

## Self-Driving Car

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**Abstract:** The autonomous Vehicles are focused to change the Human Lifestyle. In the field of automobile, to make a Vehicle autonomous various fields are considered. Google and Tesla, has already started working on the self-driving cars since 2010 and still developing new changes to give a whole new level to the automated vehicles. In this paper we have focused on certain applications of an automated car, the one pair of tire will remain on the same direction while the other will decide the direction of the car. The self-driving car drive automatically during the traffic hence relaxing driver from continuously pushing brake, accelerator or clutch. The one aspect here under consideration is making the destination dynamic, this idea has been taken from the Google car described in this paper, defining. This can be done by a vehicle automatically sensing the obstacles nearby it. Taking intelligent decisions in the traffic can also be an issue for the automated vehicle.

**Key Words:** Self-Driving Car, Rush Hour, ML

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### I. Introduction

Automated vehicles are technological development come into the field of automobiles. Autonomous vehicles are ease for human kind but, they are expensive for middle class peoples. In the paper considering the different features and the cost, on a small scale a four wheel Vehicular Robotic prototype has been designed that will automatically reach the destination by determining its nearby objects and recognizing it. We have focused on two applications of an Automated Vehicles here and designed a prototype vehicle for that. The one major issue is during heavy traffic a driver has to continuously push brake, accelerator and clutch to move to destination slowly. We have proposed a solution to relax the driver in that situation by making vehicle smart enough to make decisions automatically and move by maintaining a specified distance from vehicles and obstacles around. The second issue is when two vehicles have the same destination but one of the drivers doesn't know its route. The driver can make his vehicle follow the front vehicle if they are known and share their location to reach the same destination. A three-wheeled Mobile Robot is used for research is given. The Mobile Robot consists of multiple sensors, which helps it to recognize its nearby objects and makes it determine obstacles in order to follow the route and move smoothly. While the ultrasonic sensors, which have been used for prototype design, helps to avoid obstacles on run time. The traffic situation in India leads to design this project prototype, which aims at relaxing driver and creating an automated vehicle whose destination is dynamic unlike Google car, whose destination is static and fixed. This research has been a need for India if implemented in real time.

### II. Literature Review

There are lot of vehicles which can drive itself without or very little human interaction such as autopilot airplanes, self-driven sailboats and ships; the deceptively modest dream that has rarely ventured beyond the pages of science fiction since our grandparent's youth is the self-driving car. By the passage of time, much work has been carried out in the area to make cars self-driven, but due to technological advancement in the roads and the increasing population has made difficult for this dream to becoming true.

In the pre-computer days of the 1930s, the driverless cars were only the science fiction things. But the development of the digital computer made possible to dream of self-driven vehicles outside the fiction. By the 1960s the self-driven cars have been dreamed to navigate on ordinary streets on their own. German pioneer Ernst Dickmanns, in the 1980s, got a Mercedes van to drive hundreds of miles autonomously on highways, a tremendous feat especially with the computing power of the time. In the mid-2000s, the Defense Advanced Research Projects Agency (DARPA) sorted out the Grand Challenges where groups assembled to contend with self-driving vehicles. In 2009, Google began the self-driving car venture, including colleagues who had

effectively devoted years to the innovation. By 2012 the Google car hits the road for testing. By the passing years, the car is developed and equipped with multiple sensors, radars, lasers, Global Positioning System (GPS), it uses heavily detailed maps, and many other things to safely drive and navigate itself with no human interaction. The car can not only drive itself but it can be parked on its own, it can go on freeways, Cameras are used to find and detect objects that are then processed by the computer within the car. In May 2014, Google presented a new concept for their driverless car that had neither a steering wheel nor pedals and unveiled a fully functioning prototype in December of that year that they planned to test in 2015. In summer 2015, Google launched and tested some different features where each prototypes speed is capped at a neighborhood-friendly 25mph, and during this phase safety drivers aboard with a removable steering wheel, accelerator pedal, and brake pedal that allow them to take over driving if needed. After many successful roads testing of Google car has made to believe in some years roads will be safely occupied with self-driven cars.

In this paper, we have designed two applications of an autonomous vehicle, which can help the driver to relax for the certain duration of time. This paper presents a concept in which the modified concept of Google car is focused, the Google car has to reach the static destination automatically; in our prototype, we have made the destination dynamic. Here our destination is also a vehicle which is moving on a certain route. Our prototype will follow that vehicle. Another application that we have implemented here was to tackle heavy traffic congestion and allow the vehicle to move automatically during that traffic congestion.

