

# Development of an Electronic Conferencing System with Collaboration Processes Replay Function and Annotation Function for Intercultural Collaboration

Takashi Yoshino Tomohiro Shigenobu Fujii Kunikazu Jun Munemori

*Faculty of Systems Engineering, Wakayama University*

{yoshino, s020055, s075065, munemori}@sys.wakayama-u.ac.jp

## Abstract

*Numerous studies have indicated that electronic conferencing systems are superior in many cases to conventional, oral meetings. However, most studies have been based on groups using English. Although English is used in many countries around the world, most people prefer to use their native language when communicating. Moreover, most people cannot think in English and want to discuss issues in their first language. Accordingly, the authors have developed an electronic conferencing system with a collaboration replay function and an annotation function for intercultural collaboration. All participants can use their own languages in a text-based chat. All the texts of the system are translated into the other languages by machine translation. For close communication among users, the system has an annotation function and a replay function. Participants can add annotations to the contents in a shared workspace. This system has the function to replay the process of work on the workspace, as well as audio and video communication.*

## 1. Introduction

As of 2003, the Asian Internet population surpassed that of the US and Europe. A wide range of people can use the network for various purposes. However, language differences exist as a barrier to information exchange. Generally, information in nonnative languages makes sufficient understanding difficult.

Global collaboration is ongoing in English speaking countries. The European Union encourages

Europe-wide projects. However, serious language barriers exist in Asian countries. This is because neighboring languages are not taught in Asia. Asian people cannot think in English and want to make interim documents in their first languages. Some collaboration studies have been conducted in other countries [1]-[3].

The authors have developed an Intercultural Collaboration System with a Semantic Information Share Function. This system is a multilingual video conferencing system. This system consists of three functions: Spark2 for shared workspace, AnnoChat for chat communication tool and TalkGear2 for audio and video communication tool. This system has a semantic information share function and a translation function. Intercultural Collaboration System with Semantic Information Share Function

## 2. Design Policy

The following are the design policies of our electronic conferencing system for intercultural collaboration.

### (1) Replay function

The authors believe that operation processes show a part of thinking processes. That is, operation processes can help to realize a certain collaboration result. In addition, an audio and video record is effective for participants who are absent from electronic meetings. These functions are also effective for time-zone differences.

### (2) Annotation adding function

One word often has two or more meanings in normal languages. This may cause misunderstandings among speakers of different languages, and speakers

of other languages may be incomprehensible. Even if users share the same language, they are often required to add various explanations.

(3) Machine translation function

Machine translation has improved rapidly, and there are now a multitude of machine translation services on the Internet. Machine translation can be used as a Web service. In this system all the input texts are translated into other languages by machine translation.

(4) Shared workspace tool

A PC contains abundant content, such as text files, image files, movie files, voice or sound files, and document files (PowerPoint files, MS Word files and MS Excel files). The authors believe that sharing those files is useful during actual collaboration. For example, a picture often provides a better explanation than using a large number of words.

### 3. Electronic conferencing system for intercultural collaboration

The electronic conferencing system for intercultural collaboration consists of three functions:

Spark2 for a shared workspace tool, AnnoChat for a chat communication tool, and TalkGear2 for an audio and video communication tool. The authors have developed the tools for the Intercultural Collaboration System.

#### 3.1 Spark2: Shared workspace tool

Spark2 is a shared workspace tool. Figure 1 shows a screenshot of Spark2. Texts, Images, and files on PC may be arranged freely on the workspace. Those objects can be grouped and arranged hierarchically. PowerPoint files and Movie files can be seen on a screen. Text data can be translated into Chinese, Korean, Japanese, and English by Machine Translation. Figure 2 shows an example of translated texts. Text is translated automatically by background processing. Machine translation is translated with the translation server through the Internet. For instance, a sentence that a Japanese user inputs in Japanese is displayed in Chinese on the Chinese user's screen. When a Chinese user inputs a Chinese sentence, the Japanese user looks at the text translated into Japanese. The tool always keeps the text data of

