

## A writing overview on Line Following versatile robot using ultra sonic Innovation for Article Location

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### ABSTRACT:

Recently a great deal of time and effort has been spent on making structures to enable an independent robot to follow a checked way using a fantasy system. The Line Following Vehicle is an introduced machine that can recognize and follow the line drawn on the floor. Overall, the way is predefined and can be either recognizable like a dim line on a white surface with a high separated concealing or it will in general be imperceptible like an alluring field. It is a consolidated arrangement from the data on Mechanical, Electrical and PC planning. This paper presents a 9W LDR sensor based Line Following Vehicle plan and creation system which reliably organizes along the dull flaw on the white surface. This insignificant exertion fundamental electronic part based line identifying robot can pass on a reasonable weight without getting off the line.

### KEYWORDS:

Ultrasonic, Infrared, UNO, Motor Driver, Servo Motor.

### I. INTRODUCTION

"Roboticist" redirects here. It is not to be confused with Cyberneticist. Not to be confused with Cybernetics. Robotics is an interdisciplinary field that integrates computer science and engineering. Robotics involves design, construction, operation, and use of robots. The goal of robotics is to design machines that can help and assist humans. Robotics integrates fields of mechanical engineering, electrical engineering, information engineering, mechatronics, electronics, bioengineering, computer engineering, control engineering, software engineering, among others. Robotics develops machines that can substitute for humans and replicate human actions. Robots can be used in many situations and for many purposes, but today many are used in dangerous environments (including inspection of radioactive materials, bomb Department of CSE

2020-21 3 detection and deactivation), manufacturing processes, or where humans cannot survive (e.g. in space, underwater, in high heat, and clean up and containment of hazardous materials and radiation).

Robots can take on any form but some are made to resemble humans in appearance. This is said to help in the acceptance of a robot in certain replicative behaviors usually performed by people. Such robots attempt to replicate walking, lifting, speech, cognition, or any other human activity. Many of today's robots are inspired by nature, contributing to the field of bio-inspired robotics.

### II. RELATED WORK

This really ends up being a fairly troublesome inquiry. A few definitions exist, including the accompanying: A reprogrammable, multifunctional controller intended to move material, parts, apparatuses, or specific gadgets through different modified movements for the presentation of an assortment of undertaking. A programmed gadget that performs capacities regularly attributed to people or a machine as a human.

This sort of robot was before plan for computerization in enterprises for transportation reason. With progression in innovations, this sort of robot is utilized in Distribution center the executives of Amazon. Of course Amazon has dispatched 'SCOUT' a conveyance robot which homes conveyances. However it's anything but a line following robot yet works with comparable component. A short time back there was are cover of this robot for transportation around there. Here products were shipped as well as individuals treat it as a way for transportation vehicle for them. Shockingly there exist absence of progress in Medical care focuses with subject

to mechanization. This paper plans to proffer a mechanized robot to Medical services communities for simplicity of conveyance of meds, food, infusions, and so on..

The most punctual robots as we probably are aware they were made in the mid-1950s by George C. Devol, a creator from Louisville, Kentucky. He concocted and protected a reprogrammable controller called "Unimate," from "All inclusive Computerization." For the following decade, he endeavored to sell his item in the business, yet didn't succeed. In the last part of the 1960s, financial specialist/engineer Joseph Engleberger gained Devol's robot patent and had the option to change it into a mechanical robot and structure an organization called Unimation to deliver and showcase the robots. For his endeavors and triumphs, Engleberger is referred to in the business as "the Dad of Advanced mechanics." The scholarly world likewise gained a lot of headway in the creation new robots. In 1958 at the Stanford Exploration Organization, Charles Rosen drove an examination group in building up a robot called "Shakey."

### III. METHODOLOGY

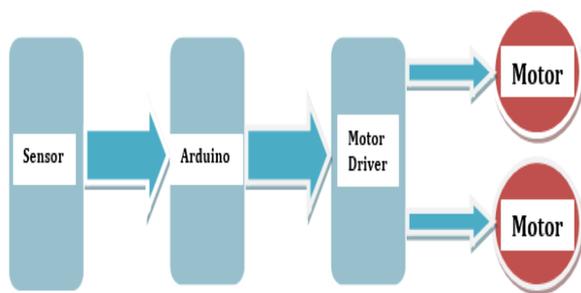


FIG 3.1 Block Diagram of Line Following Robot

These robots have the capability to detect a black or dark line on a lighter surface depending on the contrast. They estimate whether the line underneath them is shifting toward their left or right as they move over them. Based on that estimation, they give respective signals to the motors to turn left or right so as to maintain a steady center with respect to the line.

These robots usually use an array of IR (infrared) sensors in order to calculate the reflectance of the surface beneath them. The basic criteria is that the black line has a lesser reflectance value (black absorbs light) than the lighter surface

around it. This low value of reflectance is the parameter used to detect the position of the line by the robot. The higher value of reflectance will be the surface around the line. So in this linear array of IR sensors, if the leftmost or rightmost IR sensor presents the low value for reflectance, then the black line is toward the left or right of the robot correspondingly. The controller then compensates for this by signaling the motor to go in the opposite direction of the line. The IR sensor array consists of individual IR LEDs and IR photodiodes. The IR light emitted by the LED strikes the surface and is reflected back to the IR photodiode. The photodiode then gives an output voltage proportional to the reflectance of the surface (high value for a light surface and low for a black or dark surface).

