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INTELLIGENT MOBILE ROBOT FOR PUSHING OBJECTS

A dissertation submitted to the
Department of Electrical Engineering, University of Moratuwa
in partial fulfillment of the requirements for the
degree of Master of Science

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Abstract

In this research, a new approach to develop an object pushing system with a simple mobile robot with two DC servo motor driven wheels and two castor wheels are introduced. This is an attempt to design and develop a system with less number of sensors to detect the reaction force generated on the mobile robot while pushing an object. The robot behavior is such that it always tends to push the object towards the center of the pusher attached to the robot. This is achieved by rotating one driving wheel of the robot by a fixed amount of rotation. This rotation is such that the motor torque is increased continuously by increasing the motor driving positive pulse width of the pulse width modulated signal from its neutral position until the required amount or rotation is obtained. At this moment the motor stops and the wheel attached to the other motor follows the same operation. This motion creates a zigzag movement on the pushing plate attached in front of the robot. This zigzag motion always moves the object towards the centre of the pusher. When the object comes close to the centre of the pusher the force applied from both motors becomes equal. Detection of this force is done by using the positive pulse width of the motor and the encoder pulses generated by the optical encoder attached to both wheels of the robot. The test results are given to support the proposed approach.

DECLARATION

The work submitted in this dissertation is the result of my own investigation, except where otherwise stated.

It has not already been accepted for any degree, and is also not being concurrently submitted for any other degree.

UOM Verified Signature

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We endorse the declaration by the candidate.

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