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"ALCOHOL DETECTION ALERT AND VEHICLE ENGINE BLOCKING SYSTEM"

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ABSTRACT

This research paper reflects our final year project, in which we attempt to address the issue of intoxicated driving related deaths as well as property damage. Our goal is to present our project, which aims to make humans driving safer & prevent accidents. We utilized an Arduino Nano microcontroller with an alcohol sensor in our project, which enables the detection of alcohol by analyzing the breath of the person operating the vehicle. As soon as liquor is discovered, the vehicle's engine is shut off and the warning siren is sounded, reducing the likelihood of any potential disasters. As a result, there is no loss of life or property.

Keywords: Intoxicated driving, Arduino Nano, Alcohol Sensor, Engine Blocking System.

1. INTRODUCTION

India has the world's second biggest road network, with over 3 million km of roads, 60 percent of which have been paved. In India, around 97k persons are killed in traffic accidents each year. Because road safety is a top priority, the lanes, directional arrows, & signboards have adhered to basic standards and guidelines that make travelling simpler for residents. Accidents do occur, however, due to uncontrolled factors such as inebriated drivers. Driving while intoxicated of alcohol affects & destroys many people's lives, thus we must be extremely cautious on the highways. We should consider the other drivers on the road. In our proposal, the motorist will be required to adhere to safety precautions such as not driving when under the influence of alcohol. This project will be much more significant for the people if it helps to minimize the number of accidents in the city caused by intoxicated driving. The fundamental goal of a car monitoring system is to guarantee that everyone in the vehicle is safe. This project major goal is to minimize the amount of accidents.

1.1 CONCEPT OF ALCOHOL DETECTION ALERT & VEHICLE ENGINE BLOCKING SYSTEM

Arduino has risen rapidly in this changing environment to design new concepts to make the situation smarter. In our project, an Arduino UNO is utilized as a microcontroller to construct the driver surveillance system [1]. The alcohol sensor is used to monitor the driver's alcohol intake. The alcohol detecting premise is that if a motorist is intoxicated, the alcohol concentration will be detected by the alcoholic breath analyzer sensor. When a level exceeds the threshold, an alert is issued by the burger and the vehicle's engine immediately shuts down [2]. This is done to safeguard the public's safety. A buzzer sounds to tell adjacent people that something is wrong with the car, and the word "Alcohol Detected" flashes on the LCD screen placed in the device, so that nearby people may understand the seriousness of the issue & notify the appropriate authorities to avert any incidents. In our project, we intend to alleviate this problem by developing a system that automatically turns off the vehicle's engine when a particular amount of alcohol is identified in the driver's breath [3]. When the quantity of alcohol is recognized, the microcontroller shuts down the vehicle's engine. Furthermore, individuals in other vehicles and pedestrians will be significantly safer as a result of the automobile being stopped immediately. The sensor is used to detect the amount of alcohol in the air. An message is sent to the Arduino UNO that has the alcohol configured. The Arduino UNO is used to compare the quantity of

alcohol acquired by the sensor to the natural alcohol level. If the alcohol level is significantly greater than the typical or customary level, the Arduino runs the code that permits it to drive your automobile.

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2. LITERATURE REVIEW

***REVIEW OF PAST STUDIES*:**

Numerous scientific efforts have been dedicated towards the development of effective methods for monitoring drunk driving. Some of them are:

VIRAL M. VYAS et al. (2018) [1] suggested concept consists of alcohol detection as well as an accidental location detection. When an accident occurs, an emergency message is promptly transmitted to the nearest emergency service centre, along with the accident location. This recommended design must be coerced to be installed on the vehicle. Detect accurate seat belt detection in the same way. The proper use of an automobile seatbelt is critical in order to avoid the loss of human life.

FLEISCHER et al. (2012) [2] presented the design, development, & deployment of a GPS/GSM-based Vehicle Tracking and Alarm System in their work, which allows inter-city transportation businesses to track their cars in real-time and offers a warning reporting system armed robbery & accident occurrences.

ALTAF et al.(2017) [3] suggested a method for alcohol detection & motor lockup. They employed an AT89S51 controller, a MQ-3 alcohol sensor, as well as an LCD to inform automobile occupants. The AT89S51 controller contains on-board flash memory, allowing for rapid creation & reprogramming in seconds.

