

Contact State Estimation Using Motion

People can perform a variety of tasks by skillfully handling the contact between an object and its surroundings. For example, when loading and unloading goods in a warehouse, it is possible to save force compared to simply lifting the goods by sliding them. Such manipulation is also useful for robots.

To achieve such manipulation without applying unnecessary force, it is necessary to know the contact state (e.g., the surface or edge in contact) between the object and the environment. Therefore, it is important to estimate the contact state between the object and the environment based on the motion of the robot's hand.

In this study, we proposed a method for estimating the contact state between an unknown geometric object and an unknown geometric environment. We proposed an algorithm to estimate the contacting faces and edges from the motion of an object, and verified the method by experiments using a motion capture system.

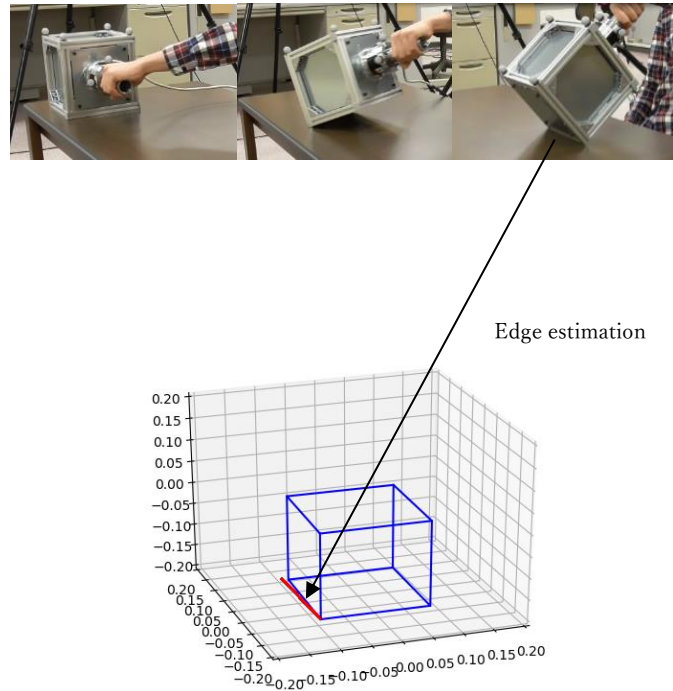


Figure 1. Experiment and result

Keywords: contact state estimation, compliant motion, manipulation

References:

- [1] Ishikawa, S., Shirafuji, S. & Ota, J. (2019). Kinematics Analysis for Estimation of Contact Conditions in Teaching, Proceedings of the 2019 JSME Conference on Robotics and Mechatronics, Hiroshima, Japan, June 5-8, 2019