The ShanghAI Lectures: Using Virtual Worlds for Intercultural Student Collaboration

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ABSTRACT

The demonstration will take place in the context of "The ShanghAI Lectures"[1], a global mixed-reality educational experiment that has three main goals: (1) Building a sustainable, global community and knowledge source in "Embodied Intelligence", a topic area of interest for an audience with widely varying backgrounds, (2) testing and refining state-of-the-art technology to enable and promote this process, and (3) piloting a platform for cutting edge research in all areas of technology-enhanced learning. These lectures are planned to be broadcast by videoconference from Jiao Tong University in Shanghai to universities on each continent. To support community formation, these institutions will join interactive videoconference sessions on a regular basis. In addition, virtual spaces will be provided to promote interaction and cooperation among participants. The communication and collaboration features of the 3D virtual environment will be demonstrated at the IWIC conference, and first experiences from a pilot study in fall 2008 at the University of Zurich will be reported.

Keywords
Global teaching, virtual worlds, intercultural collaboration

RATIONALE

At the Artificial Intelligence Lab at the University of Zurich, we have started working on a global virtual lecture series on embodied intelligence and biologically inspired robotics, exploring innovative technologies for teaching, cross-cultural collaboration, and community building. By using novel communication and information technologies, we intend to overcome the complexity of a multicultural and multidisciplinary learning context in higher education.

We aim for ten lectures which will be distributed to the participating universities via videoconference and live webcast. In parallel, there will be collaboration workshops in a dedicated virtual world setup where students from these universities work on projects. We will use Sun Microsystems' "Project Wonderland" toolkit[2] as a basis to create the collaborative 3D environment in which participants are represented as avatars. The reason for integrating virtual 3D spaces is to create a sense of social presence and a feeling of "being there" [2, 4] independently of spatial or temporal constraints for the globally distributed participants, as well as to facilitate communication and collaboration among them.

Collaboration in Wonderland: Virtual Meeting Rooms with Application Sharing Facilities.[3]

The reason for choosing Jiao Tong University in Shanghai as the host institution of the experiment is that the Chinese translation of the book "How the Body Shapes the Way We Think – a New View of Intelligence" by Rolf Pfeifer and Josh Bongard [3], which will provide the basis for the lecture series, is scheduled to appear in Spring 2009. Embodied intelligence is a topic of wide interest: First, intelligence concerns everyone. Second, embodied intelligence often leads to surprising insights (for example, how little "brain power" is required for walking, or that robots can clean up without "knowing" that they are doing so). And third, it has implications not only for science and technology (in particular robotics, artificial intelligence, behavioral science, neuroscience), but also for society at large. It will also change the way we view ourselves and the world around us. Finally, the AI Lab has much experience in establishing and using international scientific networks.

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1   http://shanghailectures.org

2   https://lg3d-wonderland.dev.java.net/

3   Retrieved from:
http://research.sun.com/projects/mc/images /mpk20-kap-office-entry.png

For example, five years ago we ran the "AI Lectures from Tokyo" where seven universities from Japan, China, Saudi Arabia, Poland, Germany, and Switzerland were connected via interactive videoconference for the duration of an entire semester[4]. As the technology has significantly advanced in the meantime, it seems realistic to expand this concept with a virtual-reality component[5], so that more universities and students can be incorporated.
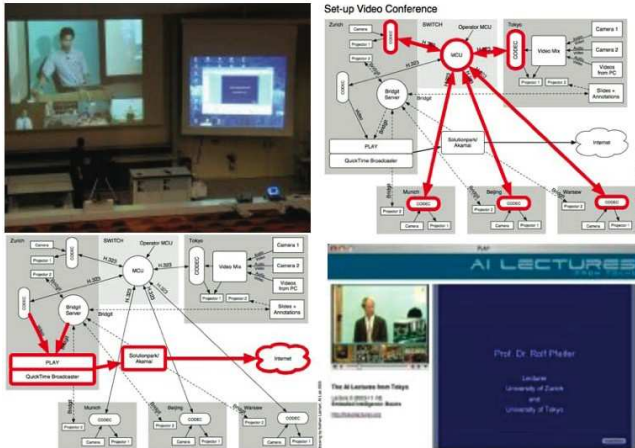
Videoconference and Webcast System in the "AI Lectures from Tokyo" in 2003/04.

In this manner, the proposed project, "The ShanghAI Lectures", has the following general goals:

_ Promoting the ideas of embodied intelligence research to a world-wide audience.

_ Employing novel educational technologies for global and multicultural educational purposes, and exploring the use of existing technologies in new ways.

_ Establishing a sustainable web-based knowledge network on embodied intelligence with a multidisciplinary community.

_ Using this technological/educational setting as a platform for research in the fields of knowledge management, intercultural collaboration, computer-supported collaborative learning, and others.