### III. Proposed Methodology

Our prototype model shows some work on both the application that we have discussed in this paper. Fig.1 shows the mechanism of vehicle,

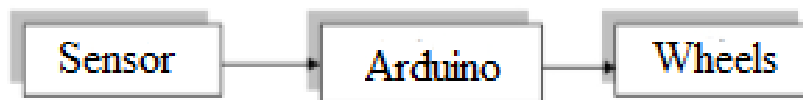


Fig. 1. Block Diagrams

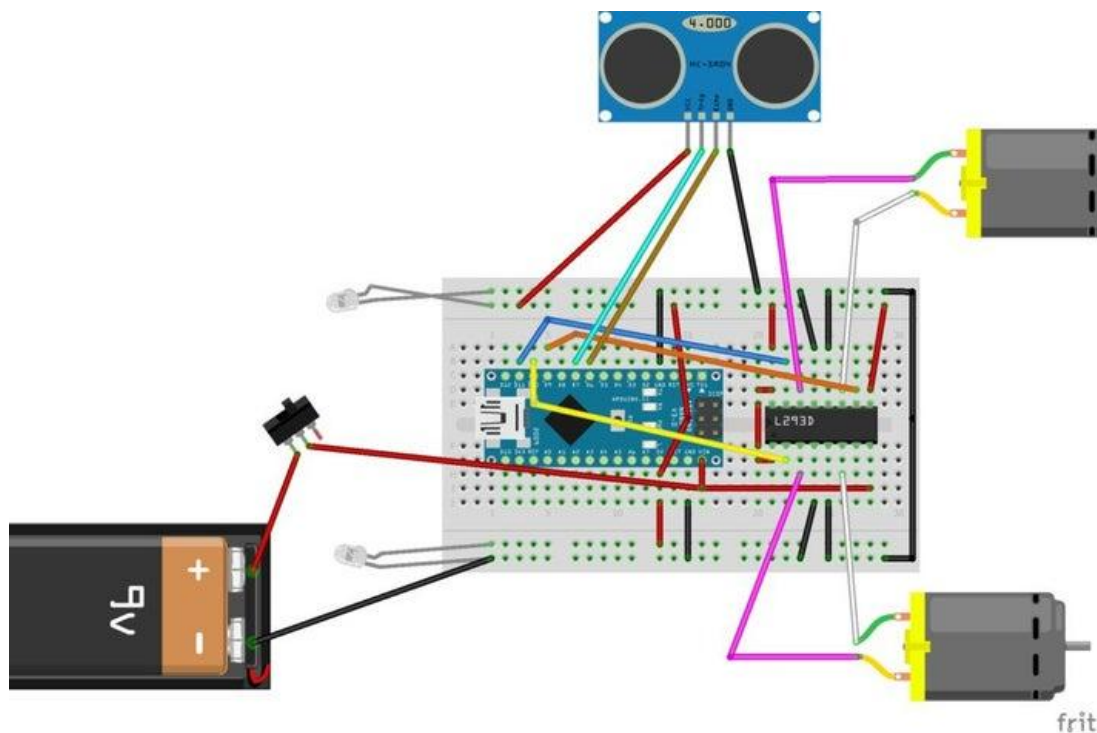
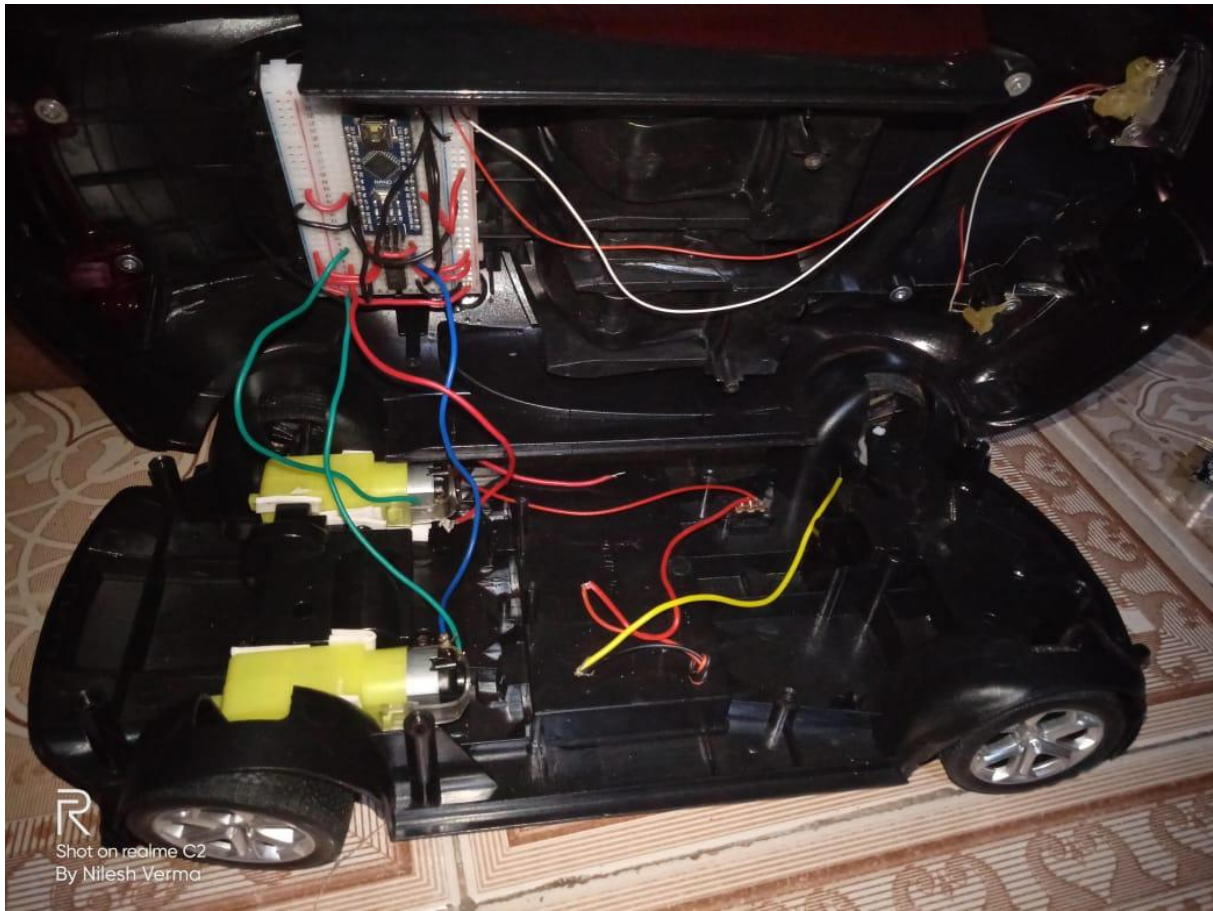


