Multimedia Based Distance Education Through the Internet

Abhay Bakshi
and
Biswajit Das,
West Virginia University

Abstract

The emergence of the World Wide Web together with the availability of high performance computing and communication systems provide opportunities to extend the transformation of conventional classroom teaching into a more distributed learning environment. The technology that is most suitable for such distributed teaching and learning is Multimedia/hypermedia. Interactive multimedia which combines the strengths of computer graphics, animation, hypertext, digital video and audio provides a superior self-paced learning environment. An important requirement for on-line engineering education is the availability of continuous interactive dialog with students and the capability of interacting with on-line experiments that provide immediate feedback. Although such capabilities can be easily provided on the Internet for synchronous text discussions using Internet Relay Chat (IRC) or similar methods, synchronous sharing of non-text information such as video, audio and animated graphics may introduce unacceptable delays due to bandwidth limitations. As an example, graphics of an uncompressed 640 X 480 (VGA) image with 24 bits per pixel (922 KB) takes about 4 minutes over a 28.8 kbps modem line to download which is unacceptable for real time interaction. Thus, for Internet based distance education involving Multimedia, this bandwidth limitation need to be addressed. In this project, we have developed a novel methodology for efficient real-time transmission of multimedia material through the Internet. The technique utilizes transmission of low bandwidth signals through the Internet for activation of programs at remote locations. The technique allows real time bi-directional communication involving video, audio and graphics. As a demonstration of this method, we have developed the interface software for efficient transmission of Authorware applications through the Internet. The technique in details as well as a demonstration of the working model will be presented.