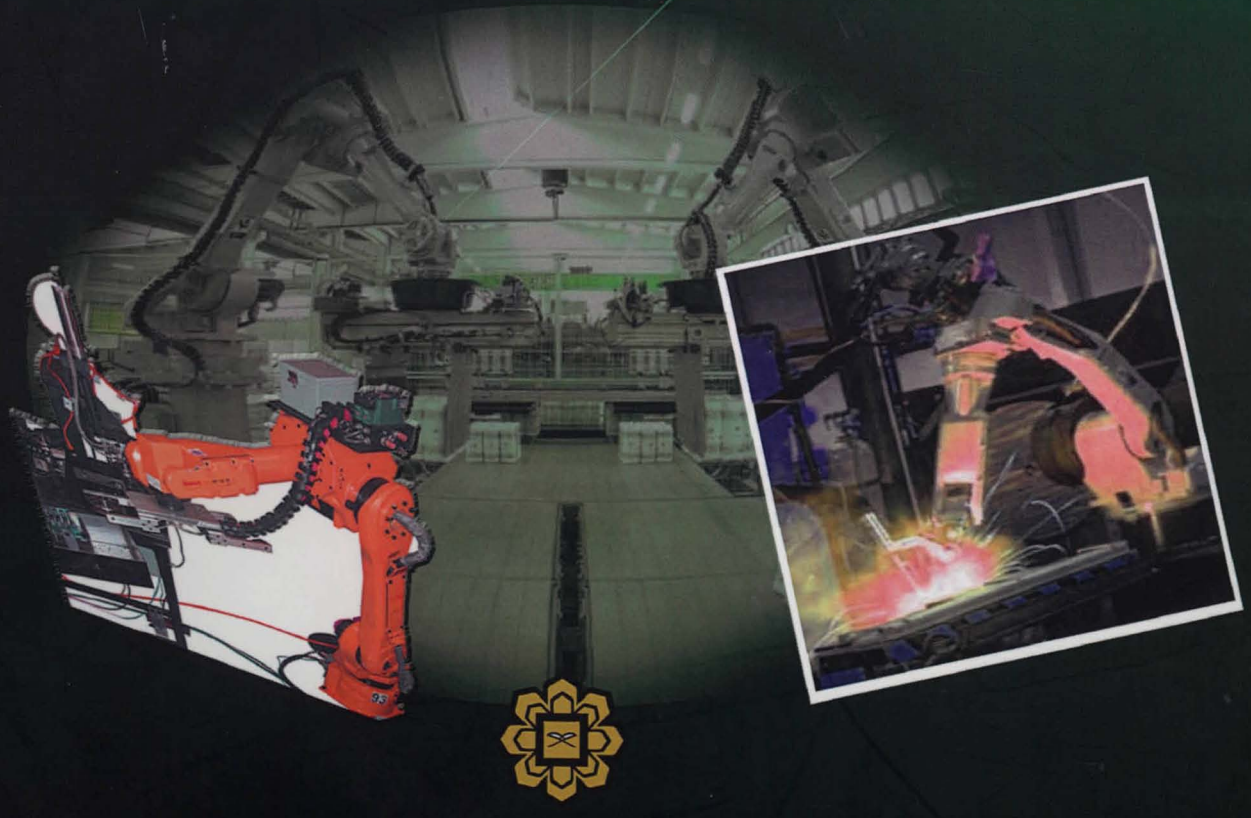
MECHATRONICS BOOK SERIES

ROBOTICS AND AUTOMATION

Rini Akmeliawati
Wahju Sediono
Nahrul Khair Alang Md. Rashid



IIUM PRESS

INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

MECHATRONICS BOOK SERIES: ROBOTICS AND AUTOMATION

Editors

Rini Akmeliawati
Wahju Sediono
Nahrul Khair Alang Md. Rashid

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Rini Akmeliawati, Wahju Sediono & Nahrul Khair Alang Md. Rashid: Mechatronics Book Series Robotics and Automation

ISBN: 978-967-418-152-9

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: +603-6188 1542 / 44 / 45 Fax: +603-6188 1543
EMAIL: iiumprinting@yahoo.com

TABLE OF CONTENTS

CHAPTER 25

Glass Wall Cleaning Robot: -Electrical Design and Control

Md Mozasser Rahman[1], Ahmed Murgab Mohammed Mahil[2], Nor sofiana Bt Umar[3] and Nurul Izzati Bt Samsuddin[4]

[1]Department of Mechatronics Engineering, IIUM, Malaysia

[1]mozasser@iium.edu.my, [2]abomurgab1@gmail.com, [3]sofie_umar@yahoo.com [4]ixaty@yahoo.com

25.1 Electrical hardware

Selection of Components and Description

A robot is not a simple affair to build, especially when you try to suspend it off of the ground. This particular robot has a few main sections:

- **The controller** --- this is the microcontroller, and some motor drivers.
- **Sensors** --- these allow the vacuum to know when it is activated and allow the robot to reverse
- **Pneumatics** --- these form the basis of motion, everything is done using pneumatics.
- **Suction** --- this is the primary force that keeps the robot on the wall.
- **Structure** --- something must exist to keep all of these parts together!

25.2 Controller

PIC Arduino Uno Microcontroller

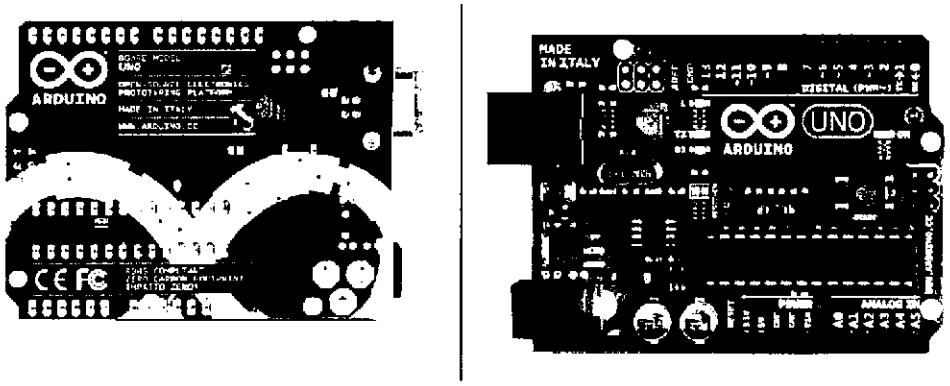


Fig. 1 Arduino Uno (microcontroller)

A microcontroller is a compact standalone computer, optimized for control applications. Entire processor, memory and the I/O interfaces are located on a single piece of silicon so, it takes less time to read and write to external devices.

The Arduino Uno PIC microcontroller is used to control "Cleaning Train Wall Bot" and all of its behaviors. The reason we choose this type of PIC is because it is easy to find and to use as well as it consumsi less power.

The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically.

External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm center-positive plug into the board's power jack. Leads from a battery can be inserted in the Gnd and Vin pin headers of the POWER connector.