Vehicle Speed Control By Accleration Pedal Through Sensing Alcohol

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ABSTRACT

This system is aimed at making vehicle driving safer than before. The main purpose behind this project is "Drunken driving detection". Now days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Thus drunk driving is a major reason of accidents in almost all countries all over the world. We have propose the detection of alcohol using alcohol detector connected to Printed circuit board (PCB) such that when the level of alcohol crosses a permissible limit, the vehicle ignition system will turn off. Alcohol Detector in Car project is designed for the safety of the people seating inside the car. Alcohol breath analyzer project should be fitted / installed inside the vehicle. And after the detection of alcohol acceleration of vehicle will control by using pneumatics system.

Keywords- *Alcohol detection system, Vehicle controlling system, Accident prevention system, Printed circuit boar*

1. INTRODUCTION

The correlation between alcohol and vehicle-related death and injury was identified in an editorial of the Quarterly Journal of Inebriety for the first time in 1904. Nowadays it is well accepted that alcohol consumption can lead to risky driving and increase the frequency of traffic accidents and related injuries and mortalities. About 40% of all traffic mortalities are associated with alcohol, regarded as the most important human cause of severe automobile crashes. Hence, there is a powerful linkage between alcohol consumption and risky driving behaviors, so driving after alcohol drinking is forbidden by law in many countries. A legal range for maximum blood alcohol concentration (BAC) was from 0.01% to 0.08% in different countries. Scientific literature showed that BAC of 0.05% could impair motor vehicle driving.

Driving performance has been already evaluated in many studies and it is believed that consumption of alcohol can influence some driving skills like choosing an appropriate speed, time and frequency of overtaking, braking, steering and determining the distance with other vehicles. Lane position, line crossing, number of crashes, speed deviation and time at maximum speed are other indexes to evaluate driving performances in this area. An important mechanism for these effects is associated with distraction caused by alcohol. Also it is proposed that alcohol intake can impair neurological and cognitive functions. Furthermore it can lead to an increase in reaction time to potential hazards and a decline in short-term memory of drivers. Some factors like age, gender and driving skills could have some exacerbating effects on the alcohol-related driving. These effects seemed to be limited whereas BAC and complexity of the driving tasks were proposed as the most important factors here. A significant association of other drug administration like dexamphetamine and caffeine along with alcohol on risky driving was reported.Interestingly, simulated driving researches exceedingly helped traffic scientists in recent years.

1.1 PROBLEM STATEMENT

In the present condition so much vehicle accidents happened because of the drinking drive so need to do something to reduce this so need to provide the safety system in the car and also take care of the comfortless of the user.

Main thing in vehicle their speed control is very important at time of the alcohol detection. So speed is get control by controlling the acceleration of the vehicle. So our problem solution is to control the vehicle acceleration.

1.2 OBJECTIVES

1- Main objectives of this project is to reduce the accident happened after the alcohol drinking on the road and so much losses happened of vehicle.
2- Also we want to provide the safe and automation in the driving to the vehicle.
3- Achieve the result successfulness and reduce the losses in the working system.
4- In low cost implement the high quality automation in vehicle.

1.3 PROJECT SCOPE

1- Alcohol detection project can be used in various vechicles for detecting whether the driver has consumed alcohol or not
2- This project can also be used in various companies or organization to detect alcohol consumption of employees

1.4 METHODOLOGY

1- Alcohol consumed by driver then starts the car alcohol detect by sensor detects .
2- Then Sensor send signal to ECU.
3- ECU will actuate the solenoid valve.
4- Then supply of air to solenoid valve.
5- It will be contribute to the pneumatic cylinder.
6- Then Speed of vehicle will be under control through the acceleration pedal.

