MediaWeaver—A Distributed Media Authoring System for Networked Scholarly Workspaces

SHA XIN WEI

Sweet Hall 415, Stanford University, Stanford, CA 94305

xinwei@stanford.edu

Abstract. We describe MediaWeaver—a software framework for composing distributed media in the context of university research and instruction. Authors compose networked media, software tools and mediastreams, and can freely annotate media by media of any form using schema of their own design. Faculty and student authors compose distributed media using common Macintosh, World Wide Web and NeXTSTEP applications, supported by services from UNIX workstations.

The MediaWeaver system mediates between network multimedia services and interface kits with which novice programmers and non-programmers may easily create radically different interactive views into shared mediasbases. The network services include search engine abstractions, filters, relational modeling frameworks.

MediaWeaver has supported collaborative projects in history, drama, music, art, anthropology, environmental studies, and other fields since 1993. Applications range from traditional relational text databases and indexed HTML WWW sites to course readers, research archives, journals and seminar spaces.

Keywords: multimedia, distributed databases, humanities computing

1. Introduction

A major challenge facing designers of networked computing environments today is to fashion scholarly workspaces which are simultaneously coherent, easily reconfigurable, efficiently expressive—small gestures go a long way, and above all, worth using.

In this paper, we describe MediaWeaver, a system that has streamlined the composition of arbitrary renderable media, mediastreams and applications in diverse models and narrative structures. MediaWeaver is designed to support the construction of models of human systems which are both conceptually rich and data rich. It also mediates between coherent, customizable interfaces and an open set of network services, such as database engines, WWW servers, fulltext and image search engines [13], and media conversion facilities. And it is designed for open sets of media that will change over time.

Our context is humanities computing [12], which significantly stretches the envelope of networking technology, multimedia, intelligent search systems, and human-computer interface design. Software technology paradigms now run the gamut from verb-object tools (“set the color of the selected word to red”) to document processing, intersubjective computing and urban design [3]. We take a perspective situated somewhere between intersubjective computing and urban design. Our method has been to have designers and programmers work intimately with the faculty and student researcher/authors who use the evolving systems [6]. In fact, MediaWeaver was conceived in the beginning as a framework to accelerate our own multimedia designers’ work in creating rich complexes of media.
supported by relational data models. But it was natural to extend the role of the designer to include authors who were experts in fields outside computer engineering.

2. The problems

After about five years of making interactive multimedia applications, we took stock of our work process to see where the bottlenecks were, and also what were the greatest defects in the interactive titles produced for scholarly applications.

- Media were scattered all over the network. It was becoming hard to keep inventory using ad hoc databases.
- Researchers significantly changed their conceptual models over the course of a project, so that custom data structures had to be re-written.
- User interfaces had to be constantly re-designed in concert with graphics artists, programmers and researchers, using unpredictably varied media. New interface constructs such as help sprites and custom gestures which did not fit pre-fabricated window-menu-button widgets had to constantly invented.
- Finished titles were often locked into a videodisc or piece of software (e.g., Director or Supercard stack), and put out of reach of re-purposors.
- Finished titles had thin media content/hard content boundaries—users quickly hit the boundaries of what was recorded on a CD ROM or videodisc.
- Conceptual models were often too simplistic to be taken seriously by any but the most novice students. We wanted environments which could support research level work as well as introductory classes. (In general, software which was designed specifically for a given class or lesson was often too rigid or shallow.)
- Hypertext/media graph topologies were either navigable but too sparse to sustain a viewer’s interest, or rich but too dense to be comprehended. Hypertext links are fragile, difficult to author or manage, and hard to map.
- We could not easily support multi-author and multi-player discourse networks.

The MediaWeaver was designed to address all of these problems. Its various frameworks were designed to be used by faculty and student authors and by designers of multimedia simulations. It was designed explicitly to be usable by members of academic disciplines outside computer science and engineering. And it had to leverage tiny application programming resources.

We started with two prototype projects in 1993–1994: a history of Renaissance (Elizabethan) theater, and a study of high technology in the Silicon Valley. The first was chosen from a pool of faculty projects which required some management of art images and associate music or text on the network. The second presented the challenge of dealing with a significant, changing body of structured text in a complex, evolving research project. In addition, we wanted to lay the foundation for general relational modeling of human systems as such data became available in the course of the research. In both cases, we could not assume a fixed interface or conceptual model. Indeed, the only surety was change.