Smart Voice Controlled Obstacle Avoiding Robotic Car

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Abstract:

The project is about building a Multifunctional robot with obstacle avoidance robotic vehicle using ultrasonic sensors for its movement and Bluetooth control through manual or voice commands. A microcontroller (ATmega328P) is used to achieve the desired operation. A Robot is a machine that can perform task automatically or with guidance. The project proposes robotic vehicle that has an intelligence built in it such that it directs itself whenever an obstacle comes in its path. This robotic vehicle is built, using a micro-controller of AT mega 328 family. An ultrasonic sensor is used to detect any obstacle ahead of it and sends a command to the micro-controller. Depending on the input signal received, the micro-controller redirects the robot to move in an alternate direction by actuating the motors which are interfaced to it through a motor driver. It has features as smart voice control by which user can give commands as left, right, front, back which gives another mode as manual operating mode.

Keyword: Ultrasonic sensor, Bluetooth control for voice and manual commands,

Introduction:

In the developing world, Robots plays a very important role. The robot is a machine which always works under the proper guidance. Controlling and monitoring the robot becomes easier through sensors. Electronic devices with sensors are used in robotics to achieve accurate results. Robotics is still an evolving technology. There are Various methods to make robots, and no one is sure which method or technology will be used 100 years from today. Robotics is evolving somewhat like the Darwinian evolutionary concept of survival of the fittest. In this project we are going to build a Bluetooth Controlled and Obstacles Avoiding Robot. When this robot is in an unknown environment, it is capable of detecting and avoiding the obstacles in front of it. A code has to be dumped in to the Arduino chip and the robot work accordingly. The robot can be controlled by both manual and automatic mode. If it is in automatic mode ultrasonic sensor helps the robot to sense the obstacles and for the further movement. And it is controlled manually by adding a Bluetooth module for the same. This requires an APK Application, which has to be installed in our Smart phone to control the robot through Bluetooth. There is a menu in the App which has buttons to instructs the robot. According to the instructions Robot confirms it's path. This Remote and manual control robot works essentially in the unknown environment.

Literature survey:

Bluetooth control:

A Robotic car has features as obstacle avoidance, Bluetooth control, voice control separately but we had made a multifunctional robotic car with all these functions together with references mentioned below and had also added certain extra features that makes our project unique. This paper [1][3] proposes voice-controlled automobile that may be controlled by voice commands. Here [1][3][4], A Bluetooth module (HC-05) can be used to set a communication link between the car and human voice commands via Android Application.

Obstacle avoidance:

This paper [5] proposes Robot with senses only, which it can use traverse in unfamiliar environment without damaging itself. The car [1][4] will have the ability to detect the barrier and informs the user to prevent the barrier by picking different route with the assistance of Ultrasonic detector. The car will stop instantly by slowing down once identifies an obstacle. It [2] is a robot vehicle the works on Arduino microcontroller and employee IR sensors to detect obstacles.

Methodology:

Existing system:

This Technology provides the robot with senses only, which it can use traverse in unfamiliar environment without damaging itself. It is a robot vehicle the works on Arduino microcontroller and employee ultrasonic sensors to detect obstacles.It is used for obstacle detection for traverse, that have no more features. It is an autonomous robot which will be able to avoid every obstacle in it's path. It stops while detecting an obstacle without further movement. The robot will check how far the nearest obstacle is and then decide upon the actions to be taken**.** There is also technology which has Bluetooth control separately. The major drawback here is that the robotic car doesn't have more than two features together and there are several problems that makes the robotic car performance inefficient.

Proposed system:

Our project is about building a Smart voice controlled obstacle avoidance robotic vehicle using ultrasonic sensors for obstacle detetction and bluetooth module for voice or manual control. A microcontroller (ATmega328P) is used to achieve the desired operation. The project proposes robotic vehicle that has an intelligence built in it such that it directs itself whenever an obstacle comes in its path. This robotic vehicle is built, using a micro-controller of AT mega 328 family. An ultrasonic sensor is used to detect any obstacle ahead of it and sends a command to the micro-controller. Depending on the input signal received, the micro-controller redirects the robot to move in an alternate direction by actuating the motors which are interfaced to it through a motor driver. It has features as smart voice control mode by which user can give commands as left, right, front, back which gives second mode as manual operating mode.

Block diagram:

