GRIPPING IN ANTHROPOMORPHIC ROBOTICS

Mostafa A. M. A. Zarea, Alejandro Hernandez, Arthur G. E. Chesnot, Michel K. Seiffert, Nicolas H. J. Jensen

Department of Materials and Production, Aalborg University
Fibigerstraede 16, DK-9220 Aalborg East, Denmark
Email: {mzaria20, aherna21, njens21, achesn21, mseiff22}@student.aau.dk, web page: http://www.mechman.mp.aau.dk/

Keywords: Anthropomorphic Robotic Hand, Production, Biomechanics, Gripping methods

ABSTRACT

There is currently great potential for improving robotic gripping operations in industrial production. In most gripping applications, the gripper only fits exactly one object to be handled. If another object is to be grabbed by the robot, the gripper must be changed. This process is not very time efficient because the grippers are not sufficiently versatile. In addition, the grippers are unique because they must match perfectly with the geometry of the object.

Several analyses of different human hand gripping methods can be found in the literature. This existing data will provide crucial information for the understanding of the human hand behaviour.

Figure 1: AnyBody Model of a human hand

In this project, an analysis of the biomechanics and kinematics of the human hand is performed to understand the main advantages of the human hand compared to a robotic gripper. By using existing research data on hand kinematics, an anatomical hand model is set up and programmed in The AnyBody Modelling System as shown in Figure 1. This program is used to simulate multiple gripping motions related to different objects. The data obtained from this model will be used to design an anthropomorphic robotic hand, which behaves like a hand. This anthropomorphic robotic hand will be able to grasp different objects.

Acknowledgement

The authors of this work gratefully acknowledge Grundfos for sponsoring the 10th MechMan symposium.