

# Autonomous Radio Controlled Car Project Proposal

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**Abstract**—This research project proposal provides an overview of suggested modifications made to the existing project. The modifications made to the existing design includes inculcating sensors, actuators, tweaking the existing hardware design and finally documenting all the hardware and software implementations within the given time constraints. In general this project is a modified version of the existing project with more sophisticated features.

**Index Terms**—design, Autonomous Radio Controlled Car, hardware, CS 807

## I. INTRODUCTION

THE usage of Radio Controlled cars are gradually increasing nowadays. Even the original author of the project was fascinated about radio controlled cars since his childhood days. The original project, developed by Marcelo Jos Rovai on instructables.com, describes dismantling one of the Radio-controlled cars, racking its fundamental parts, supplanting the original embedded hardware by an Arduino controlled remotely through an Android device [1], this existing project was used as a reference in building an autonomous radio controlled car which runs on its own. The base project in this case helped in providing a good platform for implementing the autonomous functionality to the car.

## II. MODIFICATIONS

The main aim of this project is to recreate the functionality of this framework of a radio controlled car by making it an autonomous car wherein it just runs on its own without anyone controlling it, whilst avoiding hitting obstacles. Ultrasonic sensors along with servos would be used just to scan for the obstacles around it. Alongside replacing the electronic module by Arduino UNO for logic processing, triggering motors, LED and buzzer, this idea was referred from Hacking an RC car from instructables.com [1]. Also, buzzers can be attached just to indicate that the obstacle is being approached. Some more tweaks such as adding photoresistors for turning the Headlights ON/OFF of the car during day/night time. Similarly a touch sensor or a push button is used in order to turn the DC motors ON/OFF, and a potentiometer to vary the speed of the car. If time permits, then path-finding algorithms can also be implemented so that the car can go in a specific well-defined direction rather than going in a random direction from the starting point.

## III. MOTIVATION

THE main motivation of choosing this project was, the increase in autonomous self driven cars today in the real world, and also it was a relevant area of interest to work with radio controlled cars. Everything today is on the verge of being automated, keeping this in mind along with the idea of the

existing project helped in arriving at a conclusion of building an autonomous radio controlled car. Also this project would be interesting in a way, to see a radio controlled car automatically runs without anyone controlling it.

## IV. LIST OF MATERIALS REQUIRED

The list of materials or components that are required for the implementation of the autonomous RC car are as shown below.

- Sensors:
  - Ultrasonic Sensor HC-SR04
  - Photoresistor
  - Touch Sensor
  - Potentiometer (if Required)
- Actuators:
  - LEDs
  - Buzzer
  - Servo Motor
  - DC Motor
- Arduino UNO R3 AT Mega 328P (Micro Controller)
- Prototyping Breadboards
- Jumper Wires
- Various Resistors
- Various Capacitors
- Push Buttons (if Required)
- H-Bridge Motor Shield L-293D
- Battery 9.6V
- A RC car toy w/o battery

## V. TEAM ROLES

This project is done only by me (Tanu N Prabhu) and no teammates were involved in this project. All the project work including project selection, research, hardware design, prototype testing, GitHub documentation/writing the paper and programming all in whole were done solely by me in-order to perform smooth functioning of the prototype.

## VI. MILESTONES

The below are the given milestones which would be met once when the project is completed.

- **Milestone #1:**
  - Knowing the RC car, gathering all the materials.
  - Due March 10th
- **Milestone #2:**
  - Hacking the electronics (removing the original electronics from the old car).
  - Due March 13th
- **Milestone #3:**

- Initial Assembly but no coding involved.
- Due March 17th
- **Milestone #4:**
  - Sensors and actuators are being calibrated and positioned in the car for functioning
  - Due March 25th
- **Milestone #5:**
  - A complete working demo of the prototype is ready.
  - Due March 30th
- **Milestone #6:**
  - The Autonomous RC car final demo and expected to work well with all expected functionalities and not prone to failure.
  - The documentation of the implemented hardware is completed and finalized.
  - Stretch goal: Making the car to know where its going in a specific direction, avoiding random direction using some active logic such as path-finding algorithm etc.
  - Due April 3rd

The stretch goal is quite complicated but would be a great accomplishment allowing the car to move in a specific direction, if time permits then an attempt to the stretch goal would be definitely made, if not then the stretch goal cannot be met and then only 5 Milestones would be covered.

## VII. SUMMARY

The proposed project when completed turns out to be a more sophisticated and easier to operate with minimum requirements and making it an autonomous fully functioning RC car. Primarily this project was referred from instructables.com wherein the author Marcelo Jos Rovai hacked an RC car, supplanted the original hardware to Arduino and made it remotely controlled through Android device. Likewise, the goal of this project was to make the RC car fully autonomous such that making the car to run on its own and avoiding obstacles on its way, this concept can be further implemented in real time cars if enhanced.

## REFERENCES

- [1] Jos Rovai, M. (2015). Hacking a RC Car With Arduino and Android. [online] Instructables. Available at: <https://www.instructables.com/id/Hacking-a-RC-Car-With-Arduino-and-Android/> [Accessed 6 Mar. 2019].