

Title	多地点遠隔会議における自然なコミュニケーションの実現に関する研究
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Abstract

With the spread of the broadband Internet, the research and development or the trial use about interactive video teleconferencing via the Internet has been active. Then, the realization of natural communications, such as smooth conversations or changing of speakers by the eye contact among multi-sites, is very important for successful interactive video teleconferencing among multi-sites as well as the ordinary conference in one site. But, the conventional video teleconferencing among multi-sites has following two technical difficulties that disturb the realization of natural communications that are established in the face to face conference in one site. One is for the participants between other sites to be hard to converse freely because the round-trip time delay of audio/video signals becomes larger. The other is to be hard to control changing of speakers smoothly because it is difficult for all participants to establish the eye contact with the remote participants displayed in the monitor screen.

This paper has attempted solving these technical difficulties through following two researches. The former research is to reducing the round-trip time delay of audio/video signals in interactive video teleconferencing by using the specification of the audio/video CODEC and developing the real-time processing mechanism such as the audio mixing. The later research is to establish the eye contact with the remote participants by using the attorney terminal that actually participates as the attorney of the remote participant with other real participants and its remote control system.

As the former research, at first, the author has selected the use of the digital video (DV) as the audio/video CODEC because the DV supplies the high quality that can grasp the look of the participant's face and short time delay due to encoding by the intra-frame video compression without the inter-frame video compression. Next, the author has developed the real-time processing mechanism on the way of network connections of the video teleconferencing among multi-sites that receives incoming DV streams in IP packets from all sites and directly processes audio/video digital signals such as the audio mixing and sends IP packets including DV streams to each site in real time. This paper evaluates the availability of this mechanism implemented in the simulated interactive video teleconferencing system and shows that this mechanism maintains audio/video signal quality while greatly reducing the transmission time delay, compared with a conventional interactive teleconferencing system with analog audio/video signal processing.

As the later research, at first, the author has developed the attorney terminal that a set of a camera, a monitor, a microphone and a speaker acts for remote participant's eyes/face/ear/mouth can turn round freely as the attorney of the remote participant with other real participants in the same real space. Next, the author has developed the remote control systems with a joystick that can control without the look of information screen for concentrating on the video conferencing and also attempts the changing of speakers by the eye contact with the remote participants displayed in the screen of the attorney terminal. This paper evaluates the usability of the proto-type system of the attorney terminal and its remote control system and considers about the requirements for establishing the eye contact with concentrating the interactive teleconferencing.

Finally, the author has examined the total evaluation about the availability of the interactive video teleconferencing system including above two mechanisms on condition of real interactive video teleconferencing among multi-sites, compared with the face to face conference in one site and the conventional interactive teleconferencing system. This paper proposed the new method that estimates the progress of the conference by reference to the Earned Value Management (EVM) which is used as the evaluation method for the progress of projects and the future progress as the core evaluation method. The author examined the total evaluation by use of this new method and also considered the availability of this new method compared with the results of the conventional evaluation method, such as the survey by questionnaires and the measure of the number of conversations, which was used as the total evaluation about the availability of the interactive video teleconferencing system.