Synchronizing Group Interactions with Lecturing Video in Agent-based Asynchronous Virtual Classroom

Hiroaki Ogata, Kenji Matsuura, Yoneo Yano

Faculty of Engineering, Tokushima University
2-1, Minamijosanjima, Tokushima, 770-8506, Japan
Email: ogata@is.tokushima-u.ac.jp
URL: http://cscl.is.tokushima-u.ac.jp/ogata

ABSTRACT

This paper tackles to develop and evaluate the asynchronous virtual classroom, called AVC, which enables learners to participate in at anytime and from anywhere. Its environment provides on-demand multimedia learning-materials, e.g. videos of the lecture, slides and web pages. To utilize the two types of learning resources, on-demand materials and asynchronous interactions, the system synchronizes links and reproduces them toward efficient learning. To realize that, a software agent participates to the classroom behalf of a real learner and replays the past interactions along with the video. Besides this, we propose the model that a software agent recommends the suitable interactions for the current learner according to his/her interest.

Keywords

Asynchronous virtual classroom, Video on demand, Collaborative annotation, and Software agent.

INTRODUCTION

We have proposed the system, called AVC (Asynchronous Virtual Classroom), which allows learners to use at anytime and anywhere (Matsuura et al., 1999; 2000). The system provides multimedia learning materials, e.g., video of the lecture, slides, and text-based communication tools such as a bulletin board system. The basic idea is that the AVC system enables learners to share the past interactions about the leaning material, and reuses them appropriately for the later participants. To utilize the past action logs (question, answer, and annotation) that were stored in the same classroom, the system employs a software agent, which simulates the past interactions as an animation. In the reproduction, each statement appears on a series of relative time in the virtual classroom. The past activities have to be synchronized with the learning material. As is often case with an asynchronous system, it is easily figured out that the difficult situation to communicate with others (e.g., unless anyone asks another person, none exists at the same time) will occur among asynchronous participants (Ogata et al, 1996; 2000). Therefore, the system bridges asynchronous participants by notifying others' activities in her/his absence at the same classroom and by reproducing their activities in order of the relative timestamp when s/he joins the same classroom again.

Through the past experimental use, we found a critical problem to be solved that the subsequent learners often felt stress to read past discussions with a video. This problem was caused in a case that many topics were included in one discussion room and some contexts appeared at random based on absolute timestamp. However, this was originated from the framework itself essentially. The most characteristic point of the AVC system is to synchronize the past interactions with on-demand learning materials. In other words, the system must update the contents of the past interactions on the video's time-line. Nevertheless, both of them have their own time span. Hence, this paper proposes the new idea to solve this problem, which is the adaptive support for synchronizing interactions with on-demand video-based learning materials in an asynchronous virtual classroom.

Figure 1 shows an example of AVC interface. A learner can watch on the video in frame (A), where the learner can control the video, e.g., jumping to a video section. Frame (B) shows slides or web pages of the lecture with the video synchronized. The learner can annotate on them. Frame (C) and frame (D) shows a 3D virtual classroom. The learner can walk around in the virtual space. Frame (E) shows the animated reproduction of the asynchronous dialogues among learners along with the video time line. The system sorts out the discussions based on her/his curiosity. In this frame, the picture of each user is shown in the left side and his/her statement is shown in the left side. A learner can add the statement by clicking one of the statements in (E). Moreover, the leaner can enter the statement in frame (F) after stopping the video and selecting the type of his/her agent's face and its behavior and the type of statements. In this way, the asynchronous dialogues can augment.

