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Smart Car Collision Avoidance System

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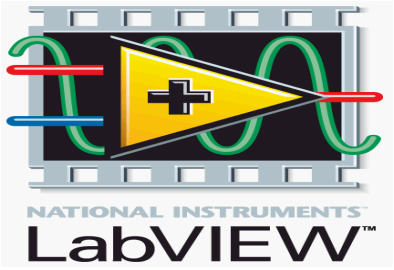
Abstract: *In this paper we demonstrate the potential usage of vehicle to vehicle communication(V2V) to reduce the number of road accidents caused due to over taking of vehicles. The system will operate by transferring data in the form of packets. The packet contains the details of the vehicle like speed, position, registration number. The system gives alertness to the driver if any vehicle approaches towards it, so automatically the speed and position of vehicle can be determined. GPS technology is used to know the position of the vehicle and along with it speed sensor is fixed to the vehicle to determine the speed.*
Keywords: *GPS, LabVIEW, myRIO, speed sensor, wireless communication.*

I. Introduction

The vehicle Ad hoc network (VANET) is a technology having an art of integrating Ad hoc network, wireless LAN and cellular technology to achieve intelligent inter vehicle communication (IVC) also known as Vehicle to Vehicle communication (RVC).Vehicular Ad hoc network is a type of mobile Ad hoc network in which communication with each other without the use of central access points, means that vehicular nodes are treated as computers on wheels or computer network on wheels. Some of the characteristics of VANETs which differentiate it from other mobile network are frequently changing topology and high mobility, no power constraints, geographical positioning availability hard delay constraints and modelling mobility and corresponding predictions.

II. Lab view

Lab View (Laboratory Virtual Instrumentation Engineering Workbench) is a platform and development environment for a virtual programming language from National Instruments. The graphical language is named "G". The programming language used in LabVIEW, also referred to as G, is a dataflow programming language. Execution is determined by the structure of graphical block diagram on which the programmer connects different function nodes by drawing wires. LabVIEW ties the creation of user interfaces (called front panels) into the development cycle. LabVIEW programs/subroutines are called virtual instruments (VI's). Each VI has three components: a block diagram, a front panel, and a connector pane.



III. Existing System

3.1. Car collision mitigating braking system

Collision mitigating braking system assists the braking operation by automatically applying an appropriate amount of braking force to help you to avoid or minimize the chances of hitting the vehicle ahead of you in the traffic. The sensor is placed behind the emblem of car. The only disadvantage of this system is ,if the emblem is covered with any sort of material, the sensor gets deactivated.

3.2. Adaptive cruise control

Adaptive Cruise Control (ACC) is an automotive feature that allows a vehicle's cruise control system to adapt the vehicle speed to the environment. A radar system attached to the front of the vehicle is used to detect whether slower moving vehicles are in the ACC vehicle path. If a slower moving vehicle is detected, the

ACC system will slow the vehicle down and control the clearance, or time gap, between the ACC vehicle and the forward vehicle. If the system detects that the forward vehicle is no longer in the ACC vehicle path, the ACC system will accelerate the back to its set cruise control speed. This operation allows the ACC vehicle to autonomously slow down and speed up is controlled is via engine throttle control and limited brake operation.
The disadvantage of this system is that it encourages the driver to become careless. It can lead to severe accidents if the system is malfunctioning. The ACC systems yet evolved enable vehicles to cooperate with the other vehicles and hence do not respond directly to the traffic signals.

IV. Proposed System

To overcome above stated problems we are proposing a collision avoidance system which is more secure. The new system will use GPS technology to know the exact position of the vehicle. Using GPS the speed of the vehicle will be calculated by subtracting the values of latitude and longitude at different time. The system alerts the driver is any vehicle approaches it the opposite direction with a range of 50m.If there is no obstruction coming in the opposite direction in the same lane, then the system just displays the speed and distance of the oncoming vehicle.

V. Block Diagram And Flowchart

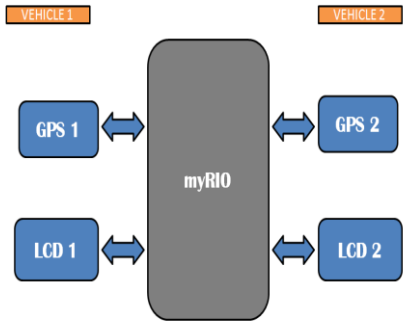


Fig - Block diagram

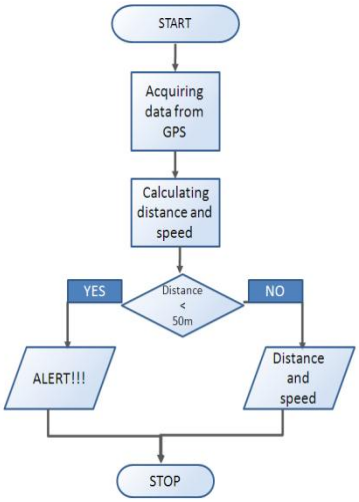


Fig - Flow chart

STEP 1**:** GPS acquires the data using GPS module.
STEP 2: myRIO calculates distance and speed by subtracting the values of longitude at different instant of time.
STEP 3: If another car is travelling in the same lane in opposite direction with 50 meters of range, then the system alerts the driver.
STEP 4: If no obstruction is present the system just displays the speed and distance of the oncoming car.

VI. Project Result

Fig- Front panel for user interaction

✓ The main VI shows the speed and distance of the oncoming vehicle.

- ✓ If the calculated distance between the oncoming vehicles is less than 50 meters then the system throws an alert message to the driver.
- ✓ This will work when the driver is trying to overtake the front vehicle.
- ✓ If it is safe to overtake the vehicle, then the system just displays the speed and distance of the oncoming car which is at safe distance from the user (Driver).
- ✓ The system even has an emergency stop button in case the system fails and gives unwanted alarms.

Fig- Front panel for extra information

- ✓ This is the backend of the front panel, which is another option to understand the system more precisely.
- ✓ It consists of NMEA(National marine electronics association) sentences, which shows the received data from the GPS module.
- ✓ The received data consists of latitude, longitude, altitude, Velocity, etc. From which we are only using the values of latitude, longitude and the time stamp.
- ✓ It also displays the speed of the oncoming car.

VII. Conclusion

It has been developed by integrating features of all the hardware components used. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit.
Till date GPS was only used for navigation purpose. Smart car collision avoidance system is another valuable usage of GPS. The accuracy can also be increased by using the indigenous developed navigation systems like IRNSS, GLONASS, and GALILEO to name a few.

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