2. LITERATURE REVIEW

A literature review of published studies on alcohol and traffic injuries in developing countries was undertaken to examine evidence of the prevalence of alcohol. 16 studies were identified through electronic database searches from 1966 to 1994. The studies employed different measurement methods and cut-off levels of blood alcohol concentrations (BACs). 8 fatality studies reported varied BACs in drivers ranging from 33.3% to 63.2%, measured by blood analysis. In four of the studies, alcohol prevalence, tested in less than 50% of the study population, varied from 17.3% to 46%. No clear selection criteria were stated, and the representativeness of those tested could not be ascertained. In eight non-fatality studies, the proportion of intoxicated subjects, determined by blood analysis, breath tests and interviews, were considerably lower and varied widely, from 7.7% to 28.4%. Alcohol prevalence was consistently higher amongst drivers (33.3% - 69.2%) than in other road users, and over 95% of intoxicated drivers were male (95%-100%). 50% of alcohol positive subjects were aged between 20 and 30 years. From this review, evidence of the influence of alcohol in traffic injuries in developing countries is limited. Due to variable measurements and threshold BAC levels applied, direct comparison of results is inappropriate. The true prevalence of alcohol-related traffic injuries remains unknown. There is need for a standardized methodology, reliable BAC measuring devices and a uniform cutoff level.

2.1 Gabriel Gasparesc

This paper describes a driver alcohol detection system based on breath sample testing,
developed using Arduino Compatible Compiler for LabVIEW (ACCL), that allows to program Arduino boards with Labview. The system is able to measure the alcohol concentration from breath sample and control the operation of the car ignition system to prevent drunk driving

2.2 Robert M. Brooks

The floating car method was used to observe the acceleration characteristics during overtaking maneuvers. The acceleration characteristics from rest were observed manually. Various acceleration values for different vehicles were determined. The maximum value of acceleration observed was that of SUVs and the minimum value of acceleration observed was that of buses.

2.3 Abhishek Gupta

The main purpose behind this project is "Drunken driving detection". Now days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Thus drunk driving is a major reason of accidents in almost all countries all over the world. We have propose the detection of alcohol using alcohol detector connected to Printed circuit board (PCB) such that when the level of alcohol crosses a permissible limit, the vehicle ignition system will turn off. Alcohol Detector in Car project is designed for the safety of the people seating inside the car. Alcohol breath analyzer project should be fitted / installed inside the vehicle.

2.4 Gyorgy

In engineering practice we often use pneumatic cylinders, motors, actuators. Popularity of these instruments is understandable, since fast and clean, isn't an electromagnetic compatibility trouble, and can be used in potentially explosive environments. A disadvantage of undetermined speed of movement can be mentioned, which is coming from the dynamic characteristics of the air is generally difficult to handles. In the present paper we present such a solution, which can be achieved by using an embedded micro-controller with a special pulse width modulation control (PWM) which the pneumatic actuators velocity is controllable. The proposed process control scheme is reached at which the piston travel speed range can be large. To do this we need to change the three parameters, depending on the physical characteristics

2.5 Chandrashekar K.V

A smart vehicle speed monitoring system is proposed using arduino and speed sensor. Considering the road safety a new technique is described to identify the speeding vehicle and charge them fine for breaking the rules or intimating the consulted authority to take action. In past, lot of devices to detect rash driving on highways has been made. Most of the approaches require human concentration and involve a lot of effort, which is difficult to implement.

3. SELECTION OF COMPONENT

3.1 Alcohol

A colourless volatile flammable liquid which is produced by the natural fermentation of sugars and is the intoxicating constituent of wine, beer, spirits, and other drinks, and is also used as an industrial solvent and as fuel.

3.2 Alcohol Sensor Module:

Air Quality Sensor (MQ135) Description: Air quality sensor for detecting a wide range of gases, including NH3, NOx, alcohol, benzene, smoke and CO2. Ideal for use in office or factory. MQ135 gas sensor has high sensitivity to Ammonia, Sulfide and Benze steam, also sensitive to smoke and other harmful gases.

Fig No. - 1 MQ-135

3.3 Relay

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a separate low-power signal, or where several circuits must be controlled by one signal.

Fig No. - 2 Relay

3.4 ATmega328 Microcontroller Unit

The Atmel AVR® core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers.

