ALCHOHOL DETECTION AND AUTOMATIC ENGINE LOCKING SYSTEM

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Abstract : Alcohol driving is the leading cause of road accidents. AD requires the stopping vehicles and it manually scan the drivers breadth analyzers. In the system that allows a alcohol sensor with arduino board and LCD display to show alcohol is detected and it automatically lock the vehichle's motor. Then the system first allows configuring the user's numbers into the program. And the driver is drunk by alcohol above permissible limit sensed the input triggers by providing required voltage. Thus the system provides AD using engine locking through arduino automatically.

Keywords:
AD=Alcohol Detection, AELS=Automatic Engine Locking System.

I. INTRODUCTION

Now a day's every system is automated in order to face new challenges. In the present days Automated systems have less manual operations, flexibility, reliability and accurate. Due to this demand every field prefers automated control systems. Especially in the field of electronics automated systems are giving good performance.

According to a survey done by W.H.O Almost every 90 seconds, a person is injured in a drunken driving crash.. Because of Drunk and Drive the people are highly injured or sometimes dead. This is killing not only the driver but also the co-passengers travelling on the road at the same time. .In order to overcome this problem scientist's proposed a project "High Sensitive Alcohol sensor with fuel cut of function".In this project we are using Arduino micro controller. In this we are going to embedded the program to receive data from alcohol sensor, convert it into digital form and then control the engine locking system. After that the data is stored and then compared to threshold values if the value is beyond its limits then controller takes appropriate action. Here in this project we are going to turn OFF the fuel pump system, by doing so we can stop the vehicle and prevent accidents that occur due to drink and drive.

II. RELATED WORK :

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These days, majority of road accidents are caused by drink-driving. Drunken drivers are in an unstable condition and so, rash decisions are made on the highway which endangers the lives of road users, the driver inclusive. The enormity of this menace transcends race or boundary. In Nigeria, the problem is being tackled by issuing laws prohibiting the act of drivers getting drunk before or while driving as well as delegating law enforcements agents to arrest and persecute culprits.[1] However, effective monitoring of drunken drivers is a challenge to the policemen and road safety officers. The reason for this stems from the natural inability of human beings to be omnipresent as well as omniscience within the same space and time. This limited ability of law enforcement agents undermines every manual effort aimed at curbing drink-driving.

One major reason of deaths on Indian roads is accidents due to drunken driving. This happens because of drunk people being able to take control of vehicle even after being drunk. In our project, we propose to solve this problem by designing a system which automatically switches off the vehicle's engine whenever alcohol of certain quantity is detected in the driver's breath. As soon as the presence of alcohol is detected, the microcontroller stops the engine of the vehicle and a siren is blown to alert nearby people to convey that something is wrong with the vehicle and a message "Alcohol Detected" is flashed on the LCD screen [2]which is installed in the system, so that nearby people can interpret gravity of the situation and inform the concerned authorities to avoid any kind of incident.

In this paper we are introducing a smart helmet which is used to detect alcohol consumption, usage of mobile phones while driving. In this we are insisting that every bike riders must wear the helmet. The existing system is used to detect the alcohol consumption if accident occurs the information conveyed to relative via SMS or Short Message Service. If the driver is drunk then the engine will not get started. In proposed method a smart helmet system which detects that, the person wearing helmet or not and also the system detect the person is drunk, If the driver using cell phone during driving means the bike will be jammed slowly. If a vehicle across this system, then the head light is automatically dimmed and dipped. We are using alcohol sensor to detect the person is drunk and we fix it in helmet.[3]

Hence this paper is very much helpful for all the bike drivers and also the traffic rules will be followed properly.

This system provides a unique method to curb drunken people. The system has an alcohol sensor embedded on the steering of the car. Whenever the driver starts ignition, the sensor measures the content of the alcohol in his breath and automatically switches off the car if he is drunken. In this system the sensor delivers a current with a linear relationship to the

alcohol molecules from zero to very high concentration [4].The output of the sensor is fed to the comparator for comparison. If the measured value reaches the threshold, relay cut off automatically and the buzzer produces sound.

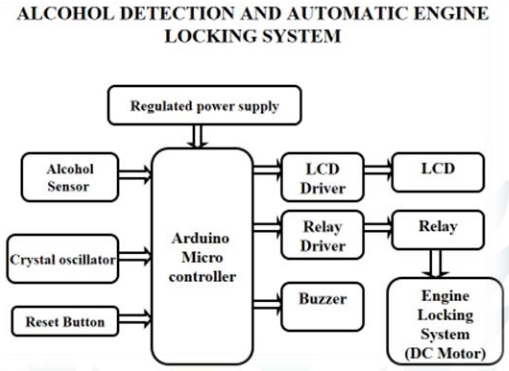
III. IMPROVEMENT IN AELS:

Earlier studies maximum cases dealing on the "ignition system and GSM modules" for operation of engine locking mechanism ,but everyone are familiar about ignition system they can remove this device(in this condition there is no use of device) or short circuit of ignition terminals(it may leads to fire accident in the vehicle).

To rectify this problem , we have changed the placement of device from "ignition system" to "fuel pump system". As we know that fuel tank is placed rear side of the vehicle and engine is placed in the front side so to supply the fuel from fuel tank to engine a pump is required , then we connected a relay in between the positive terminal of fuel pump system
Relay is operated through the programmed microcontroller(arduimo).

Fuel pump with two terminals

IV. BLOCK DIAGRAM



The input for the Microcontroller is identified by the alcohol detector sensor through the breath of a human. In the next scenario the levels of alcohol measured by the sensor and compared with the set-in limits. If the set limit of consumption of alcohol is less than the alcohol consumed by the person, the system of activating relay is initiated which in turn activates the automatic lock on the vehicle, i.e. it stops the motor rotation if it is in running state or it is unable to start. The system will lock the Engine at the same time will automatically give a buzzer. By this, we can avoid accidents by checking the driving people on the roads. Software Program for the system developed in embedded C

V. METHODOLOGY

1.ARDUINO (MICROCONTROLLER)

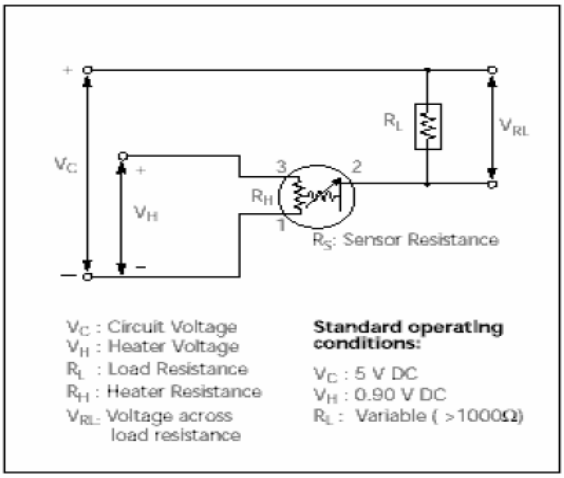
Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programmed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

2.ALCHOHOL SENSOR MQ3

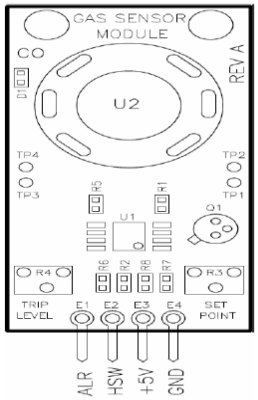
Alcohol detector sensors need to be calibrated and periodically checked to ensure sensor accuracy and system integrity.

MQ303A is semiconductor sensor is for AD. It has good sensitivity and fast response to alcohol, suitable for portable alcohol detector.

You could get of MQ303A; it reflects change from voltage change on fixed or adjustable relations between resistance and gas load resistance. Normally, it will take several concentration, resistance of the sensor minutes preheating for sensor enter into stable reduce when gas concentration increases working after electrified; or you could give 2.2±0.2V high voltage for 5-10secs before test, which make sensor easily stable.



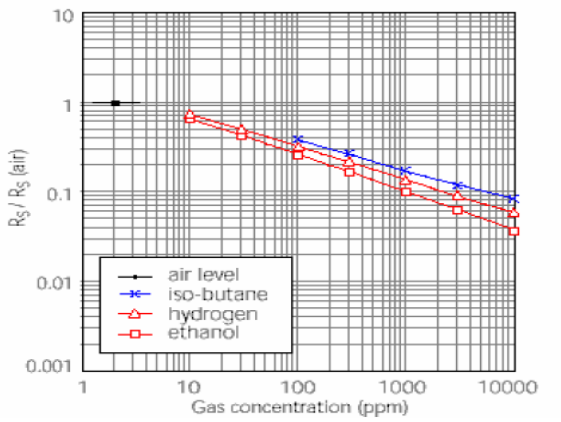
Standard circuit



Sensor module

Sensitivity characteristics:

The sensitivity characteristics curve of the MQ-303A (typical data). Sensitivity characteristics of the gas sensors are expressed by the relationship between the sensor resistance and gas concentration. The sensor resistance decreases with an increase of gas concentration based on a logarithmic function.



