Authoring Tools for Interactive Mixed Reality

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Abstract

This short paper describes the basic ideas of the ATMIRE effort that is dedicated to the structured design of interactive mixed reality applications. The overall objective of ATMIRE is to define and implement a general framework for the structured design of next generation mixed reality (MR) applications that can be easily customized to domain specific requirements.

Keywords: Authoring, Mixed Reality Framework, Design Tools

1 Introduction

While technical advances in mixed reality are steadily increasing and have received significant attention, there is still a lack of design experience for mixed reality applications. The unavailability of dedicated tools prevents the seamless integration of interactive VR/MR components into current applications. In addition, authors are still required to possess a broad range of technical skills. This limits the efficiency of the design of such interactive environments. Most often the development of new applications requires an ad-hoc implementation that is realized from scratch contradicting reusability and cost-efficiency and diverting the author's creativity from content to the underlying technology.

In order to improve this situation and to support the easy and cost-efficient creation of sophisticated virtual worlds the objective of the ATMIRE effort is to develop **a framework for the structured** authoring of MR content applications. This framework consists of a user-centered design process and a corresponding toolset that easily allows the derivation of application specific authoring environments for arbitrary application scenarios.

The ATMIRE effort is a joint project of a number of European researchers who combine their recent efforts [1,2,3] to develop the proposed framework. Two very different application examples have been selected to serve as validation scenarios for the proposed framework. One is to build a prototype of a new tourism information service that allows historic places to be experienced as they were in the past and that provides interactive mixed reality illustrations about historical sites. The other is an extension of an existing VR safety training environment [2] in such a way, that it uses ATMIRE's components.

2 Conception

Future multimedia applications will more likely be accepted and enjoyed by end users if they combine radically new media forms like 3D, VR and mixed reality techniques. The combination of sophisticated models, complex object behavior and high level interactions in concert must conform to existing standards in usability to prevent user irritation and to give a life-like impression. State of the art tools for developing 3D and VR content are mainly proprietary approaches and presuppose detailed programming knowledge. ATMIRE will establish a new **workflow model** that allows assembling applications from a set of simple components.

The development of new mixed reality applications will be simplified by introducing **a component model and a component management unit** that allow an efficient communication between content elements. Complex behavior of the MR objects and user interactions can be realized by providing dedicated base elements that encapsulate I/O devices. Following a construction kit metaphor, base elements can be combined to application specific components using visual tools.

The development process established by the ATMIRE workflow model will be accompanied by a set of **visual tools** that directly support the design methodology and that adapt to the user and the application domain and not vice versa. The tools will rely on a component based approach. For instance, they will encapsulate different interaction metaphors in the form of components. These components can be inserted in an authoring tool framework and thus enable the flexible adaptation to authors with different skills and backgrounds.

The general ATMIRE framework (method, tools and base components) will be designed independently from an intended application domain. However, the efficient support of end users as authors requires adaptation to the user's needs. Using a construction kit approach in the whole framework it will be easy to derive **application specific frameworks** for different application domains. The authoring framework provides a pattern how to use, combine and integrate the components and will support different types of authors:

base component developers, authors who customize and derive domain specific frameworks and end user authors.

3 Objectives

The objectives of the ATMIRE project can be summarized in the following terms:

To develop a framework for the authoring of next generation mixed reality media forms that supports content creation by end users. The framework consists of a conceptual model / metaphor, a structured design method and a set of corresponding visual tools.

To define an iterative design approach that allows a user-centered development based on scenario analysis, rapid prototyping and evaluation. Using an actor oriented metaphor as the conceptual model and clearly defined process steps end users can follow this method step-by-step to design their NGM applications

Fig.1: ATMIRE Architecture

To adequately address the specific requirements of different application domains. ATMIRE allows the easy derivation of application specific frameworks consisting of dedicated visual tools and application specific base components that act as building blocks for end user authoring.

To design and implement a component model that allows the reuse of existing elements in different application contexts. A dedicated management unit will be developed that allows to handle components. Loading and unloading of elements will be provided even at run time and support for components developed by third parties will be given.
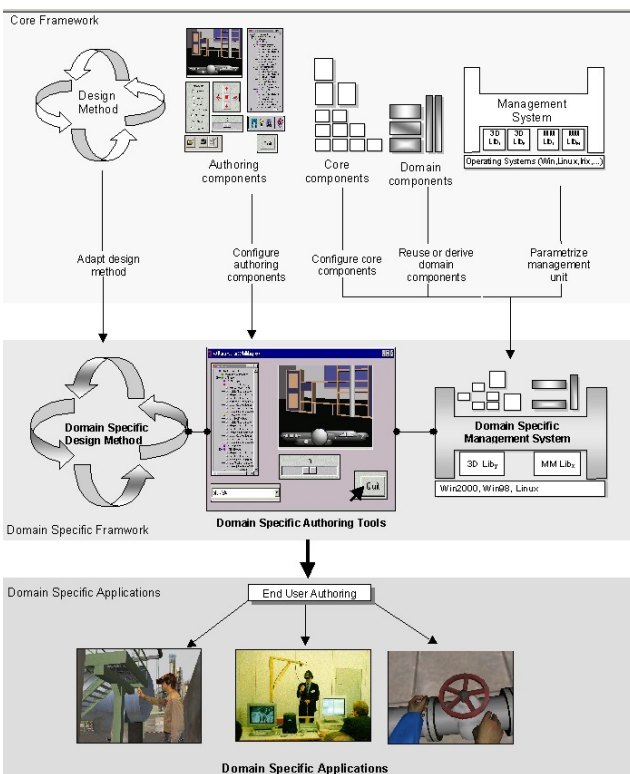
To provide a number of relevant high-level components that can be used in a wide range of application scenarios. Examples include sophisticated animation and interaction techniques, support for modeling and rendering and base elements for the design of user-friendly visual tools.

To provide a set of evaluation techniques that can be easily adapted to domain specific authoring frameworks and give authors qualitative and quantitative feedback on their created applications.

To develop a framework and generic components for creating and customizing visual authoring tools that support the ATMIRE content creation process.

4 References

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