

Telepresence Control of an Ambidextrous Robot for Space Applications

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ABSTRACT

A master-slave system is developed to evaluate the effectiveness of telepresence in space telerobotics applications. The master provides operator control of the slave robot through the use of telepresence and virtual reality equipment. The slave is a dual-arm, dual-hand robot equipped with a stereo camera platform designed to provide an operator-centered perspective of the remote environment. A set of tasks is evaluated which includes grasping and handling tools, manipulating electronics controls, manipulating soft flexible material, and performing planetary geology tasks that involve a variety of manipulation and tool-use skills. The system is able to complete most of these tasks in less than 2 minutes. In addition to direct teleoperation, limited supervisory control capabilities are also added to increase task efficiency and to deal with the anticipated time delay resulting from long-distance teleoperation.

KEYWORDS: telepresence, dexterous robots, space, virtual reality, tele-existence, dual-arm control.