MECHATRONICS BOOK SERIES

CONTROL AND INTELLIGENT SYSTEMS

Momoh Jimoh E. Salami
Abiodun Musa Aibinu
Yasir Mohd Mustafah

IIUM Press
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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EDITOR

Momoh Jimoh E. Salami

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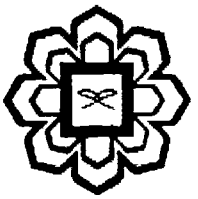

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011
©IIUM Press, IIUM

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Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Momoh Jimoh E. Salami, Abiodun Musa Aibinu, Yasir Mohd Mustafah: Mechatronics Book Series: Control and Intelligent Systems
Bibliography p.
Includes Index
ISBN

ISBN: 978-967-418-176-5

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN.BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan
Tel +6**03-6188 1542 / 44 / 45** Fax: +6**03-6188 1543**
EMAIL: iiumprinting@yahoo.com

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17.0 Introduction

Today, the urbanization process at every part of the world includes of Asia speeds up the prominent trend of high rise building and skyscrapers construction. Regarding this scenario, the effective transportation service among floors in the building is very important. In these circumstances, the elevator technologies are developed to serve the requested passenger's floors with high consideration of passengers' satisfaction and optimal performance. Responding to the issue, this chapter focuses on development of an elevator group controller based on fuzzy algorithm. By introducing a fuzzy controller in an elevator system, this technique is developed to be capable of handling the required passenger traffic densities while keeping passenger waiting times within reasonable limits.

17.1 The General overview of Elevator Group Controller Project

The elevator controller responds to the passengers' requests through pressed buttons which consist of hall calls and car calls. Regarding this matter, hall call is referred to a passenger's request who wishes to go to another floor, from elevator foyer of the current floor. Whereas, the car call indicates as the request made inside the elevator. Fundamentally, an elevator system is controlled by a two level control hierarchy for solving two different control problems. The lower level task plays function in commanding each elevator to move up or down, to stop or start and to open and close the door. The higher level coordinates the movement of elevator group via a set of logical rules crafted to improve the system performance [2]. The main function of the Elevator Group Control System is designed to achieve as follows:

- To decide on the most suitable car to be dispatched in response to registered hall call.
- To ensuring that all elevator cars in the group work together for group's overall rather than cars' individual, best performance.
- To design a simulator for an elevator group controller by using fuzzy algorithm in MATLAB software.
- To develop the set of fuzzy rules of operational elevator group controller for selecting the suitable elevator according to assigned request.
- To comprehend the traffic patterns of elevator operation in order to develop effective traffic modes in actual situation.
- To achieve the quality of customer service with realizing the high priority of waiting time and riding time minimization factor.

Considering to its advantages in dealing with imprecision and uncertainty, the FL has been widely applied in the search for an alternative solution to elevator control problems. As reported by Siikonen (1997), FL is used to identify traffic patterns, which able to provide appropriate control actions. The control system is then made adaptive to suit various traffic