DEVELOPMENT OF AUTONOMOUS NAVIGATION IN STRUCTURED ENVIRONMENT FOR MOBILE ROBOT

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ABSTRACT

This paper presents the development of autonomous navigation for mobile robot in structured environment. The robot is controlled by a CPM2A Programmable Logic Controller (PLC) series micro controller that can be programmed. The inputs variables for the controller are photoelectric sensor and limit switches. Sensors play an important role in this project because the controlling parts of the robot depend on sensors that will detect any conditions that are set upon. The robot has to complete a critical task and also all the movement depending on the task given to accomplish the objective. The scope of this project is to design and construct the mobile robot with the sequences of task known as "partner robot".

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CHAPTER 1

INTRODUCTION

1.1   Introduction

Robotics is the science of designing and building suitable for real-life application in automated manufacturing and other nonmanufacturing environments. Robot are the means of performing multifarious activities for man's welfare in the most planner and integrated manner, maintaining their own flexibility to do any work, effecting enhanced productivity, guaranteeing quality, assuring reliability and ensuring safety to the worker. [3] The robot is assumed to be able to think by itself and therefore it can do certain task, providing the help of other components like sensors and a micro controller to make it more independent. [1]

The purpose of this project is to build an autonomous mobile robot that can operate in structured environment. The concept of this mobile robot is more on personal robot in the practical use in private home or any pre-determined environment. On the other hand, there are highly specialized and sophisticated robots which can carry out house maid tasks such as serving drinks, arranging books, cleaning floor, disposing trash and serving fan to make the comfort condition when its owner require.

For this project, An Autonomous Mobile Robot has been carefully designed and built. The mechanical structure consists of base, manipulator arm, internal dustbins and end effectors. Its also have the function of sweeper with vacuum, fan, indicator and buzzer. The arm has been built with three degree of freedom (3-DOF) that movement of Joint1 (J1), Joint2 (J2) and gripper. The photoelectric sensors and limit switches has been involved to be more intelligent robot. For the controlling system, OMRON SYSMAC CPM2A micro programmable logic controller has been used to control the movement of an Autonomous Mobile Robot. The micro Programmable Logic Controller (PLC) is choosing because it's easy to redesign or reprogram the command if needed.