INTERACTIVE EMOTION COMMUNICATION BETWEEN HUMAN AND ROBOT

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ABSTRACT. *In this paper, we aim to realize the bidirectional communication that a human and a robot perform the face to face interaction based on the behavior with emotion. A model of "Interactive Emotion Communication" (IEC) is proposed in this paper. This model is a kind of interactive process that a robot infers human emotions from human behavior and generates robot emotions. In addition, we evaluated the impression for emotional behavior of pet-type robot in the experiment of human-robot interaction.*
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1. **Introduction.** Recently, opportunities when a robot contacts human are increasing, therefore, the technology for the interactive communication with human is gradually needed. In addition, the flexible understanding ability of human intension and the expressing ability of robot intention are required for the robot to live together. Technology for realizing the interactive communication between human and robot has not been established yet, therefore, there are few robots which communicate to human smoothly.

In order to understand the human intension and express the robot intention, some researches used the nonverbal information have been proposed [1, 2, 3, 4]. If there are difference between the verbal and nonverbal communication when we convey our emotion and attitude, nonverbal communication includes over 90% information for the emotion of interlocutor. There are various kinds of nonverbal communication that is eye sign, voice, expression, gesture, and so on. On the other hand, we feel the unpleasantness for the robot expression like human.

We have been performed the research on the nonverbal communication based on human and robot behavior. Because a robot does not have various abilities to express own intention and can perform only the restrictive way of motions, sounds and so on, the communication between human and robot is generally very difficult. For this reason, we proposed a method "Interactive Emotion Communication" to communicate through emotional behavior. By this method, we try to realize the interaction that the human and robot enable to communicate smoothly through emotions. In this research, the method of emotion inference from the human behavior is used [5]. At first, the body feature of a subject is extracted based on the Laban's theory. Next, we obtain the basic emotional degree by fuzzy inference using extracted human body feature. Finally, the emotion value of human behavior is evaluated based on the Russell's Circumplex Model. In this research, we aim to realize "Interactive Emotion Communication" (we call IEC) which is a bidirectional communication based on the emotional behavior between human and robot.