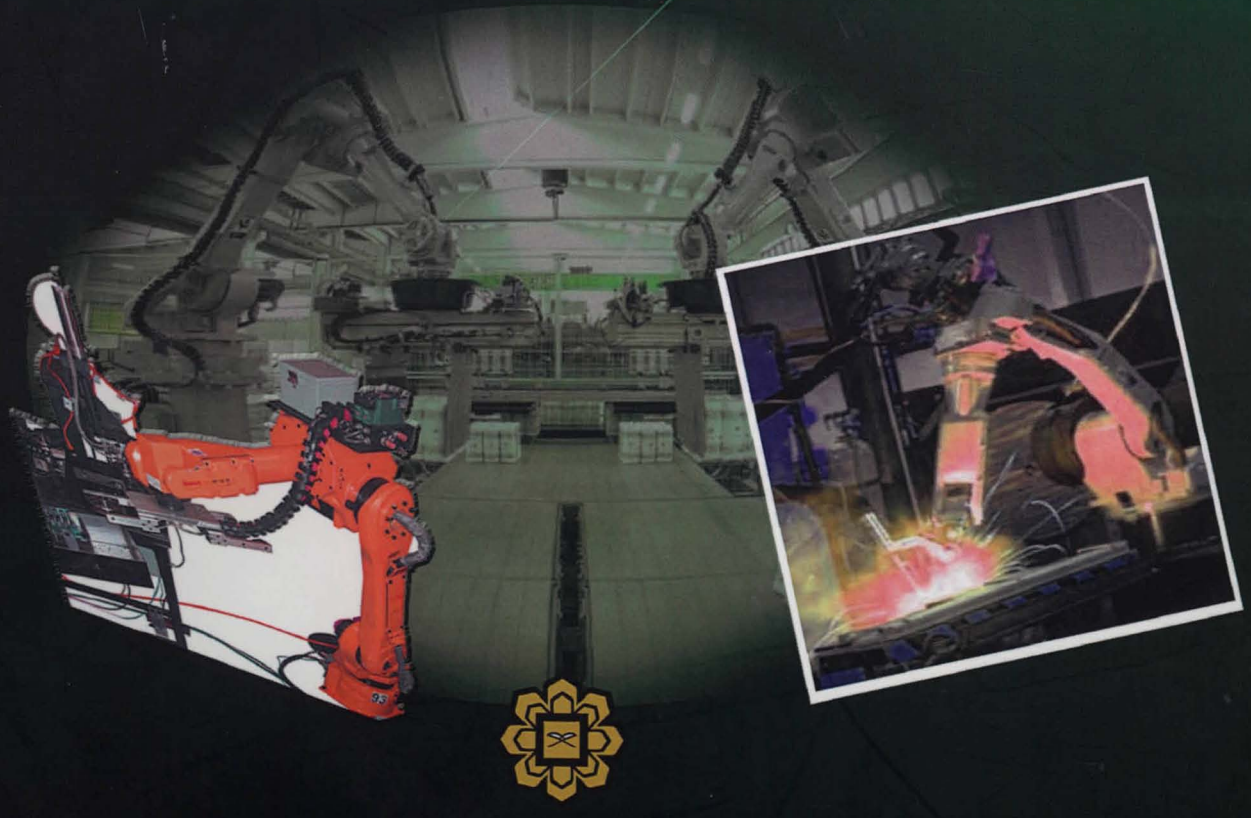
MECHATRONICS BOOK SERIES

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
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CHAPTER 33

A New Energy Efficient Building System

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33.1 Introduction

Energy efficiency refers to reduction of energy used but at the same time provides the same level or improved level of output [2]. It is a new approach to save energy, material resources, recycle materials and to minimize the emission of toxic substances

For the past years, there has been a tremendous growth on energy consumption rate thus raising the concern on the sufficiency of energy worldwide [3]. Besides the problem of efficient energy utilization, human comfort factor has also been identified as one of the factors to be considered while evaluating energy management [4]. Consequently, the two main areas highlighted in this project are; the lighting and cooling systems. This research proposed an approach of utilizing energy efficiently by proposing a control system for managing the current existing system.

Malaysia, air conditioners system has been noted to be the major users in office buildings (60%) followed by lighting (20%) and other equipment such as lift and pumps (20%), the detail is shown in Fig. 1. This paper presents the development of an intelligent cooling system enhanced with sensors and incorporated with the main controller, Fuzzy Logic (FL) system.

New idea of using fuzzy controller in controlling the lighting and cooling systems is being presented in this work. In pursuing this research, the Library of International Islamic University Malaysia (IIUM) was selected as the study case and for data collection purposes.

A small room was modeled as constructed as library prototype so as to test the performance of the proposed system.

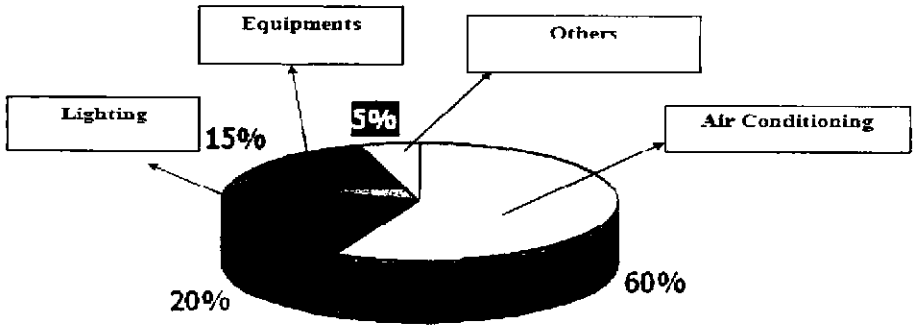

Fig. 1 Various field in energy consumption in building [1]

33.2 Literature Review

Zuojun and Wenlong proposed a variable air volume to control the air conditioning system. The proposed system uses the artificial neural network system [5]. The system will be using the variable air volume that function as the feed forward control. In a related work done by Mintang and Tong, the variable air volume is connected to the LonWorks intelligent control network [6]. The system will acquire real time data in order to observe the effect of the variable air volume.

Hangzhou and Zhejiang suggested that temperature and humidity decoupling method was the best solution to resolve the coupling problem that occurred in the central air conditioning system. Absolute humidity is used as an intermediate variable to control the system dew point, and