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Automatic Braking System and Fuel Flow Measurement

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ABSTRACT

The major cause of collision during road accidents is drink and drive situation. If the driver is drunk, he usually loses the control over the vehicle and this result in collision. This is not only dangerous to the driver's life but also may take the life of the person if the car collides with the person.Another reason of vehicle collisions and loss of life is the inexperienced driver driving the car. The driver is risking his own life as well as the life of others and can cause serious injuries resulting in death if the car collides.

Thus whatever the cause of collision of the vehicle there is the need to develop an efficient system which automatically detects the obstacle in the path of car at particular distance and then if the distance crosses the particular threshold then it automatically brakes the car which can avoid the collision and also possible life injuries.Thus the project is to control the vehicles speed automatically and avoid the accident and save the life. Another aim toimplement smart fuel metering system in vehicle.

Key words- Adaptive cruise control, collision, ultrasonic sensor, Hall-Effect sensor, Smart fuel metering.

I. INTRODUCTION

Road accidents are increasing day by day. With this loss of human lives and injury is also increasing. The death rate due to road car accidents in India is increasing day by day. With more than one death and four injuries every minute, India has the dubious distinction of reporting highest number of road fatalities in the world and the government says the prime reason is "drivers' fault". "During the previous year, there were around 490,000 road accidents, which resulted in the deaths of 125,660 people and injured more than five lakh persons in India.

The majority of road crashes are caused by human error. Research has shown that driver error accounts for over 80% of all fatal and injury crashes on road collisions. The main causes of death and injury on roads remain speeding, drink driving and non-wearing of seat-belts.

Thus this work involves designing such a system which can automatically adjust the speed of the car according to conditions encountered on the road. The project focuses on development of engine driven model of a vehicle which is equipped with smart systems to control the speed as well as braking of the system automatically. The project also aims to implement smart fuel metering system to avoid petrol theft.

II. METHODOLOGY

The project involves fabrication of an engine driven vehicle which can automatically adjust the speed sensing the obstacles in its path and apply brakes when necessary. The implementation of this project involves designing and fabrication of smart system and also a modelof vehicle on which the concept can be demonstrated.

1. The designing of smart adaptive cruise control system
2. The microcontroller unit
3. The vehicle chassis fabrication
4. The Drive train
5. Smart Fuel metering system
6. Assembly

III. WORKING PRINCIPLE

1.When a particular point approaches where the car is too close to the obstacle and is about to collide the braking system is automatically activated which apply brakes the vehicle thus preventing collision. This is done using electromechanically control throttle as well as brake pads. i.e. the manual throttle as well as brake pedals are given to the controller and then controller adjusts it accordingly.[1]

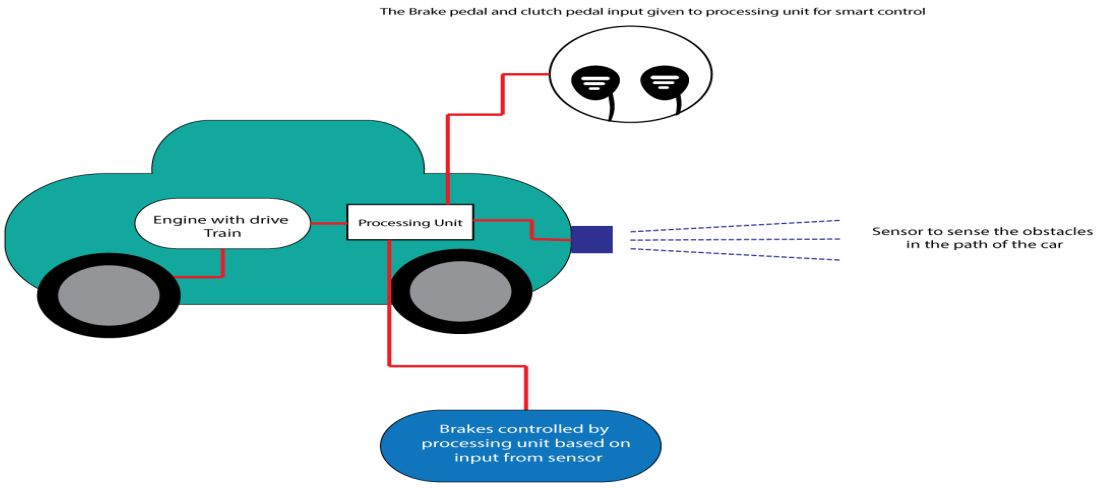

Fig 1: Working principle

Three cases can be considered to understand the concept of the project.