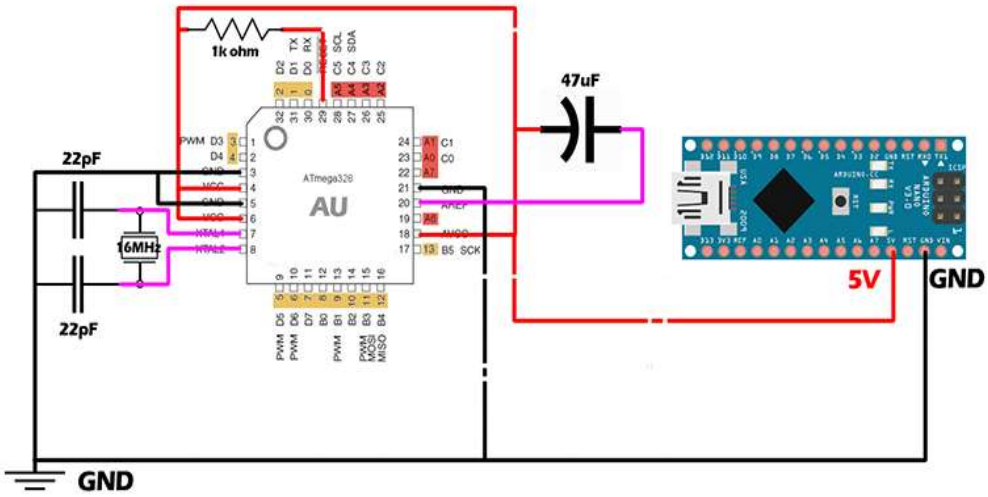


Fig No. 3 ATmega 328/p

3.5 Pneumatic Cylinder: -

Pneumatic cylinder (sometimes known as air cylinders) are mechanical devices which use the power of compressed gas to produce a force in a reciprocating linear motion. Like hydraulic cylinders, something forces a piston to move in the desired direction. The piston is a disc or cylinder, and the piston rod transfers the force it develops to the object to be moved

Fig No. 4 Pnematic Cylinders

3.6 Hose pipe

A hose is a flexible hollow tube designed to carry fluids from one location to another. Hoses are also sometimes called pipes (the word pipe usually refers to a rigid tube, whereas a hose is usually a flexible one), or more generally tubing. The shape of a hose is usually cylindrical (having a circular cross section).

Fig No. 5 Hose Pipe

3.7 Solenoid Valve:

A solenoid valve is an electromechanical device in which the solenoid uses an electric current to generate a magnetic field and thereby operate a mechanism which regulates the opening of fluid flow in a valve.

• 3/2 12v electrically controlled solenoid as shown in figure 5 valve can be used.

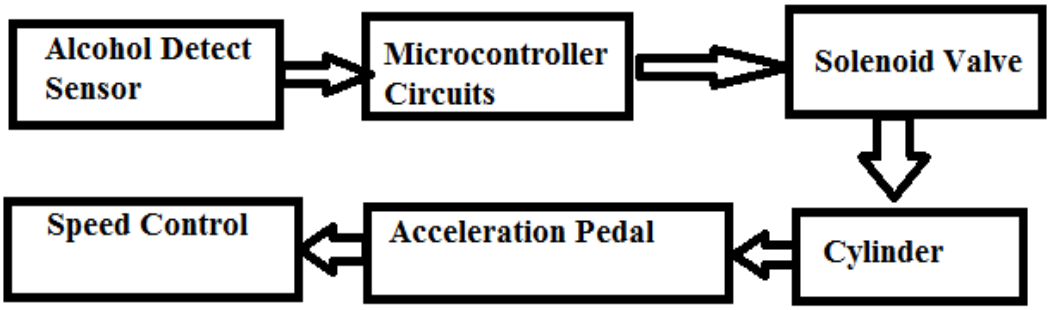
• The solenoid valve gets actuated when it receives signal from the control unit.

• Thus, compressed air is released into pneumatic cylinder through FCV.

• Solenoid valves offer fast and safe switching, high reliability and long service life.

Fig No.6 Solenoid Valve

4 BLOCK DIAGRAM



5 Calculations

- **Frame design:**
- Material used –mild steel, square pipe
- Area=1*1inch=25.4*25.4=645.6mm^2
- Length of link=30 inch=762 mm
- Weight of project=15 kg= 15*9.81 =147.15 N

Cylinder Calculation

- **Double acting pneumatic cylinderGiven data:**
- Pressure: 0.4 Bar
- Cylinder: 20*50 mm^2
    - **Volume of air = Stroke *Area of piston**
        - =100*π/4*20^2
    - =31415.92 m^3

