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Research of Control System for Space Intelligent Robot Based on Vision Servo

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Abstract : Space intelligent robotic systems are expected to play an increasingly important role in the future. The robotic on-orbital service, whose key is the tracking and capturing technology, becomes research hot in recent years. In this paper, the authors propose a vision servo control system for target capturing. Robotic manipulator will be an intelligent robotic system with large-scale movement, functional agility, and autonomous ability, and it can be operated by astronauts in the space station or be controlled by the ground operator in the remote operation mode. To realize the autonomous movement and capture mission of SRM, a kind of autonomous programming strategy based on multi-camera vision fusion is designed and the selection principle of object visual position and orientation measurement information is defined for the better precision. Distributed control system hierarchy is designed and reliability is considering to guarantee the abilities of control system. At last, a ground experiment system is set up based on the concept of robotic control system. With that, the autonomous target capturing experiments are conducted. The experiment results validate the proposed algorithm, and demonstrates that the control system can fulfill the needs of function, real-time and reliability.

Keywords : control system, on-orbital service, space robot, vision servo
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