1) There road is empty:

When the road is empty the vehicle will be moving with full speed as you can see in the below figure . The adaptive cruise control system wont be working this time.

2) When the car approaches another car or an obstacle:

When the car approaches another car or obstacle and the obstacle is still at a sufficient distance from the car, the speed of the car goes on dropping as it approaches another car. This is nothing but adapting the speed of the car with respect to another car, the core concept of adaptive cruise control.[4][5]

3) When the car is about to collide:

When the car is about to collide, the car automatically applies the brake even if the throttle is pressed by the drives. This prevents the head on collision between the cars.[2][3]

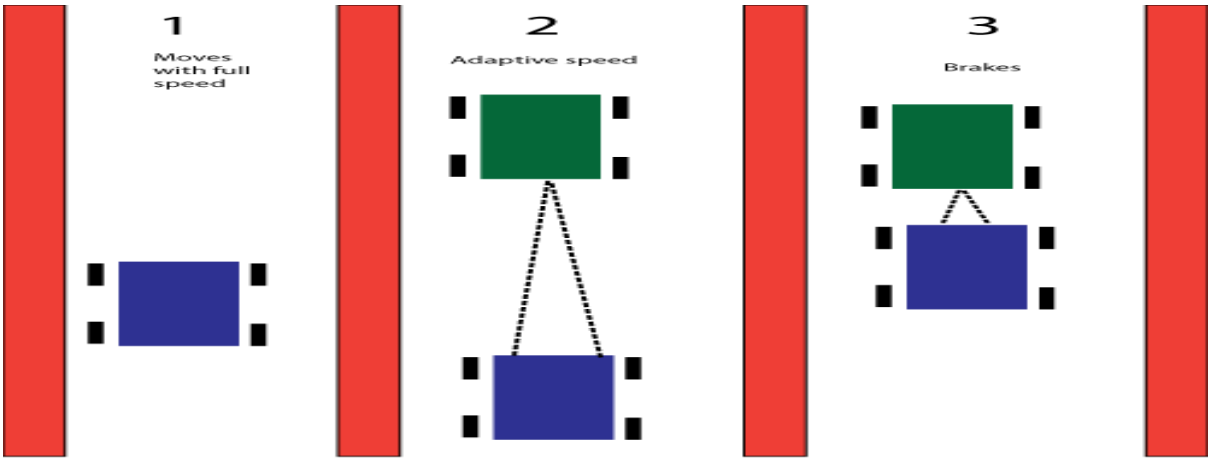

Fig 2: Working steps

2.The liquid pushes against the fins of the rotor, causing it to rotate. The shaft of the rotor is connected to a Hall Effect sensor. It is an arrangement of a current flowing coil and a magnet connected to the shaft of the rotor, thus a voltage/pulse is induced as this rotor rotates. In this flow meter, for every liter of liquid passing through it per minute, it outputs about 4.5 pulses. This is due to the changing magnetic field caused by the magnet attached to the rotor shaft as seen in the picture below. We measure the number of pulses using an Arduino and show the quantity of fuel on display.[6]

Fig 3 : Hall-Effect sensor

IV. CONCLUSION

From the developed concept it can be concluded that the developed system will help to prevent the rate of road accidents due to over cruising and loss of control on vehicle. To avoid jerks the proposed system also adjust the speed smoothly rather than immediate braking. In addition the proposed fuel metering can show us the actual amount of fuel being refueled in the vehicle and avoid the theft of fuel in fuel pumps.

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REFERENCES

Journal Paper:

[1] M. Prabha , M. Seema, P. Saraswathi, "*Distance based Accident Avoidance System usingArduino*", International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056*Volume: 2 Issue : 7* in year 2015.

[2] Divya Thakur, A. P. Thakare, *"A Review on Implementation of FPGA for Automatic ReverseBraking System",* International Journal of Science and Research, ISSN (Online): 2319-7064*Volume: 4 Issue :1* in year 2015.

[3]Sushil kumar, Vishal Kumar**,** *"Automatic Emergency Braking System",* International Journal of Research In Science and Engineering e-ISSN: 2394-8299*Volume: 1 Issue: 3*

[4]*"Advanced accident avoidance systems for automobiles"*by T.U.Anand Santhosh Kumar, J. Mrudula ,International Journal of Computer Trends and Technology e-ISSN: 2231-2803 *Volume: 6 Issue: 2 in year 2013.*

Books:

[5]Atmel AVR Microcontroller Primer by Steven F. Barrett, kcaP .J leinaD

[6]Programming and Customizing the AVR microcontroller by Dhananjay Gadre