

ABSTRACT

Several technologies have been developed to assist the activities of persons with disabilities, such as motion-controlled wheelchairs, powered exoskeletons, robot assistants, artificial arms, and an articulation robot. An articulation robot is designed to resemble a human arm, which has a wrist, an elbow, and a shoulder [2]. In the medical field, this articulation robot has been developed to be smaller and functional to be fitted in a wheelchair and in a bed. It assists disabled person in carrying out various activities on their own [3], such as holding, picking, lifting, and moving items [4].

Due to the technology advancement, a tool is designed for easier use, more efficient and effective. Therefore, this final project proposes a control system for the robotic arm based on gyroscope and flex sensor. It proposes to control the articulation robot naturally using simple hand gestures. It is designed to be controlled using a glove. The glove is fitted with a gyroscope as a sensor controlling the rotation of the robot arm, two flex sensors controlling both the swing axis and a gripper on the robot arm to pick objects up.

The results of this study are in the form of an articulation robot control design using a gyroscope and flex sensor. The movement is carried out by controlling the four axes contained in the robot arm, i.e., the elbow axis and the gripper moved by the flex sensor, whereas the shoulder axis and the base axis (body) moved by a gyroscope. While rotating (the base axis and shoulder axis of the body), the articulation robot gets an error value at the corners of 2.04% at the y (roll) angle, and 3.82% at the z (yaw) angle. The overall performance of the articulation robot, for carrying out the movement of picking up, lifting and moving an object, has a 100% success rate.

Keywords: Articulated Robot, Hand Gestures, Flex Sensor, Gyroscope, Robot Arm.