

## **Tactile slippage analysis in optical three-axis tactile sensor for robotic hand**

### **ABSTRACT**

This paper presents experimental results of object handling motions to evaluate tactile slippage sensation in a multi fingered robot arm with optical three-axis tactile sensors installed on its two hands. The optical three-axis tactile sensor is a type of tactile sensor capable of defining normal and shear forces simultaneously. Shear force distribution is used to define slippage sensation in the robot hand system. Based on tactile slippage analysis, a new control algorithm was proposed. To improve performance during object handling motions, analysis of slippage direction is conducted. The control algorithm is classified into two phases: grasp-move-release and grasp-twist motions. Detailed explanations of the control algorithm based on the existing robot arm control system are presented. The experiment is conducted using a bottle cap, and the results reveal good performance of the proposed control algorithm to accomplish the proposed object handling motions.

**Keyword:** Optical three-axis tactile sensor; Robotic hand; Tactile sensor; Tactile slippage sensation