A Reality Checklist for Multi-Device Systems in the Wild?

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Abstract

This position paper proposes the development of a reality checklist for multi-device systems in the wild. The checklist will help researchers evaluate designs, design ideas or design specifications for a system before it is deployed in the wild.

Author Keywords

Checklists, multi-device ecologies, in-the-wild

ACM Classification Keywords

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

Introduction

In our research community we have a strong interest in understanding how technology can augment our everyday activities whether at home, at work, in the city, or in the local library. The technological advancement now allows us to explore systems or applications that span multiple devices both personal devices such as smartphones, tablets and laptops, and shared devices such as interactive wall or tabletop displays. We know from the literature that enticing people to interact with a system in a public or semi-public setting is challenging. It has been explored and discussed in work on tabletops [10, 7], public displays and interactive walls [8, 3], media architecture [4], and in combinations

of public displays and personal devices [5, 9]. In our own work with building and deploying multi-device systems (e.g. [11, 13]) we have experienced that the challenges multiply with the complexity of the ecology, particularly when involving peoples' personal devices, spatially distributed devices and/or networked infrastructure. Ironically, while most of us automatically reach for our smartphone as soon as there is a break in our busy life, getting us to take our phone out of the pocket to interact with a system in the wild is *hard* and people are reluctant to install applications on their device(s) on the spot [5]. For instance, Müller & Krüger [9] describe a system of 20 public advertisement displays installed in shops in a large German city running over the course of a year where people could use their phones to get rebate coupons. *Only 37 coupons were redeemed*. Another example is the CHI 2013 Interactive Schedule [13]. It was similarly based on a number of large (semi) public displays showing video previews for upcoming paper sessions. The system allowed for advanced interaction through the conference smartphone app over the local network. Papers featured on the large displays could be added to users' personal schedules and it was possible to create custom playlists for display on the large display. The WiFi at the conference center was (as always at large conferences) unstable, therefore obstructing the smartphone to public display interaction. *No one noticed, as no one got their phone out of their pockets at the displays*. In both cases there can be many explanations to why so few (or none) interacted with the system as intended by the designers.

With this position paper we propose the need for analytical tools to help us as researchers to systematically reality check designs, design specifications or design ideas for multi-device systems that are to be deployed in the wild, to catch our blind spots for potential interaction show stoppers before the system meets actual use.

Checklists and walkthroughs

Analytical tools in HCI and interaction design serve as means for evaluating a design or a specification for a design before involving real users. The *cognitive walkthrough* [12] is a well-known example. The method forces the analyst to break down and question each step involved in completing a task with the given user interface, to verify if a potential user will be able to select an appropriate action at each step. The cognitive walkthrough takes its starting point in an engaged user that is motivated to interact with the system. We are interested in analytical means to assess the situation that precedes and surrounds the actual interaction with the system. The *activity walkthrough* [2] is an extension of the cognitive walkthrough that emphasizes a *contextualization* of the use situation. This includes considering the activities the use situation is part of, the users' previous experiences with similar user interfaces, and previous experience with realizing their activity without the given user interface. Similarly, the *activity checklist* [6] is intended to elucidate the most important contextual factors of a user interface including a focus on user goals and social and physical aspects of the environment. We will in the following present a set of themes that we believe could form the initial foundation for a reality checklist for multi-device systems.

Outlining a Checklist

In the following we outline a checklists based on a preliminary analysis of our own cases and the related work. The checklist is based on themes divided into individual focus areas, which are accompanied by specific questions. A *no* to each of these questions should be seen as a red flag requiring further investigation.

Physical properties and visibility	
Distance	Is the system visible to potential users? Is the system discernible at the distance users first encounter it? Is the users' view to the system clear of obstructions?
Movement	Does the system align with the way people would move or sit in a space? Is the system aligned with the flow and existing layout of the physical space?
Orientation	Does the system align well with how people orient themselves in the physical space (e.g. opposite of doorways and openings)? Does the system utilize how the existing physical layout directs attention?
Quality	Does the system support the existing functions, configuration and purpose of the physical environment? (Should it?)
Material form	Does the system resemble what it is or indicate use through its form (e.g. interactive table/public display)? Is it easy to see what is part of the system and what is not?
Signs & instructions	Is the system accompanied with symbols or instructions explaining what it is? Are there symbols/text indicating connectivity (e.g. WiFi/Bluetooth) or basic functionalities?
Spatial distribution	Does the system relate to other physical objects close by? Are other artifacts in proximity of the system distinguishable from it (information displays, signs, installations)?

Understanding interaction	
Input & output	Is the interaction understandable (without other people using the system)? Is it easy to discern how to interact with the system at first encounter? Is it easy to understand the input/output relation? Does the system tease potential users with animations, examples, graphics, audio etc.?
Skill & time	Is interacting with the system easy for new-comers? Is it comprehensive how much time interaction will take? Does interaction 'end'?
Reward	Will interacting with the system reward potential users? Is there a clear outcome?
Social dynamics	Is interaction with the system aligned with social norms or existing social interactions? Is how the system expose or draw attention to users deliberately thought through?

Physical properties and visibility
The first step, which may seem banal, is to ensure that potential users are aware of the system. This entails looking at the context wherein the potential use will occur: How do people move and orient themselves in the physical space, distance, orientation, obstructions etc. (see e.g. [1])? How is the system is represented in the physical space, the material form, position, signs and spatial relationship? How

should potential users might recognise elements of the system and draw on initial familiarity? After all, a display might just be a display in the crudest sense and input/out devices might be more or less hidden or the connection between them might be less obvious.

Understanding interaction
Once potential users have some awareness of the system, making sense of and identifying how one might interact with the system is the next step. Understanding how one interacts with a system might prompt actual interaction, understanding what one signs up for and/or participate in is key part of the decision process leading to initial interaction, and understanding some of the social dynamics of interacting with a table or pulling out a personal device is equally important [8, 3].

Motivation	
Goals & Incentives	Does the goal of using the system align well with potential goals of potential users? Are there incentives for walking up and using the system?
Investment & time	Is the required degree of personal investment for interaction acceptable for the users? Do the users have the time for it? Do the users want to get their smartphones out of their pockets for this?

Technical issues	
Connection & Compatibility	Is it quick to connect to the installation? Is the system compatible will all kinds of user devices? Is a password or a login required?
Configuration	Can users avoid installing anything on their personal devices? Can they avoid changing settings? Is setup simple and consisting only of very few steps?
Trust & Security	Does the system keep personal data safe? If interaction is logged, is it for the immediate benefit of the users? Can the user remove her profile/history/device from the system? Can others access users' data, if so is this made clear to the users?

Motivation

The motivation for approaching and initiating interaction is key in understanding how potential users negotiate whether they want to try, look and/or continue their activities. Extrinsic and intrinsic motivation both play a role. Systems within work settings or systems offering essential information offer extrinsic incentives and other potential users are driven by intrinsic motivation (playful, curious, fascination with technology etc.). Understanding motivation from a user's perspective will help reveal shortcomings or just a basic challenge in the design.

Technical obstructions

Lastly, when we have convinced a potential user, they need to be able to participate and use the system. For systems that utilise personal devices, some initiation and configuration is often needed, and in systems that relies on user information (login, profiles etc.) there is some overhead in setting up or logging into the system. Putting a personal device on an interactive table or logging into a public display also involves issue of trust and might make potential users reconsider interaction even when they have their smartphone out of their pockets.

Summing up

The themes and tables presented above outline a very preliminary reality checklist for multi-device systems when deploying these in the wild. We hope this proposal will spark discussion at the workshop and that the participants will help us move towards a more complete reality checklist.

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