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A Prototype Model of Self Driving Vehicle Using Atmega 328p Micro-Controller

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Abstract: *In any type of industry or business there is need of transportation invariably and has to be fulfilled in order for that industry to sustain .in all most all sectors of industry there is a need of a human to drive in order to complete the task which is not that cost effective. In this research work it describes how the need of a human being can avoided in this whole process. By developing a low-cost driverless vehicle can be developed by an Ardinouno, Ultrasonic sensors, BO motors, and LIPO battery. Which have it had its own mind and knows when to stop and when to resume its particular and can foreseen many obstacles and avoid them. And can do the task repeatedly without and debility and further developed it can be used for transportation sector and many man labor hours can be reduced by a much cheaper and cost effective technology.*

Keywords: ARDUINO, ULTRASONIC SENSORS, LIPO, MOTORS.

1) INTRODUCTION:

From the moment the robot was developed in 1950 it is always been evolving to be more human friendly and reliable. In this fast pace world robots have become a requisite for the man kind. But there is one field which is still embryonic and needs to be more cumulative and that is in transportation department. In this research it is being tried out to solve the problem of constant supervision of a human with a self-driving vehicle by low cost equipments for sustainability. In this research it is being tried out to develop a vehicle which will detect the obstacle and automatically change its direction according to the program designated by the help of ultrasonic sensors and Adriano UNO and BO Motors and motor driver .this vehicle can be reduce the risk of human negligence while driving and can avoid many misshaping. it can also detect different terrains and adjust to it needs. And this vehicle can be used in areas where the conditions for a human is not suitable for driving. And it can also do the task often without the supervision of human being. And in the bright side self driving vehicles will be much smoother and will not have the danger of recklessness driving which can be committed by any human being.

2) LITERATURE REVIEW

1) OBSTACLE AVOIDING ROBOT BY FAIZA TABASSUM, SUSMITA LOPA, MUHAMMAD MASUD TAREK & DR. BILKIS JAMAL

In this paper it is described that a robot is build which can avoid obstacles and can move without any collision by sensing obstacles on its course with the help of three ultrasonic distance sensors. The robot can would be able to detect obstacles in its path based on a predetermined threshold distance. And after obstacle detection the robot would automatically change its path to an open path. It does not require any human intervention .it can measure the distance between the robot and the obstacle. And would be able to operate in any environment .the robot is equipped with three ultrasonic distance sensors to measure distance to surrounding objects .the robot uses ARDINOUNO as the microcontroller platform and its software components in future the authors of the paper tend to put on imaging sensors for better detection of obstacles

2) OBSTACLE AVOIDANCE ROBOT USING ARDUINO PAVITHRA A C SUBRAMANYA GOUTHAM V

In this paper it has been clearly mentioned about how an obstacle avoiding robot is been built which can detect and avoid obstacles in its path. The arduino platform is used for data processing and its software counterpart helped to communicate with the robot to send parameters for guiding movement. The robot only needs the code to be loaded once and after loading no human intervention is required .it is a fully autonomous Robot. The paper also states that the robot when was tested in an unknown environment with obstacles it moved while avoiding all the obstacles with considerable accuracy. In future cameras can be used to detect the obstacle however uses ones to get clear & fast pictures. It can also be used as a surveillance robot in the future if the camera is installed and can give the live feed to the user whenever needed. And can be used in dangerous environment, where human penetration could be fatal.

3) OBJECTIVES:

1. Circuit designing using TINKER CAD.
2. Building the hands-on model.
3. Writing Code in Arduino IDE.
4. Application.

4) BOM:

The list provided below is the list of components that are being used in completion of the project and used in building the physical prototype model.

S.NO	COMPONENT NAME	QUANTITY	COST
1.	Ardinouno	1	500
2.	Ultrasonic sensors	3	300
3.	chassis	1	200
4.	Castor wheel	1	50
5.	BO motors	4	400
6.	wheels	4	120
7.	LIPO Battery	1	400
8.	Jumper wires	1 Set	150
9.	Nut and Bolt set	1 Set	50
10.	Soldering iron	1	200
11.	Motor driver	1	150
12.	Total	----------	3000

5) COMPONENTS DESCRIPTION:

1) **ARDINO UNO** (source: https://store.arduino.cc/usa/arduino-uno-rev3)

Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started.

FIGURE 4.1

2) **ULTRASONIC SENSORS** (source: https://www.fierceelectronics.com/sensors/what-ultrasonic-sensor)

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity.

FIGURE 4.2

3) **BO MOTORS** (source: https://www.ansoz.com/BOMotor/363)

Light weight DC geared motor which gives good torque and rpm at lower voltages. This motor can run at approximately 150 RPM when driven by a single Li-Ion cell. Great for battery operated light weight robots. A specific type of DC geared motors that can be operated through battery and that why known as Battery Operated (BO) motors. It is used for light weight applications mostly. Available in different torque and RPM

FIGURE 4.3

4) **LIPO BATTERY** (source:https:https://www.techopedia.com/definition/8093/lithium-polymer-battery-lipo-battery)

A lithium-polymer (LiPo, LIP or Li-Poly) battery is a type of rechargeable battery that uses a soft polymer casing so that the lithium-ion battery inside it rests in a soft external "pouch." It may also refer to a lithium-ion battery that uses a gelled polymer as an electrolyte.