KOUSIKAN AND SUNDARAJ (2014) [4] used an infrared (IR) alcohol detection device to enable constant monitoring of a driver's BAC. The IR radiation was directed thru an IR sensor TSOP 1736 positioned on the steering wheel using an IR source LED 894. An interconnection between IC 4538B & transistor BC 547 allows the relay circuit to be activated.

BHUTA P et al. (2015) [5] used the Arduino ATMEGA328 controller board, which was linked to the MQ-3 alcohol sensor module, LCD, GPS, GSM & DC motor. The GPS module records a vehicle's location & sends it as a sos message thru the GSM module. The LCD serves as the display, while the Electric motor was used as a model to characterize the mechanism's capacity to stop the engine each time ethanol is detected.

SHAIFI et al. (2016) [6] suggested an automated vehicle engine lockout control system using Virtual Instrumentation. An alcohol breath analyzer was implemented in the suggested system using Lab VIEW. The suitable methodology an Arduino as that of the control module, with a MQ-3 sensor serving as a breath analyzer. Buzzer, LED, LCD, & DC motor are some of the other modules that may be interfaced with the Arduino. The output device was the LED and LCD. Other tools used include ZigBee, IOT, and Lab VIEW software. IOT allows E-mails will be sent to worried family members of detained drunk drivers.

MANDALKAR et al. (2015) [7] presented a system that used a GPS to track the car's position, a heart pulse sensor to warn the driver of normal or abnormal conditions, and a bumper switch to detect vehicle collisions. GPS, LCD, GSM, MQ-3 alcohol sensor, obstacle sensor, alarm, relays & also fuel blocker are among the other functional modules that interact with the ATmega328 controller.

BANDI SREE GEETA et al. (2015) [8] suggested a system based on an ARM7 LPC2148 microcontroller that allows constant monitoring of a driver's BAC. The PAS 32U alcohol sensor was used to constantly monitor for the presence of alcohol, while the Global Positioning System as well as Global System for Mobile communication units sent the location of the car through SMS. It contains a sophisticated electrical system that continually measures the amount of alcohol in the air surrounding the protagonist's body. The vehicle's speed is affected by the amount of alcohol detected. The vehicle-based countermeasure system monitors the vehicle's speed locking system as it progresses from high (100 kmph), medium (60-80 kmph), and low (40 kmph), assisting the driver in safely reaching his or her destination. The device disables the car by turning off the ignition under severe scenarios. With the aid of a Global System for Mobile (GSM) device and a one-time password, the Global Positioning System (GPS) captures the position and sends information to the authorities. The car can only be restarted when the password has been entered. In the back end, all of the riding circumstances, the amount of alcohol discovered, the vehicle speed, and the location are automatically and correctly uploaded into the web server for investigation purposes as soon as the sign of alcohol is detected. The LPC 2148 microcontroller, which is based on ARM 7, is used to carry out all of the project's activities.

SHAH AND NAWGAJE (2016) [9] presented a technique for identifying intoxicated drivers and tracking them down. The system detects liquor using an Advanced RISC Machine -ARM CPU & MQ3. The MQ3 sensor uses an analogue to digital converter included into the LPC2148 ARM controller to detect the strength of the liquor.

PRASHANTH et al **(2014) [10]** created a road accident avoidance system prototype that included an alcohol sensor MQ-2 that detects of alcohol in human breath, a PIC16F877/874 microcontroller that works as the controller, as well as an LCD as the output.

3. PROBLEM STATEMENT

The number of traffic accidents due by drunk driving has risen dramatically in recent years. Drunk driving is being more recognized as a serious hazard to public safety. Drunk driving is one of the leading causes of accidents across the world. Alcohol-impaired drivers have an evident loss of perception recognition & vehicle control. As a result, an accident happens. It is long past time to develop a system that effectively prohibits drunk driving. We are working to establish a system that is accessible on every automobile, as this type of system is not widely used. Because it is concerned with human safety, this technology will not be expensive, but it will deliver a lot. This technology has a preventive effect, which means it can prevent accidents from occurring in the first place.

