

ALCOHOL DETECTION AND ENGINE LOCKING SYSTEM USING ARDUINO UNO

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Abstract – In this project, the design and implementation of an Alcohol Detection with Engine Locking for cars using the Ultrasonic Sensor and Arduino-UNO as the controlling unit is done. The system will continuously monitor the level of alcohol concentration by alcohol detection sensor and thus turn off the engine of the vehicle if the alcohol concentration is above the threshold level. This model will also send a message to the registered mobile number with the location of the vehicle using the SIM900A.

Key Words: Arduino UNO, Ultrasonic sensor, Buzzer, LED, SIM900A, MQ-3 Sensor, DC Motor.

1. INTRODUCTION

The concept described in this project report is aimed to regret the drunken driver by not allowing driving the vehicle. When this system is installed in a vehicle over the dashboard and detects the drunken driver through the alcohol sensor, the simulated vehicle presented here with a DC motor, which will be stopped automatically, treated as engine shutdown. Since the availability of the exact sensor is not possible and since it is a prototype module, the basic concept is proven with the universal sensor which can detect all sorts of toxic gases, petroleum products, smoke, etc, in addition,

To the alcoholic vapor. The sensor used here is named MQ6. Since it can detect all sorts of toxic vapor and is available easily everywhere, it is said to be the universal sensor. This sensor is used here to detect alcoholic vapors. Presently, this kind of sensor can be used for goods transport vehicles, because these vehicles will not carry passengers. At the point when this sensor is utilized in vehicles, it is hard to recognize the tanked individual in light of the tipsy travelers. Henceforth it is prescribed to involve this innovation in trucks just because the truck contains a separate lodge for the driver and his associate. If a proper sensor is used, it can be installed in cars also. One benefit of utilizing this sensor is that it cannot distinguish minimal far fumes, since it isn't the case delicate. It is supposed to be an advantage since it shouldn't identify other tipsy people the individuals who are minimum away from the driving wheel. This shows that the sensor should be introduced over the dashboard and that direction should be extremely close toward the driving wheel. Assuming that this sort of course of action is made in the lodge, the framework can identify just a tipsy driver. As

portrayed over, the sensor isn't delicate, during a demo, the sensor should be presented to the liquor fume.

For this purpose, pour little alcohol (brandy or whiskey) into a small cup and place the sensor a little above the cup with a gap of 2 to 3 cms approximately. Contingent upon the liquor fume focus in the air, the conductivity of the sensor will be changed and in light of this conductivity, outplaced in the structure of voltage levels will be varied automatically. These varieties are observed through the operation amp and a high sign will be created at whatever point the sensor recognizes liquor fumes in the air.

The result of the MQ-6 sensor is utilized to set off the Op-amp, this operation amp arranged as a voltage comparator can produce a rationale high sign when sensor yield is greater than the reference voltage. Based on this signal, the microcontroller used as the processing unit is programmed to energize the alarm and flashing type red light simultaneously. In addition to the simulated ignition in the form of push-button and though it is activated, the motor will not be energized, creating the situation of engine shutdown.

The innovation introduced here is exceptionally basic, it tends to be utilized as a demo module, yet when it will be utilized for genuine applications, every one of the vehicles should be furnished with genuine sensors which can recognize even a little grouping of liquor fumes present in the air.

2. LITERATURE SURVEY

These days, many accidents are happening because of the alcohol consumption of the driver or the person who is driving the vehicle. Alcohol Detectors installed inside the vehicle can provide safety to the people seating inside the car. An alcohol breath analyzer should be fitted/installed inside the vehicle. Another age of innovation is coming to fruition around frameworks that keep vehicles from working assuming the driver is tanked. Scientists say the innovation is promising to the point that they contrast it with the coming of the safety belt concerning its true capacity. This is the best option to prevent drunken driving.

Analysts are creating two states of the art draws near:

- Breath: A framework estimates blood liquor levels from a driver's breath. The levels would be identified from sensors mounted before the driver. Yet, the driver shouldn't know they are being observed.
- Touch: This strategy would evaluate for liquor when the driver contacts the beginning button or one more assigned surface in the vehicle. Liquor levels would be estimated under the skin's surface on a couch cushion with an infrared light scanner.

