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DYNAMIC REAL TIME CRUISE CONTROL SYSTEM (DRT-CCS) WITH ACTIVE ACCIDENT ALERT USING GSM AND SECURED RFID BASED IGNITION SYSTEM

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Abstract:
Automotive is a widespread field in the 21st century. Automobiles play an important role as a means of transportation in our daily lives. The term cruise control refers to a concept that assists the driver in the charge of steering the vehicle longitudinally circumventing an accident or collision. As the world's population grows, demand for cars and their daily use soars. This leads to severe traffic congestion, annoyance and risk of accidents.
Automotive Black Box is used to analyze the causes of traffic accidents and prevent personal injury and property damage caused by traffic accidents. This document is constructed on the theme of the Adaptive Cruise Control project.
The proffer system tried implementing DRT-CCS on cheaper devices while improving usability and adding additional features. The purpose of this project is to build a semi-autonomous system. It uses an ultrasonic sensor (HCSR_04) to help the driver steer the vehicle longitudinally while driving. When the ultrasonic sensor's output signal reaches a threshold level, the vehicle speed will first decrease, and if the following distance is too close, the system will stop the vehicle.

Keywords - Dynamic Real Time Cruise Control System (DRT-CCS), Driver Assistance Technology, Sensors, Speed, Distance, Transport Vehicle, Following Distance, Road Safety, Comfort, Rear-end Collision, Manual Speed Adjustment.

I. INTRODUCTION:

In the 1970s, the idea of supporting the driver with a “cruise control device” first appeared in America. The easiest version of CC (cruise control) system shows a linear response in increasing the speed and decreasing it to maintain a constant speed, but not enough to account for all other automobiles present on the road and hence congestion. It was impractical on busy roads. With this in mind, a better version called "Adaptive Cruise Control" (ACC) was soon invented. Controlling of vehicle is done by analyzing the information received from the sensor present in the system. Such systems use ultrasonic sensors, radar, or cameras to allow the vehicle to detect when another vehicle is approaching and brake the vehicle when it exceeds a secure distance set by the owner. Adaptive cruise control does not offer self-determination. This system provides the rider with some assistance and makes the experience smoother and more comfortable. Automotive and computing technologies are creating a new layer of automotive data services. This automotive algorithm is used to predict & analyze the causes of traffic accidents happened earlier so by this is prevent loss of life and property caused by traffic accident. The proposed system uses HC-SR04, IR sensor, RFID, NEO6M, a controller (Atmega328P/Atmega2560) to implement cruise control. Vehicle speed is set according to guidelines set by the developer. This includes breaking the black box state and increasing security.The data received from the sensor is recorded. In addition, in the event of an accident or anomaly, the black box will send his SMS alerts to a predefined mobile number via his GSM module, indicating the vehicle’s location read from the GPS module. [1]

II. LITERATURE SURVEY:

Survey Papers on Automotive Vehicle Accident Detection and Rescue Systems | Springer Link from time to time we read in the newspaper or watch on TV about traffic misfortune around the world. This horrifying news stunned the family of this tragic event. One report said that property damage and such could account for 3% of the world's gross household product. To reduce this percentage,

the suggestion arose to support the driver and assist him on long journeys. States that 90% of road traffic fatalities worldwide occur in low- and middle-income countries, despite only 48% of all registered vehicles (21.5 and 19.5 per 100,000 populations, respectively). Indian statistics are terrifying. A minimum of 13 people die in traffic accidents in every hour, according to the most updated report from the National Criminal Records Bureau (NCRB). [2]

An "ACC (adaptive cruise control) system" helps driver to maintain safe distance from the vehicle present near space of his vehicle. Earlier cruise system was only available on all luxury cars such as Rolls Royce, Land rover and Volvo Trucks. The Transportation department of US and his ACAHSR in Japan are working on to develop "smart vehicles" that can bi-directionally share information among each other with this system called "Cooperative Adaptive Cruise Control."

ACC has been implemented in various new cars abroad, including black boxes. But as you know, these ACC systems have not yet been seen in our cars. Even the working class and ordinary people can't afford cars with adaptive cruise control and black boxes because they have very advanced sensors and security systems so they are very expensive so normal cost sensors and We are trying to implement a system that uses the control system in the car to create a cost-effective ACC and black box system, which can provide accurate and accurate result. [3]

III. ASSOCIATED WORKS:

Present Methods:

Earlier versions of the CC (cruise control) system were actually used when automobile vehicle were first created. Standard CC (cruise control) spontaneously maintains the speed of the car. Driver determines the car's speed by adjusting the position of throttle.

The cruise control system has a speed boundary function that works only at prearranged speeds and stops working beyond that. But as the number of cars on the road increases, traditional cruise control is becoming obsolete.

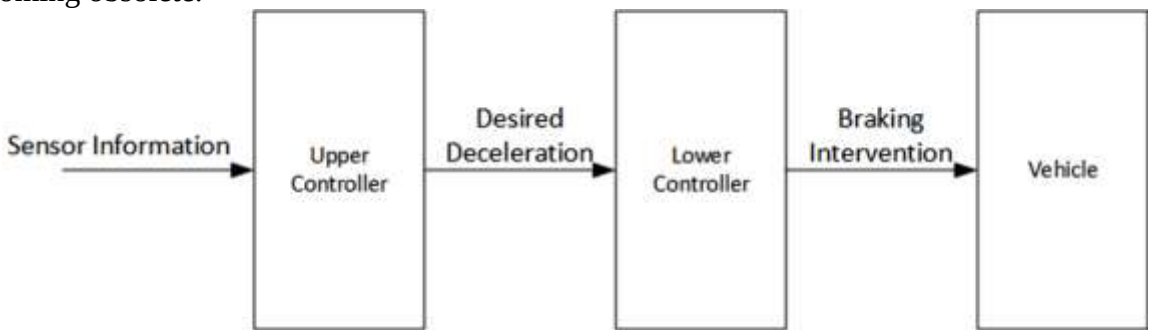

Fig. (1) – General block diagram of Dynamic Real Time Cruise Control System (DRT-CCS)

Proposed Method:

An advanced method of cruise control is the Dynamic Real Time Cruise Control System (DRT-CCS) system. DRT-CCS system not only controls the speed of the car, but it also measures the distance between vehicles ahead and adjusts the speed simultaneously to keep in lane. In the event of an accident, the location of the vehicle is also transmitted. This is an improved feature of the Black Box system. Adaptive cruise control improves fuel economy. Our project is low-cost and user-friendly, meeting the necessary requirements of Dynamic Real Time Cruise Control System (DRT-CCS) (acceleration controlling & distance tracking) and system analyzer and debugger (driver safety by transmitting the driver's location in the form of text message). We aim to implement a system that emergencies. If the driver could have reacted just a few seconds earlier, 60% of head-on collisions would not have occurred," is the result of research and studies to date. To overcome on this problem, researchers have shown that adaptive cruise control considerably improves driver comfort by reducing the driver's tiredness and nervousness and increasing concentration while driving. This will

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make it safer to use and implement DRT-CCS systems in all future vehicles, both electric and manual.[4]

The Figure 1 demonstrates the prototype model of the Dynamic Real Time Cruise Control System (DRT-CCS) system. It tells us about the process of executing CC (cruise control) in a car. Sensing devices (distance sensors, acceleration (speed) sensors and other sensors) collect the information from surroundings. This information is entered to the controller; then controller processes the information and decides to accelerate/decelerate the motor - vehicle and brake accordingly.[9]

IV. BLOCK DIAGRAM:

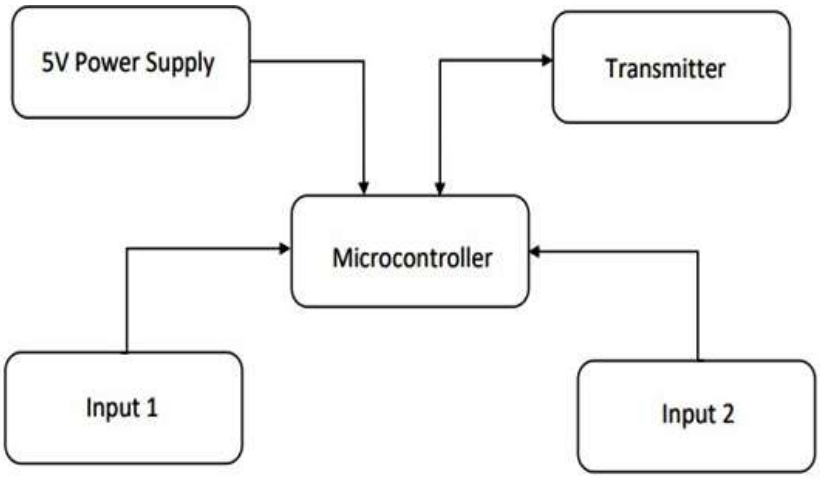

Fig. (2) - Transmitter block diagram

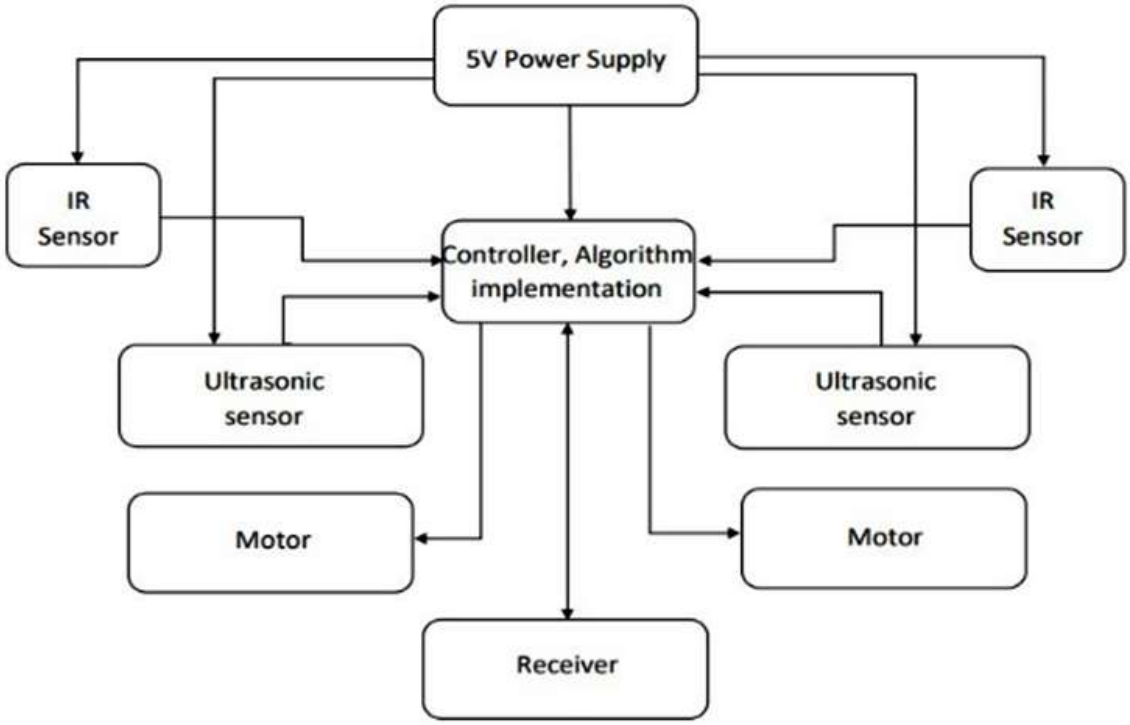

Fig.(3) - Receiver block diagram

V. WORKING:

Dynamic Real Time Cruise Control System (DRT-CCS)is enhanced version of the previously operating cruise control system. With the older system, the vehicle cruises at the rate (speed) set by the controller or in this case driver which allows the driver to keep his feet away from acceleration pedal. Additionally, the Dynamic Real Time Cruise Control System (DRT-CCS) operates on the same

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method; it can automatically calculate the rate at which the car in front of you is going by using the data collected from ultrasonic (radars) sensor & accordingly it adjust the rate at which DRT-CCS should drive in order to avoid accident of your vehicle with the vehicle in front of you this also keep look on all the vehicle near you. If the vehicle in front of you is slowing down this vehicle also try to slow down its speed to maintain a safe distance. If the vehicle ahead changes lanes, the system signals to accelerate and reach the correct speed.

Ultrasonic Sensor Value	Motor Speed
1023	255
1020	255
1017	255
1014	255
1011	255
1008	255
1005	255
1002	255
999	255
996	255
993	255
990	255
987	255
984	255
981	255
978	255
975	255
972	255
969	255

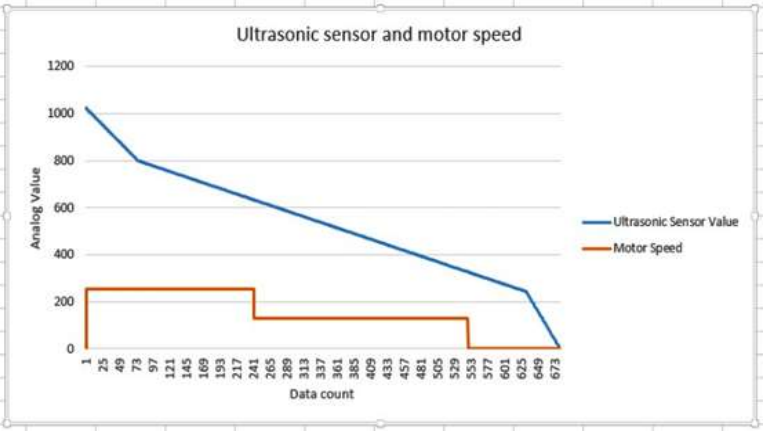

Fig. (6) -Ultrasonic sensor and motor speed

In the above graph illustrate how our motor adjusts its speed based on environment condition. If any vehicle is moving with speed x in front of our vehicle then our vehicle will adjust its speed based on distance sense by ultrasonic sensor and current speed of vehicle in front. Similarly it can implement with the entire surrounding vehicle and not only for front vehicle. In above graph we can see we have set threshold value below which our motor stops automatically this has done to avoid accident.

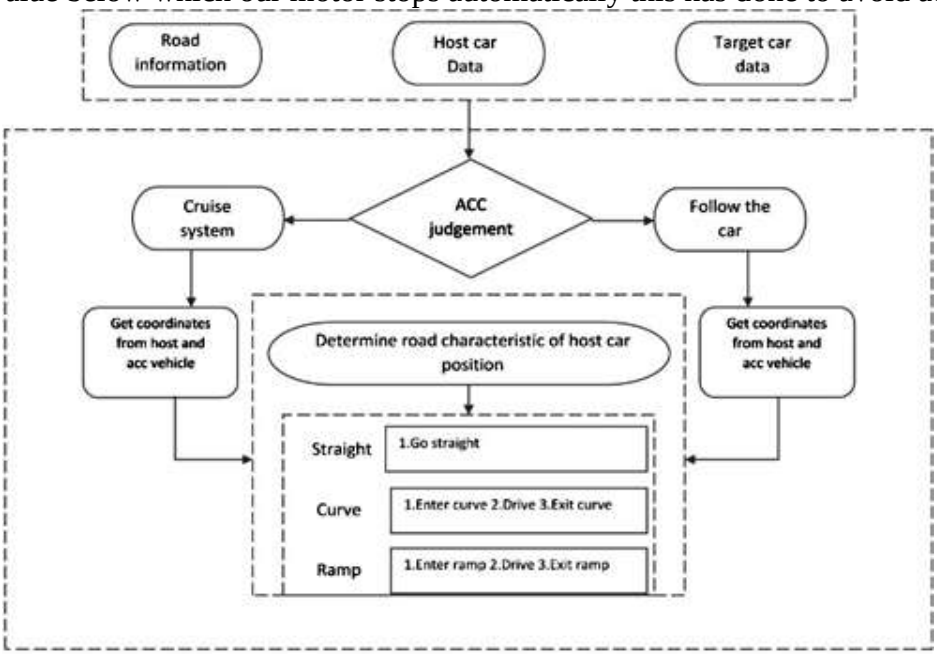

Fig. (7) - Driving condition of vehicle [7]

