



<https://www.doi.org/10.5281/zenodo.5675444>

LINE FOLLOWING AND OBSTACLE DETECTION ROBOT

¹ Anshad, ² Mrs. Marraynal S Eastaff

¹ PG Student, ² Assistant Professor,

^{1,2} Department of Information Technology,

^{1,2} Hindusthan College of Arts and Science (Autonomous),

^{1,2} Coimbatore, Tamil Nadu, India.

ABSTRACT - Line follower is a smart autonomous robot that detects or follows a visible line embedded in the ground. The trail is predetermined and can be selected with a high contrast color or with a black line visible on the trail surface. Infrared sensors are used to detect these lines. The robot movement is automatic and can be used for applications of long distances. It is the fundamental line follower robot's function. The device proposed for commercial, medical, rescue and military operations are extremely useful. In particular, these past constraints are no longer necessary with recent technological advances in computing. The production of tracking systems can now be made more capable of reliably estimating the target location behind the obstacle. The benefit of these technologies consists in the possibility of using an ultrasonic method for measurement without direct contact with a target. Different models and systems for indoor and outdoor object detection have been described in the literature. Using optical, heat base, infrared and ultrasonic approaches, object localization techniques were introduced. Indoor positioning systems monitor and locate objects and enclose environments inside buildings. Wireless methods, optical tracking, and ultrasonic techniques are used for object position detection systems. The goal of this study is to develop a monitoring system that follows certain paths and can detect objects and edges using ultrasonic frequencies. If some object is put, a regular line follower will try to move and smash the obstacle. This prototype of line follower robot tries to push the limit little to overcome this issue. It has been built in a way that any obstacle in front of it can be identified. It will stop and will not pass until the barrier remains. Also, it is able to identify every front edge and comply similarly. In industries, such as material handling, this type of robot performs many tasks. These robots are also used as machine-controlled carrier instruments in old conveyor belts switching industries

Keywords – [Robotics, LED, RFID.]

1. INTRODUCTION

Robotics is an improvement portion devoted to the plan, building, administration, creation, and arrangement of robots. Robotics is worried about the gadgets, designing, mechanics, and programming sciences. In robotics, aversion of obstructions is the errand of accomplishing some objective of the control subject to limitations on the area of

non-convergence or non-impact. Snag evasion is one of the key examination regions and is likewise an establishment for a development robot's victories. Due to its high proficiency and unwavering quality Robotics is currently ordinarily utilized in numerous enterprises. All versatile robots are intended to keep away from impediments. The engineering of an independent robot needs a few sensors and actuators to be arranged by their errands. Each independent robot must distinguished hindrances principally. The fundamental motivation behind why this framework is utilized for shipping merchandise is that it fits and fails to remember that the machine's activity is completely programmed after the gadget is put down on the predetermined way. The development of a robot to detect snags and edges is totally independent. As a result of these components, the most common way of following the line has numerous valuable applications.

A standard line keeping instrument is assembled utilizing minimal expense hardware to find obstructions and edge. The gadget will utilize a minimal expense following instrument. It expands the reasonable idea of the line GPS beacon as obstructions in any workplace are normal and if the line tracker can't meet any deterrent in transit it crashes and can be genuinely hurt. The robot gets information from its current circumstance by means of robot-based sensors. For staying away from hindrances, different kinds of sensors can be utilized. The aversion strategies relying upon the utilization of the sensor are unmistakable. A few robots achieve the discovery with a solitary detecting gadget.

2. RELATED WORK

This Line Following Robot, which is a piece of AGV (Automated Guided Vehicle), an independent robot in a straightforward term, can distinguish dark or white lines to follow them. Understudies have been fostering this sort of robots for some time. Be that as it may, the essential idea has consistently been the equivalent [1]. Also, line supporter robot contest held generally to empower understudies more with regards to it [5]. These robots decide the dark or white line utilizing Infrared beams. Furthermore, makes its way following that line. As the robot works completely independently designs have attempted to knock up its capacities to make it more dependable for useful utilization in different areas making it equipped for staying away from impediments [2].

