A Case Study of Research through the App Store: Leveraging the System UI as a Playing Field for Improving the Design of Smartphone Launchers

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ABSTRACT

With a growing number of mobile applications available on application stores and the improved capabilities of smartphones, people download more applications to their devices. Researchers began to leverage this momentum for distributing applications to conduct studies on end-users’ devices. This paper grounds the approach of research through the application store in the theory of quasi-experimental design. Further, with people having more applications installed, finding applications quickly when they need them can become a time-consuming issue that impacts user experience. This paper presents our approach to improve future design of smartphone launcher menus. The authors present our approach of combining research through the app store with the idea of studying people’s smartphones as the apparatus themselves. Therefore the authors designed a game that takes advantage of the user’s smartphone itself as a field of play. By timing a simple visual search task for an icon, the authors aim to deduce how well a user knows where he can find his applications, and thus how well he can build a mental model of his smartphone launcher menu. The authors introduce our approach, present the game rapidly that serves as a vehicle of our research question, and discuss open challenges and future work.

Keywords: Game, Launcher Menus, Mobile Applications, Operating System, Research through the App Store, Smartphones

INTRODUCTION

The number of applications (apps) available on mobile app stores is steadily increasing, and so is the number of application downloads from app stores. This also results in a growing number of apps people have installed on their devices, since many people keep applications installed without removing them after installation, and instead (for instance) move them to special places within their menus (Böhmer & Krüger, 2013). People put quite some effort...
into organizing their launcher menus. However, with an increasing number of icons in a launcher menu, finding an application in order to launch it can also become a time-critical task. Although such time spans might be very short, searching too long for an app might negatively impact user experience. Minimizing this search time by presenting predictive launcher menus is the goal of ongoing research (e.g., Böhmer & Krüger, 2013; Parate et al., 2013; Shin et al., 2012; Zhang et al., 2012).

This paper’s content is twofold: First, we present a new way of studying mobile phenomena by combining the idea of research through the application store and making the user’s smartphone an integral part of the study apparatus. This enables us to study interactions that are inherent to the smartphone and not only to the application published to the app store. We present a categorization of related works and explain how our approach goes beyond what has been done so far. Second, we present a case study of this approach stating a particular research question, which is: How well do people know their current launcher menus? Our goal is to quantify the time it takes to find a certain app on a smartphone, and to build a model for predicting this effort. This will help to improve menus of smartphone launchers, e.g., if a user would take overly long to find and launch his next app (for prediction of next-used applications see Parate et al. (2013); Shin et al. (2012)), an adaptive menu could provide a shortcut to that app where he can easily find it when visually searching for that particular app (Zhang et al., 2012).

As such, this paper makes three contributions: (i) We present our approach of making the operating system (OS) an inherent part of a game to study questions inherent to the design of the smartphone; (ii) we present a game as a study in the large to address our specific research question on visual search times in launcher menus; (iii) we present preliminary findings on how quickly people can find icons; and we discuss how the results can be used to inform future design of smartphones.

LEVERAGING APPLICATION STORES FOR RESEARCH

Collecting Data in the Wild

According to Rodgers, 2012, the idea of turning to the wild is to study “phenomena in the context rather than in isolation”, and is all about observing how people change, react to, or integrate novel technologies in their everyday lives. The approach of studying new technologies in the wild was used in different fields of HCI and ubiquitous computing to study the use of new or existing systems in situ. Rodgers remarks that isolating specific effects observed in an in-the-wild study is difficult since the participant rather than the researcher is in control of the study, and that effects may be caused by dependencies between various factors. According to this understanding, implementing a research study into a mobile application and deploying it an application store can be seen as a special case of conducting research studies in the wild.

Quasi-Experimental Design

Oulasvirta, 2012, urges rethinking experimental design when studying mobile and context-aware systems. His rationale is that assumptions about randomization and control, which can be made for experiments conducted in a controlled laboratory environment, are not necessarily valid in the wild. He proposes grounding the universal practicality of conducting studies in the scientific validity of quasi-experimentation design. Laying out the theory of experimental and quasi-experimental designs, Shadish et al. (2001), characterize an experiment as a study where the investigator purposefully applies two or more treatments to parts of a sample to observe the treatments’ effects. Common to different forms of experiments is the selection of which treatment shall be applied to which units of the sample, though how (or whether) this selection is made can differ.

Differentiating the researchers’ degree of control leads to four different kinds of experiments (Shadish et al., 2001):
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