IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Impact Factor: 7.301
Volume 3, Issue 3, April 2023

Light Following Robot

M. Srinivasa Reddy[1], G. Nithin[2], Ms. B Priyanka[3]
Students, Department of Electronics and Communication Engineering[1,2]
Internal Guide, Department of Electronics and Communication Engineering[3]
Sreenidhi Institute of Science and Technology, Hyderabad, Telangana, India

Abstract: *The increasing demand of making the roads safer has trigged a lot of companies to develop complete self- driving cars. A self-driving car requires a great number of different sensors as gyros, radars, GPS, tachymeters etc. and advanced software. This thesis will focus on the possibilities of using only light sensing devices for a tracking robot and examine the advantages and disadvantages of this. The purpose is to investigate which type of light sensor is more suitable for a tracking robot and what the limitations of a tracking robot using this technology are. A demonstrator using two light sensors for controlling speed and direction and a color sensor to avoid obstacles will be built. Apart from choosing the most suitable sensor for a light-tracking robot the sensing distance and range of the chosen one will be tested. To investigate the different light-tracking possibilities and the accuracy of the demonstrator, the vehicle will be put in an open indoor space with arranged colored luminous obstacles. The robot will be tested in both a completely dark room and a lit room. The intention with the outcome is to see the differences of the robots behaviour when disturbances from surrounding light are added as an additional aspect. The results from the test are presented and the use of different sensors are discussed. The final conclusion on using light sensing for a tracking robot is that it is an easy and inexpensive method, but it should be used as a complement to other sensing devices not as a stand-alone method.*

Keywords: Motor Shield, LDRs, Node MCU

I. INTRODUCTION

The increasing demand of making the roads safer has trigged a lot of companies to develop complete self-driving cars. A self-driving car requires a great number of different sensors as gyros, radars, GPS, tachymeters etc. and advanced software. This thesis will focus on the possibilities of using only light sensing devices for a tracking robot and examine the advantages and disadvantages of this. The purpose is to investigate which type of light sensor is more suitable for a tracking robot and what the limitations of a tracking robot using this technology are. A demonstrator using two light sensors for controlling speed and direction and a colour sensor to avoid obstacles will be built. Apart from choosing the most suitable sensor for a light-tracking robot the sensing distance and range of the chosen one will be tested. To investigate the different light-tracking possibilities and the accuracy of the demonstrator, the vehicle will be put in an open indoor space with arranged coloured luminous obstacles. The robot will be tested in both a completely dark room and a lit room. The intention with the outcome is to see the differences of the robots behaviour when disturbances from surrounding light are added as an additional aspect. The results from the test are presented and the use of different sensors are discussed. The final conclusion on using light sensing for a tracking robot is that it is an easy and inexpensive method, but it should be used as a complement to other sensing devices not as a stand-alone method

- Alarm devices
- This technology can also be used to measure light intensity for application that require greater precision.
- Cameras can use this technology to determine the proper exposure time; laptops may use in a circuit that varies screen brightness according to ambient lighting conditions.

1. Both motors start and rotate forward at the same time. (Go ahead)
2. The right engine is running and the left engine is off. (move left)
3. The left engine is running and the right engine is off. (Move Right)
4. The right motor rotates forward and the left motor rotates backward. (flick left)
5. The left motor rotates forward and the right motor rotates backward. (Move right quickly)

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Impact Factor: 7.301
Volume 3, Issue 3, April 2023

II. OBJECTIVES OF THE SYSTEM

This type of robot can be used for military purposes, delivery services, transportation systems, assistance applications for the blind. Also, there are many annual races following robots organized by universities or industries from all over the world.

They usually ask robotics teams to build a small robot with a specific size and weight according to the competition rules.

III. RELATED WORK

The motor driver is used to drive motors. Then we add a motor driver circuit to provide enough voltage and current to the motor. IC L293D sends commands to this motor driver and then drives the motors.

Step1: Set up the Robot with specific Components such as Microcontroller, Motor Driver, LDRs etc. Step 2: Write a code which is suitable to Robot.

Step 3: Import code from Arduino Program to Microcontroller (Node MCU) using Laptop. Step 4: The Robot will follow the commands given in the Code.

Step 5: Then take that setup go to dark room, and make a light using Mobile torch or any other Light. Step 6: The Robot will follow according to the Light Frequency which we are giving to LDRs.

Step 7: Both motors start and rotate forward at the same time, The right engine is running and the left engine is off (move left).

