

Investigation of Mobile User Interface Design Performance – A Case Study

Dr. G. Shankar Lingam¹Professor, Dept. of CSE, Chaitanya Institute of Technology & Science, Warangal, Telangana, India¹

ABSTRACT: With the advent of touch display phones, good UI layout and simplified input strategies for packages walking on such devices are critical elements that make contributions to its popularity and achievement. The intention of these studies is to evaluate distinctive user interface designs and enter strategies for mobile phones with contact display screen capability. In order to try this, prototypes of an easy social networking application have been implemented the usage of a G1 telephone that runs the Android platform. A user study has been conducted to compare unique enter strategies and UI designs and evaluate their usability.

KEYWORDS: ions

I. INTRODUCTION

Personal computing is at the pass from the computer to a greater mobile environment. Powerful, flexible and pervasive hand-held devices are converting the way we work, observe and communicate. This trend is visible inside the growing talents of PDAs and smartphones, enabling these devices for use for an ever-growing form of responsibilities. At the same time, mobile technologies are becoming an increasing number of essential parts of our everyday lives, and are gaining a much wider and extra various user base. Thus, more and more interactive computing structures are designed to be used on mobile hand-held devices. Bringing interactive systems to mobile devices, but, introduces additional demanding situations for powerful design and assessment of user acceptance and usefulness. Compared to computing device terminals, handheld devices have various physical and technical constraints that need to be taken into consideration at some stage in the layout. This makes software program improvement and user interface design extra worrying. Further, mobile offerings are frequently used in dynamic, crowded and unpredictable contexts requiring customers to divide their interest between several obligations. In terms of assessment, such contexts of use may be very difficult or not possible to manipulate, making traditional strategies hard to use. As mobile systems frequently require a network connection to feature, the designers also are faced with wi-fi connectivity problems affecting user recognition and usability, which includes gradual or intermittent network connections.

II. INTERACTIVE SYSTEMS DESIGN

A system can be said to be interactive when it supports bi-directional communication between the human user and the computing system. The user's actions and the corresponding reactions of the system take place via the system's user interface, the part of the system that allows the user to interact with the machine and to accomplish various computing tasks. The most essential aspect of any interactive system, as emphasized by Newman and Lamming [2], is its support for people to carry out their activities faster, with fewer errors, and with greater quality. The understanding how to support human activity is the central purpose of designing interactive systems, but it is also a factor that makes designing usable and useful interactive systems challenging. In order to develop a system that is well adapted to the user's needs and the context of use, the designers have to think beyond merely what capabilities the system should have. They also need to understand and support the tasks and processes that users perform, as well as to study the interaction between the user and the computer. This interdisciplinary subject of Human-Computer Interaction (HCI) relates computer science with many other fields of study and research, such as cognitive psychology, sociology, human factors and ergonomics. [2], [3], [4] The challenges surrounding the use of interactive systems have been noted for quite a while in the field of HCI, and a number of approaches to tackle them have been introduced. Norman and Draper recognized

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the importance of user-centered design [5], in which the needs, wants and limitations of the end user are given extensive attention at each stage of the design. The ISO 13407 standard [6] defines a general process for including human-centered activities throughout a development lifecycle. The four activities that form the main cycle of work in this model are represented in Figure 1a. Hartson and Hix propose a star lifecycle for the development of interactive systems [7]. This lifecycle, as illustrated in Figure 1b, provides an interconnected approach to development in which the central activity, evaluation, is viewed as an essential part of the design at all stages in the lifecycle. In scenario based design [8], concrete descriptions of usage situations, scenarios, are used to guide the design. In this approach the designer focuses first on the human activities that need to be supported and then allows descriptions of those activities to drive everything else. Common to all models presented above is their focus on iteration and gradual shaping of the design through various concurrent activities. Furthermore, they stress the interactive nature of design and recognize the value of user study and evaluation.

