Chapter VI

An XML-Based Approach to Multimedia Engineering for Distance Learning

T. Arndt, Cleveland State University, USA

S. K. Chang, University of Pittsburgh, USA

A. Guercio, Kent State University, USA

P. Maresca, University of Naples Federico II, Italy

Abstract

Multimedia software engineering (MSE) is a new frontier for both software engineering (SE) and visual languages (VL). In fact, multimedia software engineering can be considered as the discipline for systematic specification, design, substitution, and verification of visual patterns. Visual languages contribute to MSE such concepts as: Visual notation for software specification, design, and verification flow charts, ER diagrams, Petri nets, UML visualization, visual programming languages, etc. Multimedia software engineering and software engineering are like two sides of the same coin.

On the one hand, we can apply software engineering principles to the design of multimedia systems. On the other hand, we can apply multimedia technologies to the software engineering practice. In this chapter, we concentrate on the first of these possibilities. One of the promising application areas for multimedia software engineering is distance learning. One aim of this chapter is to demonstrate how it is possible to design and to implement complex multimedia software systems for distance learning using a tele-action object transformer based on XML technology applying a component-based multimedia software engineering approach. The chapter shows a complete process of dataflow transformation that represents TAO in different ways (text, TAOML, etc.) and at different levels of abstraction. The transformation process is a reversible one. A component-based tool architecture is also discussed. We also show the first experiments conducted jointly using the TAOML_T tool. The use of an XML-based approach in the distance learning field has other advantages as well. It facilitates reuse of the teaching resources produced in preceding decades by universities, schools, research institutions, and companies by using metadata. The evolution of the technologies and methodologies underlying the Internet has provided the means to transport this material. On the other hand, standards for representing multimedia distance learning materials are currently evolving. Such standards are necessary in order to allow a representation which is independent of hardware and software platforms so that this material can be examined, for example, in a Web browser or so that it may be reused in whole or in part in other chapters of a book or sections of a course distinct from that for which it was originally developed. Initial experiments in reuse of distance learning carried out at the University of Naples, Kent State University, and Cleveland State University are described. The authors have also developed a collaboration environment through which the resources can be visualized and exchanged.

Introduction:
Multimedia Software Engineering

For many years, the need to represent data in a portable format has grown in the industrial and in the academic community. In the past, data was kept in a format that couldn't be read by a different computer and the applications couldn't be run under different operating systems or on other hardware platforms. Today, with the spread of computer networks, it is necessary to support portability and interoperability so that data can flow through many networks in a way transparent to the user.

28 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/xml-based-approach-multimedia-engineering/18748

Related Content

Future Directions of Multimedia Technologies in E-Learning
Timothy K. Shih, Qing Liand Jason C. Hung (2008). *Online and Distance Learning: Concepts, Methodologies, Tools, and Applications (pp. 3500-3507).*
www.irma-international.org/chapter/future-directions-multimedia-technologies-learning/27652

The Influence of Clickers Use on Metacognition and Learning Outcomes in College English Classroom
Yu Zhonggenand Chang Liu (2014). *International Journal of Information and Communication Technology Education (pp. 50-61).*
www.irma-international.org/article/the-influence-of-clickers-use-on-metacognition-and-learning-outcomes-in-college-english-classroom/110369

Universal Design of Distance and Online Learning
Sheryl Burgstahler (2009). *Encyclopedia of Distance Learning, Second Edition (pp. 2195-2201).*
www.irma-international.org/chapter/universal-design-distance-online-learning/12052

The Dragon in the School's Backyard: A Review of Literature on the Uses of Technology in Urban Schools
Terry Kidd (2009). *International Journal of Information and Communication Technology Education (pp. 88-102).*
www.irma-international.org/article/dragon-school-backyard/2368

Project Management in Student Information Technology Projects
Maria Delia Rojas, Tanya McGilland Arnold Depickere (2008). *Adapting Information and Communication Technologies for Effective Education (pp. 190-204).*
www.irma-international.org/chapter/project-management-student-information-technology/4206