Survey on Automatic Collision Alert System for Vehicle Safety on Road

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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.
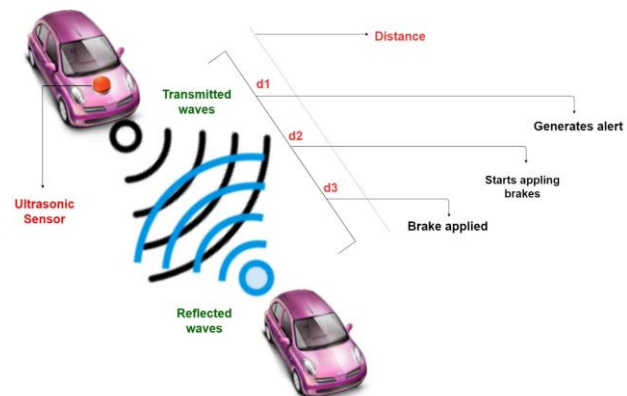

Figure 1 : Collision Detection system with automatic braking example.

II. LITERATURE SURVEY

Here we discussed the literature review of existing techniques:

Sehun Kim, Sunghyun Lee, Inchan Yoon, Mija Yoon and Do-Hyeun Kim[1], they proposed a vehicle warning system that predicts the collision and warns the driver in advance by generating alarms. The system is implemented using sensors and GPS system. The vehicle collision warning system proceeds with

two steps. First step is the AIS which obtains the location data of vehicle. The second step is the collision warning using the vehicle warning algorithm. In this system, suing GPS each vehicle's data is send to AIS and depending upon the vehicle's speed and direction the system generates the waring.

N.Sreeraman, G.Sathyapriya, G.Ganesan, G.Ajithkumar, S.Praveen Kumar [2].They proposed a methodology for automatic control of the braking system to deter any accident. In this technology, they used Arduino, Relays, IR transmitter and IR receiver for the productive function of the braking control system. This complete system can be accommodated on to the dashboard of the vehicle and effectively used for automatic control of the braking system.

Vipul Shinde, Rohan Thorat, Trupti Agarkar [3]. The paper depicts an automatic car system in which the vehicle keep the distance and applies break using fuzzy logic. The one more parameter if the detects object in a certain distance it change its lane and overtakes the object.

A.joseph Godfrey, V.Sankaranarayana [4], They proposed an electric braking system for DC motor-driven electric vehicles based on stopping time and energy regeneration. The system is designed by combining different regenerative methods and plugging.

Bhaskara. P, Eriki Ananada. K, Venkataramana [5], The Arduino board performance is taken out to analyze the distance at which the vehicle comes to a stationary position. The existence of the set up is tested in order to assist the driver during overstress ailments like long drives and long obligation hours.

Anil Kumar Gupta, Gaurav Wable, Tarun Batra [6], they proposed a system for timely detection of other vahicles in the surrounding using GPS based system, which actively and continuously vehicle's location coordinates to the eye in the sky server, which processes the data of the such vehicles and predicts the collision and sends the alert before collision so that the driver can take any action to avoid the accident.

J. V. Sai Ram, K.M.S.V. Manikanta, G. Pavanth, B.Jagadeep, Dr. B. Raghu Kumar, they proposed a system which uses Ultrasonic setup in the front of the vehicle to detect the obstacle. It any obstacle is detected the signal is send to Aurduino Nano from that bases upon distance of object it actuates the buzzer or brakes.

The overall finding of the above discussion is given below as Table-1

Sr. No.	Paper Name	Author	Method Proposed	Limitations
1.	The Vehicle Collision Warning System based on GPS	Sehun kim, Sunghyun Lee, Inchan Yoon, Mija Yoon and Do-Hyeun Kim	GPS to collect vehicle data on AIS and depending upon vehicle's speed ,direction and distance waring is generated.	Collison is detected within 30meters. Automatic braking system is not there.

2.	Performance Study On IR Sensor For Automobile Braking System	N.Sreeraman, G.Sathyapriya, G.Ganesan, G.Ajithkumar, S.Praveen Kumar	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 Car Driving System Using Fuzzy Logic	Vipul Shinde, Rohan Thorat, Trupti Agarkar	Using fuzzy logic vehicle is makes their own choice on which certain actions are taken by sensor data also implement two parameters viz., overtaking and automatic braking system.	The system does not have any communication information such as alerts and warnings. Therefore, the system does not have any vehicle communication.
4.	A New Electric Braking System With Energy Regeneration For a BLDC Motor-Driven Electric Vehicle.	A.joseph Godfrey, V.Sankaranarayanan	The crucial parameters scilicet stopping time and energy regeneration are considered to complete this scheme. As an initial phase, their actions are studied using both numerical simulation and experiments.	The consequences of regenerative braking drop with the speed a vehicle is travelling. At low speeds, friction brakes are expected to bring most vehicles to a complete stop. That means there is however energy being lost.
5.	Arduino Based Automated Braking Control System To Enhance The Safety At Low Light And Long Stressed Drive Condition.	Bhaskara. P, Eriki Ananada. K, Venkataramana	Brakes are connected to the wheels of the vehicle. Before applying the brake, speeding up is released to stop the fuel allowance framework in this way motor builds up no more energy to	The setup ceases to function at turns, also if the object is coming in the straight direction but still is out of range then the system will fail.

			run the vehicle, and after that clutch is withdrawn which subordinate the motor from the transmission frame work.	
6.	Collision Detection System for vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts.	Anil Kumar Gupta, Garurav Wable, Tarun Batra	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.
7.	Automatic Braking System Using Ultrasonic Sensor.	J. V. Sai Ram, K.M.S.V. Manikanta, G. Pavanth, B.Jagadeep	Ultrasonic Sensor detects the obstacle and sends signal to the Aurduino Nano for processing safe distance and accordingly buzzer and brake id applied.	Aurduino Nano less I/O pins so it can be used for limited number of things.

TAXONOMY CHART

Table 2 : Taxonomy Chart

Factors	Processing on Server	Automatic Brake	Alerts Generation	Feasibility in any weather
The Vehicle Collision Warning System based on GPS	✅	❌	✅	❌
Performance Study On IR Sensor For Automobile Braking System	❌	✅	✅	❌

Automatic Car Driving System Using Fuzzy Logic	✅	✅	❌	✅
A New Electric Braking System With Energy Regeneration For a BLDC Motor-Driven Electric Vehicle.	❌	✅	✅	✅
Arduino Based Automated Braking Control System To Enhance The Safety At Low Light And Long Stressed Drive Condition.	❌	✅	✅	✅
Automatic Braking System Using Ultrasonic Sensor.	❌	✅	✅	✅
Collision Detection System for vehicles in Hilly and Dense Fog Affected Area to Generate Collision Alerts.	✅	❌	✅	✅

III. 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. 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.

IV.ACKNOWLEDGEMENT

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