This Line Following Robot, which is a piece of AGV (Automated Guided Vehicle), the independent robot in a straightforward term, can distinguish dark or white lines to follow them. Be that as it may, research has been done to make them fit for following any tone [3]. Light sensors dependent on LED or LDR and RFID based check frameworks have been utilized to update the line adherent robot to that level. How a Line Following robot runs depends on the sensor esteem it gets from the sensors. The right sensor esteem prompts the right outcome. That is the reason have an exact thought of those sensor information, etc. That is the thing that the specialists have done. They assembled their line devotee robot model as well as went through those information. In view of which the robot takes its choices [4]. A commonsense report has been done to carry out this in the model. Talking about taking care of useful life issues utilizing line adherent robots, in our homes video reconnaissance cameras are so normal. One downside of them is it is trapped in one spot. The creators of this paper recommend that these reconnaissance cameras can be utilized with line devotee robots [7].

Thusly, it will have a greater inclusion. The best idea we need for a line adherent robot is, it ought to have the option to go through the most basic way at all conceivable time. For example, we can specify T shape way, confounded circles, and basic points, etc. These things lead a line adherent robot to be awesome. Be that as it may, we need to utilize the base sensors conceivable to keep the value low. Specialists have gone through every one of these to make the ideal Line Following Robot [8].

3. PROPOSED SYSTEM

In the proposed framework we can presented the new kind of the robot that is liner following robot, its can consequently follow the line way just, and it have some sensor, in the way of line if any sort of snags happen molecularly the robot get stop by giving the caution. After the snag disappeared the robot get push ahead. It very well may be utilized for significant distance and furthermore utilized for the homegrown reason and modern reason. Creating and keeping up with cost is very low. In this proposed framework it is overseen by a few modules. The modules which are utilized in the proposed are referenced underneath.

Line Following Principle

Here in this line supporter robot, we are utilizing two IR sensor modules, left sensor and right sensor and two ultrasonic sensors. One of the ultrasonic sensors is looking in front to recognize the hindrance and another is looking down to distinguish edges on a superficial level. At the point when both left and right sensor detects dark then the robot pushes ahead.

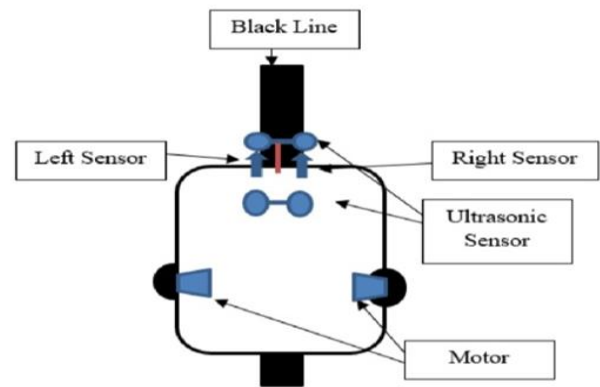


Figure 1 Moves Forward

However long it is getting a quantifiable dark line it is pushing ahead. Assuming the ultrasonic sensor distinguishes the impediment put on the dark line, the robot stops.

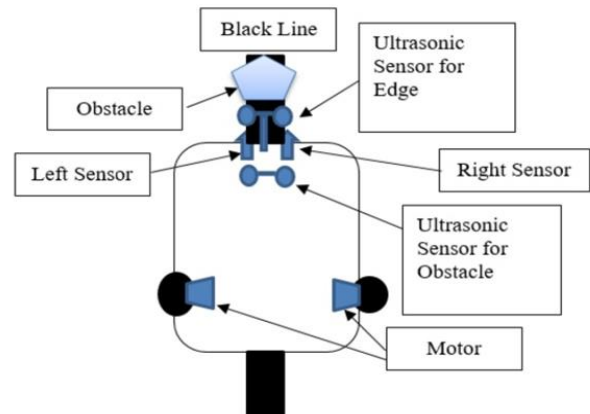


Figure 2 Motor Stops for Obstacle

It will continue to remain there as long as the obstruction is available. On the off chance that another ultrasonic sensor recognizes the edge, the robot stops also.

