Alcohol Detection of Drunk Drivers with Multi Security Parameters for Engine Locking System

Karthik B R[1] Lava M[2] Mahamaddileep[3] Manoj C[4] Prabhakar.C.G[5]
[1,2,3,4]Student [5]Assistant Professor
[1,2,3,4,5]Department of Mechanical Engineering
[1,2,3,4,5]Nagarjuna College of Engineering and Technology, Bangaluru, India

Abstract— In the present day's alcohol-attributable accidents are increasing rapidly where the concern as alcohol is a factor in many categories of injury. Every year it is reported about 2.3 million premature deaths due to harmful consumption of alcohol. In this paper we proposed improved alcohol detection for use in an automobile ignition locking system using Arduino. A temperature sensor is used to measure the temperature of the breath sample to ensure that it is the same temperature as human breath. A sensor is used for a specific volume of the breath sample, which is used to determine the alcohol content. A Micro Controller is used to convert the output into are adding which represents the breath alcohol content of the breath sample. This analysis is used as part of an overall automobile ignition locking system which prohibits starting the car when the operator is intoxicating. The system also requires rolling retests to ensure that the driver is still sober.

Keywords: Alcohol Detection, Arduino, Ignition Locking

I. INTRODUCTION

The growth of automotive vehicles has been increasing gradually day to day, which In turn leads to the increased growth of road accidents. The numbers of accident that take place in India are ranked to be in top most position in world. The number of road deaths is high mainly in metropolitan cities. According to the survey Delhi ranks first in the position, Bangalore in fourth place and Hyderabad in ninth place in these road accidents. The car alcohol sensing device will have threshold to allow the driver to start the car. The driver can start car only when he consumes alcohol lower than the threshold level. A sensor is used for specific volume of the breath sample, which is used to determine the alcohol. A microcontroller is used to convert to the breath sample. A temperature sensor measures the temperature of the breath sample to ensure that it is the same temperature as human breath.

Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in near future. the system implemented by us aims at reducing the road accident in the near future due to drunken and drive. This paper present the progress in using the alcohol detector, a device that senses a change in the alcoholic gas content of the surrounding air these device is more commonly referred to as a breath analysis, as it analysis the alcohol content from person's breath. The system detects the presence of alcohol in the vehicle and immediately locks the engine of the vehicle. India has earned the questionable qualification of having more number of fatalities because of street mishaps on the society.

A. Alcohol Sensor

The alcohol sensor will detect the alcohol content from human (driver) breath and send its value to microcontroller. Alcohol sensor (MQ3) is suitable for detecting alcohol concentration just like your common breathalyzer. It has a high sensitivity to small value of BAC and fast response time, provides an analog resistive output based on alcohol it has sno2 as gas sensitive material to sense alcohol. MQ3-alcohol gas sensor is a low-coast semiconductor sensor which, used to detect the presence of alcohol vapor gas at concentration from 0.05 mg/L to 10 mg/L. It has high sensitive to alcohol and has a good resistance to disturbance due to smoke, vapor and gasoline the sensitive material used for sensor is SnO2, whose conductivity is lower in clean air. Its conductivity increase as the concentration of alcohol vapor gas increases. This module provides both digital and analog outputs.

This alcohol sensor is suitable for detecting alcohol concentration on your breath. It has high sensitivity and faster response time. The sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is a resistor. A simple interface could be a 0-3.3v ADC. The MQ3 alcohol sensor module can be easily interfaced with microcontrollers, Arduino boards.

B. Relay

Relay is used to turn off the ignition system by passing low power signal to ignition system that's mean when alcohol detection power signal is triggered.

C. Blood Alcohol Content (BAC) limits

The concentration of alcohol in blood: 0.05 grammas per 100 milliliters (all drivers), professional drivers 0.02 grammas per 100 milliliters. Breath alcohol content 0.24 milligrams per 1000 milliliters (all drivers), professional drivers 0.10 milligrams per 1000 milliliters.

