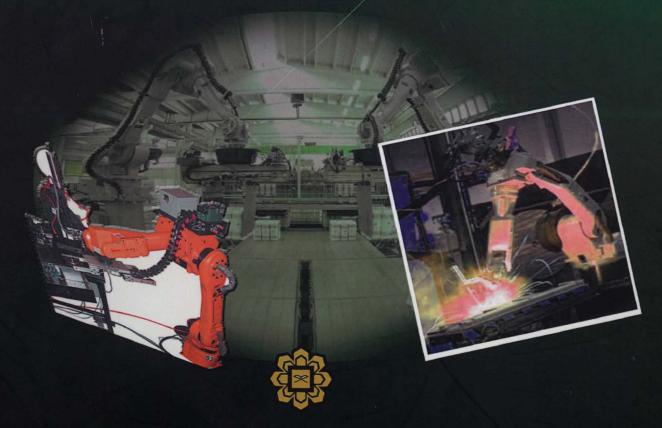
MECHATRONICS BOOK SERIES

ROBOTICS AND AUTOMATION

Rini Akmeliawati Wahju Sediono Nahrul Khair Alang Md. Rashid



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MECHATRONICS BOOK SERIES: ROBOTICS AND AUTOMATION

Editors

Rini Akmeliawati Wahju Sediono Nahrul Khair Alang Md. Rashid



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CHAPTER 34

Automatic Car Parking System

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34.1 Introduction

Automatic parking is an autonomous car maneuvering from a line of traffic into a parking slot to perform parallel, perpendicular or angle parking. The purpose of automatic parking is to enhance the driving comfort and safety in constrained situations where much attention and experience is essential to steer the car. The parking maneuver is performed by means of coordinated run of the steering angle and speed. During the maneuver the actual situation in the environment is always considered to ensure collision-free motion within the existing space.

An automatic car parking system can be understood as an automatic storage and retrieval systems (AS/RS) which are computer controlled to automatically store and retrieve cars with high throughput [1-2]. Current development of automatic car parking technologycan be divided into four stages, namely - manual, mechanical, automatic (automation) and intelligent [3-4]. The effective management of cars in an automatic car park is a challenge, especially finding the locations of the car. It has been reported in the literature that more than 70% of Malaysians commute in private cars to their work place and other destinations [4-7]. As a result the parking spaces in various organizations become inadequate leading to low productivity.

34.2System Development

Functional Design. In designing the system, we consider a system that consists of nine spaces with eight platforms for the car park. The platforms are free to move horizontally or vertically like a puzzle. The system is developed so that people just leave their car on the platform outside the parking area, the system automatically finds the empty space and the platform with the car moves to occupy the empty spaces. For retrieval of the car, the driver just wait outside the parking area, key in the identification of their car and wait for the system to trace and bring out the car.

Electrical and Mechanical Elements. Microcontroller is utilized as the controller device for the project. In this project, we decide to use Programmable Intelligent Computer (PIC) as the microcontroller. The lot consists of nine spaces of parking with eight parking lots and an empty space for the car movement. The parking lots consist of the platform and the base. Spaces are efficiently used in this design as there are no spaces required for people entering and exiting the car.

Torque can be transformed to linear force by a rack and pinion. The pinion is nothing else than spur gear. It meshes with a toothed bar or rod. The rack and pinion is used to convert a rotary motion of the gears into the linear motion of the platforms. The speed of the rack is determined by the diameter of the gears as it turns. The gear is driven