

ABSTRACT

Selective Compliance Assembly Robot Arm (SCARA) is a type of robot widely used in industrial applications. It operates based on a selective compliance system, meaning the robot has flexibility of motion along certain axes while maintaining rigidity along others. This characteristic plays an important role in industrial sectors, especially for tasks such as transferring objects from one location to another. A SCARA robot has a slightly different motion mechanism compared to other robotic arms. Generally, it has four axes of motion, consisting of two parallel arms that move in the X and Y axes, a Z-axis for vertical movement, and the ability to rotate 360 degrees about the Z-axis.

In this research, a SCARA robot was designed to transfer egg objects. The classification process was carried out using a camera sensor to identify the shape and position of the eggs. A PC or laptop was used as the image processing device, considering the need for high processing speed. This system was developed to evaluate whether the integration of a SCARA robot with inverse kinematics and the Local Binary Pattern (LBP) algorithm is capable of handling the egg transfer problem. The design of the SCARA robotic arm, whose motion mechanism is suitable for pick-and-place tasks, showed that the average angular error remained within the tolerance limit of less than 1° . Furthermore, the egg transfer process achieved a success rate of 87.5%.

Keywords: SCARA robot, object transfer, egg, inverse kinematics, LBP.