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Estimating Empathy Using Head Motion Synchronization of the Presenter and Viewer While Viewing an Explanatory Video

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Abstract

This study examines the relationship between head-motion synchronization and internal communication states. A total of 39 participants viewed a 3-minute explanatory video as a simulation of actual communication, and their empathy was measured through questionnaires. Participants' head motions were calculated using the coordinates of head postures captured by web cameras. We calculated the cross-correlation of head motion as synchronization and analyzed the relationship between the degree of synchronization and empathy. Consequently, we found that the head motion of the participants was synchronized with that of the presenter with a delay, and the yaw cross-correlation value of a high-empathy person was significantly higher than that of a low-empathy person. Furthermore, we confirmed that the degree of empathy can be estimated using the cross-correlation value and the viewer's sex. Our findings suggest that focusing on the synchronization of head movements contributes to the estimation of empathy in real communication.