Has proposed a method to detect alcohol but uses GPS and GSM module which increases the overall cost which could be avoided. In our project, we are using a siren which will be more cost efficient. Use of siren will alert the people nearby and hence any kind of necessary action can be taken. There are many flaws with their design. A major shortcoming is the limitation of the its application to only vehicles which use helmets, i.e. wheelers which is not a feasible idea while driving, especially for short distance. Another drawback being, the system when implemented makes the helmet too heavy which is not favorable for driving. Also they have used an expensive micro-controller whereas we are using open source hardware, which is very cheap by Namitha shinde.

Complex health monitoring systems and infrared sensor to detect the presence of alcohol. A major drawback of this system is the possibility of false alarm. The system is designed in a manner that even a slight change in some particular condition can result in ringing false alarms

through everything was normal. In our project, we are using only the required technology thereby making the system more reliable and cost effective when implemented. He has proposed a system to prevent the accident due to drunken driving. Major drawback of this system is that they have used PIC16F877A micro-controller which is not as useful as Arduio Uno micro-controller that we are using by Amresh giri.

The work carried out by various researchers for analysis of SCF is compiled and presented by Peterson [2] and SCF value under tensile loading is reported. SCF values for finite width plate with a circular hole are determined by Howland [3] and are presented for various a/w ratios in the form of curves. The above has been formulated by Heywood [4]. Mittal and Jain [5] have analyzed the stress concentration and deflection in isotropic, orthotropic and fibrous composite plates with central circular hole subjected to transverse static loading by using two-dimensional finite element methods.

II. OBJECTIVES

The objectives of this project work are as follows

1) Study of existing alcohol detection system and various methods.
2) Selection of sensor, PCB board and security system.
3) Writing coding for security system (timing, distance, temperature etc)
4) Adopting the system in live car.
5) Testing of written program and modification if any (system setting & model)
6) 6. The target of this project is to give a idea and inventive method for avoiding drunken driving of a Motorcar by locking the car.
7) To Broaden this thought with more innovative headways and makes it accessible in a financially effective way.
8) We need to plan a sort of framework which can recognize the alcohol content in the car to prevent the conduct of alcoholic driving.
9) The frame work comprises of these two sections:
10) Sensor part – used to identify the centralization of alcohol all around and send the concentration as voltage signals to the accompanying part.
11) Display part – used to get the prepared signal and demonstrate the information to users in LCD.
12) To extend this idea with more technological advancement and make it available in a cost-effective way,
13) To prevent road accidents.

III. MATERIALS AND METHODOLOGY

The alcohol sensor used is MQ3 sensor is appropriate for recognizing alcohol concentration on your breath, much the same as your normal breath analyzer, It has a high affectability and quick response time, sensor gives a simple resistive output in view of alcohol concentration. The detection circuit is basic; all it needs is one resistor. The alcohol sensor is shown in figure. A basic interface could be a 0-3.3V ADC. At pin A0, we connect the MQ3 sensor. It is one of the most accurate and mostly used alcohol sensors. The sensor can detect the presence of alcohol up to a range of 2 meter thereby making the detection process much accurate. Also the sensitivity can be adjusted according to needs, making the sensor more versatile. This module is made using alcohol gas sensor MQ3. It is a low-cost semiconductor sensor which can detect the presence of alcohol gases at concentration from 0.05mg/l to 10mg/l. the sensitivity material used for this sensor is Sno2, whose conductivity is lower in clean air. Its conductivity increase as the concentration of alcohol gases increases. It has high sensitivity to alcohol and has good resistance to disturbances due to smoke, vapor and gasoline. This module provides both digital and analog outputs. MQ3 alcohol sensor module can be easily interfaced with microcontrollers, Arduino Boards, raspberry pi etc.

Fig. 1: Alcohol sensor

The Arduino Uno is a microcontroller board based on the ATmega328. It is a programmable micro controller for prototyping electromechanical devices. You can connect Digital and Analog electronic signals:

– Sensors (Gyroscopes, GPS Locators, accelerometers)
– Actuators (LEDS or electrical motors) It has 14 digital Input / output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic Resonator, a USB connection, a power jack, an ICSP header and a reset button as shown in figure 2. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB to-serial converter.

Arduino is an open source microcontroller which can be effortlessly programmed, erased and Reprogrammed at any prompt of time. It is also proficient of receiving and sending information over the web with the help of various Arduino shields. Arduino uses a hardware known as the Arduino development board and software for developing the code known as the Arduino IDE (Integrated Development Environment). Built up with the 8-bit Atmel AVR microcontroller's that are manufactured by Atmel or a 32-bit Atmel ARM, these microcontrollers can be programmed simply using the C or C++ language in the Arduino IDE.

The arduino board is the central unit of the system. The arduino Uno is the microcontroller board based on the AT mega 328. It is a programmable microcontroller for prototyping electromechanical devices. it has 14 digital inputs/output pins (of which 6 can be used as PWM output),6 analog inputs, a 16 MHz ceramic resonators the

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Fig. 2: Alcohol sensor

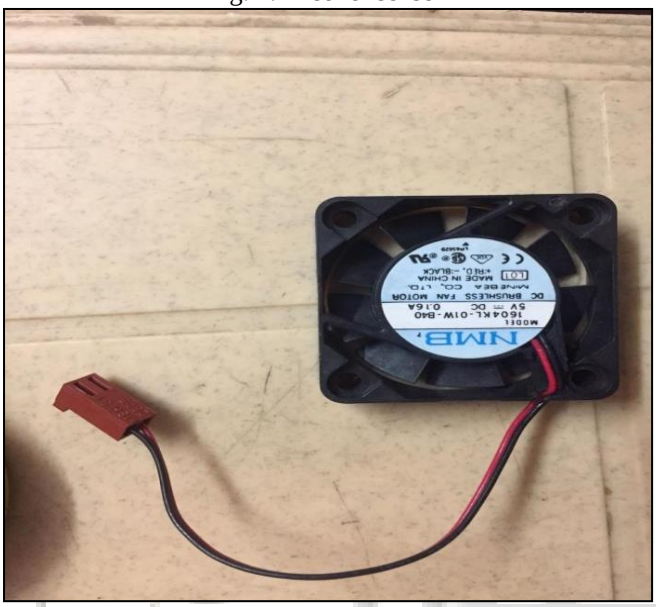

Fig. 3: D C fan

A fan is a powered machine used to create flow within a fluid, typically a gas such as air. A fan consists of a rotating arrangement of vanes or blades which act on the air. The rotating assembly of blades and hub is known as an impeller, rotor, or runner. Usually, it is contained within some form of housing or case. This may direct the airflow or increase safety by preventing objects from contacting the fan blades. Most fans are powered by electric motors, but other sources of power may be used, including hydraulic motors, hand cranks, and internal combustion engines.

Mechanically, a fan can be any revolving vane or vanes used for producing currents of air. Fans produce air flows with high volume and low pressure (although higher than ambient pressure), as opposed to compressors which produce high pressures at a comparatively low volume. A fan blade will often rotate when exposed to an air fluid stream, and devices that take advantage of this, such as anemometers and wind turbines, often have designs similar to that of a fan.

Fig. 4: Proximity sensor

A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact.
A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive proximity sensor or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target.

The relay board is what powers the switching mechanics on your electronic devices. It contains a power supply circuit, regulatory circuitry and of course the relays that you need to turn parts or all of your device (or devices) on and off – or to switch them between states.

Normally speaking, the relays on your relay board will be solid state, unlike the mechanical relays that you may see in larger electrical applications (like, for example, the switch you throw to turn off a phased power relay, or the breakers in your home's circuitry). Solid state relays are reliable over a longer term than electro mechanical relays thanks to the simple fact that they have no moving parts (hence the name solid state), which means of course that nothing can seize up or break off and prevent successful operation.

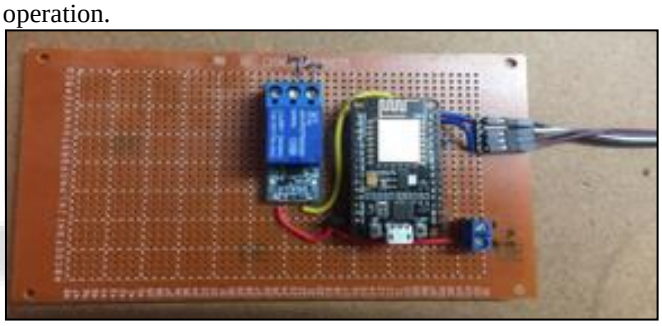

Fig. 5: Proximity sensor.

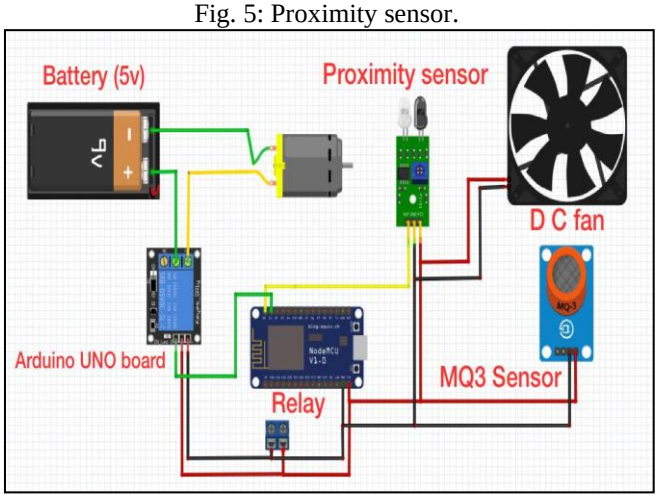

Fig. 6: Circuit diagram

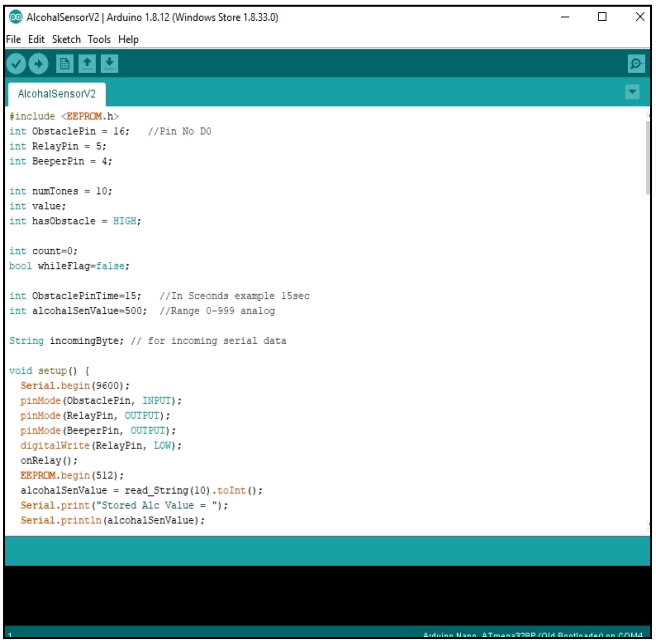

Fig. 7: sample code

IV. Results and Discussion

Check -1
Obstacle: - Ignition lock - 19.70sec
Ignition unlock- 07.88sec
Check -2
Obstacle: - Ignition lock - 19.70sec
Ignition unlock - 03.12sec
Check -3
Obstacle: -Ignition lock - 19.14sec
Ignition unlock- 06.23sec

V. Conclusions

In this project we have built up a real time model that can automatically lock the motor engine when a drunken driver tries to drive a car.

Now a day's car collisions are mostly observed. By fitting this alcohol sensor into the car, we can save the life of the driver and furthermore the rest of the travelers.

The life time of the task is high. It has low or zero support cost and obviously low power utilization.

This is a developed system to check drunken driving. By executing this outline a safe car travel is possible decreasing the mishap rate because of drinking.

By executing this outline, drunken drivers can be controlled so are the mishaps because of drunken driving.

We have provided a very effective solution to develop an intelligent system for vehicles for alcohol detection whose core is Arduino.

Since sensor has fine sensitivity range around 2 meters, it can suit to any vehicle and can easily be hidden from the suspects.

The whole system has also an advantage of small volume and more reliability. As the growing public perception is that vehicle safety is more important, advances in public safety is gaining acceptance than in the past.

Future scope of this system is to control the accidents causes due to alcohol consumption. This system improves the safety of human being.

And hence providing the effective development in the automobile industry regarding to reduce the accidents cause due to alcohol.

VI. Scope for Future Work

In Future work, Government must authorize laws to introduce such circuit in each car and must manage all car organizations to preinstall such systems while manufacturing the car itself. If it is achieved the death rate because of drunken drivers can be brought to least level. In this kind of system, securely landing of car aside without disturbing other vehicles can also be added as a future extension.

This system can be installed for heavy vehicles. Coding for Message communication to owner of the vehicle. With additional sensors for face detection may adopted. Speed limiting can be controlled for less consumed drivers.

References

[1] Amresh Giri "Driver Behavior Monitoring through Sensors and Tracking the Accident using Wireless Technology", IJCA (0975 – 8887), Volume 102, page no.2, Sept 2014
[2] Mandalkar Rahul B "Alcohol Detection and Accident Avoidance Using Locking with Tracking "Volume 3, Issue 9, September 2015 International Journal of Advance Research in Computer Science and Management Studies.
[3] S.P.Bhumkar, V.V.Deotare, R.V.Bobar "Accident Avoidance and Detection on Highway", IJETT, Volume3, Issue2 (2012)
[4] Dhivya M and Kathiravan S,"Driver Authentication and Accident Avoidance System For vehicle", Smart Computing reviews, Vol-5, Feb-15.
[5] Amitya kumar tripathy, sejal chopra, Samantha Bosco, Srinidhi Shetty, Firdos Sayyad,"Travolution-An Embedded System in passenger car for road safety",ICTSD-2015,Feb 04-06-2015,Mumbai,India
[6] Lea Angelica Navarro, Mark Anthony Diño, Exechiel Joson, Rommel Anacan, Roberto Dela Cruz Electronics Engineering Department, Technological Institute of the Philippines- Manila
[7] Manila, Philippines-Design of Alcohol Detection System for Car Users thru Iris Recognition Pattern Using Wavelet Transform [2016 7th International

Conference on Intelligent Systems, Modeling and Simulation]

[8] Cahalan, D., I. Cisin, and Crossley, American Drinking Practices: A National Study of Driving Behavior and Attitudes. 1969, Rutgers University Press: New Brunswick, NJ.

[9] MUGILA.G, MUTHULAKSHMI.M, SANTHIYA.K, Prof.DHIVYA.P- SMART HELMET SYSTEM USING ALCOHOL DETECTION FOR VEHICLE PROTECTION [International Journal of Innovative Research in Science Engineering and Technology (IJIRTSE) ISSN: 2395-5619, Volume – 2, Issue – 7. July 2016]

[10] Dhivya M and Kathiravan S, Dept. of ECE, Kalaignar Karunanidhi Institute of Technology- Driver Authentication and Accident Avoidance System for Vehicles [Smart Computing Review, vol. 5, no. 1, February 2015]

[11] Babor, AUDIT: The alcohol use disorders identification Test: Guidelines for use in primary health care. 1992, Geneva, Switzerland: World Health Organization.

[12] Marita Lynagh, et al., “Reducing alcohol-related harm: the untapped potential of prehospital Care workers”, International Journal of Emergency Medicine, vol. 2, issue4.

[13] R. C. A. Naidu, et al., "An advanced trouble intimation and automatic prior notification System of locomotives and its conditions," International Conference on Computational Techniques in Information and Communication Technologies (ICCTICT), New Delhi, pp.

