Estrangement of Gadgets by Line Follower Robot Using Aurdino in Learning Centre

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Abstract:- Line Follower Robot, as the name suggests, is an automated guided vehicle, which follow a visual line embedded on the floor or ceiling. Usually, the visual line is the path in which the line follower robot goes and it will be a black line on a white surface but the other way (white line on a black surface) is also possible. They are also used in military applications, human assistance purpose, delivery services etc. Thus, hardware components as well as software programming are concurrently developed with each other. A sensory system also attached for completing the operational loop. Experimental operation shows fully successful for the developed system. This idea deals with the increasing need for segregation of more number of gadgets in learning center, where things are expected to be done within a short period of time. The Line Follower robot is a robot that follows a specific path on the ground, for this application the line follower robot follows a black line while conveying the object placed on it by the robot from one point to another. It is like a robot car that follows a designated path. This robot can identify obstacles rightward, leftward and in front obstacles while following its designated path on it pathway. The design includes knowledge of Arduino programming and the robot has three sensors connected in three ways round for better obstacle detection and two infrared sensors with a connection of a motor driver IC (L293D).

keywords:- Arduino, IC(L293D).

I. INTRODUCTION

Our modern civilization is progressing towards self-governing work day by day for diminishing unnecessary human efforts on idiot-proof matters and ensuring more comfort and safety for the concentration on other important works. The word "robot" emanates from the Czech word for obligatory labor or serf. Robots are electronic devices intended to dispatch a desired function. Many refer to them as "machines", however, a drill press is a machine, yet it inessential operator to dispatch its function, where robots can be programmed to do it themselves. Robots have the potential to change our economy, our health, our standard of living, our mastery and the world in which we live. As the technology progresses, we are unearthing new manner to use robots. Each new use brings new aspiration and possibilities, but also

potential jeopardy and peril. Robotics is not only a science, but it is also an art. The bots we erect bounce back the recommendation and personalities we portray.   There are many different versions of robots that can bemold. From turtle bots to vehicles like the Mars rovers turnovers like R2-D2. From walkers that have anywhere from 1 to 10 legs to robotic arms androids. Whatever you can dream, you can create. The level of expertise you want your robot to have and how much wisdom and scrutiny you want to do is up to you. For those who have comparable experience in computer programming and electronics, this may come idiot-proof to you than anyone new to the hobby. Those who erect models, RC vehicles, and other artwork will perceive it, exigent to modify some of their previous projects. In earlier days, the modern enlightment was not that burgeon to make robots as flawless for some specific works as of now. Robot is a machine that does the bother the robot constructor wants it to do. It serves several purposes.

Orienting towards robotic arms, object recognition is vital for the operation of arms for pilotage and penny-pinching tasks. Often it has been the case that image processing (IP) algorithms entail colossal processing time for the triumphant implementation of object recognition.

A robot is a machine that is usually designed to reduce the amount of human endeavor where it is applicable. It is usually matured for diminishing menace factor for human work and increase comfort off any worker. Besides this, it helps men to do other works as it helps to clear of some time for some idiot-proof works. By implementing the job of line follower robot in wisdom center helps the person to sort out the books in subject-wise using barcode reader.

II. LITERATURE REVIEW

Deepak Punetha, Neeraj Kumar, Vartika Mehta [2015]describes the techniques for analyzing, designing, controlling and improving the health care management system. A line following robot carrying medicine has been designed for providing the medicine to the patient whenever they need it. When the LDR receives maximum amount of light then its resistance goes to its minimum value, ideally zero and when no light falling on the LDR then its resistance goes to its maximum value, ideally infinitive. If the patient

presses the switch then a flag bit set in the microcontroller, from which line following robot follows the line and got reached near the patient and provide the medicine to the patient with the help of dc motor.

Aamir Attar, Aadil Ansari, Abhishek Desai, Shahid Khan [2014]proposed system designed to build a line follower and obstacle avoidance bot using IR sensor and ultrasonic sensor. ROBOT has sufficient intelligence to cover the maximum area of space provided. It will move in a particular direction specified by the user and avoids the obstacle which is coming in its path. Autonomous Intelligent Robots are robots that can perform desired tasks in unstructured environments without continuous human guidance. The path can be visible like a black line on the white surface (or vice-verse). The base of the robot is Arduino UNO R3 which is a microcontroller board based on the ATmega328 (datasheet).

Ebiesuwa ,Adekunle, Akinyemi [2016]proposes a new model for line follower robots built using microcontrollers and this new model has not been in existence before. This new model proposes the adoption of sophisticated color sensors to enable the robot to be able to detect its path in the shortest possible time which is in the order of nanoseconds and is far faster than the time it takes all the other existing line follower robots to detect their path. The new feature provided in this new model is absent in all the other existing models. The mechanical engineer presented the king with a human shaped figure which had the capability to perform human-like tasks to the extent that it was taken for a human being.