EDUCATIONAL GOALS

Students will be immersed in a multicultural and multidisciplinary educational environment. By participating in different activities, such as expert meetings, lecture reviewing, and project-based team work, they will be encouraged to share and develop their ideas by interacting with other students, experts, and teachers. The novel virtual worlds technology will provide the context for this

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4 http://tokyolectures.org

5 cf. the MiRTLE Project: http://chimera69.essex.ac.uk/
   User:Gardnemr/Mixed_Reality_Teaching_and_Learnin
   g_Environment

collaborative educational environment. In this context, teachers and students become members of a global learning community with no physical or temporal classroom limitations, while students take over an active role. Thus, we are triggering not only the knowledge acquisition process but also invoking situations where students need to develop communicative and reflective skills that enable them to build a mutual understanding among the community members (i.e. socially built meanings or conceptual artifacts [1]).

In terms of educational goals, the outlined project focuses on three distinct objectives:

_ Creating a platform for the development of reflective thinking, and for exchanging ideas among members of the multidisciplinary community in order to promote networking and to foster innovation.

_ Supporting the development of intercultural communication competencies to prepare students for an international work environment.

_ Creating conditions for collaboration among teachers in a global learning community in order to face the complexity of an intercultural educational context.

Experiencing the various settings of this virtual environment, the participants will, on the one hand, learn about embodied intelligence. By attending lectures, students learn the conceptual basis which provides them with the framework for the development of their projects. Furthermore, they interact with experts and scientists from the area, and thus become acquainted with the state of the art and latest implementations in the field. And on the other hand, they will develop communication and teamwork skills that will enable them to interact in a multicultural and multidisciplinary world.

MOTIVATION FOR USING VIRTUAL WORLDS AS COLLABORATION TOOLS

Working in globally distributed teams presents some issues which Sun Microsystems' "Project Wonderland" attempts to overcome. The virtual worlds created with the Wonderland toolkit not only offer participants (i.e. students, teachers, and experts) the possibility to meet and communicate in virtual rooms but also to interact and collaborate by using personal representations (3D avatars) and shared applications. Communication and collaboration facilities offered by Wonderland tools include immersive audio conversation, mixed-reality communication and in-world application sharing which will play an important role in "The ShanghAI Lectures". The use of an open-source environment gives us the opportunity to develop new features which allow us to examine new options for social interaction and knowledge management. The existing Wonderland communication and collaboration tools will be adapted to support the educational goals. Some of the following potential use cases will be presented at the IWIC workshop.

Virtual meeting rooms
Wonderland provides facilities to create different virtual rooms for group meetings during project-based student work. Additionally, in these virtual rooms, sessions before and after the lectures will be held where the students can meet experts. The times the experts are available will be scheduled such that eventually all participants - regardless of their time zone - can participate at some point. We will also provide a space for collaboration among teachers for exchanging ideas on how to adapt the educational activities to the different participating cultures.

Virtual presentations and guest lectures
By using mixed reality settings combining video streaming and virtual worlds we attempt to carry out educational real-time events such as student presentations and guest lectures. We intend to enable students from different countries to not only attend the lectures but also to actively participate, for example, by presenting their projects to other students around the world.

In-world application sharing
In-world application sharing allows participants to share the same applications for the development of an activity (for example, text processor, presentation or spreadsheet programs). These tools enable students to create a mutual understanding by graphically depicting their ideas. Students from different countries can work together in their projects directly within the virtual world.

Annotated lectures
An extended application sharing function uses screens in a virtual room where recorded videos of the lectures can be re-viewed, with a menu containing a table of contents of all the lectures. Avatars standing in front of the lecture screen may choose a lecture and view it using "stop" and "play" buttons. Next to the lecture screen, there is a separate screen, where they can make annotations or note questions when they stop the video. The screens will be coupled such that when the lecturer reviews the lectures, the annotations are associated to the particular position in the lecture. In order to get collected annotations to a particular sequence of the lecture, the lectures have to be divided into semantic segments. In addition, we will also record the students'

text- or speech-based discussions (as avatars) at the very specific point in the lectures.

HOW THE TOOL WILL BE DEMONSTRATED AT THE WORKSHOP
We will demonstrate the current state of the technological development of the virtual world communication and collaboration facilities. In fall 2008 we will carry out a pilot study involving a small sample of participants. The purpose of this pilot study is to test both technological and educational settings in order to analyze the strengths and weaknesses of the virtual environment.

Screen recorded examples of in-world user interaction and initial findings of the pilot study will be available at IWIC in February 2009. The examples will be shown as short movies, and the presenter will point out potentials and challenges the in-world communication and collaboration facilities provide. Besides usability aspects, such as user acceptance and reported experiences, evaluation data will detail challenges faced in cross-cultural collaborative activities and environments, and suggest future steps.

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