Drunk Driver & Sleep Detection Based Smart Automobile System

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ABSTRACT

Driving while drunk is hazardous and drivers with high Blood Alcohol Content (BAC) are at expanded danger of auto crashes, roadway wounds and vehicular passings. Anticipation measures assessed incorporate permit suspension or disavowal, appropriating or seizing vehicle plates, implementing open holder bans, expanding fine punishments, imprison, ordering instruction for youth and bringing down legitimate BAC's. Despite the fact that these much obstacles made by experts to drunken drive, it is as yet proceeding with like serial scenes. In that capacity there is no viable instrument to reduce this. Here, these processes have intended to plan a Drunk driving detection, which is integrated with the directing wheel. This framework is meant for making vehicle driving more secure than previously and shield the mishaps from happening due to the liquor utilization of the driver. The individual when he is at vehicle, this is necessary to infer the driver's condition continuously and here this work proposed the detection of alcohol utilizing alcohol sensor associated with Arduino. Alcohol sensor is installed on the steering of the car, with the end goal that when the level of liquor crosses a reasonable farthest point, where the start of vehicle will kill and the motor will stop. The Arduino always uses the alcohol sensor information to check drunk driving and works a bolt on the vehicle motor to stop the engine.

Keywords: *Alcohol Sensor (MQ-3), Microcontroller (ATmega328), Fuel Blocker, Obstacle sensor, Bumper switch, LCD Display, Relay.*

1. INTRODUCTION

India had earned the dubious distinction of having more number of fatalities due to road accidents in the world. Road safety is emerging as a major social concern around the world especially in India. Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in the near future. The system implemented by us aims at reducing the road accidents in the near future due to drunken driving. The system detects the presence of alcohol in the vehicle and immediately locks the engine of the vehicle. Hence the system reduces the quantum of road accidents and fatalities due to drunk driving in future. This application is in the area of embedded systems. An embedded system is some combination of computer hardware and software, either fixed in capability or programmable that is specifically designed for a particular function. Since the embedded system is dedicated to specific tasks, design engineers can optimize it reducing the size and cost of the product and increasing the reliability and performance.

In our proposed system our efforts to detect drunk-ness of driver and if they have drunk then prevent them from driving and notifying this detection of alcoholic driver to near police station who are suffering for identifying drunken driver and give punishment. Along with this scheme we are also going to monitor behavior of vehicle in both inside and outside of vehicle. Along provide help to driver when in case accident happened by sending message to ambulance, police station and relative of driver also. Following Fig -1 show block diagram of our system.

