Line Tracking Robot Using Labview

Manoj L[1], Maheshan C .M[2], H.Prasanna Kumar[3]
[1] Dept of EEE
[2, 3] Assistant Professor, Dept of EEE
[1, 2, 3] University Visvesvaraya College of Engineering, Bangalore

Abstract- *Robot is a machine which is capable of carrying out a complex series of actions automatically. The Line follower robot is designed to develop a robotic vehicle that follows a specific path. In this project we use an arduino Uno controller for its operation. A pair of photo sensors comprising IR transmitter and photo diode is interfaced to the controller to detect the specified path for its movement. Line follower robot is a useful robot that is used in ware houses, industries, and stores etc, where it follows a dedicated path. This proposed system of a line following robot fulfils the desired functionality and demonstrates the working of it. It uses a pair of photo sensors, comprising of one IR transmitter and a photo diode in each. It guides the robot to follow a specified path by giving appropriate signal to the controller. Two DC motors are used interfaced to the controller through a motor driver IC. Input signals given to the controller from the sensors and then the controller takes the appropriate action according to the code written in it and drives motors as desired.*

Keywords- Arduino Uno, IR sensor, H Bridge

I. INTRODUCTION

Line tracker robot is build to follow a black line predetermined by operator. This black line is simple as physical black line on the floor put by the operator. These lines are detected by the sensors and sends signal to controller for further purpose. The main purpose of this robot is to just follow black line which leads to final destination. Line following robot has been implemented in semi to fully autonomous plants. Here the robots functions as materials carrier to deliver products from one manufacturing point to another where rail conveyor cannot reach. In manufacturing plants the improved version of this robot with pick and place capability are used. These move on a specified path to pick the components from specified place and put them on predetermined locations. Basically, a line-following robot is an automatic and self-operating robot that detects and follows a line drawn on the floor. The path to be taken is indicated by a black line on a white surface where the IR sensor can sense the floor.

II. IMPLEMENTATION

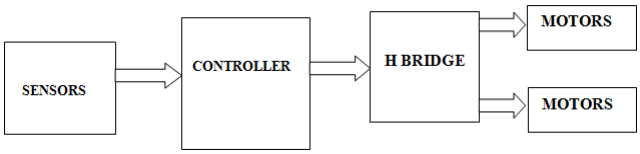

Fig 1: Block diagram of line tracking robot

The above block diagram shows the components used for the working of the line following robot, they are namely, IR sensors, Arduino board, DC motors and a DC motor driver. Here the arduino board is connected or interfaced with the Lab VIEW. IR sensor sense the black line and sends to controller and controller sends message to dc motor through motor driver to take suitable actions such as to take right or left or forward. The following table shows the working of motor logic.

Table 1: MOTOR LOGIC

MOTION	RIGHT IR SENSOR	LEFT IR SENSOR
FORWARD	1	1
RIGHT	0	1
LEFT	1	0

The line following robot is one of the self-operating robots that detects and follows a line drawn on the floor. The line is indicated by white line on a black surface or black line on a white surface. This application is depends upon the sensors. Here we are using sensor for path detection purpose is IR sensor.

The IR sensor used for obstacle detection. These sensors mounted at front end of the robot. The controller is an intelligent device the whole circuit is controlled by the controller**.**IR senor detects the light emitted by the transmitter if the receiver receive the light the wheel of that side will keep on moving as soon as the receiver stops receiving the light.

Black colour absorbs light thus no light is reflected so receiver cannot receive any light. As shown in table whenever both sensors detect i.e. right and left sensors robot moves forward. When left sensor detects it take right turn and when ever right sensor detects robot take left turn.

III. DESCRIPTION

3.1 ARDUINO UNO: Arduino UNO is a widely used open source microcontroller board based on ATmega328P microcontroller. It contains sets of digital and analog input and output pins that can be interfaced to other circuits. It contains 14 digital pins and 6 analog pins and can be powered by USB cable.

3.2 IR SENSORS: An infrared sensor is an electronic device that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually in the infrared spectrum, all the objects radiate some form of thermal radiations. These types of radiations are invisible to our eyes that can be detected by an infrared sensor. The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, the resistances and these output voltages, change in proportion to the magnitude of the IR light received.

3.3 H-BRIDGE: The DC motor driver L293D is a typical Motor Driver IC which allows DC motor to drive on either Clockwise or anticlockwise direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in either direction. That means we can control two DC motor with a single L293D IC. It works on the H-bridge concept. H-bridge is a circuit that allows the voltage to be flown in either direction.

As we all know that voltage need to change its direction for being able to rotate the motor in clockwise or anticlockwise direction. Hence H-bridge IC is the best option for driving a DC motor. In a single L293D chip there are two h-Bridge circuit inside the IC that can rotate two dc motor independently.

IV. SOFTWARE

Laboratory virtual instrument engineering workbench commonly known as LABVIEW, is a design platform/environment as a visual programming language from national instruments. It is a graphical design platform wherein users can create a flow diagram to perform any type of mathematical, control system, measurement and data acquisition operation. LABVIEW has many in- built modules which contain blocks for design, analysis and visualization of data.

Some uses of LABVIEW are listed as

1. Instrument control
2. Automation industry
3. Data acquisition
4. Embedded control systems

LABVIEW programming environment:

LABVIEW's graphical interpretation of any model is called a virtual instrument or VI in short. Each VI contains block diagram and front panel.

Front panel: Front panel is the user interface VI which has the input and output control, indicators and graphs.

Block diagram: the block diagram panel contains the functions and graphical code. The wiring and actual modelling of a program is done in the block diagram panel

V. APPLICATIONS

5.1 Industrial Applications: These robots can be used as self guided tool carriers in industries replacing traditional conveyer belts and rails.

5.2 Automobile applications: These robots are also used as automatic cars running on roads with embedded magnetic tools.

5.3 Domestic applications: These can also be used at homes for domestic purposes like floor cleaning etc.

5.4 Guidance applications: These robots can be used in public places like shopping malls, museums etc to provide routes.

VI. CONCLUSION

In this project we have studied and implemented a Line Following Robot using arduino and LABVIEW. The programming and interfacing of arduino has been mastered during the implementation. Thus we conclude that the design of Line tracking robot is implemented automatically by using Lab VIEW has been achieved. This model is used in various applications like defence, hazardous industry for safety, navigation, surveillance and security purposes. There are much more software's which are used for designing the line

follower Robot, but Lab VIEW is the easier as compared and no code is needed to run the software since it follows graphical coding.

REFRENCES

[1] Line Follower Robot Using Lab VIEW by Ashwini1, Nagraj Kyasa2, Don Bosco Institute of technology/Electronics and communication Dept., Bangalore, India
[2] Waghamodeashwini04@gmail.com, Don Bosco Institute of technology/Electronics and communication Dept., Bangalore, India, Nagaraj.kyasa@gmail.com
[3] Design and Fabrication of Line Follower Robot M. S. Islam & M. A. Rahman Department of Electrical and Electronic Engineering, Rajshahi University of Engineering and Technology