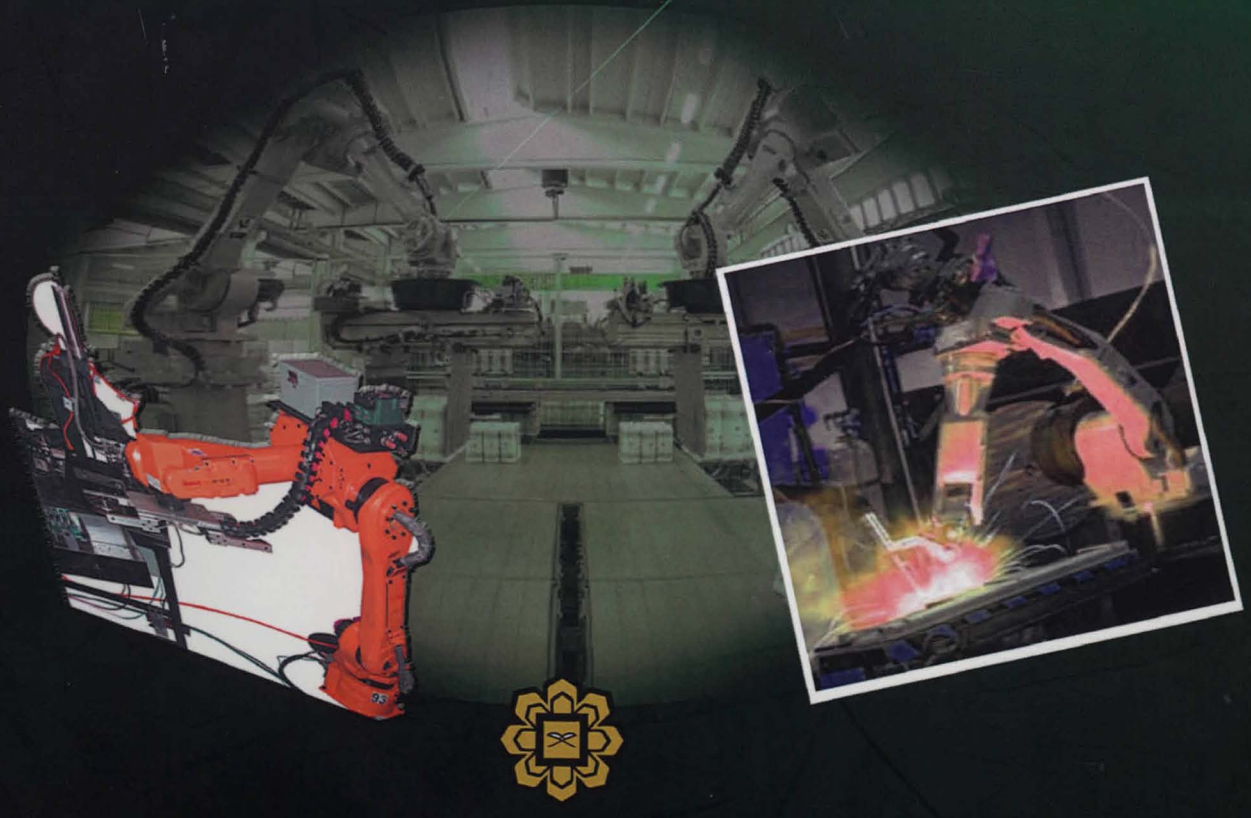
MECHATRONICS BOOK SERIES

ROBOTICS AND AUTOMATION

Rini Akmeliawati
Wahju Sediono
Nahrul Khair Alang Md. Rashid



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CHAPTER 22

Design and Development of Digger Robot

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22.1 Introduction

Increasing the construction site to be dug cause problem since there are less number of persons who have the expertise to handle the excavator machine. Moreover, this project also can solve many other problems such as to dig the graveyard and ease the farmer to hole the soil to plant their crops. According to ability of this robot, it can dig various type of soil with different force. Furthermore, it very easy to operate since it just needs parameter from the users to insert and it will run automatically.

This prototype of "Automatic Mobile Digger" has been guided by using C Programming (CCS C). The main part of the robot consists of mobile platform and robotic arm. The purpose of mobile platform is to carry the arm to desired location for digging operation. The robot arm has 4 degree of freedom where all the joints are revolute. The joints are located at base, shoulder, elbow and wrist.

This digger uses several number of DC motors and servo motors which act as the joint to move the wheel and the link and also the potentiometer as a sensor. The circuits consist of interface circuit, motor driver circuit and also 12 Volt power supply unit. The basic coding about the C language, circuits, servo motor, dc motor and also potentiometer will implement in this project. PIC 16877A work as a main controller will guide all movement of the Robot Arm and will performs as a brain of the system.

Our aim is to ensure that the robot not only can move and dig the soil but to also dig the soil according to the desired parameters required by the user. Thus, this robot will help us or lease us especially for disable human being from the terrible task; "digging soil".

Several objectives are aimed by designing and developing this automatic mobile digger which could be used in various applications, as example:

- Holes for plant.
- Digging graveyard
- Soil re-arrangement
- Digging basement for the building
- Digging quarry and etc.

The product design specifications for this design are as below:

- Able to dig various type of soil
- Dig according to the user desired parameters such as height, length and width

There are three main parts need to be investigated in order this project will be successful, namely autonomous vehicle, robotic arm which is the main part of the our project. The theory of mechanism for robot also must be learnt to achieve the goal of this project.

Locomotion: The mobile or robot locomotion is the process of causing a robot to move. In order to produce motion, forces must be applied to the robot. For this robot it must follow some mobility characteristics to move on land which are: