TDD-FDP-CCE

First-Year Design Project (Technical Design Document)

Project Name	**LINE FOLLOWER ROBOT**		
Student	[1] Phan Thi Kim Cuong [2] Ha Thanh Duc [3] Tran Van Hien [4] Truong Cao Nam Khanh [5] Phạm Thanh Liem [6] Phan Tan Loi [7] Ngo Duc Long [8] Vu Xuan Phu [9] Nguyen Bao Tinh [10] Pham Ngoc Van [11] Nguyen Thanh Vinh	**ID**	20161074 20161306 20161314 20161095 20161331 20161337 20161333 20161083 20161383 20161395 20161397
Major	Electronics and Communication Engineering	**Supervisor**	Assoc. Prof. Phan Van Ca

Contents

▪ Revision History

Version	Date	Content of revision	Author	Supervisor
1.0	10-01-2021	Damaged arduino	Team	Assoc. Prof. Phan Van Ca
1.1	20-01-2021	More complete aesthetically	Team	Assoc. Prof. Phan Van Ca

▪ Terms and abbreviations

▪ References

[1] Cộng đồng arduino Việt nam: http://arduino.vn/.

[2] https://www.youtube.com/watch?v=t7k9D1jDEtk.

▪ List of Tables & Figures

1 Introduction

Robots were born very early to replace humans to do heavy and toxic things, bringing a great benefit to humans.
In the industrial age today, robots are increasingly widely used in production as well as in life. Due to the increasing and complex love of dogs, robots need flexible and responsive changes, especially mobile robots.

Mobile robot is a self-teleporting, autonomous robot capable of completing assigned jobs. In which line detection robot is a robot that can determine its relative position and move following a predetermined trajectory (magnetic line, color line).

Currently, line detection robots have seen widely and increasingly used in the field of ocean exploration, self-propelled in the air, in warehouse environments, factories to transport goods instead of humans or used to study techniques in competitions of different sizes.

2 Technical objectives

Propose a structural solution for the product and main components;

- ☐ Make necessary calculations, confirm the economic and technical criteria specified in the technical tasks;
- ☐ Make necessary principle diagrams, mounting diagrams…;
- ☐ Propose and demonstrate technical solutions, ensuring the reliability criteria, which have been specified in previous technical tasks and research stages.
- ☐ Design, manufacture and test models;
- ☐ Product evaluation of the ability to transport, store and install at use;
- ☐ Evaluation of operational criteria (miscibility, convenience in maintenance and repair, failures, product quality checks, assurance of technical status checks by means of testing) investigation has;
- ☐ Describe the final requirements for product research, design and manufacture, new materials to be used in the design product;

3 Concept/Technology

Line detector robot is a combination of the line detector modules and arduino. Each attachment has a certain role with the general purpose of controlling the robot to run on a given line.