Breath analyzers – an overview:

A breathalyzer is a gadget for assessing blood liquor content (BAC) from a breath test. Breath analyzers don't straightforwardly quantify blood liquor content or focus, which requires the investigation of a blood test. Considering all things, they gauge BAC in a roundabout way by estimating how much liquor is in one's breath.

Alignment is the method involved with checking and changing the interior settings of a breath analyzer by contrasting and changing its test results with a known liquor standard. Policing analyzers should be fastidiously kept up with and yet again adjusted often to guarantee precision. There are two strategies for aligning an accurate energy component breath analyzer, the Wet Bath and the Dry Gas strategy. Every strategy requires particular gear and plant-prepared specialists. Not a technique can be directed by undeveloped clients or without legitimate gear.

Mouth alcohol:

Quite possibly the most widely recognized reason for falsely detecting alcohol is the presence of mouth alcohol. In examining a subject's breath test, the breath analyzer inside PC is making the presumption that the liquor in the breath test came from alveolar air — that is, air breathed out from profound inside the lungs. Be that as it may, liquor might have come from the mouth, throat, or stomach for various reasons. To help guard against mouth-liquor defilement, affirmed breath-test administrators are prepared to notice a guinea pig cautiously for something like 15-20 minutes before directing the test. The issue with mouth liquor being dissected by the breath analyzer is that it was not assimilated through the stomach and digestion tracts and went through the blood to the lungs. All in all, the machine's PC is erroneously applying the segment proportion and duplicating the outcome. Thus, an extremely minuscule measure of liquor from the mouth, throat, or stomach can essentially affect the breath-liquor perusing.

3. PROPOSED METHODOLOGY

The block diagram shown in the next chapter consists of important devices like 1) MQ6 used as alcohol sensor, 2) Arduino processor, 3) op-amp, 4) DC motor, 5) relay, 6) buzzer, etc.

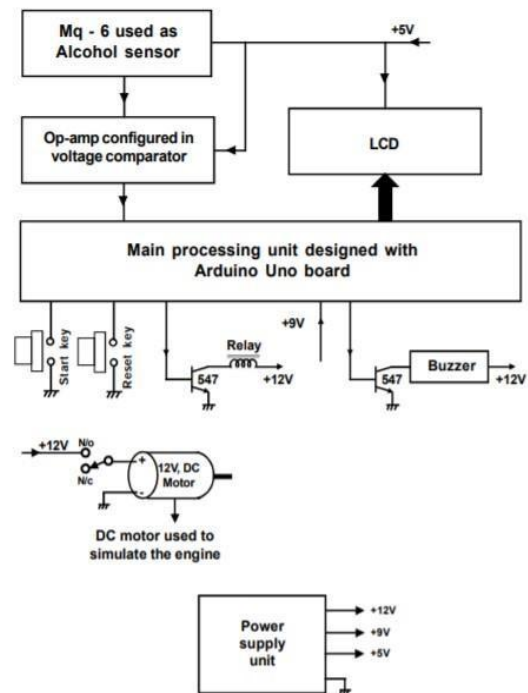


Fig-1: Block Diagram

3.1 Arduino-Uno

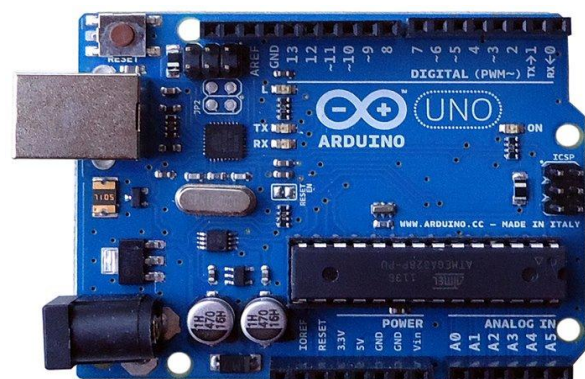


Fig-2: Arduino-Uno

Arduino is an open-source equipment and programming organization, undertaking and client local area that plans and makes single-board microcontrollers and microcontroller packs for building advanced gadgets and intelligent items that can detect and control both genuinely and carefully. Arduino sheets are accessible economically in preassembled structures or as DIY (DIY) packs.