IR sensors sense the mirrored light as per the detected light by IR sensor Arduino chooses course of engines. On the off chance that left sensor sense dark line then the line supporter will move left. Similarly on the off chance that correct sensor sense dark line, the line adherent will move right. If both sensor sense dark line at that point line adherent will stop. The Entire Line following mechanical vehicle is separated into three areas: Sensor segment, Control Segment, Driver Area.

#### 1) Sensor section

This part contains IR diodes, potentiometer, Comparator (Operation Amp) and LED's. Potentiometer is utilized for setting reference voltage at comparator's one terminal and IR sensors are utilized to detect the line and give a change in voltage at comparator's second terminal. At that point comparator thinks about the two voltages and produces a computerized signal at yield. Here two IR sensors are utilized.

#### 2) Control Section

Arduinoused for controlling entire the interaction of line devotee robot. The yields of comparators are associated to advanced pin number 2 and 3 of Arduino. Arduino read these signs and send orders to driver circuit to drive line tracker.

### 3) Driver Section

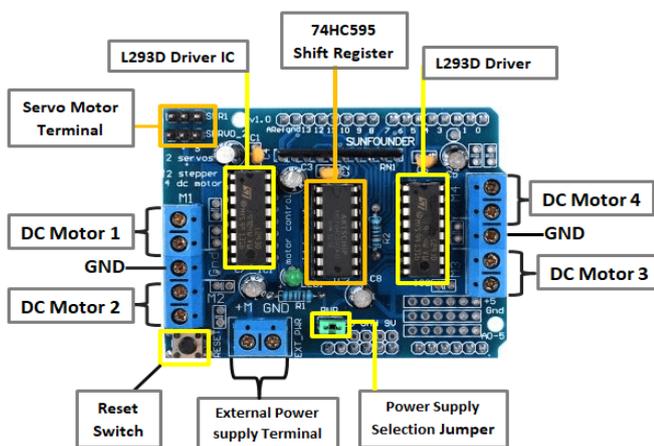
Driver segment comprises engine driver and two DC engines. Engine driver is utilized for driving engines on the grounds that Arduino doesn't supply sufficient voltage and current to engine. So we add an engine driver circuit to get sufficient voltage and current for engine.

### IV. ALGORITHM

1. START
2. Read LM and RM
3. If LM and RM both on white surface.
4. Move forward (rotate both motor on full speed)
5. Go to step 2
6. If LM on black line
7. Move left (reduce left motor speed to half)
8. Go to step 2
9. If RM on black line
10. Move right (reduce right motor speed to half)
11. Go to step 2
12. If LM and RM on black line
13. Stop

### V. EXPERIMENTAL RESULTS

#### L293D motor driver shield



**FIG 5.1 L293D Motor Driver**

#### L293D motor driver

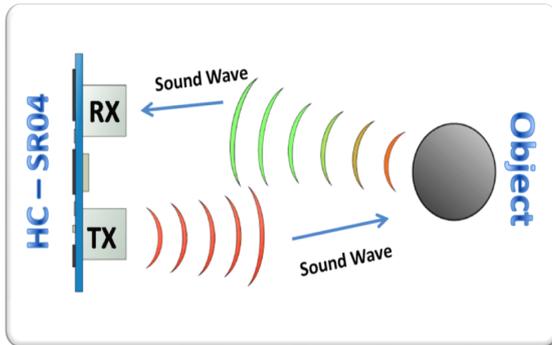
The L293D is a dual-channel H-Bridge motor driver capable of driving a pair of DC motors or single stepper motor. This shield offers total four H-Bridges and each H-bridge can deliver up to 0.6A to the motor. The shield also comes with a 74HC595 shift register that extends 4 digital pins of the Arduino to the 8 direction control pins of two L293D chips.

This motor shield can drive DC motors having voltages between 4.5 to 25V. We are using DC Motors that are rated for 9V. So, we will connect external 9V power supply to the EXT\_PWR terminal. The motor is connected to any of M1, M2, M3 or M4 motor terminals. In this case, Arduino pin11 for M1, pin3 for M2, pin5 for M3, pin6 for M4 and pins 4, 7, 8 and 12 are all in use.

#### Ultrasonic sensor

As the name indicates, ultrasonic / level sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. ultrasonic / level sensors measure the distance to the target by measuring the time between the emission and reception.

An optical sensor has a transmitter and receiver, whereas an ultrasonic / level sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic / level sensor, a single oscillator emits and receives ultrasonic waves alternately



**FIG:5.2 Ultrasonic Sensor**

The distance can be calculated with the following formula:

$$\text{Distance } L = 1/2 \times T \times C$$

where L is the distance, T is the time between the emission and reception, and C is the sonic speed. (The value is multiplied by 1/2 because T is the time for go-and-return distance.)