4. PROPOSED METHODOLOGY

Over the years, alcohol detection in automotive systems has improved, potentially resolving drunken driving accidents all over the world. One of the requirements that must be observed is that the motorist should not consume alcohol while operating a motor vehicle. The alcohol sensor is mounted on the steering wheel to comply with the legislation, which requires that the amount of alcohol consumed by the driver be determined by air breathing. If the overall accuracy does not match, the alcohol sensor must be attached to the seat belt. Any other way to receive a whiff of alcohol is feasible, but we can get around those issues by using our idea. The sensor will continually measure the quantity of alcohol consumed, and the image will be communicated to a microcontroller for verification of whether or not the driver has consumed the alcohol. When the image of the microcontroller detects poisoned alcohol drank by the driver, a warning signal sounded by the burger and shutting down the vehicle.

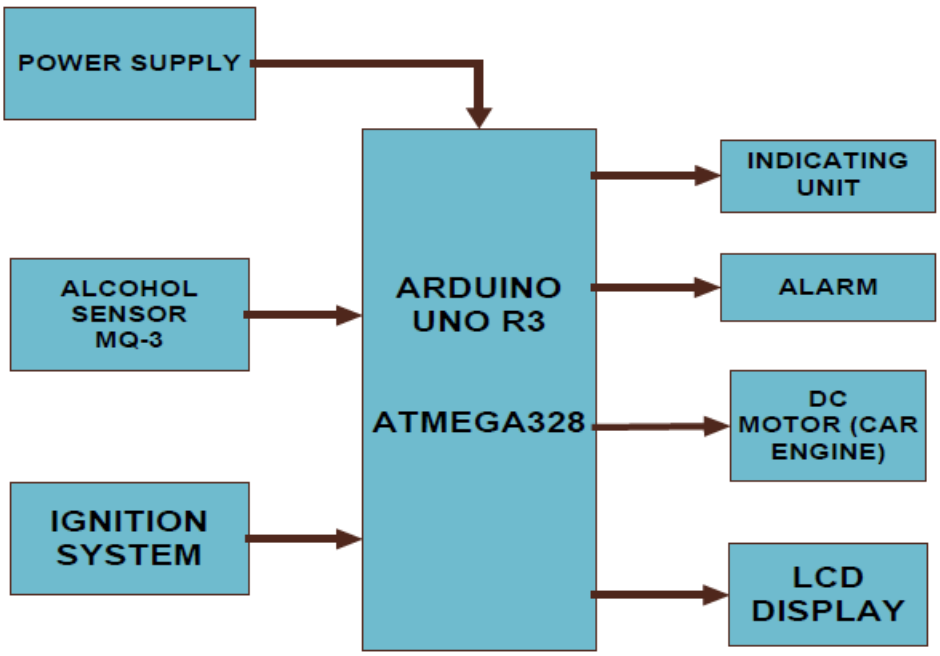


FIG.1 BLOCK DIAGRAM OF THE PROPOSED SYSTEM

The system is made up of an Arduino microcontroller that serves as a controller for all of the components. The microcontroller is supplied by a 5 volt DC power source and therefore is coupled to an LCD, an alcohol sensor, a buzzer, a DC motor, and also an LED. The LCD displays "No Alcohol Detected" as soon as the system is turned on, and also the vehicle engine starts. The LED begins to flicker, the buzzer sounds, the engine is turned off, and thus the LCD displays "Alcohol Detected" as immediately as the alcohol system senses alcohol.

