

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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TABLE OF CONTENTS

Preface	i
Acknowledgement	ii
Editor	iii
Table of Content	v
1. Visual Tracking for Human Face A.A. Shafie, Iqbal and M.R. Khan	1
2. Robot Design : A Case Study of Team Learning Experience and Outcome A.A. Shafie	7
3. Development Neck Support for Humanoid Robot Head A. A. Shafie, M.N. Kasyfi and N. I. Taufik Y	14
4. Development of Cooperative Mini Robot Amir A. Shafie , Siti E.M.Z and Shazeela A	21
5. Humanoid Robot Arm Amir A. Shafie and Mohd N. Y.	26
6. Designing Human Robot Interaction for Emotionally Expressive Robotic Hear AMIR-III A. Iqbal, A. A. Shafie, and M. R. Khan	32
7. An Overview of Fuzzy Based Person Following Robot T. Alamgir, I. J. Alfar and M. M. Rashid	38
8. Mechanical Design of a Person Following Robot Tarik Bin Alamgir, Ibrahim Jawad Alfar and Muhammad Mahbubur Rashid	43

9. Development of Fuzzy Based Person Following Robot part 2	49
Tarik Bin Alamgir, Ibrahim Jawad Alfar and Muhammad Mahbubur Rashid	
10. Mobile Robot for Fined Tube Inspection	56
Muhammad Mahbubur Rashid	
11. Robot Aided Upper Limb Rehabilitation System: Mechanical Design	64
Shahrul Na'im Sidek, Hidayatullah Mohamed Nawi	
12. Robot Aided Upper Limb Rehabilitation System: Electronics for Sensors and Actuators	69
Shahrul Na'im Sidek, Khairul Anwar Khalid	
13. Robot Aided Upper Limb Rehabilitation System: Results and Analysis	73
Shahrul Na'im Sidek	
14. Snake Robot Locomation in Narrow Space: A Review	79
Raisuddin Khan, Mitsuru Watanabe and Masum Billah	
15. Multiple Hexapod Robot and Collaborative communication	86
Raisuddin Khan, Masum Billah and Mohiuddin Ahmed	
16. Autonomous Unicycle Robot Using Reaction Wheel Pendulum: Mechanical Design	94
Atika Adrina Teepol, Nur Fadhilah Mohd Fauzey, Shahrul Na'im Sidek, Yasir Mohd Mustafah	
17. Autonomous Unicycle Robot Using Reaction Wheel Pendulum: Controller Design	103
Nur Fadhilah Mohd Fauzey, Atika Adrina Teepol, Shahrul Na'im Sidek, Yasir Mohd Mustafah	

HISTORICAL BACKGROUND AND EDUCATION

19. **Develop an Algorithm for Goal Finding Robot using Reinforcement Learning** 118
M. Kamal, R. Khan, S. Bazuhair and M. Billah
20. **Design and Development of 2 Fingers Robotic Hand Actuated by Active Grasping Data** 126
MdMozasser Rahman¹,MohdZoolfadli B MdSalleh
21. **Design and Development of Interactive Fish Robot** 144
MdMozasser Rahman¹,RizaMuhida and Mohammad Zukhair b MohdNazmi
22. **Design and Development of A Digger Robot** 154
MdMozasser Rahman,MohdRuzaini Bin AbdRalim and Others
23. **Glass Wall Cleaning Robot: A Review** 170
Md Mozasser Rahman, Ahmed Murgab Mohammed Mahil, Norsofiana Bt Umar and Nurul Izzati Bt Samsuddin
24. **Glass Wall Cleaning Robot: -Electrical design and control** 177
Md Mozasser Rahman, Ahmed Murgab Mohammed Mahil, Norsofiana Bt Umar and Nurul Izzati Bt Samsuddin
25. **Glass Wall Cleaning Robot: -Electrical design and control** 187
M. M. Rahman, M. R. b A. Ralim
- ✓ 26. **Development of Robotic Manipulator to assist human using brain Signal** 198
Mahbuba Hossain, Raisuddin Khan, and Masum Billah
- ↳ 27. **Glass Wall Cleaning Robot: Mechanical Design** 204
Mahbuba Hossain Raisuddin Khan, and Masum Billah

28. Intelligent SCADA Based Monitoring Scheme for Low Voltage Distribution System	210
M. J. E. Salami, A. M. Aibinua, Mohd Shafie Bin Sani and Nurfaizal Bin Wah	
29. Intelligent SCADA Based Monitoring Scheme for Low Voltage Distribution System	218
Abdullateef Ayodele Isqeel and Momoh Jimoh Eyiomika Salami.	
30. Autonomous Goal Finding Robot	227
M. Kamal, Md. R. Khan, Faisal and M. Billah	
31. Intelligent SCADA Based Pipe Monitoring System	236
M. J. E. Salami, A. M. Aibinua, Mohd Shafie Bin Sani and Nurfaizal Bin Wah	
32. Path Tracking of Car Like Mobile Robot	250
A. A. Isqeela and M. J. E. Salami	
33. A New Energy Efficient Building System	255
M. J. E. Salami, Md. R. Khan, O. A. Abdulquadric	
34. Automatic Car Parking System	262
M. J. E. Salami, Md. R. Khan and O. A. Abdulquadria	
35. Anthropomorphic biped robot	267
A. A. Shafie, M. F. Baharudin	

CHAPTER 25

Glass Wall Cleaning Robot: -Electrical Design and Control

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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

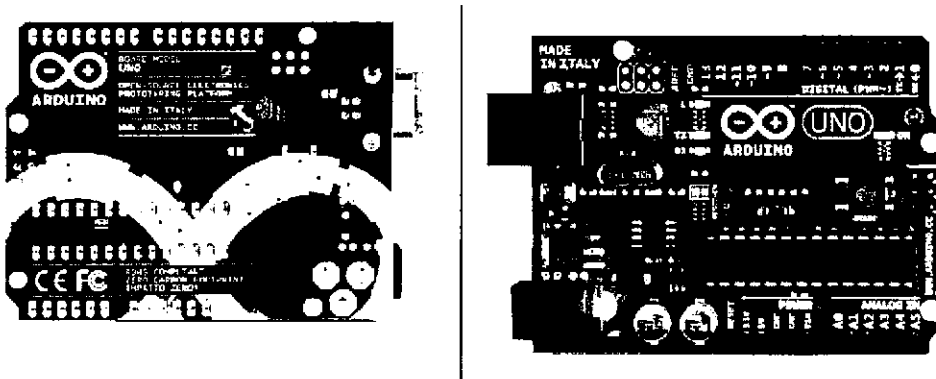


Fig. 1 Arduino Uno (microcontroller)

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 consumes 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.