Chapter VII

Abstraction and Implementation Strategies for Augmented Reality Authoring

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Abstract

Augmented reality (AR) application development is still lacking advanced authoring tools—even the simple presentation of information, which should not require any programming, is not systematically addressed by development tools. Moreover, there is also a severe lack of agreed techniques or best practices for the structuring of AR content. In this chapter, we present APRIL, the augmented presentation and interaction language, an authoring platform for AR applications which provides concepts and techniques that are independent of specific applications or target hardware platforms, and should be suitable for raising the level of abstraction at which AR content creators can operate.
Introduction

While augmented reality (AR) technology is steadily maturing, application and content development for those systems still mostly takes place at source code level. Besides limiting developer productivity, this also prevents professionals from other domains such as writers, designers, or artists from taking an active role in the development of AR applications and presentations. Previous attempts to adapt authoring concepts from other domains such as virtual reality or multimedia have met with only partial success.

In order to develop authoring tools that genuinely support AR content creation, we have to look into some of the unique properties of the AR paradigm. We argue that a successful AR authoring solution must provide more than an attractive graphical user interface for an existing AR application framework. It must provide conceptual models and corresponding workflow tools, which are appropriate to the specific domain of AR.

In this chapter, we explore such models and tools and describe a working solution, the augmented presentation and interaction language (APRIL). In particular, we discuss aspects relating to real-world interfaces, hardware abstraction, and authoring workflow.

Requirements

The requirements for an appropriate AR authoring solution have been derived from our own experience in realizing AR applications, both by expert programmers and by our students, and from published work in this field that points out the need for authoring solutions (Na-vab, 2004; Regenbrecht, Baratoff, & Wilke, 2005). To illustrate these requirements and the proposed solutions in the context of this article, we will use a widely known example of an AR application scenario: construction assistance (Figure 1). This scenario is well suited to our analysis for a number of reasons. It is a widely known example with existing case stud-

Figure 1. The interactive furniture construction guide is an example for an application created with APRIL by undergraduate students; the construction process is modeled with a state engine, and possible parts for the next step are shown to the user

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