

# COLLISION AVOIDANCE SYSTEM

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**Abstract** – Nowadays, self car is an lively studies area, mainly after the emergence of gadget imaginative and prescient responsibilities with deep studying Using one of these visible navigation gadget for self reliant car, the photographs captured through controller and facts anticipated in order that the self reliant car may want to competently navigate. The goal of the proposed paintings is to enforce the to be had method to locate the item and item distance for a self reliant car that taken motion in keeping with item distance with the assist of raspberry pi3 board. The gadget additionally makes use of ultrasonic sensor for item detection for the cause of pace manipulate of car to keep away from collision with in advance car. Rpi digital digicam module is used for type of item. The proposed gadget gets the picture of the actual from the digital digicam after which overlaying and contour strategies are used to locate the item. So vehicle could capable of take motion and lowers the probabilities of human careless movements like driving force errors which can results in accidents.

**Key Words-** Raspberry pi, Ultrasonic sensor, Camera, GPS module, LCD display, Motor Driver

## 1. INTRODUCTION

Road twist of fate is maximum undesirable element to manifest to a street user. Most of the street customers are pretty nicely privy to the overall guidelines and protection measures while the usage of roads however it's miles most effective the carelessness on a part of street customers, which cause injuries and crashes. Main reasons of injuries are human errors and a few of them are like-drunken driving, over speeding, distractions to the drivers, crimson light jumping. Malfunctioning of the motive force to obey the visitors indicators placed now no longer most effective them however different motorcyclist in risks of injuries and critical accidents and additionally become the cause for the dying of a person. According to survey greater than ninety percent injuries in USA occurs because of the motive force unawareness of visitors guidelines like visitors lights, pace restrict symptoms and symptoms etc. Sometimes drivers also are made a mistake that cause massive lack of belongings like existence in addition to money.

## 1.1. OBJECTIVE

The designing and implementation of an ultrasonic primarily based totally anti-collision gadget for vehicles. In order to perform the general goal of this project, the subsequent are the precise goal:

- To layout impediment sensor gadget.
- It develops an set of rules that mixes the electricity of sensor and reduce the sensor shortcomings.
- Ensuring the structures responds in actual time.
- Identifying the items which are ability threats.

## 2. BLOCK DIAGRAM

The overall block diagram of the car speed control system is shown in Fig 2.1.

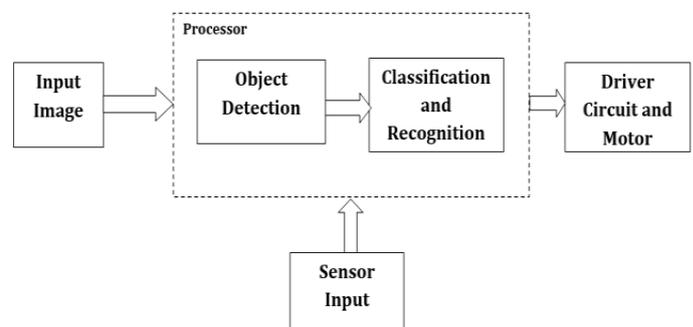


Figure 2.1

## 2.1 CONFIGURATION OF BLOCK DIAGRAM

DC Motor driving force L293d is used to manipulate the motor, one motor driving force IC can manipulate simplest motors. So the proposed gadget used one L293d this is sufficient to manipulate the motors. So the enter for motor driving force IC is given via way of means of the Raspberry pi and the output pins of the motor IC are related to the motor. For motion of the auto in forward and backward course gadget will rotate the wheels in identical pace while to transport left or proper gadget will slow down the only wheel as evaluate to the opposite one according to the turning points.