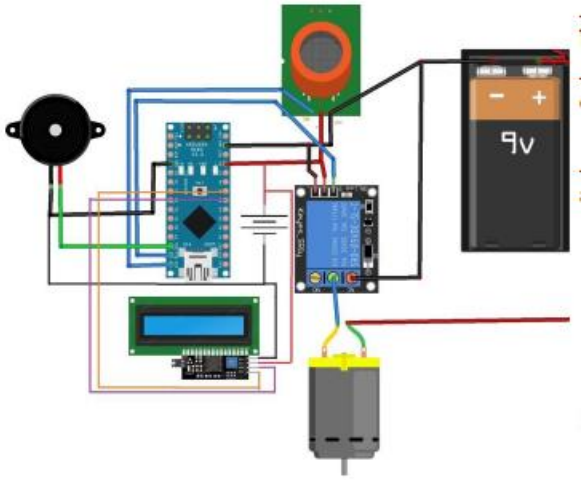


FIG.2. MAIN COMPONENTS OF THE PROPOSED SYSTEM

I. ARDUINO NANO MICROCONTROLLER BOARD

Based on the AT mega 328p, the Arduino Nano is a compact, comprehensive, versatile, & breadboard-friendly microcontroller board with 30 male I/O connectors set in DIP30 format. There are 14 digital pins, 8 analogue pins, 2 reset pins, plus 6 power pins on the Arduino Nano. Robotics, embedded systems, automation, IoT & electronics projects all employ Arduino boards. Although Arduino boards were primarily designed for students and also for non technical users, they are now commonly employed in industrial projects.

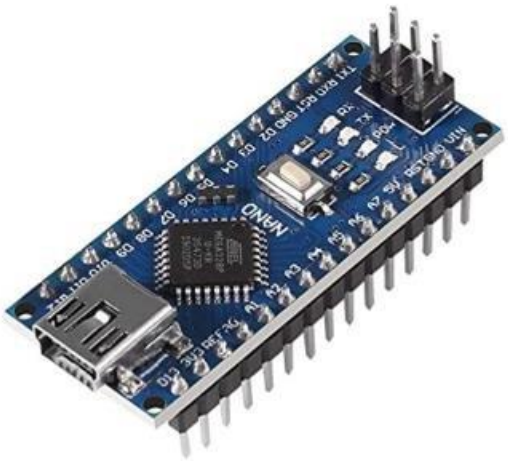


FIG.3. ARDUINO NANO MICROCONTROLLER BOARD

II. MQ3 *ALCOHOL SENSOR*

The MQ3 alcohol sensor is connected to pin A0. It is among the most precise & widely used alcohol sensors. It provides a simplified driving circuit with quick reaction, reliability, plus long life. It uses an analogue interface. Tin Dioxide (SnO2) sensitive layer is used in the sensor. The sensor has a good sensitivity to alcohol as well as a low sensitivity to benzene. The sensor is used to detect the presence of liquor up to a distance of 2 meters, making detection far more accurate. Furthermore, the sensitivity may be modified to meet specific requirements, rendering the sensor more adaptable.

FIG.4. MQ3 *ALCOHOL SENSOR*

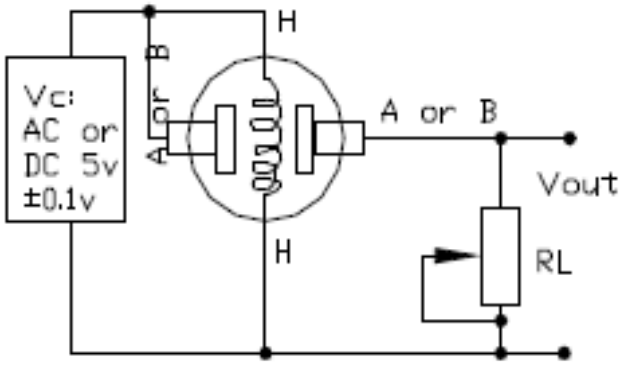


FIG.5. MQ3 *ALCOHOL SENSORCIRCUIT DIAGRAM*

MAIN FEATURES OF MQ3 *ALCOHOL SENSOR*-

A. Operation at 5V
B. Analog as well as digital output
C. Adjustable Threshold Preset
D. Beneficial in the development of breath analyzers

III. **LCD DISPLAY**

A 16X2 LCD DISPLAY unit is used in our project. The message delivered from the distant location is shown on the LCD display. The LCD module shows alphanumeric letters, kana -Japanese characters plus symbols. They are simple to programme and may be used with a variety of microcontrollers. Because of their simplicity of use, they are favored over seven segment displays. In our project, the LCD plays a critical function in providing information about the system's current state of convenience. A 16X2 LCD contains two registers, command & data. The command instructions sent to the LCD are stored in command registers. A command is an order issued to an LCD to do a specific action such as initializing it, cleaning its screen, establishing the cursor location, managing the display, and so on. Data registers hold the information that will be presented on the LCD. The ASCII code of the letter to be shown on the LCD is the data.