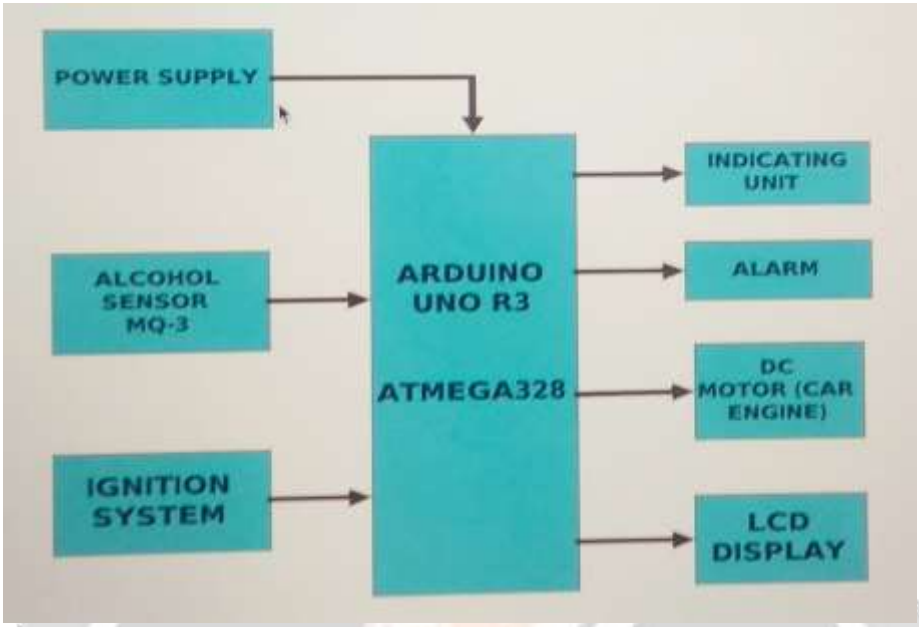


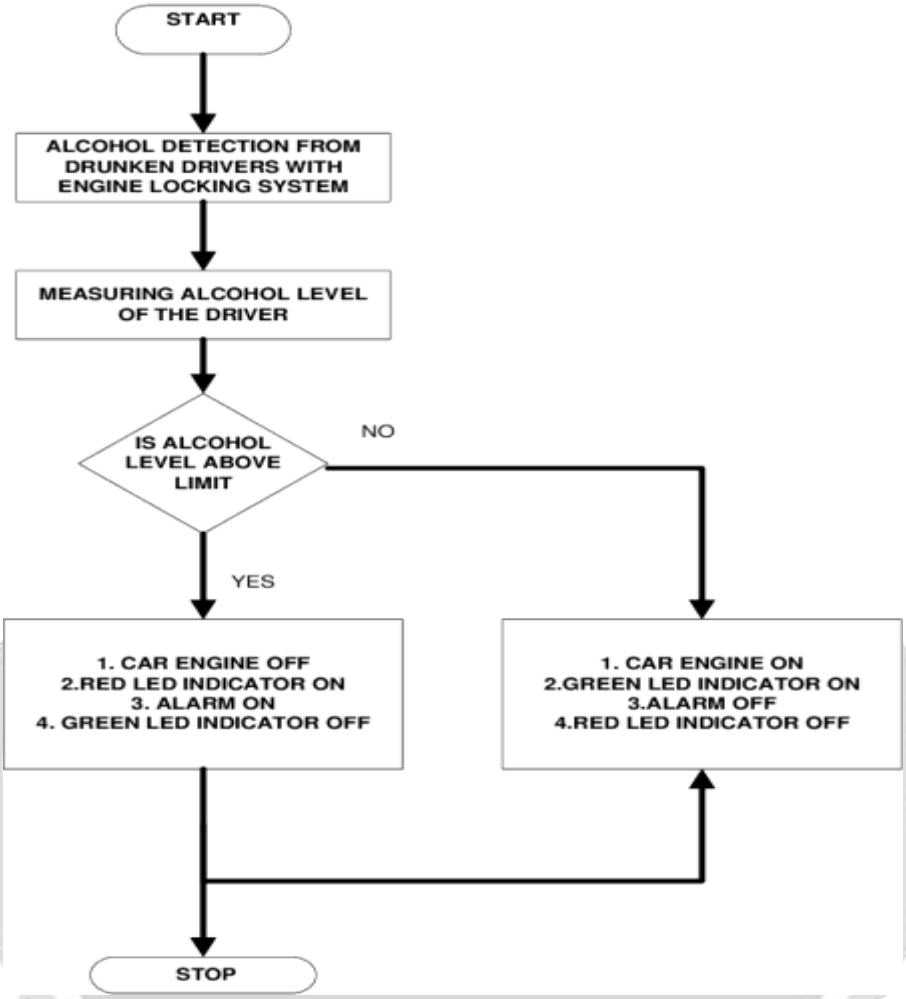
Fig -1: Block Diagram of Proposed System

In system construction, it mainly consist of two part namely as software part and hardware part. Software part include embedded software for interfacing of various hardware component like LCD display, microcontroller, alcohol sensor (MQ-3), Obstacle Sensor, LCD display, Fuel Supply Blocker, Relay, Bumper switch, Ignition System etc.

In this, upon detection of alcohol two conditions are checked. The first is that ,if driver has drunk, he wish to start vehicle at that time at trying to the starting car sensing of alcohol will be done at which speed be 0. If alcohol is detected then signal is passed to microcontroller and car ignition will be stop immediately. So this prevent driver from being drive a vehicle. The second case in which speed is greater than threshold level. It may happen that, upon drinking alcohol his wish to start vehicle from anybody. So we also provide mechanism to cut-off fuel supply instead of stop ignition system directly because direct stopping of ignition system on detecting an alcohol may be dangerous as driver driving a vehicle at high speed and it may lead to chances of accident. So after cut-off fuel supply driver will place car at proper position.