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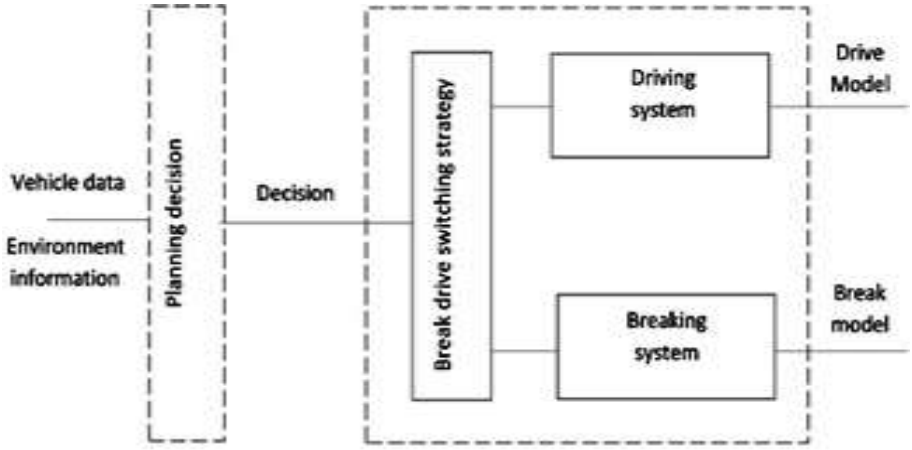

Fig. (8) - Breaking and Driving model

DISTANCE BETWEEN VEHICLE:

The trouble free path to get the distance as centimeters is by using the formula: Centimeters = ((Microsec / 2) / 29). For example, if its taking 100µs (microsec) for the ultrasonic sound to reflect back, then distance is ((100 / 2) / 29) cm or about 1.7 cm.

FOR ROTATION:

1. (Hz x 60 x 2) / number of pole = no-load RPM.
2. ((synchronous speed-rated full-load speed) / (synchronous speed)) * 100 = slip rating.
3. To change SR (slip rating) to Rotation per minute: Rotation per minute x slip rating = Rotation per minute slip
4. To get FL (full-load) Rotation per minute: Rotation per minute - Rotation per minute slip=full-load Rotation per minute.

VI. APPLICATIONS:

1) It can realize automatic cruise control system to avoid accidents and improve user experience.
2) It creates a system with low cost and efficient performance that can be integrated into widely used commuter vehicles.
3) The designed system can be integrated into both cars and bicycles.

VII. ADVANTAGES:

Comfort: On long trips, adaptive cruise control relaxes the driver and allows you to rely on the car for a while without completely taking your eyes off the road. With traffic assistant, ACC makes your daily commute a lot easier.

Speed Consistency: Dynamic Real Time Cruise Control System (DRT-CCS) can move your car at reasonable speeds permitted by national driving authorities. This is especially useful when driving on open highways or other roads where you may hit the accelerator hard for other distractions.

Fuel economy: Driving style is one of the main factors that affect fuel economy. Constantly adjusting speed consumes more fuel. Dynamic Real Time Cruise Control System (DRT-CCS) uses the accelerator and brake system only when absolutely necessary.

VIII. CONCLUSION:

Driver safety and comfort are achieved by the system's adaptive cruise control and black box. An ultrasonic sensor and an LM393 sensor were used to acquire input data, read desired results, and

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control vehicle speed and distance. This also reduces driver braking and shifting. The Thing Speak applet helps you save the data provided by the sensors in graphical form and allows you to view or manipulate the saved data. This reduces stress levels for the driver to drive comfortably, and also ensures the security that the GSM and GPS modules will fortunately and automatically send SMS about your live location in the occurrences of any accident. This system is very viable as a cheap device when used to implement small systems