The Arduino Uno is a microcontroller board taking into account the ATmega328. It has 20 computerized input/output pins (of which 6 can be utilized as PWM results and 6 can be utilized as simple information sources), a 16 MHz resonator, a USB association, a power jack, and an in-circuit framework programming (ICSP) header, and a reset button. Arduino comprises both an actual programmable circuit board (frequently alluded to as a microcontroller) and a piece of programming, or IDE (Integrated Development Environment) that sudden spikes in interest for your PC, used to make and move PC code to the real board. This is a screen capture of the Arduino IDE. Arduino is an open-source contraptions stage considering easy-to-use hardware and programming. Arduino sheets can understand inputs - light on a sensor, a finger on a button, or a Twitter message - and transform it into a result - motor, turning on a LED, circulating something on the web.

3.2 MQ6



Fig-3: MQ6 sensor

Generally, the sensor used here is aimed to detect gas leakages, since it can detect all types of gasses and smokes it is used as a universal sensor and the same sensor is also used as an alcohol sensor. This sensor contains a semiconductor named tin dioxide (SnO₂); this sensor has low conductivity in clean air. If the air is not clean or it is polluted due to any reason, the conductivity level will be increased. Depending on the conductivity, its output will be varied proportionately. For example, though the air is clean some output in the form of voltage will be obtained from the sensor; this output is observed as 1V approximately. This means at a clean environment or fresh air, the sensor output will be 1V, during this condition if the sensor detects light smoke mixed with carbon dioxide it may generate 1.5V.

Similarly, if it detects concentrated cooking gas, the sensor may generate 2V, assume that the gas density or concentration is more, and the sensor may generate 2.5V. Likewise, the sensor output will be varied automatically depending on the type of gas or vapors found in the air. Here in our trail runs, we found that the sensor generates nearly 2V when it is kept over the alcohol dish. During our path runs, we utilized various kinds of alcohols like cognac, whisky, and so on. they are poured into a small container,

and a sensor is placed above the container at a distance of one inch approximately. At this distance, the fixation will be more and thus it is seen that the sensor creates more than 2V.

If the distance is expanded, thickness will be diminished because the alcohol fume will be spread into the air, so contingent upon the distance sensor yield additionally changes proportionately. One important factor to be observed is, that the output is not similar when compared with another sensor, hence it is concluded that the output will differ from sensor to sensor. At long last, it is presumed that the result will be 2V roughly when it recognizes liquor fumes. Given this is worth reference voltage should be changed in like manner in the Op-amp circuit. Whenever the sensor output becomes high, i.e., more than the reference voltage, op-amp output will become high.

3.3 DC Motor

DC motor is connected to the Arduino through the relay, and the start button and reset button are used to control the motor. DC motor starts by pressing the start button and can be stopped by pressing the reset button.

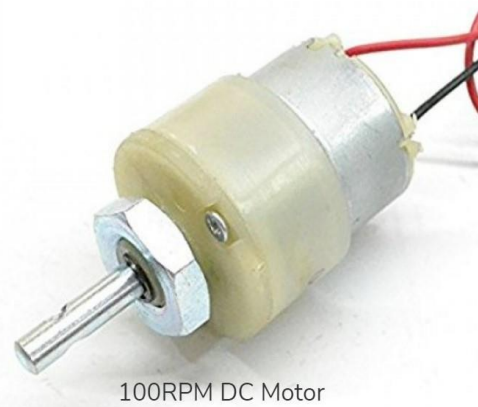


Fig-4: DC motor

3.4 LCD Display



Fig-5: LCD display

The display section is designed with LCD and the main function of this display is to display the condition of the driver whether he is drunk or not. The LCD utilized here is having two columns and each column contains 16

characters, contingent on the accessibility of the LCD board 3 lines or 4 lines boards can be utilized for the reason, so more data can be shown at the same time. LCD Displays are dominating LED displays because these displays can display alphabets, numbers, and some kind of special symbols, whereas LEDs (seven-segment displays) can display only numbers. These LCD shows are extremely helpful for showing client data and correspondence. LCD shows are accessible in different configurations. The most normal is 2 x 16, is that two lines with 16 alphanumeric characters. Other formats are 3x16, 2x40, 3x40 etc.

