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Managing the placements of participants' images on a video conferencing system based on the film language

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Most of all multi-party desktop conferencing systems, provide an environment for widely distributed participants to hold real-time conferences by interchanging information through video, audio and multimedia documents. Especially through the video interface, such system can partially allow each participant to *aware* the situations of the others, e.g. face expressions, gestures and so on. And the awareness of the others is known to have a great influence on the effectiveness cooperative work. In this paper, I present a method for managing the placements of participants' images among a video interface so as to maintain the suitable awareness of each participant. This methods has the following features;

- Even if the number of participants is increased, this method can maintain the awareness of each participants.

- This method lets the video interface take a constant area on the screen, even if the participants' increasing, hence the video interface can be cooperatively located with the other interfaces, such as shared white board or text editor, on the screen.

- This method is based on techniques of a *Film Language*, which are used in the task of making movies and TV programs.

And I also present the results of experiments for confirming the effectiveness of the method.

In recent years, many computer supported distributed teleconference systems can be available, because the infrastructure of the computer network is provided and the performance of the computer systems is improved. So these systems allow the geometrically

distributed workers to work together as if they meet in the face-to-face condition. The user interfaces for projecting the images of meeting participants, simply to say *video interfaces*, contributes a large amount of the function to maintain the face-to-face like situation. This kind of situation is known to be caused by the "*awareness*" of each participant, which reflects the extent of how one can aware the existence and intention of the others, especially among the cooperative workers. It is one of important elements to success cooperative work.

To maintain the awareness of the conferencing systems' users, the system should allocate enough area on its screen to the video windows so as to recognize the participants' expression. Consequently, the system can not allocate enough area to the video windows as well as all the other windows with text editors or white boards, while the number of meeting participants are increased.

So I built the procedure to provide the image interface in the limited space according the purpose and case to get high awareness. The procedure is based on the techniques of the film language. The film language consists of the techniques and the knowledges of taking movies and TV programs as well as of editing the films. These techniques and knowledges let the film director make movie files in the systematic way. In particular, the following techniques of the film language seem to be useful for the conferencing system to maintain the awareness of meeting participants.

- Normally in conversation, the speaker should be mainly taken by the camera.

- All characters can be taken by the a camera at a time.

- If one solely speaks for a long time, he should not be only taken but also the others should from time to time. The candidates of the others are, in turn, those who want to get the turn of talking, who had finished to talk and others. Or picture where all characters are taken, may be the candidate. And those who want to talk about the current topic may be selected preferably as a subject.

According to the above rules of the film language, I present the following methods for managing the placements of participants' images on video window.

- The order management for persons who want to get the right to speak and finished speaking.

- The switch management of speaker's video image according order to wait the right of speech.

- The insert management of the shot we can see whole.

- The content management whether in relation to the current topic or not.

- The insert management of speaker's video image in relation to the current topic.

- The insert management of speaker's video image according to the manual tune taking by the coordinator. The coordinator can control the right to speak, that is interruption of speech and nominated as speaker.

I call these techniques as *video switching.*

In the real conference we pay attention to arrangement of conference room; round table,seat and the setting of the over head projector. So I supposed that the system build the suitable virtual arrangement space depended on the type or purpose of conference. And the image of this virtual arrange space helps participant to understand context of conference. For example, in the case of adjustment conference, the participants arrange the individual table of faction in the virtual space.

Finally, to confirm the effectiveness of this method, especially the effects of image switching, I had experiments to compare the two kinds of meetings, one with this method and the other without it. As a result, I can confirm that the part of this method contributes the awareness of each participants.