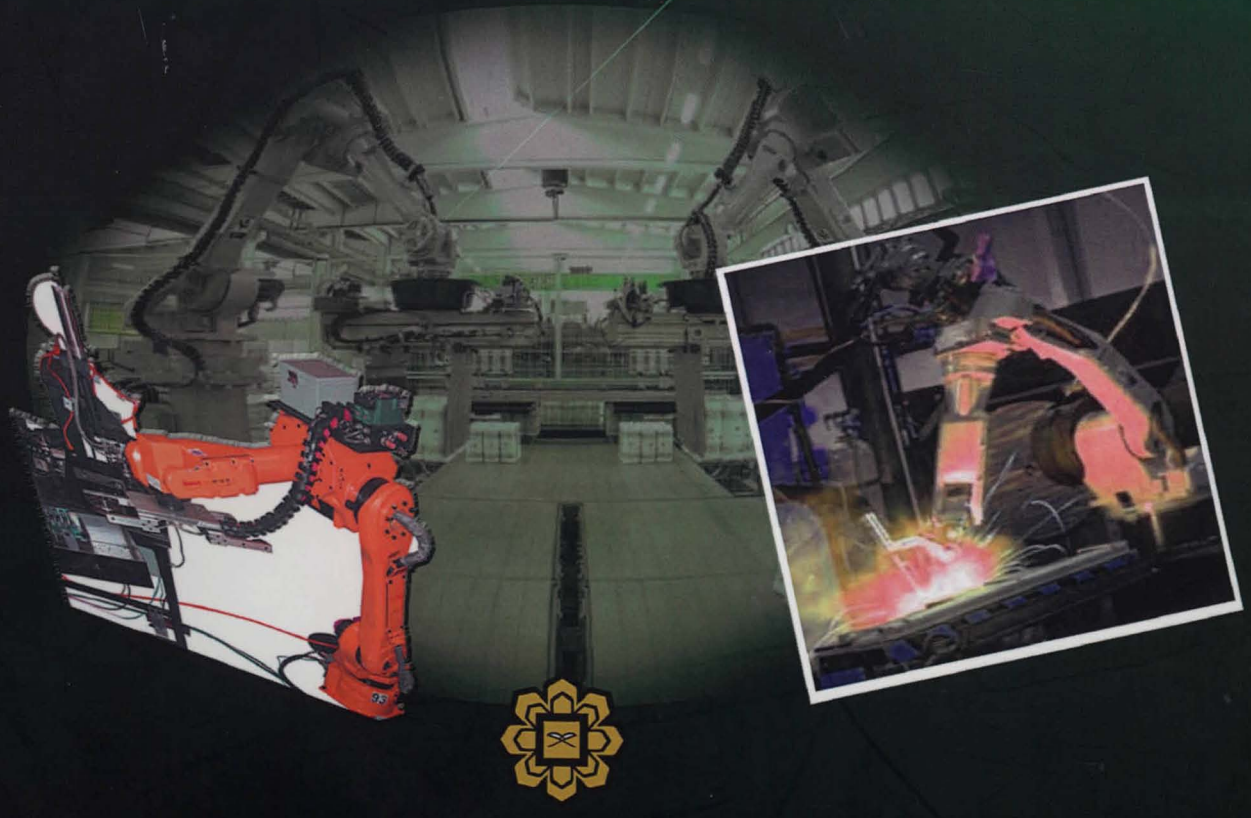
# MECHATRONICS BOOK SERIES

## 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 9

# Methods of Investigation of a Fuzzy Based Person Following Robot

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## 9.1 Introduction

This chapter deals with the general idea of how it has been planned to go about the implementation of the Fuzzy membership function and Fuzzy Inference System (FIS) to the Person-Following Robot. It will first begin with the explanation of hardware setup of the robot with special emphasis on the communication procedure which is IR Optoelectronic detection system in the robot that could be subjected to the IR co-ordinate system to point out the robot and the person's location with respect to the robot position. It then consists of the explanation of the system modeling which will be built and connected to the system. Lastly, will discuss about the Fuzzy logic and its basics followed by the implementation of Fuzzy logic to the detection of the person.

## 9.2 Fuzzy System Design

A fuzzy set is completely characterized by its membership function. Membership function is subjective in nature because it represents fuzzy concept [1]. It represents in any differential mobile robot the movement and steering is done by manipulating each of the two wheels [2]. Therefore, if we want to go left simply we can stop the left wheel and rotate the right one.

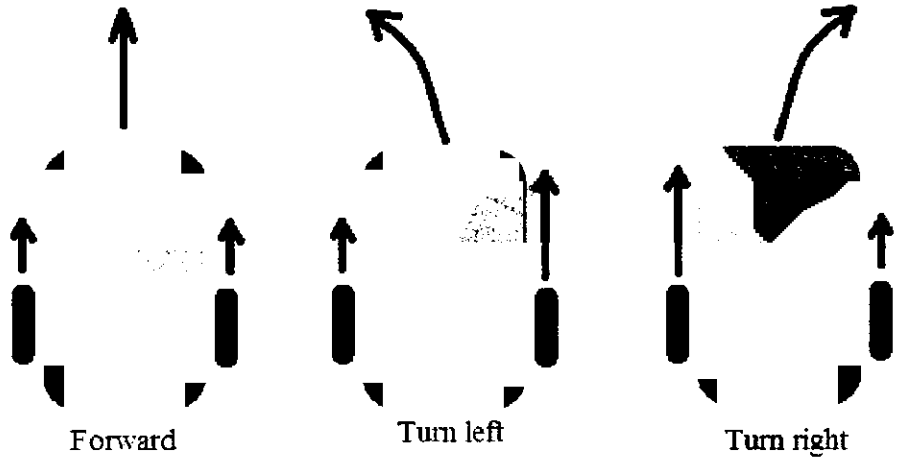


Fig. 1 Steering system in differential robot

Fuzzy rule based system was generated to accommodate the purpose of following the targeted person. In the beginning of this section introduce briefly how the steering is achieved by using two different wheels. The rule based system is developed to ensure that the person is assumed to be in the locking range, once it is intended to move the robot in a curvature pattern than both wheels is in action but one is moving faster than the other. Rules identify in asking the robot to synchronous its speed to the followed person by considering the distance to the person, once the person is far and locked than a wise action should be taken to speed up both wheels instantly. Another Rule is needed to develop at which the person is in the left and near to the robot thus the robot should follow the person in a sharp curvature path thus the two wheel should have a great difference in speed where the speed of right wheel increases and left wheel decreases. There are few more additional rules are