2. FLOW OF PROPOSED SYSTEM

- When driver starting car/vehicle then alcohol sensor start sensing at condition vehicle speed equal to zero.
- If alcoholic driver detected then immediately ignition system will turn off.
- A flag is set when first condition is passed without detection of alcohol.
- When speed of vehicle is greater than zero. i.e. vehicle started to driving then again along with alcohol ,obstacle sensor start to sense collected parameter values are send to microcontroller.
- If alcohol detected in this case then signal is send to fuel blocker by microcontroller for blocking fuel supply to ignition system. So driver feel's that vehicle is going to stop and then place car at appropriate location.
- Obstacle sensor sense whether any obstacle in front as well as in back of driver and if any then notify using alarm and display on driver.



. **Fig -2**: Flowchart of entire Proposed System

3. COMPONENTS USED IN PROPOSED MODEL

3.1 Alcohol Sensor

The analog gas sensor- MQ3 is suitable for alcohol detecting; this sensor can be used in a breath analyzer. It has a high sensitivity to alcohol and small sensitivity to benzene. The sensitivity can be adjusted by the potentiometer sensitive material of MQ3 gas sensor is SnO2, which with lower conductivity in clean air. When the target alcohol gas exists, the sensors conductivity is higher along with the gas concentration rising, use of simple electro circuit, convert change of conductivity to correspond output signal of gas concentration.

MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapour. It has fine sensitivity range around 2 meters. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.

3.1.1 Sensitivity Adjustment

Resistance value of MQ-3 is difference to various kinds and various concentration gases. So, when using

these components, sensitivity adjustment is very necessary. It is recommended to calibrate the detector for 0.4mg/L (approximately 200ppm) of alcohol concentration in air and use value of load resistance that (RL) about 200 KΩ (100KΩ to 470 KΩ). When accurately measuring, the proper alarm point for the gas detector has to be determined after considering the temperature and humidity influence.

3.1.2 Character Configuration

- Good sensitivity to alcohol gas
- Simple drive circuit
- Long life and low cost
- High sensitivity to alcohol and small towards benzene

3.1.3 Specifications

- Power supply needs: 5V
- Interface type: Analog
- Pin Definition: 1-Output 2-GND 3-VCC
- High sensitivity to alcohol and small sensitivity to Benzene
- Fast response and High sensitivity
- Stable and long life
- Simple drive circuit with size: 40x20mm

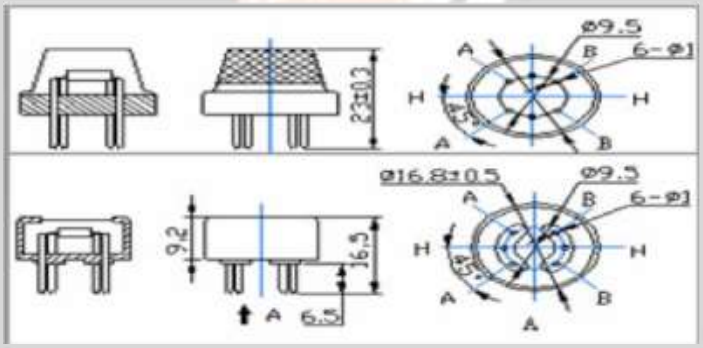


Fig -3: Overview of MQ-3 Sensor

3.2 LCD Display

The LCD display is fitted inside the car and this LCD display is act as indicator to driver and other people who are sitting inside the car. This display gives indication of alcohol level detected by alcohol sensor, this also provide warning message to driver to stop car or vehicle within particular time afterward car will automatically stop, indication of smoke/gas detected in car.

5 x 8 dots with cursor Built-in controller (KS 0066 or Equivalent) + 5V power supply (Also available for + 3V) 1/16 duty cycle This DC or direct B/L to be driven by pin 1, pin 2 or pin 15, pin 16 or A.K (LED) N.V. optional for + 3V power supply.

3.3 Fuel Supply Blocker

When alcohol is detected while driving then instead of stop ignition system directly while driving state, signal is passed to fuel blocker and fuel supply is cut-off. This results in fuel supply cut-off to the engine. Thus the engine stops working or doesn't start depending on the position of the car.

