Vidente: A glance at AR on the UMPC and Smartphone Platform

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1. Introduction

As Augmented Reality (AR) moves more and more into the mobile direction, several devices have been tested for form factor and computational power. Throughout the years backpack systems, laptop and tablet pc platforms, and handheld devices have been used with different AR setups.

With the recent initiative of the Ultra Mobile PC (UMPC), several companies have created small, powerful fully featured devices. Since some of the devices come with high processing power, built-in webcams and GPS, outdoor and indoor applications may be tested almost out of the shelf.

Another recent development is the use of mobile phones for augmented reality. Today these devices have enough processing power to perform rendering and vision tracking self-sufficiently without help of nearby servers. Nowadays they also have built-in cameras which make these platforms compact and easy-to-use AR devices.

At our institute we currently carry out Mobile AR research with two UMPC devices (Vaio U70[1] and Samsung Q1[2]) based on our own Studierstube[3] platform. And by the beginning of the ISMAR conference we will have tested a third device (Vaio UX180[1]) of the same trend. Furthermore we are currently experimenting with several state-of-the-art Windows Mobile smartphones.

2. Demo Description

Vidente, our proposed demo for ISMAR 2006, is the presentation of an AR setup that includes the visualization of subsurface features of a model of downtown Graz. This setup uses ARToolkitPlus[4] multi-marker technology for tracking. The model was built from real data obtained from a *GE Smallworld*™[5] GIS database. The AR overlaying information such as gas pipes and electricity lines was also obtained from GIS data and is used for visualization on the UMPC devices as well as in the mobile phones.

A novel visualization technique, for presentation of subsurface data, developed at our institute will be presented with the UMPCs. This is the Context Sensitive Magic Lenses (CSML), the power of this technique which relies on a context-rich scene graph is specially exploited by handheld devices. A publication on this topic has been accepted as a full paper for this year's ISMAR.

Likewise, the smartphones will feature pixel-flow and ARToolkitPlus marker tracking, as well as the visualization of a minimized set of the GIS data. This technique will allow for a more robust tracking beyond the boundaries of the markers.

2.1. Why my Grandma and the local AR expert would like to see this demo

The common interest that Grandmas and AR Researchers have is widely known: The opportunity to play with "cool gadgets" together with the simplicity of our AR setup, makes this demo worth watching for all kinds of public. Not only allowing them to see cutting edge technology but also to try it with their own hands.

Big crowds are guaranteed to be around the Vidente booth during all demo sessions, being unable to resist the magic of AR at their reach. It is our strong believe that a light-weight setup with no cables and no backpacks is the secret for practical AR applications outside research labs.
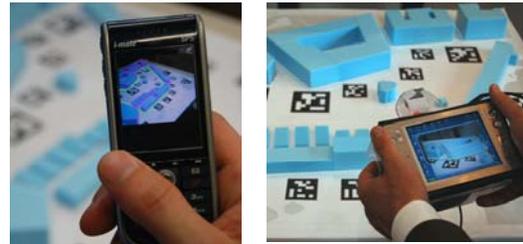

Figure 1: Windows Mobile smartphone and UMPC running Studierstube.

3. Technical Description

The demo consists of a physical scaled model of downtown Graz. Three UMPC devices running an AR application for visualization of subsurface features based on our Studierstube platform and three smartphones running our light-weight variant of Studierstube for embedded devices.

UMPC devices will also be loaded with Context Sensitive Magic Lenses. Smartphones will feature pixel-flow and ARToolkitPlus tracking.

All these devices run fully featured with no requirements for network connection. Every UMPC and Smartphone is completely independent of external servers, and allows self-dependent vision tracking.

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[1] http://www.sonystyle.com
[2] http://www.samsung.com
[3] http://www.studierstube.org
[4] http://www.studierstube.org/handheld_ar/
[5] http://www.gepower.com/