### 3. CIRCUIT DIAGRAM

The circuit diagram is for COLLISION AVOIDANCE SYSTEM in fig 3.1

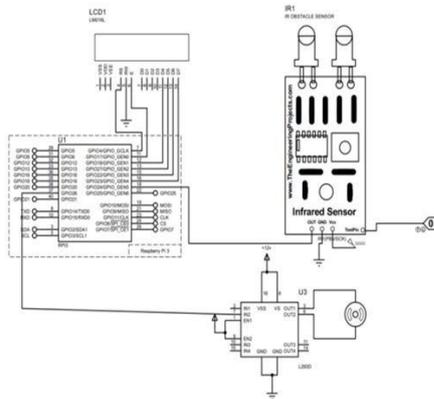


Figure 3.1

#### 3.1. SYSTEM ARCHITECTURE

##### A. Raspberry pi 3

Raspberry Pi SBCs characteristic a Broadcom machine on a chip (SoC) with an included ARM-well matched relevant processing unit (CPU) and on-chip pictures processing unit (GPU), at the same time as Raspberry Pi Pico has a RP2040 machine on chip with an included ARM-well matched relevant processing unit (CPU). Raspberry Pi is a microcontroller which has true processing electricity and lots of ports to attach diverse devices, it has forty pins (28 GPIO pins). Camera, GPS, GSM, and diverse sensor are related to the Raspberry pi, which techniques and video display units everything.

##### B. Ultrasonic Sensor

The HC-SR04 ultrasonic sensor makes use of SONAR to decide the space of an item similar to the bats do. It gives brilliant non-touch variety detection with excessive accuracy and solid readings in an easy-to-use bundle from 2 cm to four hundred cm or 1" to thirteen feet. The operation isn't always suffering from daylight or black material, even though acoustically, tender substances like fabric may be tough to detect. It comes entire with ultrasonic transmitter and receiver module.

##### C. Camera

Compatible with the reputable Raspberry Pi Camera Board V2

- 3280x2464 pixel resolution
- Supports 1080p 30 FPS video recording

##### D. GPS Module

Global Positioning System (GPS) is a satellite-primarily based totally device that makes use of satellites and floor stations to degree and compute its role on Earth. GPS is likewise referred to as Navigation System with Time and Ranging (NAVSTAR) GPS. GPS receiver desires to acquire records from as a minimum four satellites for accuracy purpose. GPS receiver does now no longer transmit any statistics to the satellites. This GPS receiver is used in lots of packages like smartphones, Cabs, Fleet control etc. GPS receiver makes use of a constellation of satellites and floor stations to calculate correct region anyplace it's far located. These GPS satellites transmit statistics sign over radio frequency (1.1 to 1.5 GHz) to the receiver. With the assist of this acquired statistics, a floor station or GPS module can compute its role and time.

##### E. LCD Display

The time period LCD stands for Liquid Crystal Display. It is one form of digital show module utilized in an in depth variety of packages like numerous circuits & gadgets like cellular phones, calculators, computers, TV sets, etc. These shows are specifically desired for multi-phase lightemitting diodes and 7 segments. The principal advantages of the usage of this module are inexpensive; truly programmable, animations, and there aren't boundaries for showing custom characters, unique or even animations, etc.

##### F. Motor Driver

L293D is a twin H-bridge motor riding pressure integrated circuit (IC). Motor riding pressure act as cutting-edge amplifiers on account that they take a low cutting-edge manage sign and provide a better cutting-edge sign. This highest cutting-edge sign is used to power the automobiles. L293D carries in-built H-bridge riding pressure circuits. In its common area mode of operation, DC automobiles may be pushed simultaneously, each in ahead and opposite direction.

The motor operations of automobiles may be managed with the aid of using enter common sense at pins 2 & 7 and 21 10 & 15. Input common sense 00 or common sense eleven will forestall the corresponding motor. Logic 01 and common sense 10 will rotate it in clockwise and anticlockwise directions, respectively.

Enable pins 1 and 9 (similar to the 2 automobiles) should be immoderate for automobiles to begin operating. When an permit enter is immoderate, the associated riding pressure receives enabled. As a result, the outputs became energetic and paintings in section with their inputs. Similarly, while the permit enter is low, that riding pressure is disabled, and their outputs are off and in the immoderate impedance state.

#### 4. FLOW CHART

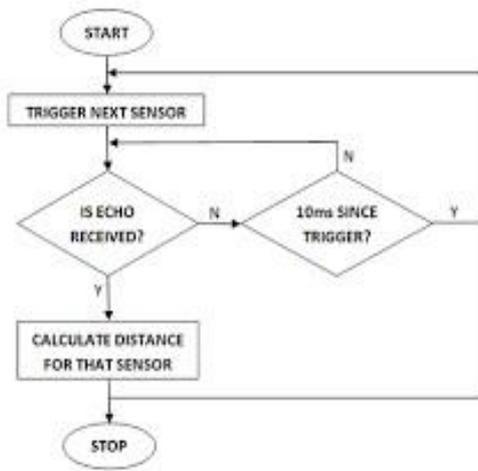


Figure 4.1

#### 5. TECHNICAL BACKGROUND

##### 5.1. SOFTWARE DESCRIPTION

###### PROTEUS PROFESSIONAL

The Proteus Design Suite is a proprietary software tool suite used primarily for electronic design automation. The software is used mainly by electronic design engineers and technicians to create schematics and electronic prints for manufacturing printed circuit boards.