Step 8: The right engine is running and the left engine is off(move left) And in some other directions by following Light

IV. SYSTEM ARCHITECTURE

Each sensor unit has a 10 nF capacitor in series with a QRE1113GR phototransistor. One end of the capacitor is connected to VCC and the other end of the phototransistor is connected to GND. The junction between the capacitor and the phototransistor is connected to a GPIO of a microcontroller via a 220 Ω resistor and is the OUTPUT pin. The phototransistor is like a transistor, and a transistor is like a valve that regulates the amount of electric current flowing through two of its three terminals. The third terminal controls how much current flows through the other two. Depending on the type of transistor, the current flow can be controlled by voltage, current or, in the case of the phototransistor, light and acts as a third terminal. In the case of the QTR sensor, the light is infrared (IR).

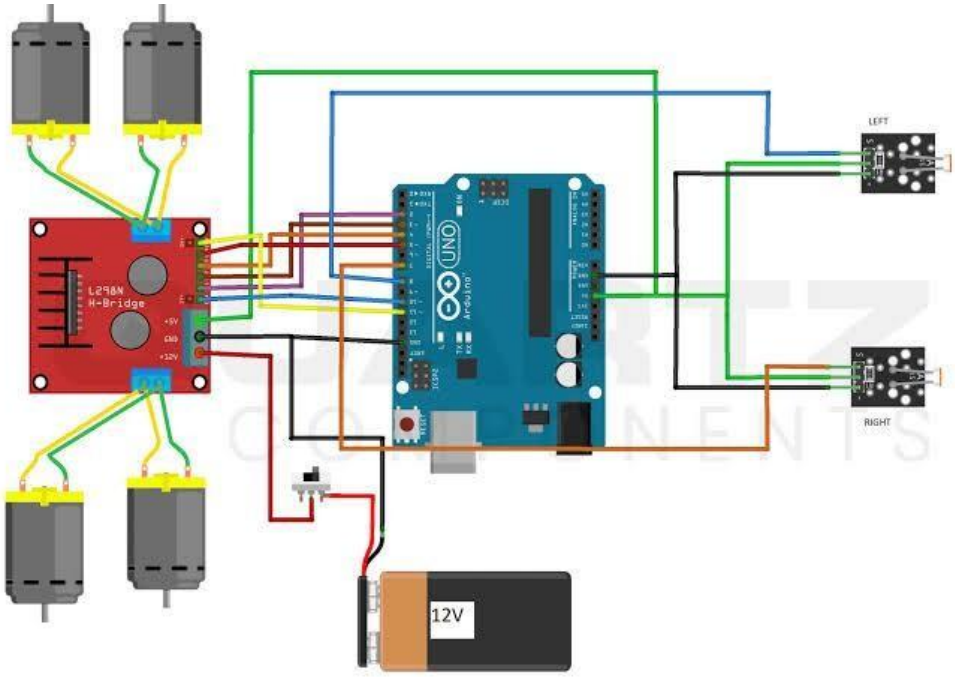

Fig 1 A Hardware setup

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 3, April 2023
Impact Factor: 7.301

The QTR uses a QRE1113GR infrared (IR) reflective sensor to determine the reflectivity of the underlying surface. When the sensor is on a black surface, the reflectivity is very low; when the QTR is on a white surface, the reflectivity is very high and will cause the sensor to read differently.

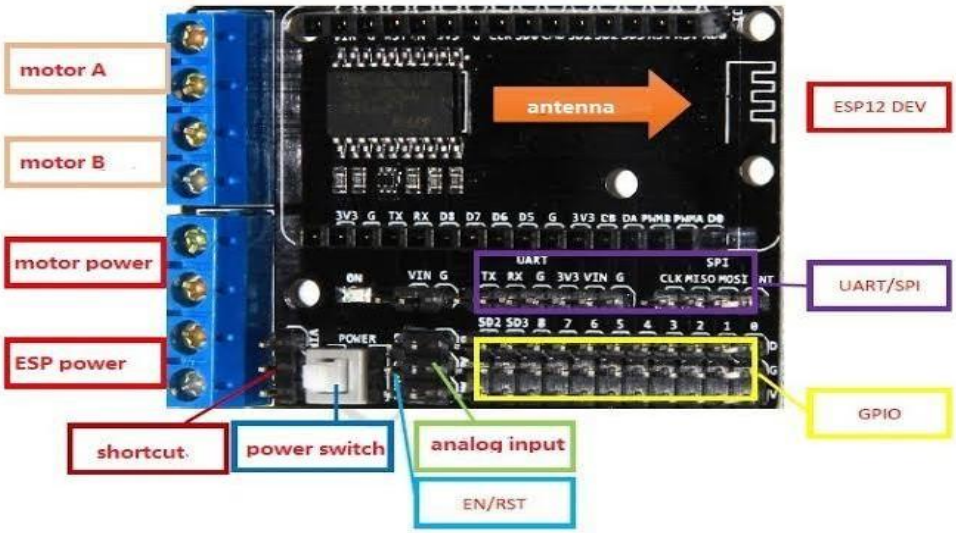

Fig 2: Motor Shield (Node MCU)

