Three fingered gripper grasping analysis of different objects using fuzzy logic controller

Lokman, Nor Anis Aneza, Ahmad, Hamzah, Daud, Mohd Razali Faculty of Electrical and Electronics Engineering, Universiti Malaysia Pahang, 26600 Pekan, Pahang, Malaysia

ABSTRACT

Three finger gripper movement analysis governs by fuzzy logic control and feedback control is the theme for this research. The research aims to analyze the performance of a three finger gripper in attempting to grasp different types of objects. The gripper must examined to keep balancing grasping technique when there are many types and sizes of objects. The analysis is enhanced with a feedback loop for the gripper system to grasp objects at different positions in their own coordinates. The sizes and angles for objects are predefined to avoid damage to the objects during grasping and are considered as inputs for the proposed system. The system output are the angles and torques values. To do this, Matlab SimMechanics and Simulink are used to design the gripper and investigate the gripper capability in grasping different objects. The results for different types of objects are discussed and the analysis shows that the gripper with fuzzy logic and feedback control can grasp each object firmly and effectively.

KEYWORDS

Feedback; Fuzzy logic controller; Three fingered gripper

REFERENCES

- Zaki, A.M., Soliman, A.M., Mahgoub, O.A., El-Shafei, A.M. Design and implementation of efficient intelligent robotic gripper (2010) 2010 International Conference on Modelling, Identification and Control, ICMIC 2010, art. no. 5553477, pp. 710-716.
- Widhia, W., Nindhia, T.G.T., Budiarsa, N.
 (2015) International Journal of Mechanical Engineering and Robotics Research, p. 4.

- Bemfica, J.R., Melchiorri, C., Moriello, L., Palli, G., Scarcia, U. *A three-fingered cable-driven gripper for underwater applications* (2014) *Proceedings - IEEE International Conference on Robotics and Automation*, art. no. 6907203, pp. 2469-2474.
- Telegenov, K., Tlegenov, Y., Shintemirov, A. A low-cost open-source 3-D-printed three-finger gripper platform for research and educational purposes (2015) IEEE Access, 3, art. no. A39, pp. 638-647.
- Rovetta, A., Wen, X. Fuzzy logic in robot grasping control (1991) IEEE/RSJ International Workshop on Intelligent Robots and Systems IROS, pp. 1632-1637.

ACKNOWLEDGMENT

The authors wish to thank Universiti Malaysia Pahang, Malaysia and Ministry of Education Malaysia for the scholarships given to the first author during the period of his study and a great appreciation also to the Erasmus Mundus STRONGTIES project for the financial support given during the student mobility period of the first author.