Chapter 13
Designing Browser-Style Augmented Reality Applications

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ABSTRACT

Handheld Augmented reality (AR) is the ability of smartphones to overlay digital information on a real view (video stream) of the world using built-in sensors such as, GPS, Compass and Accelerometer. With the use of geo-tagging and location based services, information is automatically filtered whenever users point their devices to places or objects of interest around them allowing them to browse the world. Current world browsers compromise the augmented reality experience due to poor support of contextual content, flow and interaction. This chapter discusses the principles underpinning the design of a solution for an indoor-outdoor world browser platform. The chapter presents the results of qualitative evaluations that were conducted on existing commercial world browsers and the design ideas of the proposed solutions. The main elements of a successful world browsing experience are highlighted as a guide for augmented reality designers.

INTRODUCTION

...we’re going to end up with the Internet smearing itself all over the world around us, visible at first in glimpses through enchanted windows, and then possibly through glasses, or contact lenses, with embedded projection displays. (Stross, 2009)

In 2009, the science fiction writer Charlie Stross, when predicting the near future, drew the above picture of being able to catch glimpses of the Internet through enchanted windows. Mobile Augmented reality allows us to do just that. Augmented reality (AR) is a type of mixed reality where digital information is overlaid over the physical world enabling real time interaction in 3D. Smartphones can act as a magic lens replacing the clunky head mounted display that was limiting the use of augmented reality in real life applications. Regular AR applications require computationally expensive image processing and computer vision techniques in order to recognize the world and register objects in 3D. On the other hand, smartphones can recreate this experience.
for point of interests in the outer world with minimal processing using GPS, digital compass, accelerometer and geo-tagged information. Mobile Augmented reality with its magic lens metaphor is a great enabler of Stross’ picture, but where are we from reaching this vision even when the technology is ready?

Being one of the reality-based emerging interaction styles, mobile AR is expected to be a positive move toward user experience since it will rely on existing knowledge of the world and will reduce the mental effort required to use mobile applications (Jacob, 2008). This understanding is further strengthened by the AR being rated as one of the most appealing interaction technologies on mobile devices. According to Gartner Research, AR is expected to be used by over 30% of mobile users bringing a revenue of approximately $732 million by 2014 (Perey, Blumberg, & Sinha, 2010). Nonetheless, designing the right user experience turned out to be a great challenge for this promising technology.

Augmented Reality is not a natural experience; it is a constructed one. Thus, the focus on designing a good user experience can draw the line between introducing a leap into the use of AR and just another fading technology. When designing for mobile AR, we must take in consideration the extra dimension of reality based interaction. For example, when using the smartphone as a magic lens to the world, the mobile screen becomes part of the real world. Thus, users expect to view and interact with digital content and actions that are also a meaningful part of their context. At the same time, designers should pay attention to the fact that there is a digital screen that is used as a medium for interaction which requires balancing both interaction styles: reality and mobile. Additionally, AR is continuously evolving which introduces a wide range of possible experience concepts and interaction models (Lamantia, 2009).

This chapter focuses on the design experience for world browsers, one breed of the mobile augmented reality applications. World browsers allow mobile users to view nearby points of interests from several online resources overlaid on the video stream of their cameras. The envisaged intuitiveness and appeal of such idea supported the fast growth of the world browsing phenomena since its start in 2009. Nonetheless, current world browsers are far from user friendly. Despite their support of third party sources of data, they still lack the meaningful contextual content and the reality flow of browsing the world as expected from users in reality.

The authors of this chapter are currently working on a solution for world browsing that supports creating highly interactive indoors and outdoors browsing services with seamless support of in-situ authoring of content. The proposed solution is envisaged to revolutionize the experience of mobile world browsers and take it to a different scale of use. Nonetheless, designing the right experience and taking in consideration all the possible interaction models for such a generic solution is challenging process.

The aim of this chapter is to describe the challenges, observations and lessons learned when designing for a mobile AR scalable experience. We start with a background on world browsers and their basic techniques. Then, common design considerations for world browsing are reported based on feedback from user testing. Accordingly, the elements recognized as critical for a successful experience and a new conceptual model of a browser are detailed. The chapter concludes with the evaluation of the proposed model and the major lessons learned from the process.

WORLD BROWSERS

World browsers are browser-style AR applications that aim to display nearby points of interest for users through their mobile cameras’ video streams. Such applications have the advantage of intuitive
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