Chapter 10
Mobile Content Adaptation: An Analysis of Techniques and Frameworks

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ABSTRACT

The mobile environment presents numerous challenges to users and developers alike. Ideally, mobile content should be designed to enhance a user's experience rather than simply serve up the same content originally designed for other platforms. This chapter presents a study of techniques for "content adaptation", the process of reformatting content and displaying it optimized for a mobile device. Adaptation techniques consist of a varied number of mechanisms by which content is adapted into a format more "friendly" to mobile devices. The idea of "friendly" can range from simple accessibility requirements to a dynamic redesign. Included in this discussion is a summary of the advantages and disadvantages of current techniques. Examples of different techniques are presented and illustrated along with the system framework necessary to implement them.

INTRODUCTION

The advent of the mobile environment, much like the early days of the PC and Internet-capable consumer electronics, has generated a diverse range of devices and formats by which users interact with traditional content. This freedom and flexibility has benefited users by providing cheap, wireless access to content. However, the inherent nature of smaller devices coupled with the relative youth of mobile formats has created an environment that largely ignores the context of the mobile user. The traditional methods of content creation and delivery that apply to a standard desktop simply do not apply in the mobile world. While these concerns affect cross-platform content distribution mechanisms, namely the Mobile Web, they also influence the development lifecycles of platform specific content such as mobile applications.

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BACKGROUND

Great strides have been made in the field of device independence, the ability for content to reach a user regardless of which type of digital device or machine they choose to view it on. Tools and systems have been developed to reduce the need to generate multiple versions of content or apps and reach as many devices as possible. Some of these mechanisms will be discussed in detail in later sections. However, while device independence is a goal that has largely been achieved, the usability of such content has not been adequately addressed. Digital content that gets displayed on a screen is designed for human consumption. Therefore it is subject to important sociological and cognitive processes that can aid or hinder the success of such content adaptation.

In order for content to be deemed successful there must be a match between the content creator's objectives, the user's goals when accessing the content, and the content design. Furthermore, content access is distinctly affected by the vehicle by which it is deployed to. A mobile device carries certain contextual attributes that can affect cognition, create distraction, inhibit usability, and decrease performance. Research shows that distractions in the environment can have negative impacts on both usability and performance (Deegan, 2014). However, it is important to note that certain distractions can decrease performance, while others can decrease usability. The distinction is one of technical vs. sociological effects. Performance defines the speed of completion and the resource cost of content adaptation from a technical perspective. Usability involves the satisfaction and success of a user's interaction with content from a sociological/cognitive perspective.

This chapter presents an analysis of content adaptation techniques from the perspective of performance and usability. Nielsen defines usability as a combination of quantitative and subjective values including learnability, efficiency, memorability, error rate, and satisfaction (Budiu & Nielsen, 2012). Broadly stated, it is a combination of the user's perception of how useful and an interface is and the measurable efficiency gains in using it. In addition to these five attributes, Nielsen defines utility as the ability of a system to meet the needs of the user. This is generally considered a separate precondition towards usability. When a product fails to provide utility then it does not offer the basic needs to perform a usability analysis.

Digital content takes on a vastly different form in the mobile environment. It is at the same time simplified and complicated. An attribute such as less screen space means that there is less content to interact with, thus a simpler interface. However, using a touch screen and walking at the same time is a more complicated task than using a mouse while sitting. Some complexity can be desirable. When an interface is considered too simple, it can be seen as dull and uneventful. It has been noted that people prefer a middle level of complexity: too simple and users are bored, too complex and users are confused (Norman, 2010). Therefore, it is crucial to examine and understand the factors, both technical and sociological, that affect complexity and ultimately usability. Without a proper understanding of the various factors, content creators and providers put users at a disadvantage.

DEVICE FACTORS

There are wide number of attributes and restrictions that desktop users rarely have to contend with: issues such as screen size, memory restraints, input mechanisms, and bandwidth constraints. Currently, many content providers simply ignore these factors, instead delivering the exact same content to mobile and