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The ShanghAI Lectures: Connecting Continents in Cyberspace

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Abstract

The ShanghAI Lectures project contributes to the fundamental goal of making education and knowledge accessible to a broad interdisciplinary and intercultural audience. Deploying state-of-the-art videoconferencing technology and three-dimensional virtual environments, the project enables students and researchers from all around the globe to learn and work together.

Keywords: Global Education; Virtual Worlds; Collaborative Environments; Videoconferencing

1. Introduction

Every fall semester, the Artificial Intelligence Laboratory of the University of Zurich offers an introductory lecture series on the topic of "Embodied Natural and Artificial Intelligence" [1,2]. Since 2009 these weekly lectures have been held via *videoconference*, connecting roughly a dozen universities worldwide. Under the name "ShanghAI Lectures" (because the first series of these videoconference lectures were held from Jiao Tong University in Shanghai, China) this project enhances the lectures with a *community website and a three-dimensional collaborative virtual environment*, where students meet as avatars (virtual embodied representations of themselves) to solve exercises together.

2. Videoconference Lectures

Bringing together students and researchers with very diverse backgrounds was one of the main goals of the project. Therefore, the lectures were designed for a broad interdisciplinary audience. By broadcasting the lectures via videoconference, a number of universities could participate interactively, instead of just watching a prerecorded talk without any possibility to asking questions or providing input for discussion.

Every lecture was recorded and then published on the website (see section 3) for later viewing. There were in fact some further universities that were not able to join the live videoconference due to their time zone, so their students just watched the recorded lectures and then participated in the exercises.

2.1. Lecture Technology

We used the H.323 videoconferencing standard, a collection of protocols for transmitting audio and video, as the necessary equipment was readily available at the participating sites. To make the slides available to all sites in parallel to

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the videoconference, a screen sharing software was used (Adobe Connect). Using the SWITCHcast system, the lectures were recorded and published online. All three services, H.323, Adobe Connect, and SWITCHcast, were provided by SWITCH, the Swiss Education and Research Network (http://switch.ch).

3. Community Website

In order to support the participating students and lecturers, a dedicated website was set up (http://shanghailectures.org), which provided access to materials related to the lectures, such as the recorded talks, exercises, slides and additional reading materials (scientific papers, URLs to other pages of interest, videos, etc.), as well as some community-building features (forums, personal profile pages).

3.1. Guest Talk Repository

The actual classes were enriched with guest presentations by lecturers from the participating universities and "external" speakers, which were also recorded and added to the website, forming a publicly available repository of high-profile speakers in the area of Embodied Artificial Intelligence.

3.2. Website Technology

We used the popular open source Content Management System "Joomla" with special extensions for community building.

4. Collaborative Environment

The novel component in the ShanghAI Lectures is a three-dimensional collaborative virtual environment (3-D CVE), a virtual world that is used as a platform for the students to work together on exercises and to participate in the so-called "Discussion Sessions."

In the exercises, groups of students had to solve assignments by manipulating 3-D models and using applications (whiteboards, PDF viewers, movie players, word processors, etc.) together. Complementing the lectures and exercises, the Discussion Sessions provided a possibility for students' avatars to discuss topics directly with the lecturer avatar. There were even two guest presentations held in the virtual environment.

Unlike participants in a videoconference, avatars in a 3-D CVE have more interaction possibilities. For example, the abilities to move and interact in the virtual world (e.g., walk to another room for a private discussion, or manipulate a 3-D object of a robot to explain some mechanical properties) can be used as additional, nonverbal communication channels that enhance teaching and learning [3]. Voice and text chat are of course also possible in the 3-D CVE.

4.1. 3-D CVE Technology

As underlying technology we used the open source framework "Open Wonderland" (OWL; http://openwonderland.org), which is written in the Java programming language. Originally an internal project at Sun Microsystems to provide virtual meeting spaces to its employees, OWL became a popular option for educators after it was made available as an open source project. As such, it has some major advantages over commercial solutions such as "Second Life" because OWL functionality can be changed/extended to fit very specific needs.

Unlike competing platforms, OWL allows X11 based (graphical) applications to be run within the 3-D environment, enabling avatars to collaborate using office suites, web browsers, or any other program. Another important aspect of OWL is that we do not depend on a company and therefore have full control over the server installations and can be sure log files and user data are not used for commercial interests.

Having access to the log files was also a prerequisite for the large-scale international field study on avatar behavior that was conducted during the ShanghAI Lectures. More details about this study are to be found in the "Final Report," (http://shanghailectures.org/project-report-2009).

5. Results

The ShanghAI Lectures were very well received in general, as many universities were able to participate in a lecture series they would not be able to offer otherwise, and students could broaden their horizons both on an academic as well as personal level by interacting with scholars from around the globe. In total, 421 students (bachelor, master, PhD) from 48 universities signed up on the website, over 250 students participated actively in the group exercises each year. Participants came from six continents: Asia, Africa, North and South America, Europe, and Australia.

Despite some technical issues, we believe virtual environments eventually *will* have their place in global education and collaboration because they offer interesting new teaching/learning techniques (e.g., manipulation of 3-D objects) and create a *sense of presence* among the participants that could not otherwise be established with traditional "2-D media".

We hope that as the underlying technologies evolve, the combination of videoconferencing, community website, and 3-D CVE sees its application also for other educational content in the years to come.

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