DESIGN AND DEVELOPMENT OF A PROTOTYPE MOBILE MANIPULATOR

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ABSTRACT

This project is about the development of a mobile robot with manipulator arm for unloading purpose. The robot is designed to move from one location to another location that will move and unload an object to a preprogrammed location. The microcontroller PIC 16F877 is used for the control of the mobile manipulator. Two servo motors are placed at the manipulator arm to allow the robot to turn and twist. DC motors are used to move the robot from one location to another. The program or software use to control the movement of the mobile manipulator is developed using CCS Compiler for C-language.

This research in robot technology can be applied in real life, as its task is to carry objects and unload them. As an example, it can be used to carry trash to the garbage bin. It can save cost for reducing human worker. Thus, the human worker can be relieved of the routine operation of this tedious task.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Mobile robots have grown out of research at the MIT Artificial Intelligence (AI) laboratory under Rodney Brooks and his mobile robot group. The half dozen years that the 'mobot' lab has been in existence have seen the birth of a wide variety of artificial creatures: some avoid obstacles, some collect things, a few wander and build maps, several walk and climb over rough terrain and a tiny one hides in dark corners [3].

The robot can be thought of as a machine that will move an end-of-arm tool, sensor, and/or gripper to a preprogrammed location, when the robot arrives at this location, it will perform some sort of task [1].

The mobile robot with manipulator arm is designed to move from one location to another in order to unload an object. When the robot arrives at a certain location, it will perform the task given i.e. unloading an object. For this project we just do a simple task of unloading a ping pong ball.

The locations are stored in the robot's memory and are recalled later for operation. Microcontroller PIC 16F877 is used for the control of the mobile robot with manipulator arm. The manipulator is the arm of the robot. It allows the robot to bend, reach and twist. This movement is provided by the manipulator's axes. Two servo motors are placed at the manipulator arm and also a box to put objects.