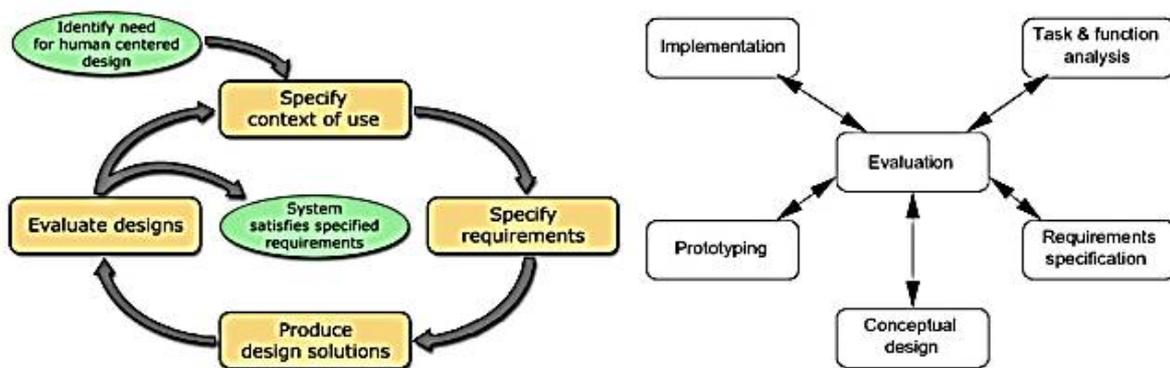


Figure 1. (a) Human-Centered Design (HCD) lifecycle, (b) Star lifecycle.

Usability engineering is a systematic approach to design software that is easy to use. Usability engineering lifecycle model by Nielsen [9] defines a set of activities performed throughout the development lifecycle to increase usability of the system. The first steps in the usability engineering process include studying users and their tasks, analyzing competing products, and setting usability goals. In parallel design stage, various parallel design alternatives are explored independently by several different designers. Participatory design attempts to actively involve the users in the design process to help ensure that the designed system meets their needs and is usable. Other essential stages of development include prototyping and empirical user testing, combined with iterative design. After releasing the product, it is important to gather statistics and feedback from real use of the system. The stages of the usability engineering lifecycle are presented in Figure 2.

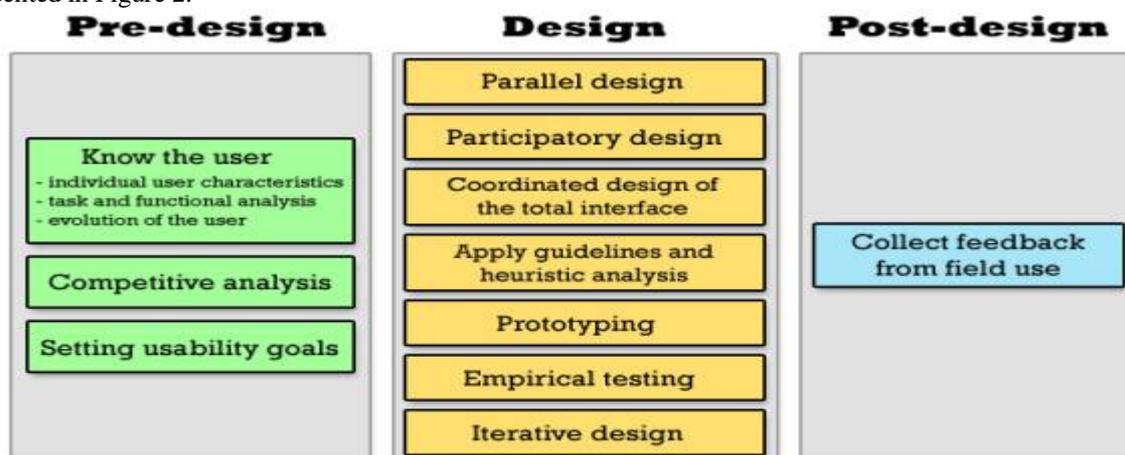


Figure 2. The stages of the usability engineering lifecycle model

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III. SYSTEM ARCHITECTURE

For the cause of this examine, a software referred to as BDroid was evolved. BDroid isa social networking application just like its internet-based counterpart such asFacebook and LinkedIn. Features of BDroid includes: an editable user profile, friendslisting with hyperlinks to other friends' profile, sending/receiving messages, ability to proportionsnap shots, calendar and a seek characteristic to look for different registered BDroid customers.Two versions of BDroid were evolved, every featuring a exclusive kind of userinterface design and input methods. Figure.3 describes the exclusive layouts, inputstrategies and menus used for both prototypes.



