

A Review: Strategies to Control Collision in Vehicular System

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Abstract: In our day today life the word accidents are very common and which means indirectly that accidents are frequently takes place now days. Form last few years the number of accidents has been increasing which due to which losses takes place. Losses may be in terms of heavy injuries and to the vehicles. Apart from these losses the loss of money as well. The basic idea of this paper is avoid collision in vehicular system using different control strategies both in hardware and software. We are implementing sensors like ultrasonic sensors, camera using ARM 7. We are also using CAN protocol so that the response time for communication within the system is minimized. Since the vehicle will run on road so practical scenarios must be keep in mind for that purpose, we have done programming in MATLAB so the vehicle can follow lane. There are various types of collision like front end, back end, rare end etc. From different types rare end collision is very common. Hence, more concentration is given to rare end collision. Most of the programming is done in MATLAB. We provide experimental setup on a system so our basic ideas can be clear.

Keywords: Rare end collision, Front end collision, ARM 7, ITS, ADAS, CAN, Obstacle detection, collision avoidance.

I. INTRODUCTION

In this paper we are implementing different strategies to minimize collision in vehicular system. Basically we are concentrating on rare end collisions, since in generally it is very common during accidents. Other than this front end collision is also consider. We are using advance driving assistance system [3], CAN, obstacle detection algorithm, intelligent transport system. We are also using ARM 7, IR and ultra sonic sensors foe object detection and avoidance. Whereas camera is for gathering the information of on road scenario [2]. The block diagram of the system is given below. The ARM7 LPC2148 is connected with CAN module then this module is connected with IR sensor, Ultra sonic sensor and camera. It is also connected to four relays.

forward. There are basically three sensors two are IR sensors and one is ultra sonic sensor along with a camera at front end side [1]. IR1 sensor is connected on left hand side and IR2 is connected on right hand side where as ultra sonic sensor on the front end side. All the sensors are activated when power is switch ON. When IR1 detects the object it will send this information to the system and it will move the vehicle on the right hand side. When IR2 detects the object, it will send this information to the system and it will move the vehicle on left hand side. Also when the object is detected at the front end of the vehicle, it will detect by ultra sonic sensor and it will make the vehicle stops due to this accident will be avoided at both the sides i.e. on right hand side and left hand side even on right hand side [10].

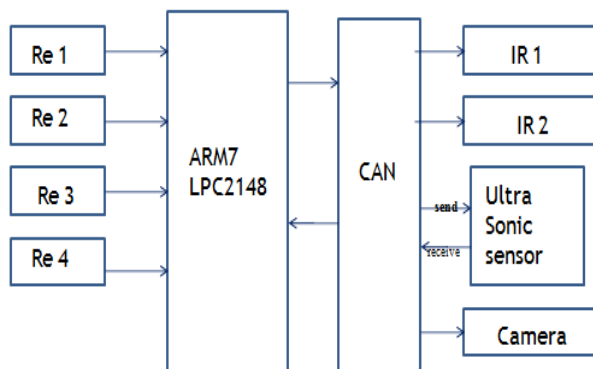


Fig.1. Basic block diagram of the system

II. FLOW CHART

The figure below is the flow chart of the system. This indicates all the process of the system. When the switch is on both the motors will starts and the system will move

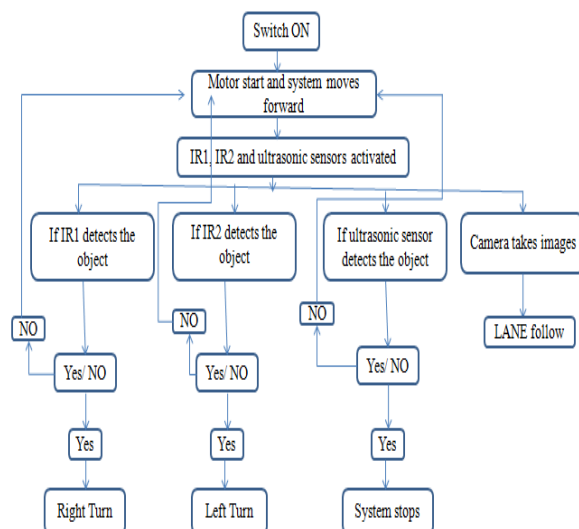


Fig2. Flow chart of the system

In India vehicles run on the left hand side so collision can be avoided if all the vehicle will follow its lane.

With the help of information collected by camera and programming in MATLAB the vehicle will follow lane [4]. All these process is shortly shown in below flow chart.

