# System Specification for Line following vehicle with object detection.

# Overview

It is an autonomous vehicle which can follow colored lines on the ground using IR- Sensor and a motor controller. It can detect different the lines and adjust its speed and direction accordingly. The system can also avoid obstacles and stop at any given destination besides ignore the object to follow the line again.

# Requirements

- The vehicle must be able to follow the lines on the ground using IR sensor, and a motor controller with its driver to allow the speed control.  
  
- The vehicle must be able to avoid obstacles and stop by ultra sonic sensor at any given destination and ignore it by using the code.

- The vehicle must be able to operate on battery power for at least 30 minutes.

#Components

- The vehicle consists of the following components:

- A chassis with two wheels and a differential drive mechanism.

- IR sensors mounted on the front of the chassis that can catch the line and follow it successfully.

- A motor controller with its driver that can control the speed and direction of the wheels based on the input from the IR-Sensors and.

- A microcontroller or Arduino that can process IR-Sensors Ultrasonic to send commands to the motor controller.

- A battery pack that can provide power to the microcontroller/ Arduino, the motor controller, and the camera.  
  
- 2 wheels and On/Off Button.

# Functions

- The vehicle performs the following functions:

- Line following: The vehicle follows the line on the ground by adjusting its speed and direction based on the color and position of the line. The vehicle follows different rules for different colors of lines  
  
- Obstacle avoidance: The vehicle avoids any obstacles in its path by changing its direction or stopping if necessary by using ultrasonic Sensor.  
  
 - Start: Start following the line on the ground.

- Stop: Stop following the line and stay in place.

- Object detection: Ignore the object when detect it by turning right or left.

- Turn left: Turn left at the next intersection or obstacle.

- Turn right: Turn right at the next intersection or obstacle.

- Line again: looking for the line and detect it once again.

-Follow the Line again: after object detected and ignore it return back to the line.

- Battery level: Request the battery level of the vehicle.