FIGURE 4.4

5) **JUMPER WIRES** (source: https://en.wikipedia.org/wiki/Jump_wire)

A **jump wire** (also known as jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

FIGURE 4.5

6) **SOLDERING IRON** (source: https://en.wikipedia.org/wiki/Soldering_iron)

A **soldering iron** is a hand tool used in soldering. It supplies heat to melt solder so that it can flow into the joint between two work pieces.A soldering iron is composed of a heated metal tip and an insulated handle. Heating is often achieved electrically, by passing an electric current (supplied through an electrical cord or battery cables) through a resistive heating element. Cordless irons can be heated by combustion of gas stored in a small tank, often using a catalytic heater rather than a flame. Simple irons, less commonly used today than in the past, were simply a large copper bit on a handle, heated in a flame.

FIGURE 4.6

7) **MOTOR DRIVER** (source: https://sproboticworks.com/blog/choosing-the-right-motor-driver)

Motor drivers actas an interface between the motors and the control circuits. Motor require high amount of current whereas the controller circuit works on low current signals. So the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

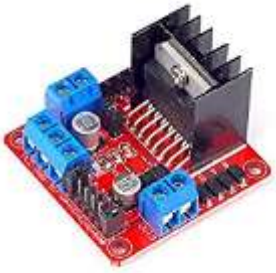


FIGURE 4.7

6) WORKING PRINCIPLE:

This prototype model works with the help of a coding program which tells the vehicle when to stop and it uses ultrasonic sensors so when the vehicle is in motion and there is obstacle in the front of the vehicle then the ultrasonic sensors sense it and then it stops then the ultrasonic sensors which are located in the right and left side of the robot get activated and then they sense in and in whichever side there is no obstruction the vehicle moves in that direction.

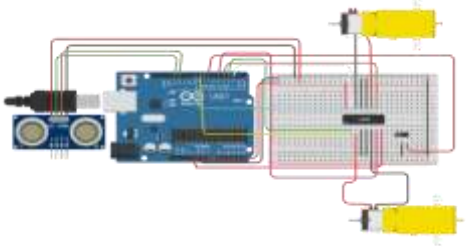
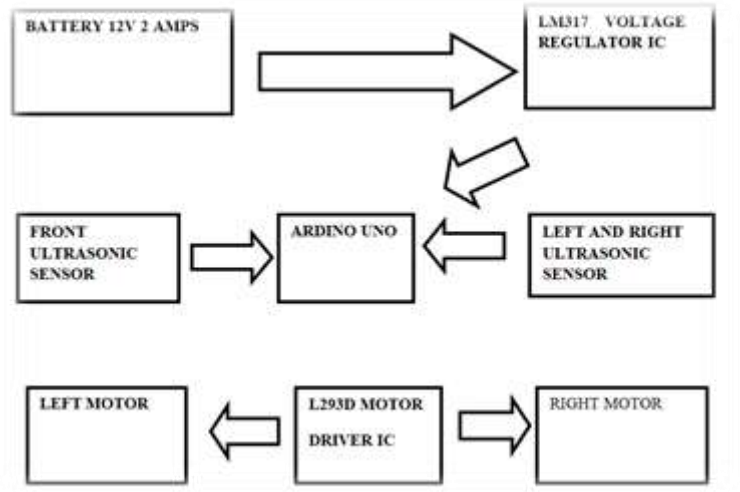


FIGURE 5.1

7) BLOCK DIAGRAM:



8) IMAGES OF WORKING PRINCIPLE

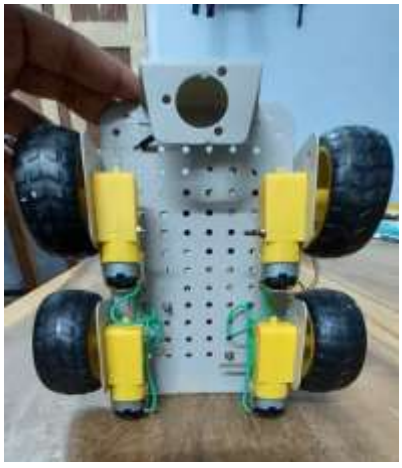


FIGURE 8.1

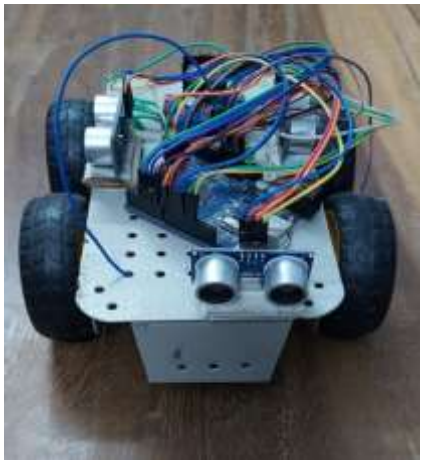


FIGURE 8.2

9) CONCLUSION:

From the above research it is concluded that this prototype model of self driving robotic vehicle .can be helped in industries for the ongoing revolution and in the future also by playing a major role in the automation sector .and can also be helped in surveillance system also if it is equipped with camera and can be more mobile and can cover more distance.

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