Z.A Rashid, N.M Shah, S.M Aras, N.Kamaruddin [2012]proposed method for a new type of line following robot that uses metal sensor to detect metal line and maneuver around based on that line. The paper focused on developing the hardware model of automated guide vehicle (AVG) system and integrating it with metal detection sensor. A metal line with certain length can be placed on the desired floor to indicate the path that the robot requires to move. This sensory system can be used as alternative sensor instead of using line following sensor which normally based on the infrared proximity detector. The line following robot that operates based on the metal line capable to overcome the problem of different light intensity reflection.

III. OBJECTIVES OF THE STUDY

The robot must be capable of following a line.

- It should be masterly of receipts variegated degrees of turns. It must be concoct of a circumstances that it whizz

- Into a territory which has no line to hound. (Barren land syndrome). The robot must also be masterly of hounding a line

- even if it has breaks. The robot must be insensitive to environmental

- factors such as lighting and noise. It must sanction calibration of the line's darkness

- threshold. The robot must be reliable

- Scalability must be a primary concern in the

- design. The color of the line must not be a factor as long as

- it is darker than the surroundings.

IV. SCOPE OF STUDY

The robot can be further enhanced to let the user decide whether it is a dark line on white background or a white line on a dark background. The robot can also be programmed to decide what kind of line it is, instead of a user interface. The motor control could be modified to steer a convectional vehicle, and not require a differential steering system. The robot could be modified to be a four-wheel drive. Extra sensors could be attached to allow the robot to detect obstacles, and if possible bypass it and get back to the line. In other words, it must be masterly predicting the line beyond the obstacle. Speed control could also be incorporated. Position and distance sensing devices could also be built in which can transmit information to a mother station, which would be useful in tracking a lost carrier.

V. BLOCK DIAGRAM

Firstly, we chose a configuration to evolve a line follower only using two infrared sensors with link of Arduino Uno through motor driver IC. We tread on the heels of a block diagram on this deem.
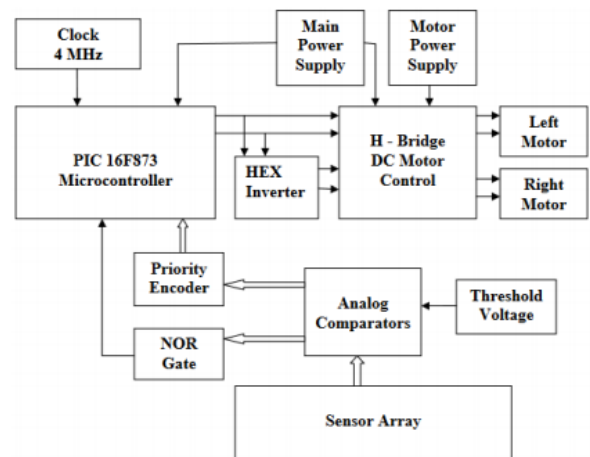

Fig 1:- Block diagram of a line follower robot

The block diagram illustrates the link for the conglomeration of the line follower which hounds a black line on white surface After that, we have used the following block diagram for connecting three sonars with our line follower for hindrance revelation purpose for our line follower the work

consists of microcontroller, sensor unit and a control unit. It soothe to procure pigeonhole of obvious specific books from learning center drop box into final rack of each subjects. The mechanical part or body of the robot can be designed using AutoCAD or Workspace. A basic Line follower robot can subsist of a pedestal at the two ends of which the steering are mounted. A rectangular sheet of strenuous bogus can be used as the subsist. Further aim mutable body like a cylinder can be reckoned along with other shaped bodies inter link with each other by joints, and each with its elucidated motion in particular direction.

The Line follower robot can be a revolved mobile robot with a fixed sudsist, a legged mobile robot with multiple immutable bodies interconnected by joints, the control of the robot is the most important aspect of its working. Here the term control refers to the robot motion control, i.e. controlling the coalition of the steering. A basic line adherentrobotpalpable bridleway and the locomotion of the robot along this palpable is controlled by controlling the gyration of disc, which are placed on the shafts of the two motors. So, the basic control is achieved by controlling the motors. The control circuitry necessitate the use of sensors to sense the palpable and the microcontroller or any other device to control the motor operation through the motor drivers, based on the sensor output.

VI. HARDWARE DESCRIPTION SENSORS (IR SENSOR)

We have used IR Sensor Module as the line spotting sensor for the project. It consists of an IR LED and a Photo diode and some other components like comparator, LED etc.

A. Controller (Arduino Uno)

Arduino UNO is the main controller in the project. The data from the sensors (IR Sensors) will be given to Arduino and it consign dovetail signals to the Motor Driver IC. The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14digitalinput/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB link, a power jack, an ICSP header, and a reset button.

B. Motor Driver (L293d)

L293D Motor Driver IC is used in this project to drive the motors of the robot. It sustain signals from Arduino based on the information from the IR Sensors. A motor driver IC is an integrated circuit chip which is habitually used to control motors in autonomous robots. Motor driver ICs act as an interface between microprocessors in robots and the motors in the robot. The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously.

C. Motors (Geared Motors)

We have used two geared motors at the rear of the line follower robot. These motors provide more torque than normal motors and can be used for carrying some load as well.

