to effectively and opportunistically adapt to the various interaction modalities available and support task continuity.

Content

After introducing some basic concepts in context-dependent user interfaces and usability criteria that depend on the interaction resources available, I will first explain how the device choice has an influence on the possible tasks to accomplish and how the structure of such tasks can vary in terms of possible secondary tasks, inter-task temporal relations, and content required depending on the device. Next, the discussion will move on to introducing the main motivations and aspects in cross-device user interfaces and the main approaches in authoring them. The tutorial will then provide a brief overview of the results that can be obtained through model-based approaches when multi-device interfaces are considered. Regarding adaptation we will see the various types of user interface adaptation rules that can be applied, and then focus on how to indicate rules to specify context-dependent behaviour. In this respect, some current solutions will be discussed in terms of their usability and expressiveness. The next part of the tutorial will be dedicated to discussing responsive design, how it works, and the aspects that are not supported by this approach. We will see further solutions in terms of multimodal context-dependent adaptation will be discussed. I will then move on to discuss various levels of flexible access in multi-device environments. I will discuss examples for each level of multi-device access, including support from tools and environments publicly available. Regarding distribution of user interface parts across multiple devices, we will discuss various possible solution at design and at run-time. At this point I will review the various possible approaches to migration in multi-device contexts as well. In multi-user contexts there are various privacy aspects that need to be

addressed through specific user customizable privacy policies. Security issues will be briefly discussed as well.

Instructor

Fabio Paternò is Research Director at CNR-ISTI, where he founded and leads the Laboratory on Human Interfaces in Information Systems. In recent years his main research interests have been in concepts and tools for context-dependent applications, model-based design and development, authoring and design of cross-device interactive applications, distributed and migratory interfaces.

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