3.5 LM324

The output of the alcohol sensor is fed to the LM324 as a variable source of voltage which varies according to the density of alcohol vapor present in the air. Here average density is considered and accordingly reference voltage value is adjusted at the second input of the op-amp.

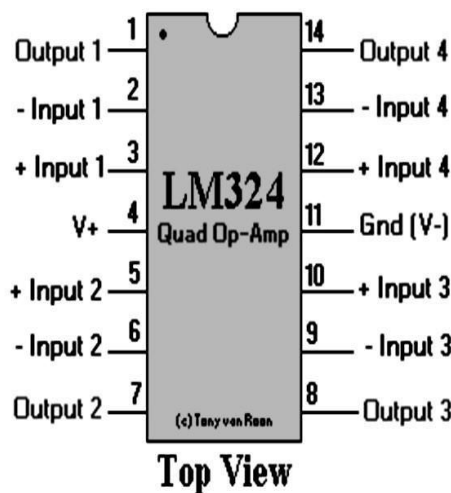


Fig-6: LM324 pin diagram

The op-amp used here is configured as a voltage comparator, in this configuration difference between the two inputs is monitored, if they are equal to each other then the output of the op-amp will become high. The sensor output is fed to the non-inverting input of the op-amp, whereas at inverting input side, with the help of a fixed potential dividing network also known as a voltage divider circuit, the reference voltage is adjusted to 1.6V approximately. Here average value is considered as 2V, which means when the sensor detects the average density of alcohol vapor it may generate around 2V.

In normal conditions, the sensor output will be less than 1.2V, if the air is polluted with alcohol vapors, then sensor output may rise to more than 2V. When this voltage is equal to the reference voltage or slightly more than the

reference voltage, the output of the op-amp will become high and this high signal is fed to the microcontroller for further process. The following is a description of the op-amp.

3.6 Buzzer



Fig-7: Buzzer

A buzzer is an electronic part that produces sound to caution individuals close by. In this system, the buzzer is connected to the Arduino Uno, which gets input, whenever the alcohol is detected by the MQ6 sensor. Its frequency & tone is adjusted as per the requirements. It is very cheap & easy to use.

4. RESULT

Assuming an alcoholic individual gives an order a shot vehicle the alcoholic sensor decides the current of liquor and closed down the vehicle motor and sound alert by which the close by individuals will trade the seat. People groups know about circumstances with the assistance of "LCD screen" present in the vehicles and thus make a necessary move. All equipment is tested and connected as required thereby giving us the much-needed result as shown in the image below.



Fig-8: Prototype

5. CONCLUSION

An ignition interlock device or breath alcohol ignition interlock device is essential equipment that must be installed in all sorts of vehicles to avoid drunk drivers. It is a kind of breath analyzer that can detect the quantity of alcohol that is been consumed by the driver, but since it is a prototype module, here in this project work, a simple alcohol detector is used and results are found to be satisfactory. In general, breath analyzers presently used by our traffic police, require the driver to blow into a mouthpiece on the device to detect the drunk drivers.

But a device must be fitted permanently over the dashboard of the vehicle and before starting or continuing to operate the vehicle the driver must prove himself clean by blowing into a mouthpiece of the breath analyzer. The system must be designed in such a fashion that the device should not allow energizing the ignition if the driver is drunk. In other words, if the resultant breath-alcohol concentration analyzed result is greater than the programmed blood alcohol concentration, the device prevents the engine from being started. The interlock gadget is situated inside the vehicle, close to the driver's seat, and is straightforwardly associated with the motor's start framework. A start interlock intrudes on the sign from the start to the start until a substantial breath test is given. Likewise the arrangement must be made in the vehicle.

REFERENCES

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