3.4 Microcontroller (ATmega328)

In this system we are using Arduino board which has advantageous features in which microcontroller ATmega328 are present which is to be using for controlling system .The Arduino Uno is a microcontroller board based on the ATmega328. ATmega has features like speed 20 MHz, Power supply 1.8-5.5, Operational range -400C to 850C, 32KB Flash, 1KB EEPROM ,2KB RAM. Arduino has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything require to support the microcontroller; simply connect it to a computer with a USB cable or power it with an 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 Atmega8U2 programmed as an USB-to-serial converter. [1]

- Compatible with MCS-51® Products
- 8K Bytes of In-System Programmable (ISP) Flash Memory
- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz

3.5 Relay

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

3.6 Obstacle Sensor

Obstacle sensor sense whether any obstacle in front as well as in back of driver and if any then notify using alarm and display on driver. At the same time heart pulse sensor, start sensing in that heart pulse is determine through finger of driver placed on steering and if it is above the normal and below the critical rate then it will be notify to driver by display LCD whereas if it is in abnormal (critical or very high) rate then fuel is block or vehicle will slow speed.

3.7 Alarm

The alarm unit used is a buzzer which indicates when alcohol is detected. The buzzer used belongs to the PS series. The PS series are high-performance buzzers that employ Uni-morph piezoelectric elements and are designed for easy incorporation into various circuits. They have very low power consumption in comparison to electromagnetic units. It has a voltage requirement of 2V and is connected to pin 10 of the microcontroller. The standard resistor value of 220 Ω commercially available is closest to the computed value of 250 Ω, so a 220 Ω resistor was used to limit the current going through the LEDs.

3.8 Eye Blink Sensor

This Eye Blink sensor is IR based. The Variation Across the eye will vary as per eye blink. If the eye is closed means the output is high otherwise output is low. This to know the eye is closing or opening position. This output is give to logic circuit to indicate the alarm. This can be used for project involves controlling accident due to unconscious through Eye blink.

4. OPERATION & WORKING OF PROPOSED MODEL

When driver starting car/vehicle then alcohol sensor start sensing at that condition vehicle speed equal to zero. If alcoholic driver detected then immediately ignition system will turn off along with SMS about detection is send to relevant of driver for notification and notification will be displayed on LCD with alarm. A flag is set when first condition is passed without detection of alcohol. When speed of vehicle is greater than zero. i.e vehicle started to driving then again along with alcohol ,obstacle sensor and heartbeat sensor start to sense & collected parameter values are send to microcontroller. If alcohol detected in this case then signal is send to fuel blocker by microcontroller for blocking fuel supply to ignition system, so driver feel's that vehicle is going to stop and then place car at appropriate location .At the same time SMS with current location of vehicle ,vehicle number and detected information send to relative of driver and police station. Obstacle sensor sense whether any obstacle in front as well as in back of driver and if any then notify using alarm and display on driver. At the same time heart pulse sensor, start sensing in that heart pulse is determine through finger of driver placed on steering and if it is above the normal and below the critical rate then it will be notify to driver by display LCD whereas if it is in abnormal (critical or veryhigh) rate then fuel is block or vehicle will slow speed and SMS will send to relative and ambulance. If Bumper switch is ON then it is detected as collision that will be notify to police (RTO). In other hand, when police station/RTO office received message then they will track car to identify driver.

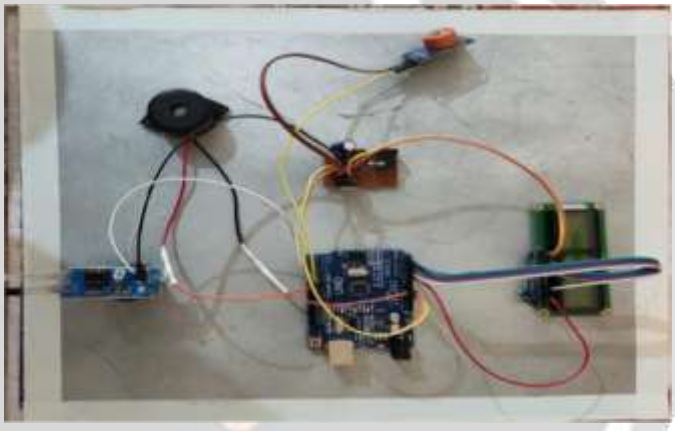


Fig -4: Overview of Model

5. CONCLUSIONS

Proposed system will efficiently detect alcohol through driver breath and stop the vehicle by suspending the ignition, instead of directly stopping the vehicle. Proposed system can notify relatives of driver, police station. Future scope of this system is it can also check whenever the accident happens will notify immediately to the numbers provided in application by the end user and therefore people in the car can get service as early as possible by minimizing the casualties. If person even blinks his eyes it will give alarm or buzz so that person may awake. In future we can implement this approach with GSM system, it will also help police to identify drunken drivers and give punishment them by tracking it's vehicle using GPS system.

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