

Modelling primate control of grasping for robotics applications

Ashley Kleinhans¹, Serge Thill², Benjamin Rosman¹, Renaud Detry³ & Bryan Tripp⁴

¹ CSIR, South Africa ² University of Skovde, Sweden ³ University of Liege, Belgium ⁴ University of Waterloo, Canada

Abstract

The neural circuits that control grasping and perform related visual processing have been studied extensively in Macaque monkeys. We are developing a computational model of this system, in order to better understand its function, and to explore applications to robotics. We recently modelled the neural representation of three-dimensional object shapes, and are currently extending the model to produce hand postures so that it can be tested on a robot. To train the extended model, we are developing a large database of object shapes and corresponding feasible grasps. Finally, further extensions are needed to account for the influence of higher-level goals on hand posture. This is essential because often the same object must be grasped in different ways for different purposes. The present paper focuses on a method of incorporating such higher-level goals. A proof-of-concept exhibits several important behaviours, such as choosing from multiple approaches to the same goal.