###### SCHEMATIC CAPTURE

Schematic capture in the Proteus Design Suite is used for both the simulation of designs and as the design phase of a layout project. It is therefore a core component and is included with all product configurations

#### 6. EXPERIMENTAL RESULTS

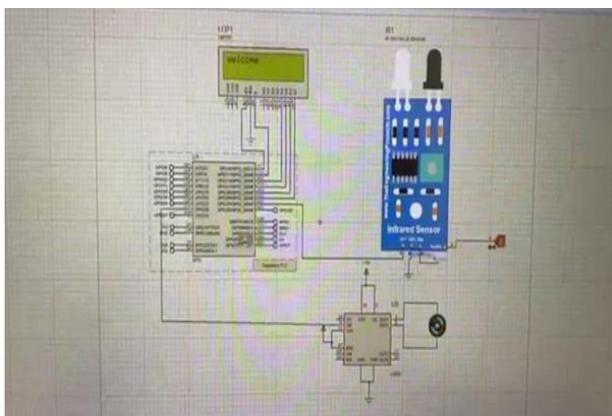


Figure 5.1 The system is ON condition

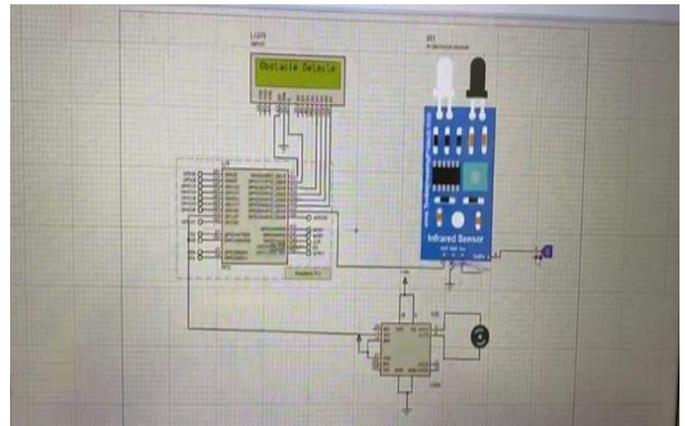


Figure 5.2 Results of Simulation (Obstacle is detected)

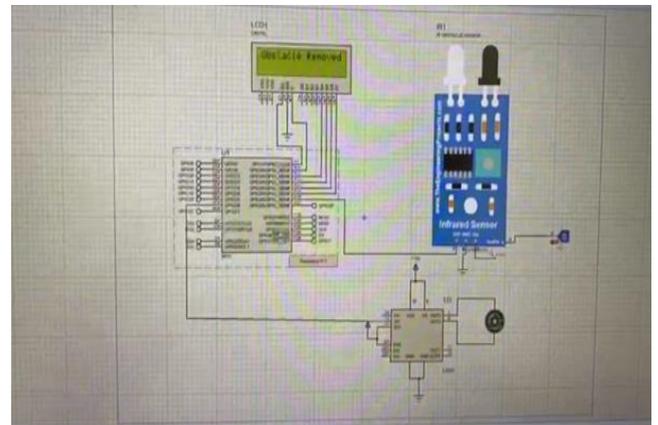


Figure 5.3 Results of Simulation (Obstacle is removed)

#### 7. CONCLUSIONS

Today's major challenge is to reduce the road accident that happens due to many reasons like not following the rules of traffic, driver mistakes. So to overcome these problems this proposed system will definitely help and reduce the road accident. This system automatically controls the vehicle when any obstacles come in front of vehicles. System will automatically detect these obstacles of the traffic and control the vehicle. For obstacle avoidance ultrasonic is used that will give the obstacles coming in front of vehicle. Camera is used for the detection of the obstacle distance. Raspberry pi is used as controller for the system that will take input from the camera and ultrasonic sensor and generate output to control the car.

#### 8. FUTURE SCOPE

The work could be enhanced by improving the algorithm by adding advanced machine learning to it. Using advanced algorithm, we can improve Image processing algorithms. Multi layered processors can be used for fast processing.

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