Bluetooth control and voice control:
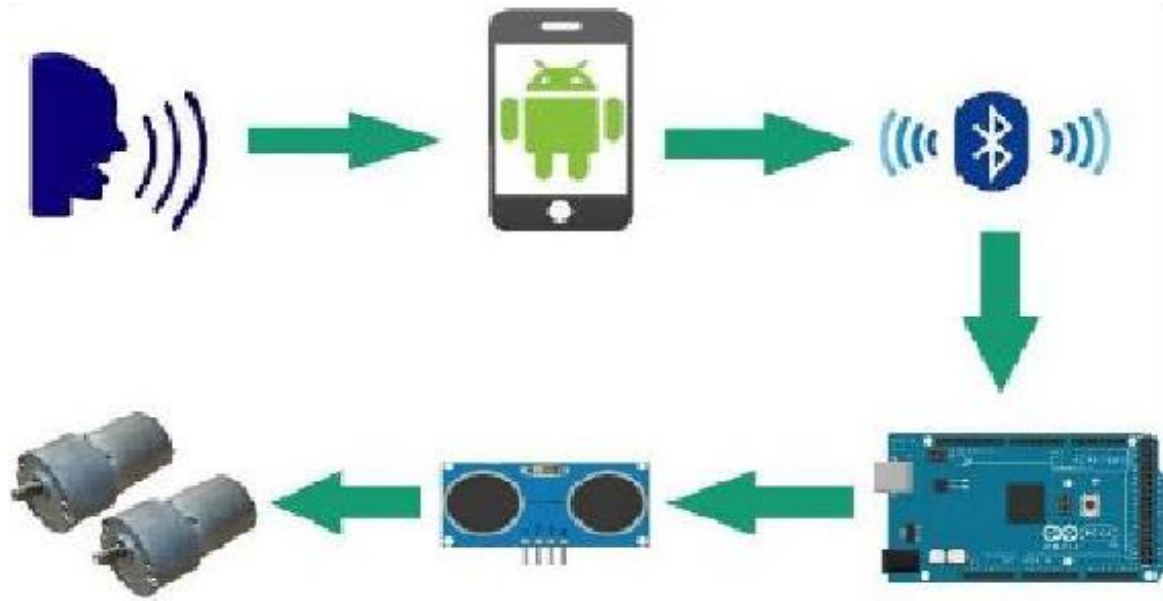
For Obstacle Avoidance mode:
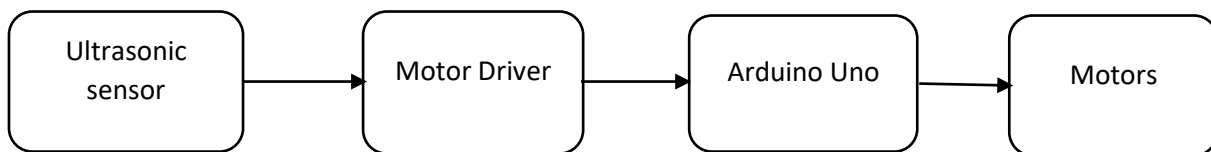
Results and discussion:

The existing projects lack features i.e, they are focussed onto either obstacle detecting or Bluetooth control with voice or manual control. This makes the robots without obstacle detection to face damage while meeting up with an obstacle. Thus, we are combining all the features as obstacle detection, Bluetooth control for a better version of smart voice-controlled obstacle avoiding robotic car.

Conclusion:

From this project, the robot is capable of navigate itself based on the algorithm, thus the movement of the robot confirms the accessibility of the algorithm used. The basic movement of the robot is produced by DC motors. Robot navigates in forward, backward, right and left directions. This movement depends on the obstacles in the path. Ultrasonic sensor provided the information regarding to the obstacles. Thus, it helped the robot to protect itself from any crashing. The servo motor turns the sensor, so that the sensor can rotate. The motors are being controlled by the motor driver. Motor driver was placed above the Arduino Board and Arduino acts as the brain of the robot. Adding Bluetooth module for this robot helped the end to control the robot through phone with manual control and voice control. The robot succeeded in all the aspects. In future this project can be further implemented using many electrical devices. Here we've used Bluetooth module for the manual control. In the place of Bluetooth module Wi-Fi module can be used. And for the better enhancement of the path, a camera can be used.
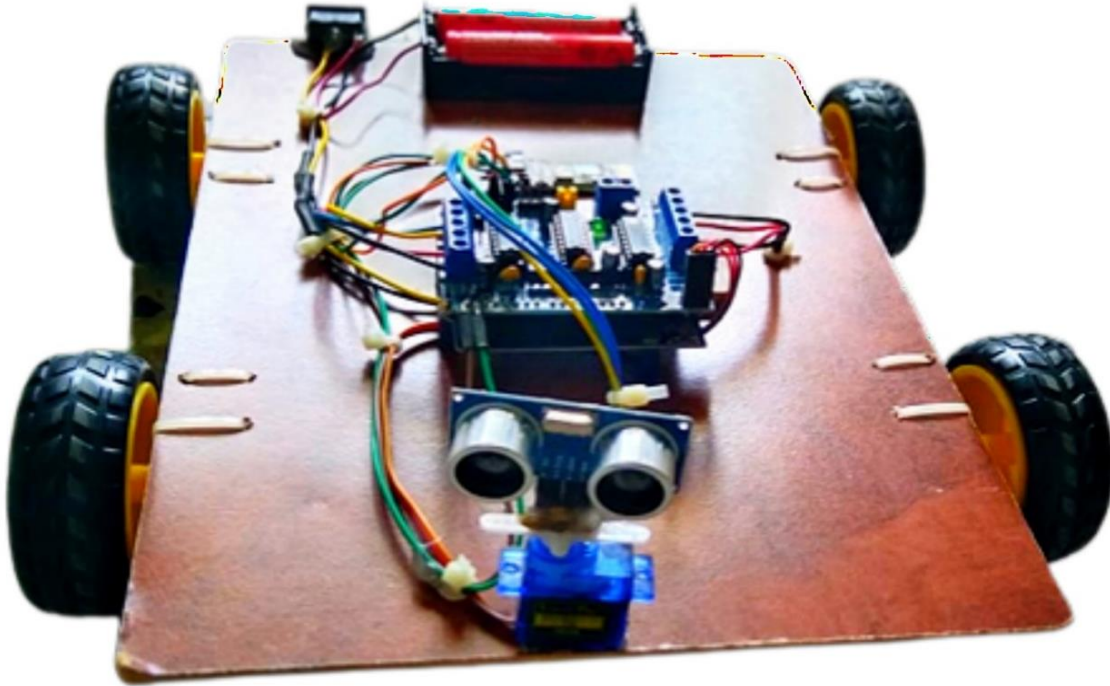
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