Fig.2 Electrical Schematic of Self-Driving Car



**Fig. 3. Designed Robotic Vehicle**

Fig 1 shows block diagram of prototype Mobile Robot (Vehicle). Our main focus was on Following Vehicle, which detects and avoids obstacles, get route and follow the route. Another application in which vehicle maintains specified distance from obstacles around. The vehicle automatically moves and hence relaxes the Driver. The Fig. 2 and 3 shows the hardware implementation. To look for the obstacle, ultrasonic sensors



have been used. Ultrasonic Sensors have been fixed all around the vehicle so that the vehicle detect the obstacle and get away from it. For instance if there is a wall or a pedestrian in front of the vehicle, the ultrasonic sensors at the front side of the vehicle will detect and the vehicle will turn to the safe side, another possible scenario might come in which there are three obstacles; in front, at the right side and at the left side of the vehicle, the ultrasonic sensors will again detect the obstacles and the vehicle will then moves backward even if there is an obstacle behind, it will stop for a moment and thus again looks for the obstacles from the beginning thus deciding the route on the basis of circumstances.

#### **IV. Result**



**Fig. When Car is Moving**



**Fig. Car While Taking Turn**

## V. Conclusion

Autonomous Vehicles are the advanced step for vehicles. With the help of this algorithm, vehicles can be set to automatically navigate to the destination location by continuously receiving the direction from another vehicle moving ahead to the same destination.

The autonomous vehicle routes itself with the guidance of an- ultrasonic sensor which helps to provide its route, therefore, deviations in time can occur. The goal of navigation process for a autonomous vehicle is to move the vehicle to a known destination in an unknown environment. When the robotic vehicle actually start to move toward the planned route it may find unknown obstacles from the existing location to the destined location, hence the robotic vehicle must avoid the obstacles and follow the route to reach the destined position. The potential applications of this robotic vehicle are to use these types of autonomous vehicle on highways or heavy traffic roads. These types of autonomous vehicles can also be used when a driver travels to the new areas.

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