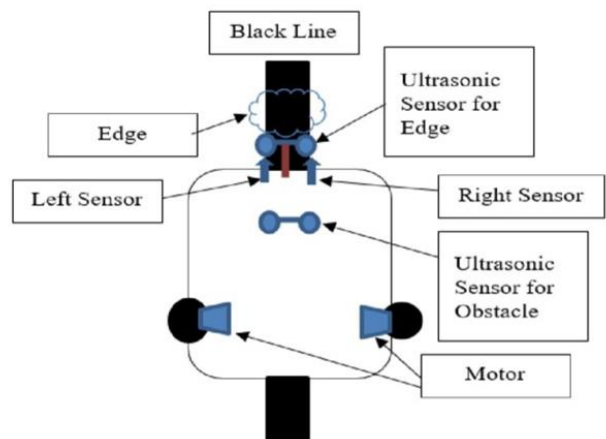


Figure. 3 Motor Stops for edge

Paths of Line Follower

Robot line supporter drives the track followed on the ground. The line is generally dark on a white surface. In case there's no hindrance or edge on its way, the robot continues to push ahead. In the event that the robot has any obstruction or edge coming, it will stop. Utilizing programming code the

development of the robot can without much of a stretch be changed for various ways. The robot will follow 45 ° and in an awful point, circle or awful bends. On the off chance that it sees an intersection of a dark line it stops.

CONCLUSION

Robotics have a huge impact in the worldwide economy and daily existence. One more test of robotics research is to be fruitful and to foster licenses as per the intricacy of their applications for worldwide ventures. The market for robotics innovation is ascending in a wide assortment of uses and human exercises, especially for the assembling, clinical, utility, safeguard and purchaser enterprises. This line adherent and deterrent with edge distinguishing robot is the model of robots for modern use. This shrewd and wise robot has more advantages since it doesn't devour a lot of force. Our task targets making an independent robot that insightfully faculties the impediment and the edge in its way and explores as indicated by the conduct that we have set for it. Along these lines, what this framework gives is an option in contrast to the current framework by supplanting skilled work with mechanical apparatus, which thusly can deal with more patients quicker than expected with better precision and a lower cost. Execution can be improved by utilizing great materials and incredible detecting power likewise works on engine development. The arrangement cost of the line adherent robot relies fundamentally upon the expensive hardware, property, and building and staff nonstop to keep up with and utilize the apparatus.

REFERENCES

- [1]. Cao QuocHuy, "Line Follower Robot", University UPG din Ploiesti.
- [2]. Chowdhurya, Nakib Hayat, DeloaraKhushib, and Md Mamunur Rashidc."Algorithm for line follower robots to follow critical paths with minimum number of sensors."International Journal of Computer 24, no. 1 (2017): 1322.
- [3]. F. Kaiser, S. Islam, W. Imran, K. H. Khan and K. M. A. Islam, "Line follower robot: Fabrication and accuracy measurement by data acquisition," 2014 International Conference on Electrical Engineering and Information & Communication Technology, Dhaka, 2014, pp. 1-6.
- [4]. Gao Y., Fu G., Nieto A. A comparative study of gas explosion occurrences andcauses in China and the United States. Int. J. Min. Reclam. Environ. 2015; 30:269–278. doi:10.1080/17480930.2015.1043770.
- [5]. K. M. Hasan, A. Al-Nahid, K. J. Reza, S. Khatun and M. R. Basar, "Sensor based autonomous color line follower robot with obstacle avoidance," 2013 IEEE Business Engineering and Industrial Applications Colloquium (BEIAC), Langkawi, 2013, pp. 598-603.
- [6]. Kahe, "AVR Microcontroller", Nas Publication, 2007.
- [7]. Kasprzyczak L., Trenczek S., Cader M. Robot for monitoring hazardous environments as a mechatronic product. J. Autom. Mob. Robot. Intell. Syst. 2012; 6:57– 64.
- [8]. M. B. Nugraha, P. R. Ardianto and D. Darlis, "Design and implementation of RFIDline- follower

- robot system with color detection capability using fuzzy logic," 2015International Conference on Control, Electronics, Renewable Energy and Communications (ICCEREC), Bandung, 2015, pp. 75-78.
- [9]. M. Mashaghi, "Robotic Guide", Kanone Oloum Publication, 2008.
- [10]. M. Pakdaman and M. M. Sanaatiyan, "Design and Implementation of Line Follower Robot," 2009 Second International Conference on Computer and Electrical Engineering, Dubai, 2009, pp. 585-590.
- [11]. M. Pakdaman, M. M. Sanaatiyan and M. R. Ghahroudi, "A line follower robot from design to implementation: Technical issues and problems," 2010 The 2nd International Conference on Computer and Automation Engineering (ICCAE), Singapore, 2010, pp. 5-9.