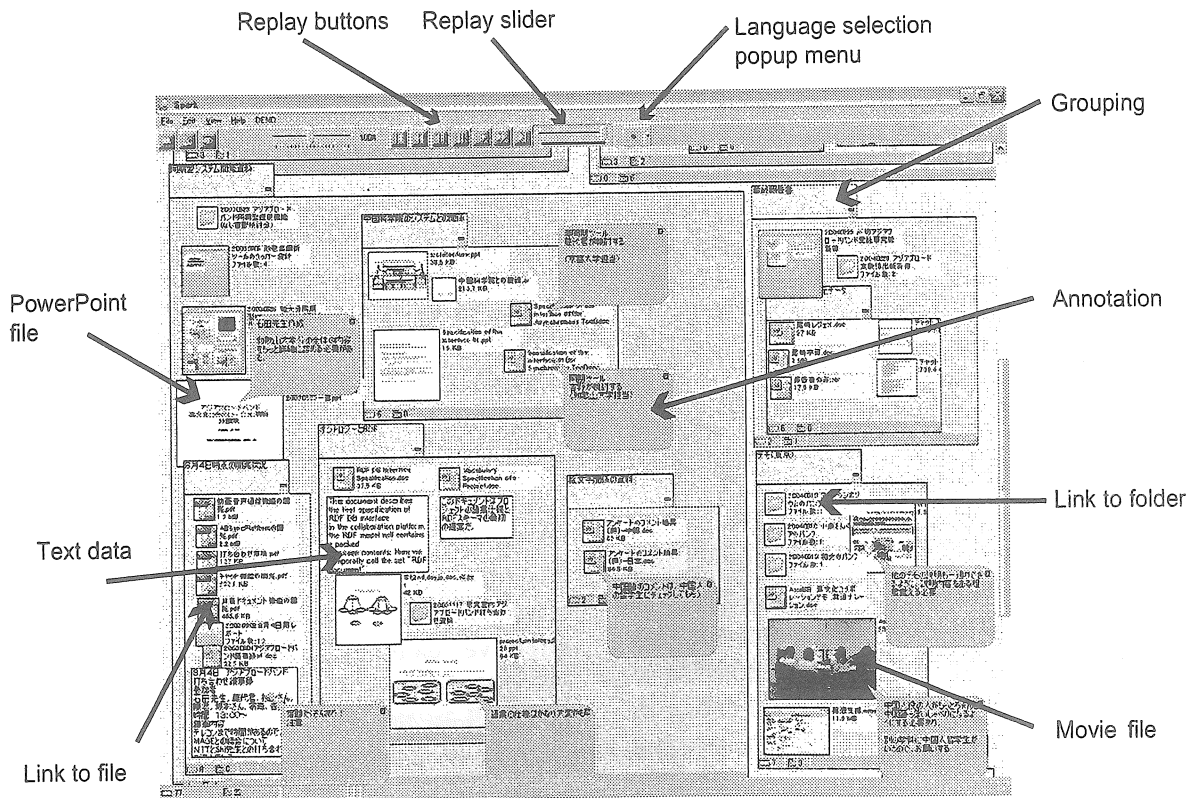


Figure 1. Screenshot of Spark2  
Spark2 is a shared workspace tool.

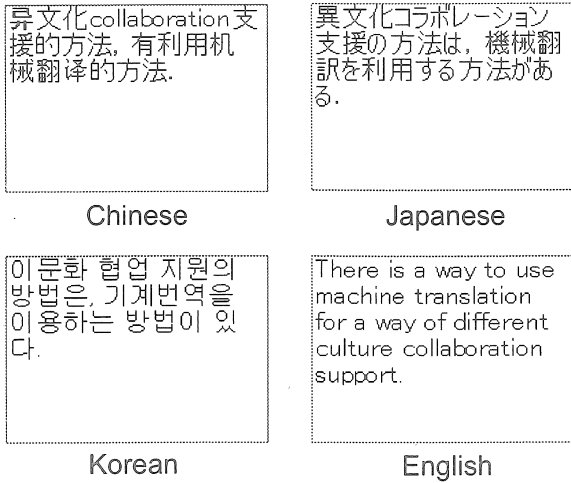


Figure 2 Translated texts.

