

## An Automated System on Collision Alert for Vehicle Safety on Road

Rachana Kumari, Komal R, Deepak Yadav, Prof. Monika Dangore

Department of Computer Engineering, Dr. D. Y. Patil School of Engineering, Lohegaon, Savitribai Phule Pune  
University, Pune, Maharashtra, India

### ABSTRACT

There are various reasons due to which accident rates are increasing, some of the reasons are the negligence of the driver, fog, smog, smoke, etc. because of which people are losing their life. In this project, we are going to take note of how we can reduce these accidents by other means which will help to detect the problem in the first place. So, in this project we are basically, calculating or measuring the safety distance between the driving car and front object to avoid the collision.

**Keywords :** Electromechanical, Automated Braking System, Sensors, Notification, Alert.

### I. INTRODUCTION

Automated collision alert system works to avoid accidents or damage. Whenever the sensor detects any obstacle the car automatically adjust accordingly, for instance, it calculates the required speed, proper distance to be maintained between vehicles. So according to the speed of a car, the system will calculate the safety distance. If the obstacle is not in the safety distance then the system will generate alert to apply the brake but in case if the driver doesn't respond then the system will automatically apply the brake. So, in this way it helps to prevent collisions that lead to the safety of vehicles on road.

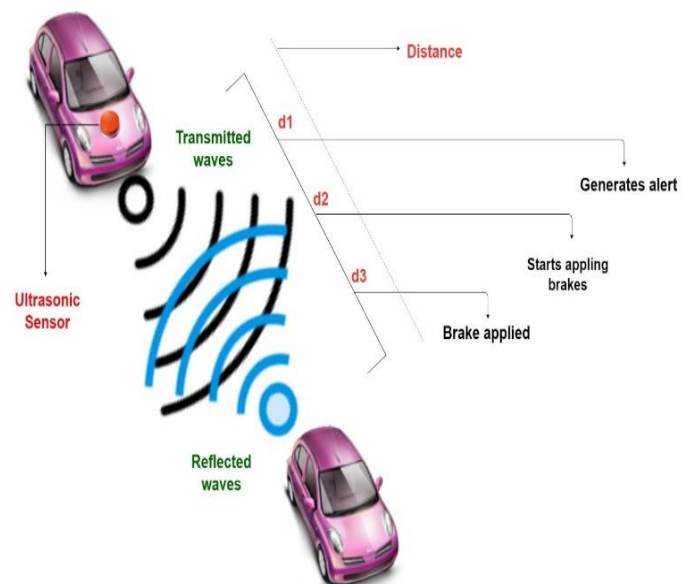


Figure 1: System Architecture

**II. LITERATURE SURVEY**

**TABLE I**  
**LITERATURE SURVEY TABLE**

Sr. No.	Paper Name	Author	Method Proposed	Limitations
1.	The Vehicle Collision Warning System based on GPS	Sehun kim, First ACIS/JNU International Conference	GPS to collect vehicle data on AIS and depending upon vehicle's speed ,direction and distance warning is generated.	Collision is detected within 30meters. Automatic braking system is not there.
2.	Performance Study On IR Sensor For Automobile Braking System	N.Sreeram, IRJET, Volume:05 Issue:03  Mar-2018	The distance of any obstacle, a stationary or a moving vehicle or a road block is sensed by an infrared sensor and it is provided to the microcontroller	Performance Study On IR Sensor For Automobile Braking System.
3.	Automatic Braking System	J. V. Sai Ram, IRJET,	Ultrasonic Sensor detects the	Aurduino Nano

	Using Ultrasonic Sensor.	Volume 3, Issue 4, April 2017	obstacle and sends signal to the Aurduino Nano for processing safe distance and accordingly buzzer and brake id applied.	less I/O pins so it can be used for limited number of things.
4.	Collision Detection System for vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts.	Anil Kumar Gupta, International conference on Issues and Challenges in Intelligent Computing Technologies(ICICT), August 2014.	The location of the all the vehicles is send to server using GPS, there processing is done, and if any vehicle comes nearer then the safe distance, then alert is generated.	The system is not suitable for poor connectivity area. the processing time is quite high.

