

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
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Path Tracking of Car Like Mobile Robot

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32.1 Introduction

The aim of this work is designing and developing a path tracking control for a car-like mobile robot. As the first work, this paper applied the conventional method, the car will move in accordance to the condition of the sensor at that particular time. The path to be followed by the car-like mobile robot is a track made up of a black line on a white background. A suitable track was constructed that can satisfy the radius of curvature of the robot.

A car-like mobile robot is a robot with four wheels that is able to turn left and right, move forwards and backwards just like a real car. An example of car-like mobile robot being built by the students in University of Extremadura, Spain, is Speedy (Colin and Wyeth, 2007) as shown in Figure 1.

Speedy is a 1/8 model car based autonomous mobile robot. This robot includes a two-level architecture: a mini-ITX board with a C3 x86 compatible processor and 4 ATmega32 based custom boards designed and built in the lab. Each of these boards take care of a low-level behavior or group of behaviors: PID drive motor control, steering servo control and digital compass for autopilot in one of them, an ultrasound tilt-controlled scanner in another one, a set of 3-axis accelerometers for inclination sensing in the third one, and servo control of a pan-tilt camera.

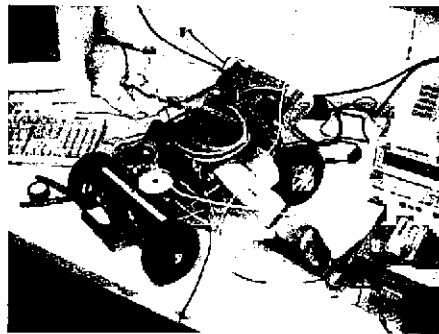


Fig. 1 'Speedy' an example of a car-like mobile robot.

32.2 Conventional Method

The concept used for conventional method is very simple. The car will move in accordance to the condition of the sensor at that particular time. For example, if the middle sensor detects the line, then servo will maintain or move to center position. If the sensor at the most right position detects the line, then servo will move its direction toward THE most left to bring the car back on track. The control algorithm for the conventional method is as shown in Figure 2.