### Infrared Sensors

IR sensor is an electronic device, that emits the light in order to sense some object 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 radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations.

The emitter is simply an IR LED ([Light Emitting Diode](#)) and the detector is simply an IR photodiode. Photodiode is sensitive to IR light of the same wavelength which is emitted by the IR LED. When IR light falls on the photodiode, the resistances and the output voltages will change in proportion to the magnitude of the IR light received.

### Servo motor

A servomotor is a linear actuator or rotary actuator that allows for precise control of linear or angular position, acceleration, and velocity. It consists of a motor coupled to a [sensor](#) for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. A servomotor (or servo motor) is a simple electric motor, controlled with the help of servomechanism. If the motor as a controlled

device, associated with servomechanism is DC motor, then it is commonly known as a DC Servo Motor. If AC operates the controlled motor, it is known as a AC Servo Motor.

### DC motor

The DC engine is the engine which changes over the immediate current into the mechanical work. It deals with the standard of Lorentz Law, which expresses that "the flow conveying conduit set in an attractive and electric field experience a power". Also, that power is the Lorentz power. A DC engine is an electrical machine which changes over electrical energy into mechanical energy. The fundamental working rule of the DC engine is that at whatever point a current conveying conductor places in the attractive field, it encounters a mechanical power.

## VI.RESULTS

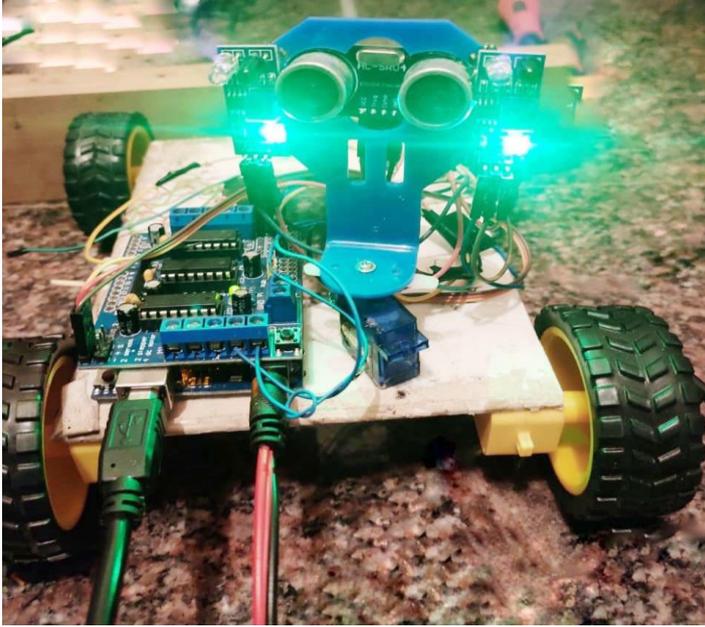
Through this paper we have used line following robot carrying medicine has been designed for providing the medicine to the patient whenever they need it.

**FIG: 6.1 Output**

A Line follower robot is an electronic System that can detect and follow the line drawn on the floor. This robot carries components from desired source to destination by following fixed path

## VII. FUTURE SCOPE

- Line following mechanical vehicle can be utilized in the clinical store to get the medication from a specific cabinet for this one needs to simply add some mechanical arm to it.



- Can be additionally stretched out for shading identification tasks or path identification on expressways.
- It tends to be grown so it tends to be utilized in clinics where patients are expected to take prescriptions each customary time frame so one can take what they need.
- It tends to be utilized in shopping centers for conveying unique kinds of items.
- Further advancement of this vehicle can be made, so that it tends to be utilized in protection enterprises for conveying the perilous materials like radioactive materials and noxious gas chamber.
- Advanced camera can be appended to the vehicle without a doubt time checking of the traffic.

## VIII. CONCLUSION

The goal of line following automated vehicle is to follow a line on its given way which is acquired for which it utilizes IR sensors which recognizes the line and sends the data to L293 engine driver IC and afterward H-connect which controls the working of the wheel. Arduinouno controls the other operations. The line following mechanical vehicle was at last finished. A great deal of exertion was placed into the plan, execution and long stretches of work before the PC, composing and investigating the code. The robot was at last running with a couple of glitches to a great extent which were arranged in

the later modifications of the firmware. The line following robot still has a couple of deficiencies yet accomplishes a large portion of the destinations. A ton of information on miniature regulators, a more profound and more clear perspective on the engineering, ports and any remaining utilitarian squares was accomplished. Likewise had a look take a gander by any stretch of the imagination basic utilitarian pieces of the undertaking like the gem oscillator, rationale doors and the works. So, a line following mechanical vehicle requires a line and it follows that line .On adding IR sensor, it defeat its constraint. The particulars of line following automated vehicle are It have bunches of various way to go to its objective. It can pick where to follow giving legitimate guidance at beginning. This automated vehicle utilizes modest parts like IR sensor, a low voltage engine, a skeleton (design of robot), which makes this robot a savvy item.

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