### III. TAXONOMY CHART

TABLE III  
TAXONOMY CHART

	Processi ng on Server	Automa tic Brake	Alerts Generat ion	Feasibili ty in any weather
The Vehicle Collision Warning System based on GPS	✓	✗	✓	✗
Performa nce Study On IR Sensor For Automob ile Braking System	✗	✓	✓	✗
Automati c Braking System Using Ultrasoni c Sensor.	✓	✓	✗	✓
Collision Detection System for vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts.	✓	✗	✓	✓

### IV. Algorithm

#### A. Algorithm for Safe distance Calculation-

**Input** : Obstacle

**Output** : Alert

**Steps:**

1. Ultrasonic sensor transmits ultrasonic waves.
2. If an obstacle is there, the UV rays get reflected back and then signal is passed to Uno Arduino.
3. Arduino finds the safe distance and threshold distance.
4. On reaching the safe distance , Arduino generates alert.

#### B. Algorithm for automatic braking -

**Input** : Threshold distance

**Output** : Automatic brake is applied on the vehicle

**Steps:**

1. If drive fails to take any action and the threshold distance is reached,
2. Automatic brake is applied and the vehicle is stopped before collision.

### V. RESULT

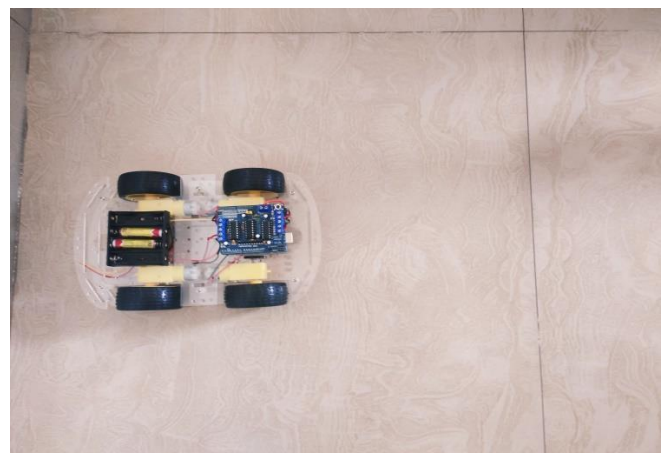


Figure 2: Car at initial state

The ultrasonic sensor emits sound to detect the presence of an object in front, if it receives back the sound, it indicates the presence of an object.

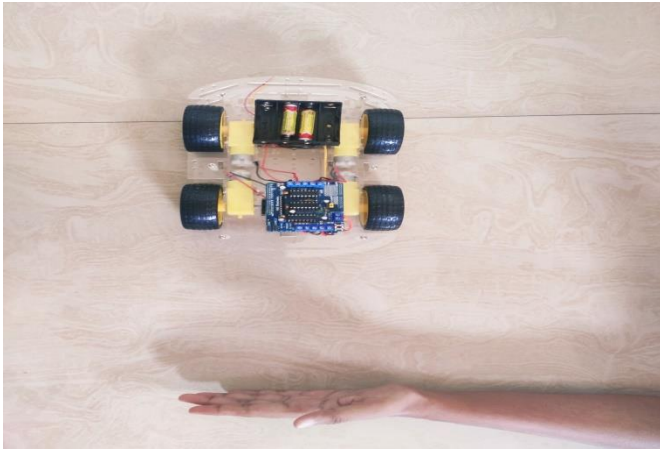


Figure 3: At range 1 system generates alarm

Once the object is detected the buzzer beeps giving a warning to the driver to apply brakes.

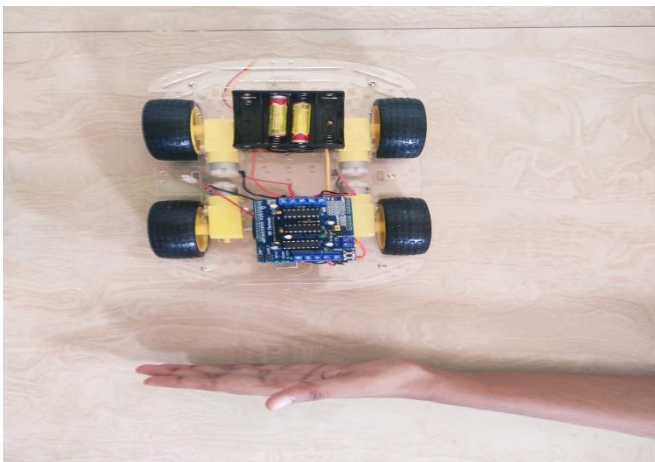


Figure 4: At range 2 system applies automatic brakes

If the car is less than threshold range from the object detected then the motor automatically stops. Hence the car is stopped preventing the accident from occurring.

