

ABSTRACT

The dishwasher system serves to help the activity of washing dishes. Dishwashing systems have also been widely used by industry, restaurants, and household use. The dishwasher system can also cope in the absence of a household assistant. The existing dishwasher systems generally still use time-based methods such as the length of time to wash dishes and the length of time to dry dishes. This final project aims to apply an artificial neural network to a dishwasher system that focuses on computer vision feedback with accuracy above 70%, which is obtained based on training data, distance, room lighting, detection angle and effective rotational speed.

The author took the initiative to create a dishwasher system with feedback in the form of data from computer vision results. The author uses a camera to process image processing with the Artificial Neural Network method to detect the object and uses the Faster R-CNN method to train the data that is used to detect objects. The application of feedback in the form of computer vision using a camera device. To apply object classification to the system, a data training test was conducted. Meanwhile, to find out the effective camera placement, the parameters of distance, room lighting, detection angle and rotational speed of the dish rack were tested.

The application of the artificial neural network algorithm produces a good accuracy of 87%. From the test, the training loss is 0.05134, the effective camera distance is 50 cm, the room lighting intensity is 3700 lx, the detection angle is 60° and the average rotating angle speed of the dish rack to capture images is 0.129 rad/s. Then for object classification and washing time is more than 30 seconds.

Keywords: *dishwasher, image processing, machine learning, Faster R-CNN, Artificial Neural Networks*