IX. FUTURE SCOPE:

The Dynamic Real Time Cruise Control System (DRT-CCS) uses LIDAR or radar sensor or in this case ultrasonic sensor technology to determine the distance between two vehicle and speed in order to ensure the safety. Germany is one of the best and the best lucrative market for Dynamic Real Time Cruise Control System (DRT-CCS) in Europe. According to FMI, this growth is due to the high volume of automobile production in the country. Manufacturers of adaptive cruise control systems focus on improving vehicle safety by employing a variety of technologies. According to this study, the Dynamic Real Time Cruise Control System (DRT-CCS) market is expected to grow at a CAGR value of 14.1% to 14.6% in Asia during the predicted period. The addition of advanced Dynamic Real Time Cruise Control System (DRT-CCS) system features in speeding the demand for Dynamic Real Time Cruise Control System (DRT-CCS) system in China.

The rising number of vehicles on country like India and China's roads, along with a increasing population and rising replaceable income, are the factors which influence increasing the demand for Dynamic Real Time Cruise Control System (DRT-CCS). [5]

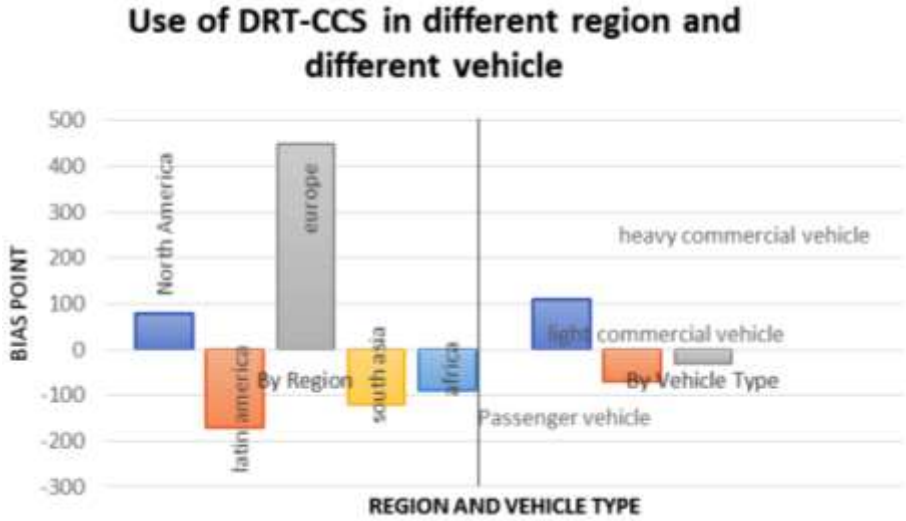

Fig. (9) - Use of DRT-CCS in different region and different vehicle

X. RESULT AND DISCUSSION

Dynamic Real Time Cruise Control System (DRT-CCS) we have tried to make reliable cruse control system with modern feature of lock and safety with this system we can monitor our vehicle performance and location in real time and this was already available in many our advance luxury vehicle we are cutting its cost and making available for low end vehicle so that they can also have so sort of safety.

FEATURES	EXISTING SYSTEM	DRT-CCS
1.LIVE LOCATION	IT'S NOT AVAILABLE IN EXISTING SYSTEM.	WE HAVE MADE IT POSSIBLE IN DRT-CCS
2.ALERT SYSTEM	IT'S NOT AVAILABLE	GET ALERT MESSAGE WHEN SOMETHING HAPPENS WITH VEHICLE
3.RFID	OLD TECHNIQUE ARE USED TILL NOW IN MAY VEHICLE FOR ACCESS	WE HAVE MADE KEYLESS ENTRY TO ACCESS SYSTEM

4.ECONIMOCAL	EXISTING SYSTEM IS PRESENT IN HIGH END VEHICLE	IT CAN BE MADE AVAILABLE TO LOW END VEHICLE TOO.
5.VEHICLE VIEW	ABLE TO GET VEHICLE INFORMATION WHICH ARE PRESENT IN FRONT AND BACK OF THIS VEHICLE	ABLE TO GET VEHICLE INFORMATION IN ALL DIRECTION.

With reference to the result in figure 6 it could be observed that the desired outcome can be achieved with optimum efficiency using DRT-CCS.

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