Augmented reality for the masses

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Introduction

At the start of 2010, augmented reality (AR) seems to be approaching the peak of its hype curve [1]. Existing mobile AR applications, such as Wiktiude [2] and Layar [3], allow users to view digital graphics overlaid on top of the video camera feed, as if layers of digital information are attached to the world around us. Still, today's mobile AR applications are typically developed by visionary companies and used mainly by early adopters [4]. What does it take to make mobile AR applications that reach mass adoption?

The idea of being able to access layers of information quickly and conveniently when needed is appealing and it can clearly have a big impact upon the ways in which people will use emerging mobile technology [5]. However, since today's mobile AR applications are mainly based on GPS and compass input, the resolution of information positioning is still quite crude and the resulting user experiences can be somewhat disappointing. In this paper, we discuss some design issues that developers should address if they are serious about delivering AR applications that survive the current hype and successfully reach the mainstream market.

Engaging applications

Current AR applications for mobile are either general information platforms, such as Layar and Wikitude or highly specialized tools, such as Nearest Tube. While these types of tools might be useful, there are few AR applications that are truly engaging or actually solve a real need for many people. Therefore TAT is developing a mobile application that links the real world and web-based social networks. TAT Augmented ID is a "people search" application and a platform for self expression that builds on people's already existing social networks [6]. It deals with fundamental human characteristics such as vanity and curiosity and it addresses people's need to be in control of their own appearance.

When AR is used to add information layers around people's faces, all users must be able to take control over the way they appear when people look at them. In essence, this means that they can "dress up" virtually, only showing the information that they think is suitable for the context they are in. The information people choose show will in many cases already be available from the social network services they use on the Internet.

Speed

AR applications must be fast. If there are long delays when people scan their surroundings, there are better and more established ways to search for information about things in the world around you, e.g. using Google Voice Search [5]. Nobody wants to walk around pointing their mobile cameras at objects or people if the information is not presented instantly. Ideally, AR applications should have no-click interfaces, where camera scanning is the only gesture needed in order to get the information users want. This requires a powerful platform with efficient processing of sensor input as well as the graphic output. A camera with a high resolution and frame rate, matched by equally fast rendering of graphics is essential for a good AR user experience. Fast CPUs, GPUs, networks and cloud services are also required.

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Precision

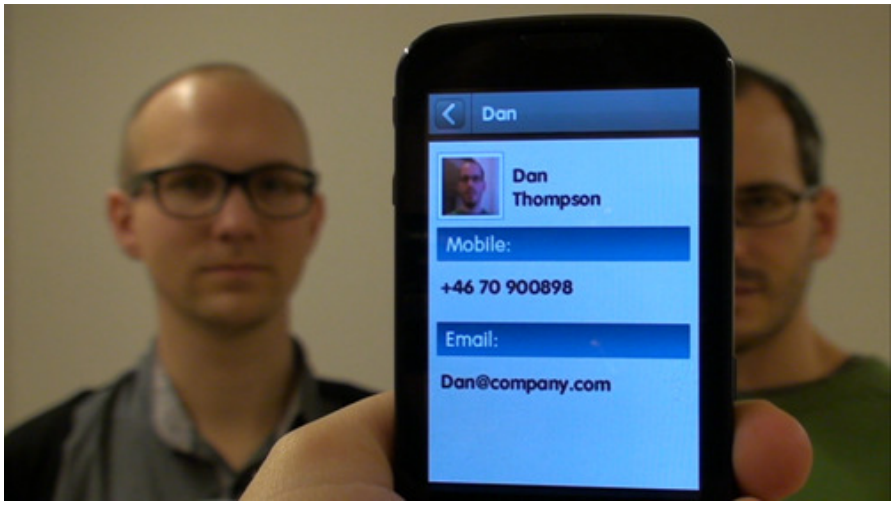
The precision of overlaid graphics in AR applications based on GPS and compass input is crude. Using these sensors, there is no way to avoid that information badges cover their targets. Neither is there any way to make sure that information layers are close enough to their targets to be associated with them and not with other objects. By building AR applications that instead use computer vision as the main input, it becomes possible to link the information overlays very tightly to the camera layer. Using head tracking and face recognition algorithms from Polar Rose [8], the information badges in Augmented ID can be positioned with great precision.

Aesthetics

We believe that users are attracted to well-designed user interfaces. This also applies to AR applications, where the information layers of most existing applications have a very basic design. As AR applications approach the mainstream, the design of information layers will become an important differentiation factor. The award-winning "Looking Glass" design concepts by Mac Funamizu [9] show how appealing AR interfaces can become when they seamlessly blend with reality.

Context

In a few years from now, we might no longer talk much about AR, since it will become a natural component of many types applications and services. AR will be something we can take for granted, just like we no longer need to label things “electrical”, “digital” or “Internet enabled”. An AR view is mainly useful in applications that deal with information about things that are in the vicinity of the user. This means that AR must coexist with other types of applications with traditional UI elements based on 2D or 3D graphics. Applications that use AR must be able to switch to other UI views when handling events such as incoming calls, dropped networks or low batteries. Therefore, AR applications should preferably be built with a strong, general purpose UI framework, such as TAT Cascades [10]



Conclusions

We believe that AR will become widely adopted when it allows “real life search” with speed, precision and in an aesthetically appealing way. Mobile users should not have to switch applications or type URLs to access information about things that are right in front of them. Preferably AR applications should be able to present information quickly in a no-click UI, and to appeal to mainstream users, they also need to look good.

References

[1] http://www.gartner.com/it/page.jsp?id=1124212

[2] http://www.wikitude.org/

[3] http://layar.com/

[4] Moore, G. A. (1991) *Crossing the Chasm*, New York: Harper Business.

[5] http://www.readwriteweb.com/tag/augmented+reality

[6] http://www.youtube.com/watch?v=tb0pMeg1UN0

[7] http://www.google.com/mobile/google-mobile-app/

[8] http://www.polarrose.com/

[9] http://petitinvention.wordpress.com/2009/09/04/red-dot-design-concept-award-2009/

[10] http://tat.se/