III. HARDWARE CHARACTERISTIC

A. ARM 7

ARM 7 is a low power and general purpose microprocessor based on reduced instruction set computing. It has fast interrupt response for real time application. We are using ARM7 LPC2148; it has few kilobytes of on-chip RAM. It has increasing clock rate, reduced CPI, based on pipelining mechanism.

B. IR sensor

IR sensors are the infrared sensors. Basically they are used for object detection [6]. They can work day as well as night. They operate about 430 Ghz frequencies.

C. Ultra sonic sensor

It is also called as transducer since it can transmit and receive the signals. It works on the principle of sonar. They emits the echo signals and which it means transmission whereas when echo collides with object and comes to the system it means reception of signal.

The range of target is determined by the “time lagging” between transmitted pulse and received “echo” [6].

D. Relay

We are using four relay which are connected to motors and battery. When relay1 operates the vehicle will takes right turn whereas when relay2 operates the vehicle will take left turn. In similar manner, when relay3 operates the vehicle will move reverse and otherwise relay4 is always ON and moving the vehicle in forward direction.

E. Camera

A low cost USB on board camera is implemented. Due to which continues information is send to the system [8]. With the help of information collected from camera, first it is converted into RGB and the RGB image into binary and so by using object detecting algorithm object will detected.

And also different position of vehicle is observed and it will continuously indicate to the driver on the screen and helps him to be in proper lane [8]. And also using MATLAB programming the system will automatically follow lane.

IV. VEHICLE ON ROAD

As the vehicle will run on road so physical parameters must be consider. There are many other vehicles so our system should detect which is obstacle for our vehicle [1]. Our vehicle must know which vehicle is properly leading or not also which vehicle is proper following. With the help of MATLAB it can be done.

V. LANE FOLLOW

Figure below shows the different positions of our vehicle with the help of which lane is followed [8].for following the proper lane our vehicle must have all information about the different positions of lane [1]. Since, on road other vehicles are also there. Here only the vehicles are keep in concentration [8].



Fig. 3. Different positions of the vehicle on road (a)



Fig. 3. Different positions of the vehicle on road (b)

OUTPUT:



Fig3 Different positions of vehicle while LANE following (c)

VI. CAN

In this project all the internal communication is done with the help of CAN protocol. As we know there are many connections with in the vehicle [9]. CAN uses single wire connection so reduces the complexness of the vehicle and also reduce the weight of it. With the help of CAN the response of communication is fast and since it is a serial communication, the transmission of data is must no losses takes place [1]. The figure below shows different output of CAN.

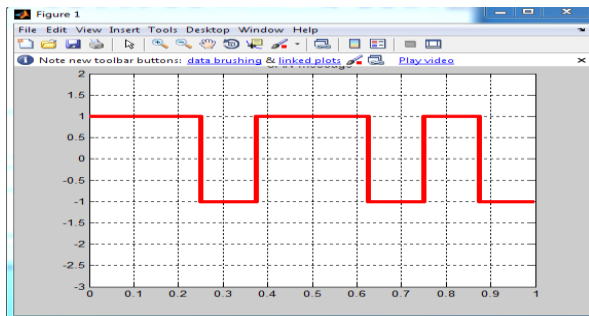


Fig. 4. MATLAB CAN message (a)

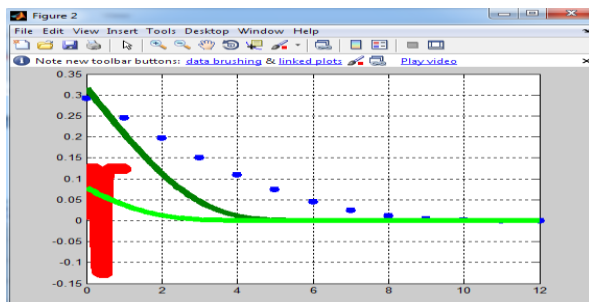


Fig. 4. MATLAB CAN transmission (b)



Fig. 4. MATLAB CAN output (c)

VII. CONCLUSION

Form many year advance driving assistance system has been develop and many new strategies have been include in it. Due to which the human errors i.e. The possibilities of collision while driving can be eliminated. As the rare end collision is one of the most common types of collision and rare end collision avoidance prevents the front end crash while driving [1]. The car manufacturing companies are also including different types of sensors within their car so avoid collision such as camera, short range and long range sensor [8]. With the help of proposed algorithm the object detection is done with the help of camera and ultrasonic sensor which will stop the vehicle before collision. Also IR sensors at the left and right side of the vehicle so they can detect the object front right and left side. These entire algorithms have been done with the help of MATLAB and laptop. Implementation of warning system for driver assistance was not proper due to delay in timing. Practically for this project proper light should be present to get an exact output. And also that objects which not if range of camera and sensor are not considered.

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BIOGRAPHIES



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