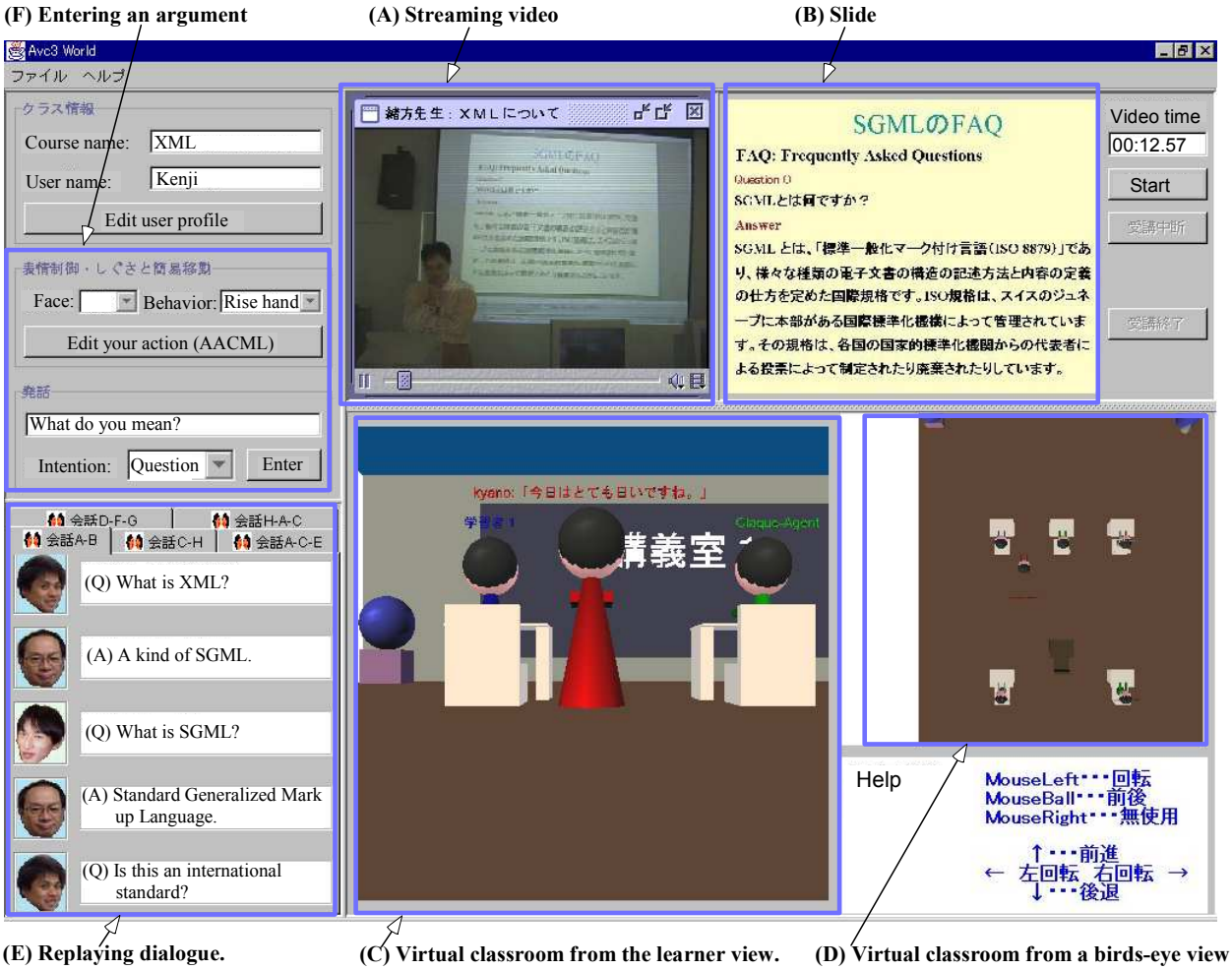

Figure 1: A screen snapshot of AVC.

CONCLUDING REMARKS

This paper introduces the interface agent to act for real learners in a same classroom. This agent reproduces the past interactions to the current learner on behalf of the absentees. These reproduced dialogues are sorted based on the priority of each learner's curiosity and filtered by the time span of section of the video. This work was partly supported by the grant to the research project at Doshisha University named "Intelligent Information Science and It's Applications to Problem Solving in Engineering Fields", and the Grant-in-Aid for Scientific Research No.13780121, No.12558011, and No.11878032 from the Ministry of Education, Science, Sports and Culture, Japan, from the Ministry of Education.

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