- **Area of piston = π/4*20^2**
  - = $A = 314.15\ mm^2$
- **Outstroke force (F) = Pressure *Area of cylinder**
  - =0.4*314.15
  - =125.66 N
- **Piston rod area (A1) = π/4*d^2**
  - = π/4*7^2
  - =38.48mm^2
- **Effective area= Piston area- Piston rod area**
  - =314.15-38.48
  - =275.66 mm^2
- **Instroke force= P*A**
  - =0.4*275.66
  - =110.26 N

6 CAD MODEL

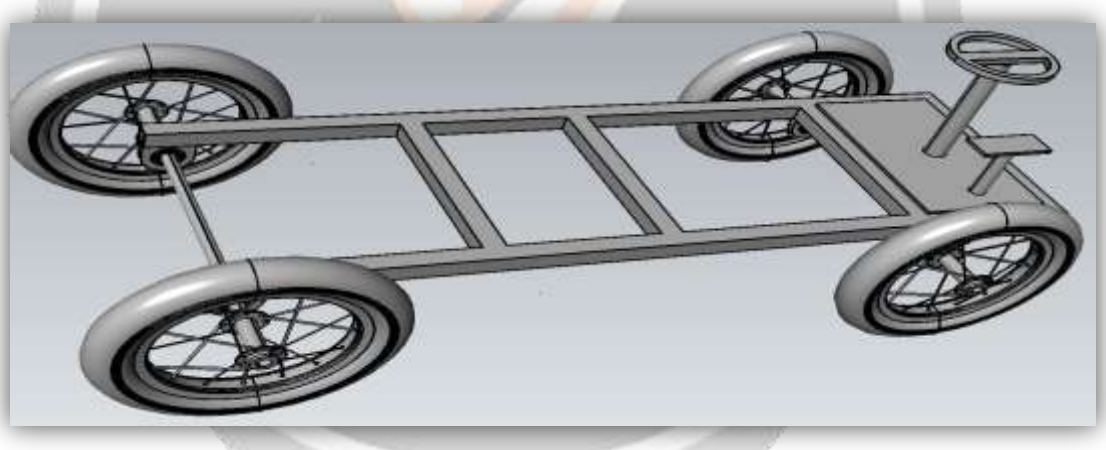


Fig No.16 CAD MODEL

7 WORKING

Basically, Our project is Vehicles Speed Control By Accleration Through Sensing Alcohol which are commonly known as Alcohol Detection With Vehicles Controlling, is an prototype device, are component of this System, which include a ground-based supports Stand Setup Consist four Wheel ,Some electronic parts like Relay, MQ-3 Sensor And Microcontroller are used in this project . Also Solenoid valve and Double acting pneumatic cylinder are used in this project.The protype may operate by human operator, basically the system Sense the alcohol through MQ-3 sensor then signal send to relay and microcontroller unit. The electronics devices attached with computers. Then the Signal go to solenoid valve , solenoid valve is connected to the pneumatic cylinders with the help of hose pipe ,then air Supply to the system, air go to solenoid valve and pneumatic cylinders , If the sensor values are greater than predefine values that means sensors are active and driver exceed any of the mentioned parameter. If the driver is driving in the influence of alcohol and is under the limit, then there will be no problem. But if the alcohol

exceeds the limit, then the sensor will sense alcohol send signal provide the microcontroller unit, solenoid valve then the accleration pedal blocked by pneumatic cylinders.

Fig No. 7 Actual Model

8. ADVANTAGES AND DISADVANTAGES

Advantages

1- Main advantage of the project is to control the accident of the vehicle
2- Also provide the safety in the automobiles.
3- System is very less costly to install and maintain.

Disadvantages

1- Need to design the vehicle design as per the our project.
2- Some times pneumatic system will be fail then the total system will gets fail.

9. CONCLUSION

Our project Vehicle Speed Control By Acceleration Pedal Through Sensing Alcohol System was implemented successfully. This device provides much advanced facilities in now a days life as it can be easily implemented in vehicles. Thus we can reduce alcohol related road accidents and hence these kinds of detectors have a great relevance. It can also be used in schools, colleges, offices and some public places such as hospitals, libraries etc. Through this project we present hardware programming of microcontroller to facilitate as alcohol sensor.

10. FUTURE SCOPE

1. The system can be improved by the use of the GPS and GSM system.

2. The cost of the system can be reduced.

3. This system can be implemented manually.

4. The speed of the car can be limited by the alcohol percentage.

5. This system can be implemented in every car.

6. This system can be implemented in two wheelers.

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