V. IMPLEMENTATION AND RESULTS

It is possible to construct a tracking robot using only light, but there are some restrictions, as previously stated. For the demonstration robot to function properly, additional sensors and more advanced software are required. When driving inside with interior lighting, the demonstrator's inability to avoid walls and open doors was one of its main issues. The issue might be solved by putting in place an infrared or ultrasonic sensor. The ability to control the vehicle's speed could also be interesting to further develop. The robot could again position itself at the brightest spot in the scanned area after using that system to scan the light intensity of a defined area. A thought could be utilized for an independent grass trimmer, one stacked with, say. The mower could find the sun on its own and use solar cells to recharge, eliminating the need for human intervention to get it to its charging station. More sensors would also be required in order to use this kind of tracking robot in places like mines and airports where humans cannot escape. For use in a mine you will require a planning framework and a nearbyroute framework, and a detection system with a fixed ground reference are required for its use in an airport (RL, 2016). The robot will be able to position itself with the aid of a ground reference system 24 and exact accuracy will be provided by an illuminated light. Additionally, autonomous vessels and sea lanes can benefit from the concept of red and green color sensing.

- Both motors start and rotate forward at the same time. (Go ahead)
- The right engine is running and the left engine is off (move left)
- The left engine is running and the right engine is off (Move Right)
- The right motor rotates forward and the left motor rotates backward (flick left)
- The left motor rotates forward and the right motor rotates backward. (Move right quickly)

VI. CONCLUSION

Being able to control the robot using only light cannot be the most accurate way. It is not impossible to follow the path but it is surrounded by some limitations. It can be achieved if the robot is supposed to follow light such as a flashlight , but the ability to allow the robot to drive freely in a room and seek out the brightest light source is unreachable without adding other sensors to avoid obstacles While it is not the best possibleway to build a tracking robot, could draw a conclusion based on the information determined during this methods? For this type of tracking robot, LDR wasselected as the most used light sensor. The ability to make robot avoid hurdle using only colored light was made possible with the use of a color sensor, and the easiest color to detect was red due to its long wavelength. In summary, using light

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Impact Factor: 7.301
Volume 3, Issue 3, April 2023

sensors for the tracking robot is a simple and cost-effective method, but it should be used as a complement to other tracking devices, not as a standalone method.

VII. ACKNOWLEDGMENT

We wish to express our deep sense of gratitude to our Internal Guide Ms. B PRIYANKA and project coordinator Dr. SN. CHANDRASEKHAR, Associate Professor (ECE) who have taken great care in the Project Work undertaken, by devoting his valuable time in advising and guiding us at each phase, leading to successful completion of our Project Work. It has been an educative and enlightening experience working with him. We are greatly indebted to Prof. Dr. S.P.V SUBBA RAO, Head of the department of Electronics and Communication for providing valuable guidance at every stage of this project Work. We are thankful to our principal Dr. T. CH. SIVA REDDY for providing valuable guidance and support at every stage of this Project Work. We are profoundly grateful to our director Dr. C. V. TOMY and college authorities for helping us in completing our Project Work. We would also like to thank all our faculty members and staff who supported us completing the project work.

REFERENCES

[1]. International Journal of Advance Foundation and Research in Science &Engineering (IJAFRSE0 Volume 1, Special Issue, Vivruti 2015.
[2]. Aiman Ansari et al, / (IJCSIT) International Journal of Computer Science andInformationTechnology, vol. 6(2), 2015, 1598-1600.
[3]. International Journal of Electronic and Electrical Engineering. ISSN 0974-2174,Volume7, Number 5 (2014), pp. 443-448.
[4]. International Journal of Engineering Trends and Technology (IJETT) –Volume 5Number 5-Nov 2013.
[5]. International Journal of Computer Science and Information Technology ConceptsVol. 2problem. 4, June 2014; ISSN: 2345-9808