A. Standard Operating conditions

Symbol	Parameter	Specification	Conditions etc.
V_H	Heater voltage	0.9V ± 0.10V	AC or DC
V_C	Circuit voltage	Less than 6 V	DC (polarity is important)
R_L	Load resistance	Variable	P_S < 10 mW
R_H	Heater resistance	4.5 Ω ± 0.5 Ω	at room temperature
I_H	Heater current	Less than 130 mA	$I_H = V_H / R_H$ (typical value)
P_H	Heater power consumption	Less than 130 mW	$P_H = V_H^2 / R_H$ (typical value)
P_S	Power dissipation of sensing element	Less than 10 mW	$P_S = (V_C - V_{RL})^2 / R_S$

B. Environmental conditions

Symbol	Parameter	Specification	Conditions etc.
Tao	Operating temperature	-10 °C to 50 °C	Recommended range
Tas	Storage temp	-20 °C to 70 °C	
RH	Relative humidity	Less than 70% RH	
(O2)	Oxygen concentration	21%±1%(Standard condition)	Absolute minimum level: more then 18%
		The sensitivity characteristics are influenced by the variation in oxygen concentration.	

C. Sensitivity characteristics

Model	MQ-303A (tentative specifications)		
Symbol	Parameter	Specification	Conditions etc.
R_s	Sensor resistance	(20kΩ to 200 kΩ)	at ethanol 300 ppm
β	Sensitivity	(0.50 ± 0.15)	Rs (at ethanol 300 ppm) / Rs (at ethanol 50 ppm)
Standard Test Conditions: Temp: 20 °C ± 2 °C (in clean air) Pre-heating time: more than 48 hours		Humidity: 65% ± 5%	V_C : 5.0 V ± 1% V_H : 0.9 V ± 1% R_L : 50K Ω ±5%

D. Mechanical characteristics

Items	Conditions	Specifications
Vibration	Frequency: 100 cpm Vertical amplitude: 4 mm Duration: 1 hour	Should satisfy the specifications shown in the sensitivity characteristics.
Shock	Acceleration: 100G Number of impacts: 5 times	

Standard Operation Conditions

Characteristics:

1. High sensitivity to alcohol gas in wide range
2 .High sensitivity to alcohol gas
3.Fast response
4.Wide detection range
5.Stable performance long life
6.Simple drive circuit

Technical Data Of MQ3

Model No.			MQ-3
Sensor Type			Semiconductor
Standard Encapsulation			Bakelite (Black Bakelite)
Detection Gas			Alcohol gas
Concentration			0.04-4mg/l alcohol
Circuit	Loop Voltage	V_C	≤24V DC
	Heater Voltage	V_H	5.0V±0.2V AC or DC
	Load Resistance	R_L	Adjustable
Character	Heater Resistance	R_H	31Ω±3ΩRoom Tem.
	Heater consumption	P_H	≤900mW
	Sensing Resistance	R_s	2KΩ-20KΩ(in 0.4mg/l alcohol)
	Sensitivity	S	Rs(in air)/Rs(0.4mg/L Alcohol)≥5
	Slope	α	≤0.6(R_{300ppm}/R_{100ppm} Alcohol)
Condition	Tem. Humidity		20±2℃65%±5%RH
	Standard test circuit		Vc:5.0V±0.1V V_H: 5.0V±0.1V
	Preheat time		Over 48 hours

3.FUEL PUMP

Fuel pump

Fuel pumps pump gasoline from the vehicle's fuel tank to the engine and also distribute fuel under low pressure to the carburetor or to the fuel injection system under higher pressure. Carburetor engines utilize low pressure pumps, which are located outside of the fuel tank.

4.RELAY

Relay

A relay is an electromagnetic switch that is used to turn on and turn off a circuit by a low power signal, or where several circuits must be controlled by one signal. We know that most of the high end industrial application devices have relays for their effective working.

VI.DISCUSSION

Advantages:

1. Drunken driver detection using Alcohol sensor
2. Highly efficient and user friendly design.
3. Easy to operate.
4. Low power consumption.
5. Audible alerts using buzzer alarm
6. Visual alerts using LCD module.
7. Implementation of real time embedded system which involves hardware and software interaction.

Disadvantages:

1. The system uses alcohol sensor and its interfacing with comparator is highly sensitive.
2. Manual attention is required
3. It may detect the hard perfumes or deodorants.

Result:

The project "AD with AELS " was designed such that to develop a system that can detect the alcohol content in the air exhaled by the driver and automatically turn off the car if Alcohol percentage exceeds the limit. The microcontroller gets the information regarding the alcohol through the alcohol sensor and alerts about the condition being sensed using Buzzer and automatically vehicle motor turn off through relay. Status will be display on LCD.

Conclusion:

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

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