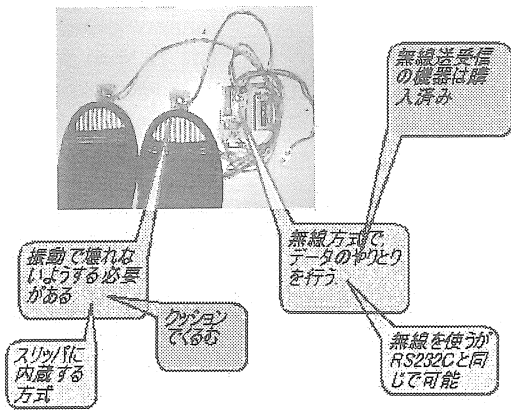


Figure 3 Hierarchized annotations.

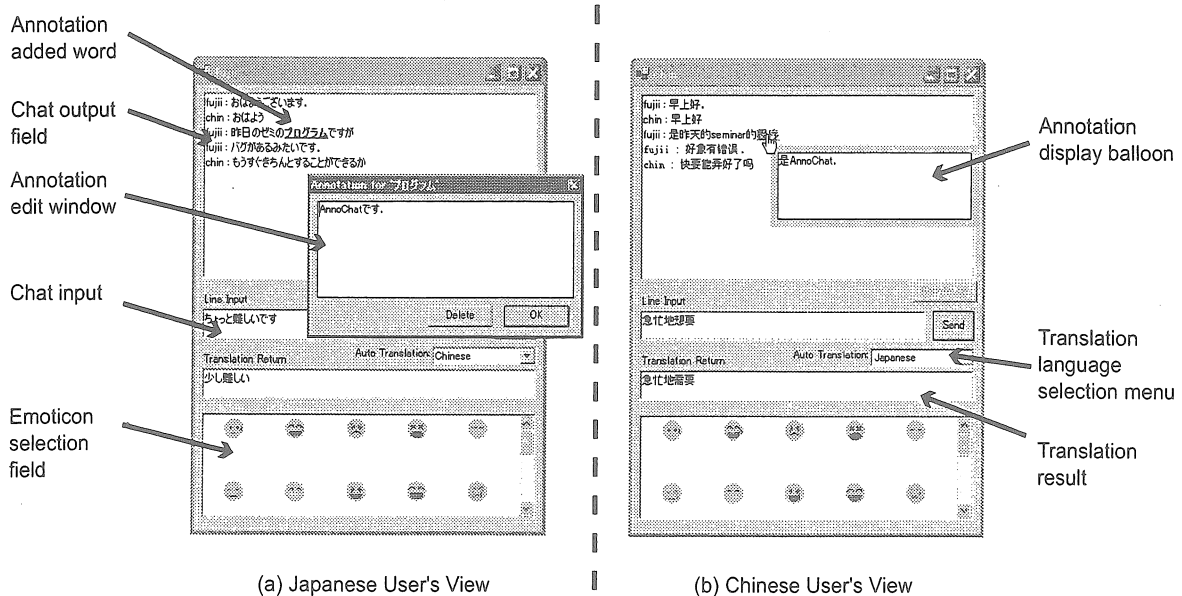


Figure 4 Screenshot of AnnoChat. AnnoChat is a chat communication tool.