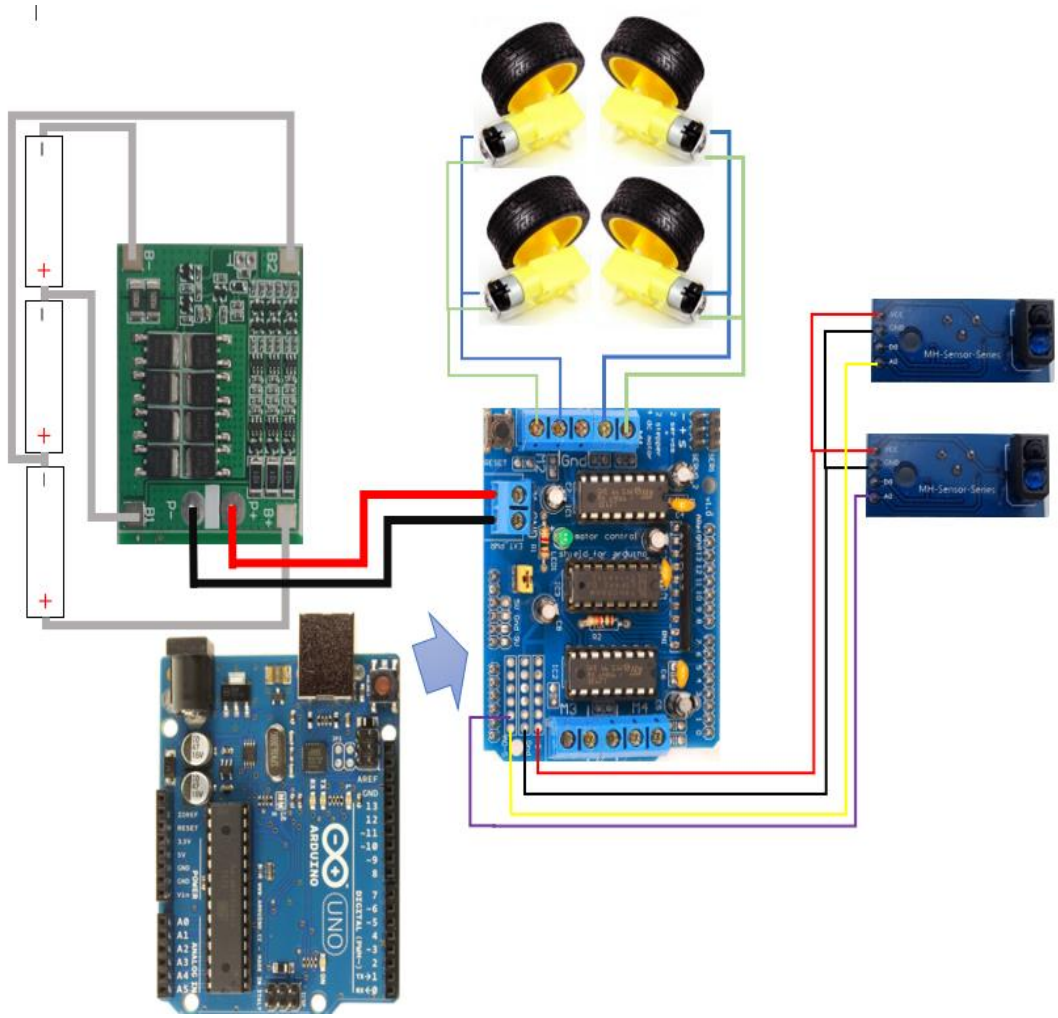
Line detector robot is a device capable of operating by itself:

- Robot automatically when power on.
- Robot stops when the power is turned off or out.
- Move according to the predefined line.
- Redirect when the line changes direction.

