DEVELOPING OBJECT DETECTION ALGORITHM FOR DELTA ROBOT AS AUTOMATIC SORTING, PICKING, AND PLACING ROBOT USING ROS

By

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.

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ABSTRACT

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This thesis describes automatic sorting robot system based on computer vision technology, which will be implemented to the delta parallel robot with revolute actuators. The idea was to create an object detection algorithm which could easily detect multiple objects with various forms, location, and orientation. Computer vision library, OpenCV, will be used in the image processing process. Besides, the image processing algorithm will be written via C++ program in Qt framework. Contours feature with orientation algorithm is used for objects location and orientation detection solution and transform the object location in the image into the coordinate system. Furthermore, Kalman Filter features is applied to estimate prediction position and orientation of the objects in the delta arm robot area. In addition, a conveyor belt is used to transport the objects towards delta robot area. The delta parallel robot with revolute actuators is used to perform all the pick and placing works. And the robot operating system (ROS) is used to control the communication system in the delta robot, therefore the delta robot can receive objects location and orientation coordinate. In conclusion by developing object detection algorithm using ROS and Kalman filter for delta robot, a robot sorting system is built so the delta robot can sort up to 3 objects based on shape by picking and placing the object into the predefined position.

Keywords: ROS, OpenCV, Delta Robot, Automatic Sorting Robot, Object Detection, Kalman Filter.

DEDICATION

I would like to dedicate my work to my advisor, my lecturers, my family, and my friends for support, advice, understanding, and assistance they provide during the process of this thesis.

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