

Communication during the cooperative motion in the task of carrying an object between two humans

Abstract

Reductions in growth population and increased longevity have increased the demand for healthcare worker. In the near future, humanlike robot will be designed to assist and eventually replace the need for human in certain work areas. Our interest is to design a robot that has human characteristic and cooperate with human in moving an object. To design such robot, first, we need to understand how a human manages to cooperate naturally and smoothly with another human. The human characteristic that we are interested in is how human communicate using implicit and explicit information exchange. This includes audiovisual and touch senses that enable both humans to achieve good interaction to complete a cooperative task in moving an object. In order to understand the effects of communication between two humans, we devised an experimental object to be moved cooperatively by two humans. In this cooperative task, one human worked as a leader to initiate, determine the trajectory and final position of the object while the other human acted as a follower and followed the leader's path. The experiment object was put into position along with the force sensors and the data collected was analyzed by computers. Based on the data analyzed, we compared the actual velocity of the experiment subjects and the ideal minimum jerk velocity profile. This enables us to study the effects of force, motion, starting signal and target information in order to determine the cooperative task ideal condition. From our research, we have found the ideal condition of the human characteristic for human-human cooperative task and therefore this paper is proposing a way of thinking to design robot which can be used for human robot cooperative task.

Keywords — Health care robot, human robot interaction, human-human collaboration