The below image show the output of the working system on Arduino IDE.

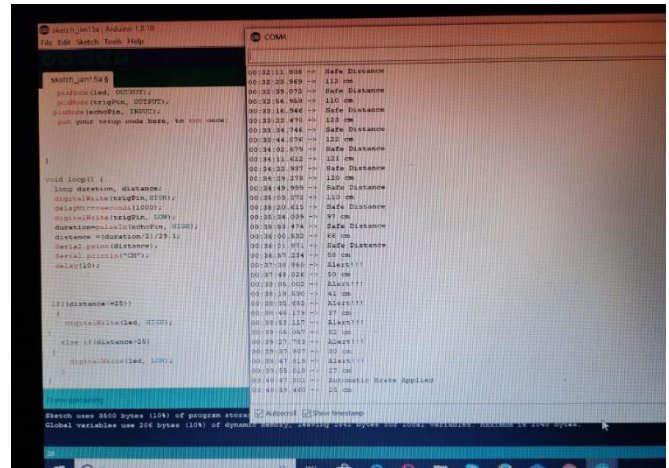


Figure 5: Output on Arduino IDE.

### VI. Advantages

1. Avoids Accidents.
2. In area of poor connectivity and poor visibility (foggy area) accidents can be avoided.
3. First generates Alert and if no action is taken Automatic braking is applied.

### VII. Limitations

- 1 Can detect obstacle upto 100 cm (1m).
- 2 Can detect obstacle in front of the car only.

### VIII. Future work

The project work is no more exhaustive as it can be further accomplished by using different range sensors and actuating mechanism.

### IX. CONCLUSION

The following conclusions that can be made on automatic braking system using ultrasonic sensor are:

1. Arduino UNO microcontroller is user friendly and helps learners. Mechanical engineers in providing better coding/ programming for automatic braking.

2. Ultrasonic sensor is inexpensive compared to other sensors and provides better sensing span within 100m. [3]

3. Automatic braking system take decision based on microcontroller inputs and begins the braking automatically and regulate the vehicle in advance to any harmful accidents situations. Thus, implementing this System can reduce the close impact likely accidents. Also, it can be concluded that the present project work is no more exhaustive as it can be further accomplished by using different range sensors and actuating mechanism. Present paper work becomes a prepared reckoner for engineers in future project growth. [4]

#### X. ACKNOWLEDGEMENT

It gives us a great pleasure in presenting the paper on An Automated system on collision alert for vehicle safety on road. We would like to express our special thanks of gratitude to our Guide, Prof. Monika Dangore, and Dr. Pankaj Agarkar, HOD Computer Engineering Department, for giving us all the help and support we needed during course of the Paper writing work. We would also like to thank Dr. Ashok Kasnale, Principal, Dr. D Y Patil school of Engineering, who motivated us and created a healthy environment for us to learn in the best possible way.

#### X. REFERENCES

- [1] Sehun Kim, Sunghyun Lee, Inchan Yoon, Miji Yoon, Do-Hyeun Kim “The Vehicle Collision Warning System based on GPS” First ACIS/JNU International Conference on Computers, Networks, Systems, and Industrial Engineering.
- [2] N.Sreeraman, G.Sathyapriya, G.Ganesan, G.Ajithkumar, S.Praveen Kumar “Performance Study On IR Sensor For Automobile Braking System”, Volume:05 Issue:03|Mar-2018.

Vipul Shinde, Rohan Thorat, Trupti Agarkar, “Automatic Car Driving System Using Fuzzy”, Volume:05|Issue:03|Mar-2018.

A.joseph Godfrey, V.Sankaranarayanan, “A New Electric Braking System With Energy Regeneration For a BLDC Motor-Driven Electric Vehicle”, Volume:21|Issue:04|August-2018.

Bhaskara. P, Eriki Ananada. K, Venkataramana, “Arduino Based Automated Braking Control System To Enhance The Safety At Low Light And Long Stressed Drive Condition”, Volume:04|Issue:2|2018.

Anil Kumar Gupta, Garurav Wable, Tarun Batra ,“Collision Detection System for vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts”, 2014 Interational conference on Issues and Challenges in Intelligent Computing Technologues(ICICT), August 2014.

J. V. Sai Ram, K.M.S.V. Manikanta, G. Pavanth, B.Jagadeep , “Automatic Braking System Using Ultrasonic Sensor”, Volume 3, Issue 4, April 2017.