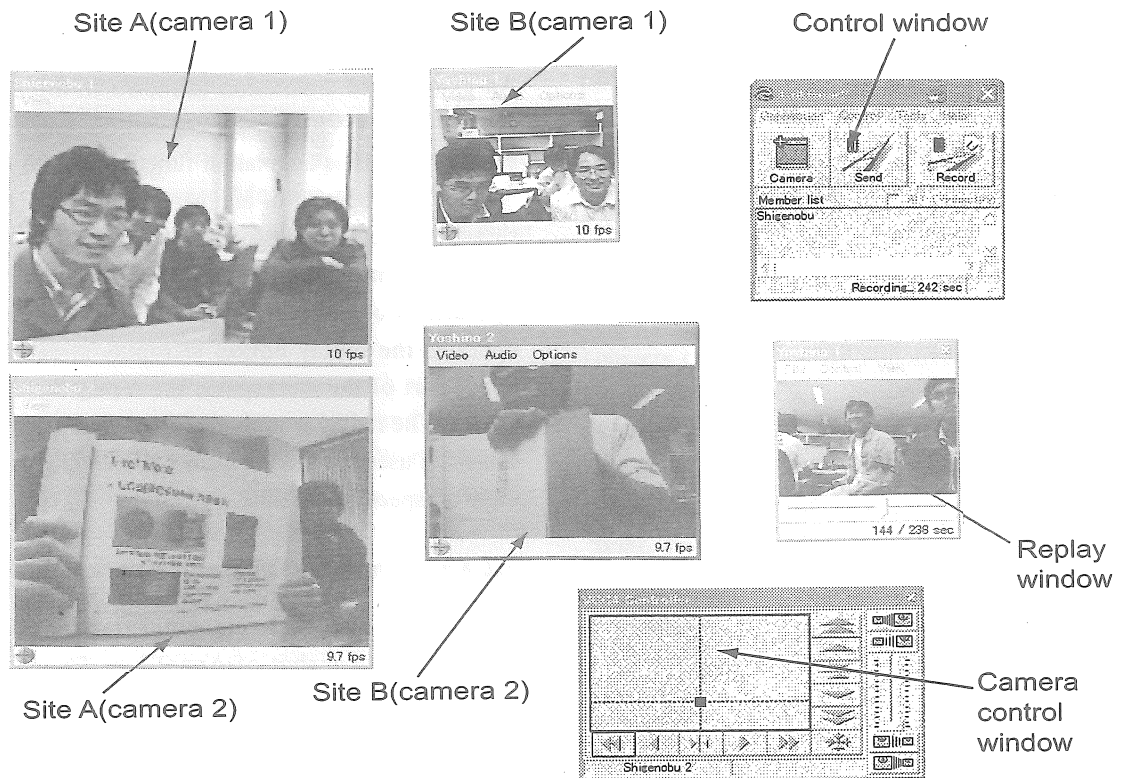
those languages. A user can change the displayed language by using a language selection popup menu.

Annotations can be added to those objects. An example of annotation is shown in the balloon shape in Figure 1. One object can contain various explanations. The annotation function can be further added to the content of another annotation. Figure 3 shows hierarchized annotations.

Spark2 has a replay function to show users' operations of the workspace. When a participant operates the replay button or replay slider on the upper part of the workspace, the replay function is started. The replay is individually operated and is not shared. A user can see the history of the operations on the workspace at any time.

### 3.2 AnnoChat: Chat communication tool

AnnoChat is a chat communication tool. Figure 4 shows a screenshot of AnnoChat. The tool has a function to input a chat text and pictographic characters (emoticons) together. An inputted text sentence is translated and displayed in the user's native language. The annotation function can be further added to the content of another annotation. When a user places the cursor on words or phrases to which an annotation is attached, an annotation balloon is displayed.



**Figure 5 Screenshot of TalkGear2.**  
**TalkGear2 is an audio and video communication tool.**

### 3.3 TalkGear2: Audio and video communication tool

TalkGear2 is an audio and video communication tool. Figure 5 shows a screenshot of TalkGear2. The tool has a function to communicate audio and video among multi-points on the Internet. The tool can simultaneously use two video capture devices connected to one PC. For example, the first is used as a background/audience video and the other is used as the presenter's video. TalkGear2 can store sent and received audio and video data, as well as replay stored data.

### 4. Conclusion

The authors have developed an intercultural collaboration system with a semantic information share function. The system consists of three pieces of software: Spark2 for shared workspace, AnnoChat for chat communication and TalkGear2 for audio and video communication.

Use of this system among some countries is planned for 2005.

### Reference

- [1] Takashi Yoshino, Tomohiro Shigenobu, Shinji Maruno, Hiroshi Ozaki, Sumika Ohno, Jun Munemori: Development and Application of an Intercultural Synchronous Collaboration System, Proceedings of Eighth International Conference on Knowledge-Based Intelligent Information Engineering Systems & Allied Technologies (KES 2004) (LNAI 3214, Springer Verlag), pp.869-875, Sept. 2004.
- [2] Milam Aiken: Multilingual Communication in Electronic Meetings, SIGGROUP Bulletin ACM, 2002.
- [3] Kaname Funakoshi, Akishige Yamamoto, Saeko Nomura, and Toru Ishida: Lessons Learned from Multilingual Collaboration in Global Virtual Teams. 10th International Conference on Human - Computer Interaction (HCI2003), Crete, Greece, June 2003.