Authoring Augmented Reality: a code-free approach

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1 Abstract

We present an environment that enables non-programmers to quickly author interactive augmented reality projects without writing code or waiting to compile. Major changes to models, animation, behaviors and interactivity can be made while the application is running, and the results immediately seen on a HMD or screen. We do this by combining marker-tracking software with Touch Designer, a real-time 3D interactive modelling and animation program.

2 Introduction

Until recently, it has been impossible to make augmented reality without writing custom programs in C++ and libraries such as the AR-toolkit (Kato and Billinghurst 1999) and MXR[††] toolkit. For artists and designers, this has meant either being, or having access to, a programmer. Recently, CATOMIR[‡‡] from TU Vienna and DART (MacIntyre et al, 2003) from Georgia Tech provide 'drag and drop' approaches AR authoring. In both cases, models are typically built and animated in a 3D modelling package such as 3D studio Max, then imported into the augmented reality environment.

3 Touch Designer and DesignAR

DesignAR takes advantage of a commercial 3D modelling package, Touch Designer by Derivative.
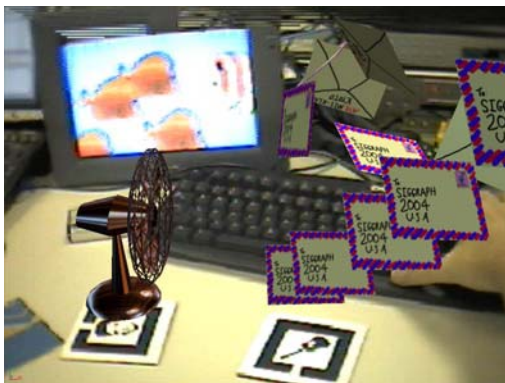

Figure 1 Wind from a fan blows envelopes in a particle system.

Touch's 3D modeller lets you manipulate points, edges and polygons with the mouse. However, Touch Designer also provides a procedural environment allowing live inputs to control just about any aspect of the geometry and animation in real-time. Inverse kinematics, keyframe and morph-target capabilities support the making of real-time interactive characters. Channel operations allow the quick development of live interactive behaviours according to the position of the markers or any other data visible to the system (including MIDI). Modelling with particles, noise, metaballs and other algorithmic modelling techniques are possible.

In our prototype, a program based on the MXR augmented reality libraries, tracks the positions and rotations of fiducial markers, and sends them to Touch Designer. This information is used to position computer-generated objects in relation to a virtual camera and render them with a video background. The user can see the camera video and the computer generated objects in the same field of view.

4 Results

Because the user can regularly check through the HMD and try the results of different behaviours and interactions, it appears faster to test ideas on the spot using this system than by more conventional methods. However, communication between the applications is still a little slow, creating an uncomfortable lag when using a head-mounted display.

5 Conclusions and Future Plans

As a proof-of-concept, DesignAR demonstrates one way of placing augmented reality in the hands of non-programmers. We believe that this kind of tool will eventually help make augmented reality into a true vehicle for human expression. It is our hope to develop this system into a product that can plug in to touch Designer and other 3D modelling software. We also want to extend the tracking ability of the program to include magnetic and other sensors for virtual, as well as augmented and mixed reality.[§§]

References

Kato, H., and Billinghurst, M. 1999. "Marker Tracking and HMD Calibration for a Video-based Augmented Reality Conferencing System", *Proc. of 2nd Int. Workshop on Augmented Reality*, pp.85-94

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