Figure.3 BDroid prototypes and feature comparison [1]

Ten people participated within the person observe whose ages ranged from 23 to 53 years old(40% female, 60% male). All of the participants very own a mobile tool, and the commonperiod of possession is 9years. Out of the ten contributors, most effective 10% very own a mobile device with contact display capability. In phrases of experience with mobile tool usage,40% of the members declare to have excellent enjoy in using mobile devices,whilst 30% simplest rated themselves common and the relaxation stated they are inexperiencedwith mobile device utilization. The layout of the user have a look at became an inside-subjects factoriallayout. The order wherein the two prototypes had been used became counterbalanced tominimize learning effects.

In the start of the user examine, the participants have been in short taught how to usethe smartphone which includes having access to the context menu by way of doing a protracted press at the screen,converting the orientation of the mobile phone to view the display screen in panorama or portrait view,the usage of the hardware additives (e.g. Keyboard, device menu, trackball), etc. Theimpartial variables were the 2 different variations of the prototypes, whichdiffered in terms of the layout of components (tabs vs. List view) and recordsenter (keyboard input on non-modal screen vs. Tapping on modal screen, contextmenu vs. Device menu). Task times had been measured via a logging system withinthe BDroid prototypes. Qualitative records become additionally gathered in a form of aquestionnaire on the end of each set of tasks.

The Tasks. Each player become requested to perform unique obligations for each prototype ofthe BDroid application. For both prototypes, each venture may be optimally performedwithin the same number of steps and basically range in terms of how the user interfaceadditives are displayed and which additives are used for enter. The subtasks thatwe concentrated on looking into and the particular elements evaluated are: navigatingfrom the principle profile to the edit profile section (examine layout), enhancing profile(compare access methods) and, searching and adding/viewing a user (evaluate menuaccessibility).

Through our empirical observation of how the users interacted with the prototypes,the probable reason why it was easier for them to navigate using the scrollable viewwas that, most of them used the trackball on the device. When the user was

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grasping the device with both hands when in horizontal position, there was no need to release their hold on the device since the trackball was easily accessible with the thumb. In contrast to navigating with the tabbed view, the user had to move the dominant hand in order to tap the tabs on the screen, or move one of the fingers closer to the screen which was relatively unreachable as compared to the trackball especially when both hands were grasping the device. An exception to easy navigation using the scroll view was when the user tried to scroll using the onscreen scrollbar by dragging their finger on the screen. The problem with the onscreen scrollbar was that, it was too thin and tends to be occluded for users with large fingers. Another problem which was more hardware oriented was that, the screen itself was not too responsive to the touch.

IV. CONCLUSION

Two one of a kind prototypes that feature different sorts of UI and enter techniques for mobile devices with contact screen functionality had been presented. Evaluation turned into finished in order to see which layout provided the user higher ease-of-use. However, the user interface components and input strategies described on this paper are simply part of a bigger work that must be done to create a whole catalog of comparisons of distinct UI controls that sell usability. Automated device guide who gives the developer help on which precise UI elements to use with their programs could also be beneficial. It should be stated that, even though popular design suggestions are beneficial, particular examples that applies these recommendations for a specialized variety of devices (e.g. the usage of particular UI additives for devices with touch screen capability) is more useful for the builders and architects whose goal is to create lovely and usable applications.

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BIOGRAPHY



Dr. G. Shankar Lingam completed his MCA in Chaitanya Degree & P.G College and M.Tech in CSE from Ramappa Engineering College respectively. He is having teaching experience of more than 20 years in various Under Graduate and Post Graduate courses. He has guided lots of students in various Under Graduate and Post Graduate Research Projects. At Present, he is working Professor, Dept. of CSE, Chaitanya Institute of Technology & Science, Warangal, Telangana, India.