

Image Arrangement Paradigm for Eye Contact Videoconference

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Abstract

We proposed an idea to achieve a sense of eye contact in multiparty videoconference (VC) by applying an image placement paradigm for four positions of a camera on the display. The concept is to find the relation between face's turning direction and image's position that can serve a sense of eye contact. The experimental results proved the merits of proposed idea to achieve the sense of reality in multiparty videoconference.

1. Introduction

Although VC has been greatly advanced in performing cooperative work activities, it still suffered from the lack of realistic sensation. This is because when participants look at each other, they stare into their display rather than into a camera, which is typically mounted above or beside the display. In this paper, we proposed an alternative method of image arrangement to serve an eye contact based on the head orientation.

2. Image Arrangement Paradigm

A sense of eye contact is defined as the feeling of being recognized from the other person while talking or gazing at each other. With relative to a camera's position on the left side, your face's turning will be only in the right direction wherever you look at any images on the display as shown in Figure 1. The length and direction of each arrow indicate the gaze's distance and direction, respectively. In order to make eye contact with a local participant, any pairs of participants' images that are gazing at each other need to be placed in the opposite position (i.e., left↔right, top-left↔bottom-right) within the half side area of display around its camera's position. Figure 2 shows an example of image paradigm for 7-way meeting when a camera is on the left side of the display. Where P_n is the nth participant in a meeting.

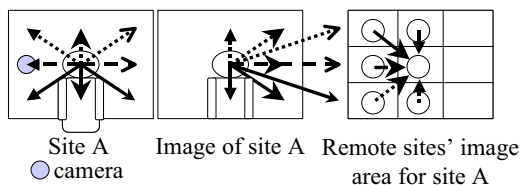


Figure 1. The face's turning direction and corresponding image area

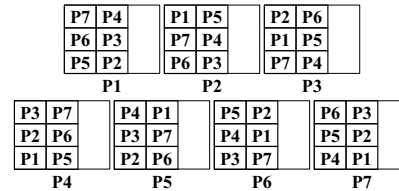


Figure 2. Image paradigm of 7-way meeting for a position of camera on the left side of the display

3. Experimental Results

The experiments were conducted by using 50" plasma display with 1.5 meters between participant and display. The various numbers of participants in a conference have been simulated for various positions of camera on a screen. Figure 3 shows the experimental result when all remote sites are making eye contact with this terminal for a camera's position on the left side of the display. It can be seen that when the remote sites are looking at a local participant, their face directions are turning to the position of a participant in that terminal which is in the middle of the display. As the results, participants using this approach can have the ability to be aware of whom, if anyone is visually attending to them.



Figure 3. Eye contact in 7-way meeting for the position of camera on the left side of the display

5. Conclusion

By using the proposed image arrangement paradigm, any pair of participants' images that are gazing at each other, can be located at the position that can serve the eye contact communications. Therefore, their gaze directions can be observed as talking with each other wherever a camera's position is at the top, bottom, left or right side of a display.