

## Online Video Conferences Communication with Eye Contact Design System

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The lack of social, emotional, and tactile feedback between participants in online video conference systems is a serious problem that interferes with communication. This problem is caused by the loss of non-verbal information which plays an important role in face-to-face conversation, especially eye gaze and eye contact. Eye contact in communication contributes to sharing interests and emotions and building trust. However, in video conferences, eye contact is lost due to the physical gap between the camera and the screen. This problem is widely known, and studies on maintaining eye contact have been conducted using various methods such as image processing or camera actuation correction based on eye tracking. However, these studies continue to unconditionally correct the user's gaze, forcing the user to maintain eye contact even at unintended times, and the context of the gaze, such as the user's intention for the gaze distribution, is lost. Only maintaining eye contact is not enough to successfully communicate the user's context. Therefore, this study aimed to design eye contact in such a way that eye contact is made without losing the context of gaze. Specifically, the system corrects the gaze when the user is looking at the face of a participant in a video conference by focusing on the time and place where the user is looking, and verifies the system in a user study. Prior to the implementation of this system, a preliminary study of the participants' gaze information in video conferences was conducted to quantitatively investigate where and how much the participants in video conferences are looking, and to find a way to detect situations where eye contact may be lost. Based on the results, a new gaze correction system was implemented and the user study was conducted to evaluate the effectiveness of the system. Although no significant differences from other conditions occurred, the opinions of the experimental participants allowed us to find improvements in the system. This research could be a solution to regain eye contact and other gaze communication that has been lost in video conferences.

(Advisor Yoichi Ochiai, Tatsuki Fushimi)