

**INTELLIGENT LINE FOLLOWER ROBOT USING LDR SENSOR**

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**7 MAY 2008**

“I/ we have approve that I’ve read the Final Year Project report with my opinion this report is fulfill the scope and the quality to be honored with the Bachelor of Electrical Engineering (Control, Instrumentation and Automation).

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**This Report Is Submitted In Partial Fulfillment of Requirements for the Bachelor  
Degree of Electrical Engineering (Control, Instrumentation and Automation)**

**Fakulti Kejuruteraan Elektrik  
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**MAY 2008**

“I hereby declare that the report is the result of my own, as clearly stated in the sources of references and sources is explained and stated.”

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I dedicate this to both of my beloved parents, Abdul Manan bin Mohd Yusoff and Norani binti Abdul Hamid, my family, supervisor Madam Ainain Nur Bt Hanafi, friends and all electrical engineering community that determines to make the future of engineering lies in our hands.

## ACKNOWLEDGEMENT

Special thanks to my supervisor, Madam Ainain Nur Bt. Hanafi for his support, idea, knowledge and sharing his experience to fulfill the objective of this final year project. With her support I gain knowledge from this project. I have learned a lot of project management skill which include the time and cost effective to realize the project.

Also thanks to my friend for spending their time teaching me about the PIC microcontroller connection, which seems to be very difficult for me to understand before. Million thanks to all of my friends that giving me so much supports to obtain the outcomes of this project.

Lastly, thank you to all of my family that has spending many time and money to give a never-ending support. Without them my life would be nothing.

## ABSTRACT

This project is about design and implementation mobile robot kit that purpose to education .This mobile robot is capable to differentiate color lines. Microcontroller is use to control all the robot movement depend on the programming. The concept is the LDR sensors differentiate color lines based on color lines resistance. Two LDR sensors are use as an input that send signal to microcontroller to be processed. The compilation of output is showed by an application to a mobile robot which is moves due to the compilation of signal send by LDR sensors. Signal that come from PIC will control the wheel spin with the help of H-bridge and motor. Finally, this project has completed after a string of hardwork and energy done. The objectives achieved and robot capable to differentiate color lines and moved according to program. As for conclusion, Light Dependant Resistor (LDR) can be used to differentiate different color lines with different sensitivity levels.

## ABSTRAK

Projek ini adalah untuk mereka dan membina sebuah mobil robot bergerak untuk tujuan pembelajaran. Robot ini berkemampuan untuk membezakan sesuatu warna dan bergerak mengikut arah yang telah ditetapkan. Micropengawal digunakan untuk mengawal keseluruhan pergerakan mobil robot kit ini. Dalam projek ini PIC merupakan pengawal yang akan mengawal segala pergerakan mobil robot bergantung kepada aturcara yang telah ditetapkan. Terdapat dua penerima LDR berfungsi sebagai input yang menghantar isyarat kepada mikropengawal untuk diproses. Semua kompilasi output akan ditunjukkan melalui pergerakan mobil robot yang bergerak mengikut kompilasi isyarat yang dihantar oleh penerima. Isyarat-isyarat yang akan keluar daripada pin PIC akan mengawal pergerakan roda dengan bantuan H-bridge dan motor. Akhirnya, selepas segala usaha dan tenaga digunakan untuk menyiapkan projek ini, projek ini berjaya disiapkan. Objektif berjaya dicapai dan robot yang terhasil dapat membezakan pelbagai jenis warna dan bergerak mengikut aturcara yang telah ditulis. Secara kesimpulannya, perintang peka cahaya dapat digunakan untuk membezakan pelbagai jenis warna yang berlainan daya sensitivitinya.



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**LIST OF ABBREVIATION**

<b>PSM</b>	-	Projek Sarjana Muda
<b>PLC</b>	-	Light Dependant Resistor
<b>PC</b>	-	Personal Computer
<b>CPU</b>	-	Central Processing Unit
<b>I/O</b>	-	Input/Output
<b>DC</b>	-	Direct Current
<b>AC</b>	-	Alternate Current
<b>RAM</b>	-	Random Access Memory
<b>EEPROM</b>	-	Electrically Erasable Programmable Read-Only Memory
<b>LED</b>	-	Light Emitting Diode
<b>IC</b>	-	Integrated Circuit
<b>PIC</b>	-	Programmable Integrated Circuit
<b>LDR</b>	-	Light Dependant Resistor

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## CHAPTER I

### INTRODUCTION

#### 1.1 Introduction

Building a simple line following robot is a good entry point into the world of autonomous robotics. When developing a mobile robot, we can apply the principles of robotics. . This project aim is to a built a robot, controlled by a PIC microcontroller that able to perform the required tasks and instruction. The purpose of this project is to implement Light Dependant Resistor (LDR) on a mobile robot to differentiate color lines.

Line following robot is a combination of hardware and software parts. Hardware parts are sensor circuit, microcontroller circuit, voltage regulator circuit, motor driver circuit, chassis and wheels. Software parts are simulation software and programming software using C language.

Combination of hardware and software parts will produce a mobile robot that able to implement the tasks and programs structured.

## 1.2 Project Objectives

To achieve the requirements, I lined up several objectives of this project:

1. To design and built mobile robot using LDR sensor and analyze the outcome of the project.
2. By developing sensors, hardware and software, the project enables us to get a deeper understanding of what is required in the design of a mobile robot.
3. Expose students on how Programmable Integrated Controller (PIC) functioning as a logic control in robot design.

### 1.3 Project Scope

In general this project scopes are:

- Design circuit for:
  - LDR sensor
  - PIC microcontroller
  - Motor Driver
- Write program for microcontroller system.
- Circuit simulation using Proteus.
- Combine hardware and software part to combine a mobile robot.
- Present project result and analysis.

If there any problem or error in the robot operation, researches and experiments will be do again and robot design will be modified to achieve the expected results.

#### **1.4 Problem Statement**

Nowadays, line follower mobile robots used for education purpose are to be in the market. The implementation of this mobile robot can solved student's problems in

order to learn and studying how to create and design mobile robot. Students also get expose on how to connect Programmable Integrated Controller (PIC) to electronic components such as sensors, motor circuit, and so on. The application of control system also can be learn with this mobile robot project. This project also embraces relevantness of Light Dependant Sensor (LDR) usage in industrial applications nowadays.

## CHAPTER II

### LITERATURE REVIEW

Title : Simple Line Follower Robot

Author: Murat Dilaver Vural

: Atilim University, Department of Electrical and Electronics Engineering.

This project serves as a short term summer practice project for undergraduate engineering students in Atilim University. The purposes of this project are to allow the students to design and implement a model or a complete electromechanical system involving both mechanical and electrical hardware as well as software component that has a great educational value. This project objective is to develop and implement a robot which can follow a curve drawn on a surface with contrasting color, such as a black curve on a white surface.

The hardware design for this project is divided into several units that first can be tested or implemented separately and then combined together. These units are components needed in any basic design and implementation:

- Processing unit
- Mobility unit
- Sensory unit
- RS232 communication unit