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Development of Streaming Contents Generation System for Rapid e-Learning

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Abstract: A streaming contents generation system for rapid e-Learning has been developed. PowerPoint with narration is converted to e-Learning contents, which is then published through a Web system, allowing researchers not familiar with information technology to easily create e-Learning contents. This system, called the Kumamoto Universal and Multipurpose Authoring system (KUMA), is useful for propagating rapid e-Learning.

Keywords: Authoring system, Rapid e-Learning, Streaming Technology, PowerPoint, Higher Education

1. Introduction

The development of Course Management System (CMS) [1] and authoring software [2-3] as well as the standardization of e-Learning contents [4] have driven e-Learning in higher education. However, the lack of professional staff to create e-Learning contents and maintain systems remains a problem. Creation of educational contents is a significant problem for researchers who are not familiar with information technology, particularly when teaching materials include narration and text which to date have required much time and technical skill [5]. In order to create effective e-Learning contents, many authoring software has been developed by researchers and vendors. Such authoring software makes possible creation of dynamic e-Learning contents, including multimedia. However, many researchers remain reluctant to create e-Learning contents due to the complexity of the authoring software. Rapid e-Learning has grown as an attractive method to diffuse e-Learning in higher education [6]. The purpose of rapid e-Learning is to perform quickly a series of executions from e-learning contents creation to distribution. With rapid e-Learning, a researcher is easily able to create e-Learning contents using the Kumamoto Universal and Multipurpose Authoring (KUMA) system. Our meaning of "rapid" is that whole time for making e-learning contents is evidently quick and easy way.
In this paper, a streaming contents generation system with which anyone can easily create e-Learning contents is introduced. This system, called the KUMA system, not only allows creation of e-Learning contents from PowerPoint with narration but also publishes e-Learning contents without the need for any other software, thus reducing researchers' burden. The KUMA system is expected to contribute to the further diffusion of e-Learning in higher education.

2. System Configuration

Figure 1 shows a conception diagram including the KUMA system configuration. The KUMA system consists of three servers: a Web application server on Cent OS 5.4; the KUMA server on Windows Server 2008; and a Windows Media service on Windows Server 2008. The Web application server acts as an interface between the KUMA system and users. One function is for searching and managing e-Learning contents via the interface window MYPAGE; the other is for students to access e-Learning contents via the Web application server. The KUMA server converts PowerPoint with narration to streaming contents automatically. The Windows Media Server delivers e-Learning contents generated by the KUMA server. There are similar systems developed. The authorSTREAM is one of convert system which can convert a PowerPoint with narration into Windows Media Video at the server side. However users have to install some software related to this system [7].

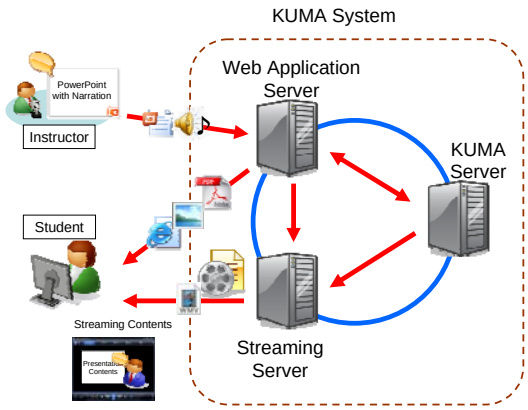

Figure 1. The KUMA system configuration

2.1 Web Application Server

The Web application server provides several services, including a registration and login function as well as MYPAGE for researchers and a delivery of e-Learning contents to students. In order to create e-Learning contents, a researcher the first registers via the Web application server in order to create a MYPAGE. After login to MYPAGE, a researcher can upload prepared educational materials including PowerPoint with narration, which is converted to streaming contents by the KUMA server as shown in figure 2. The compatibility with PowerPoint is crucial as more than 80 percent of higher education institutions use this presentation tool in order to create educational materials.

2.2 KUMA Server

The KUMA server is configured by Windows Server 2008 Standard edition as an operating system. Microsoft PowerPoint 2007 and Windows Media Encoder 9 run in the background and are controlled by the management program as the kernel of KUMA. The KUMA server plays a key role in the KUMA system as it converts PowerPoint with narration to Windows Media Video (WMV). Figure 2 shows the entire process of converting PowerPoint with narration to streaming contents.

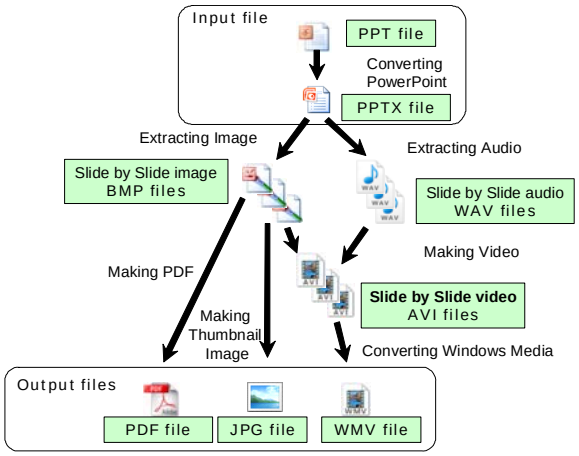

Figure 2. Flow chart of file conversion

2.3 Windows Media Streaming Server

Windows Media Service with the Microsoft Media Services (MMS) protocol is configured by Windows Server 2008 Standard edition as an operating system. E-Learning contents can be accessed via Windows Media Video Redirector (WVX), describing the location of the WMV using Windows Media Player. Windows Media Service delivers e-Learning contents at a bit rate suitable to the user's bandwidth. Two advantages of a typical streaming server are as follows: 1) protection of e-Learning contents is achieved by the Windows Media Service with MMS protocol; 2) Windows Media Player can stream the media without downloading.

3. Application of The KUMA System

The KUMA system has been applied to a series of streaming video lectures called "Streaming Book on Pulsed Power Engineering," produced by eminent researchers in the field of pulsed power engineering. The figure 3 shows the example of an application of KUMA system The "Streaming Book" is accessible over the Internet and thus can be used anytime and anyplace. The aim of this Website is to deepen understanding of pulsed power engineering by graduate students and young researchers. And this site opened to the world can become a good opportunity which makes a relation with a superior researcher and a student.

Figure 3. Web pages of Streaming Book

4. Conclusion

A streaming contents generation system for rapid e-Learning has been developed. PowerPoint with narration is converted to e-Learning contents, which is then published through a Web system. Researchers not familiar with information technology can easily create e-Learning contents. This system, called the Kumamoto Universal and Multipurpose Authoring system (KUMA), is useful for the diffusion of rapid e-Learning.

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