The system is capable of receiving signal to acknowledge the route

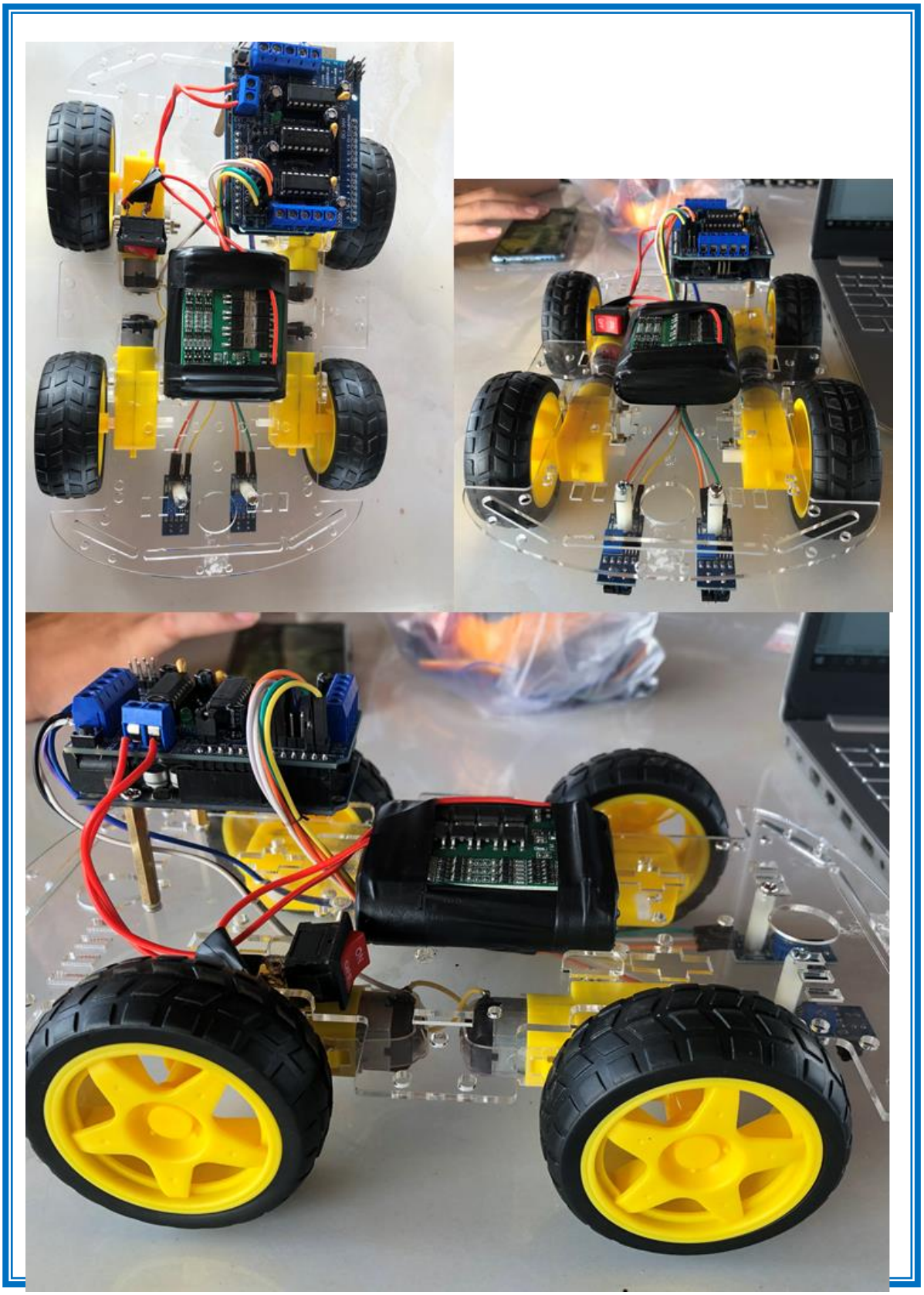
- The power supply works stably for a period of time.
- The power supply is easily swappable or rechargeable.
- Sensors work well for the robot to move the correct path to the user.

4 System Architecture



Shield L298D	Left Infrared Sensor Module	Right Infrared Sensor Module	Power Source	DC Motor
GND	GND			
5+	VCC			
A4	A0			
GND		GND		
5+		VCC		
A5		A0		
GND			**P-**	
M+			**P+**	
M1				DC 1
M2				DC 2

5 Final Product



6 Appendix

6.1 Division of Labor

ID	Task	Team Member
1	Buy materials- components	Pham Ngoc Van Phan Thi Kim Cuong
2	Design car	Tran Van Hien Pham Tan Loi Truong Cao Nam Khanh
3	Vehicle assembly	Ha Thanh Duc Vu Xuan Phu Ngo Duc Long
4	Installation of car-load trial run code	Nguyen Bao Tinh Pham Thanh Liem Nguyen Thanh Vinh
5	Fix errors	Team
6	Report	Nguyen Bao Tinh

6.2 Bill of Material

ID	Parts/Components	Amount	Price per Unit	Total
1	Arduino UNO R3	1	82.000	82.000
2	Motor Driver Shield	1	45.000	45.000
3	Infrared Sensor	2	12.000	24.000
4	DC Motor	4	29.000	116.000
5	Wheels	4	14.000	56.000
6	Rechargeable battery protection circuit and 3s	1	52.000	52.000
7	Battery 18650	3	47.000	141.000
8	Chassis + screws	1	55,000	55.000
9	wire	10	300	3000
Total		28		574.000

6.3 Gantt Chart

ID	Task	Time												
		January 2021												
		9	10	11	12	13	14	15	16	17	18	19	20	21
1	Buy equipment													
2	Design car													
3	Assembly													
4	Write code													
5	Fix error													
6	Write report													

6.4 User manual

- Create a roadway for vehicles with black glue or objects in black.
- Check for plugs, welds, other vehicle parts.
- Turn on the switch to drive the car. Observe and evaluate.