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Authors

Ohmoto, Yoshimasa

Matsumoto, Asami

Nishidi, Toyoaki

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Alternating Estimation of Local Objective and Global Purpose by Two-Layer Model of Emphasizing Factors

Yoshimasa Ohmoto

Kyoto University

Asami Matsumoto

Kyoto University

Toyoaki Nishida

Kyoto University

Abstract: To facilitate collaborative tasks that include different but related subordinate tasks, it is important to consider the consistency and coordination between the objectives of the subordinate tasks (local objectives) and the purposes of the entire task (global purposes). In this study, we propose a method that alternately propagates local objectives and global purposes during a collaboration through interactions using a two-layer model. We investigated the effects of the proposed method on human stress levels. We conducted an experiment in which we used two types of agents to evaluate the effect. Questionnaires confirm that the proposed method significantly improved impressions of consistency and naturalness. The results of our electrocardiogram analyses confirm that the participants' stress levels increased throughout the task when they interacted with the traditional agent. The analyses show the possibility that physiological indices can use to evaluate the collaborative task performance from the viewpoint of human stress.