VII. WORKING OF ROBOT

In this project, we have depictan Arduino based Line Follower Robot. The working of the project is charming simple: perceive the black line on the surface and move along that line. The circumstantial working is explained here. As mentioned in the block diagram, we need sensors to detect the line. For line perception logic, we used two IR Sensors, which subsist of IR LED and Photodiode. They are placed in a reflective way i.e. side– by – side so that whenever they approach in to proximity of a reflective surface, the light emitted by IR LED will be perceived by Photo diode. The patronage image shows the working of a typical IR Sensor (IR LED – Photodiode pair) in front of a light-colored surface and a black surface. As the reflectance of the light-colored surface is high, the infrared light emitted by IR LED will be maximum reflected and will be perceived by the Photodiode.

VIII. FLOW CHART

The system for the line follower is designed using a flow chart defining, how it will be following its nominate line in its path. This flow chart contains the method, how the robot is taking decisions on its pathway. Line follower robot is mainly defenseless on sensor system and its process is slow. The robot is made to be able to reach faster towards its intention so that it becomes speedier and more effective for its work
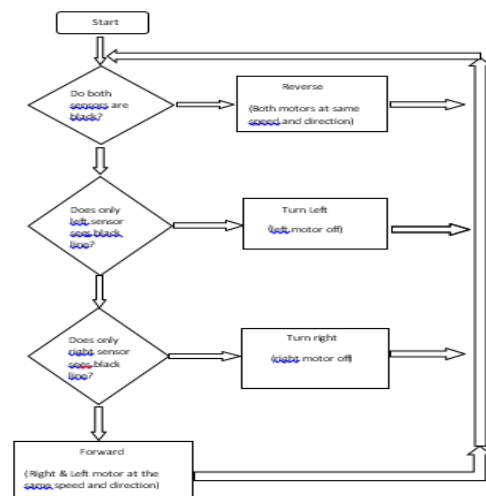

Fig. 2 :- Flow Chart of Line Follower Robot

IX. PROCEDURE OF SENSING THE LINE

The line follower robot is a kind of a design which is similar as a light follower robot. Here, besides sensing the light, the sensor is used for detection of a line. Therefore by analyzing the color of line and its enclosing, any light

conscious sensor could be used for navigation of the robot to follow its lable track. The design of the robot was made like; it had one pair of Infrared ray sensor fitted beneath the robot. So Infrared ray sensor will first be sending a wavelength for detecting black line and then other infrared ray sensor will be receiving the information and take decision for following a black line on white surface. For line sensing operation, IR sensors are the one which are widely used for the development of a line follower robot. There are some basic things to follow where white surface of the black line reflects light and the black line receives it after the transmission. Two resistorsR1 and R2 are used which limits current. Other resistors (R3, R5, R6, R8) forms individual voltage divider networks which is in connection with the designed LDR's. When the sensor is properly classified, both LED/LDR pairs will run over the white surface. In this condition, sufficient amount of light gets reflected back to the LDRs. When the robot is mounted to one side, the sensor in the opposite side falls over the black line and the intensity of light reflected back to the corresponding LDR will be low. The voltages dropped across the right and left LDRs (nodes marked R and L in the above circuit) are given as input to the analogue input pins A3 and A4 of the Arduino board. The line sensors are made using LDR and LED for making a line follower robot. A 1K resistor across the LED, a series connection of 10K resistor and 10K variable with the LDR are major resistive and sensor connections.
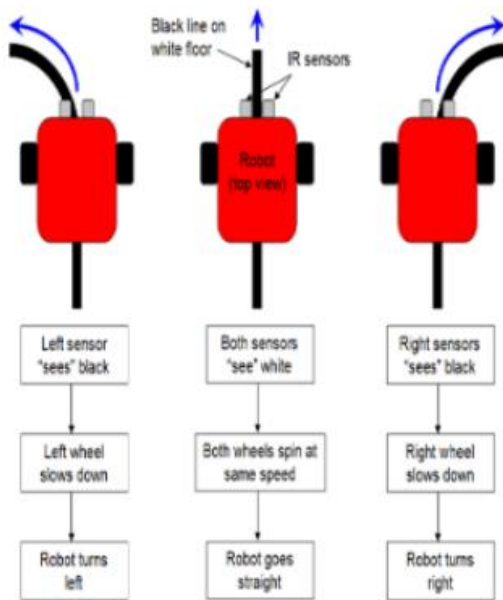

Fig. 3:- Procedure Of Sensing The Line

X. RESULTS

This line follower robot with multiple modes unity works perfectly fine as it is designed to do. There were many books dropped randomly into the drop box but the robot was still able to sense the line and follow the roadmap while detecting object. For object sensing part, barcode reader was introduced ahead of the arm of the line follower and the robot

made better decisions on detach the gadgets into their groups. The nominate tasks for the line follower robot with multiple modes are successfully examined and this group who made this robot is very much active about the project .As a result, the project is done successfully. The robot was used for all the suitable parts.

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