FIG.6. LCD DISPLAY

IV.ALARM UNIT BUZZER

A buzzer is employed as the alarm system, and it sounds whenever alcohol is detected. A buzzer is utilised in the system to inform individuals nearby, allowing them to evaluate the situation & take appropriate action. The buzzer is attached to the Arduino Nano's pin 3. It is turned on anytime the MQ3 sensor detects alcohol. In compared to electromagnetic units, they consume extremely little electricity. Its frequency & tone may be adjusted and used to suit your needs. As a result, it is a simple and inexpensive technique to notify others and draw attention to the fact that anything is wrong.

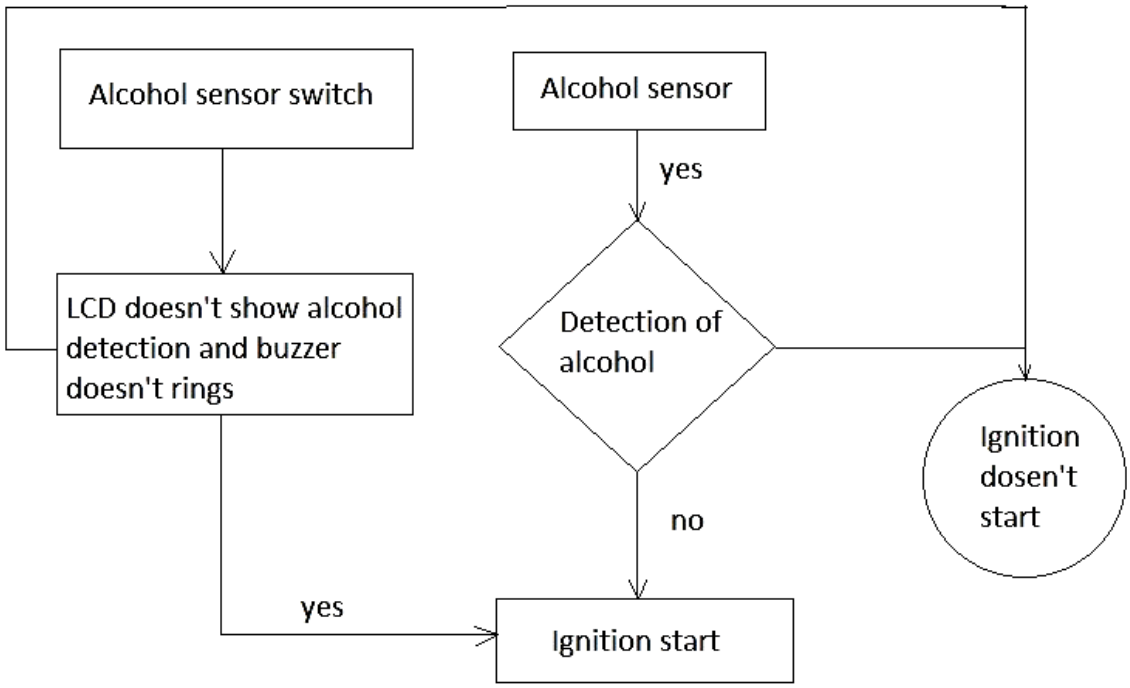
FIG.7. *ALARM UNIT* BUZZER

V. RELAY MODULE (5V)

The single channel relay module is being used to handle high voltage, high current loads such as solenoid valves, motors, & AC. It is primarily designed to connect with microcontrollers such as PIC, Arduino, and others.

FIG.8. RELAY MODULE (5V)

5. FLOW CHART OF THE SYSTEM



FLOWCHART

6. BENEFITS OF OUR PROJECT

1. The risk of loss of lives and properties as a result of intoxicated driving is reduced.
2. Simple implementation yields precise results & timely results and quick to assess the alcohol levels of the body.
3. It may be used on a variety of automobiles.
4. Fewer accidents, more security
5. Beneficial to law enforcement and offers automatic safety measures for automobiles as well as other vehicles.

7. APPLICATIONS OF OUR PROJECT

1. This technology may be installed in automobiles to help prevent accidents caused by drunk driving & this may be employed in various cars to identify whether or not the driver has ingested alcohol.
2. This project may also be utilized in many businesses or organizations to identify employee alcohol usage.

8. RESULTS

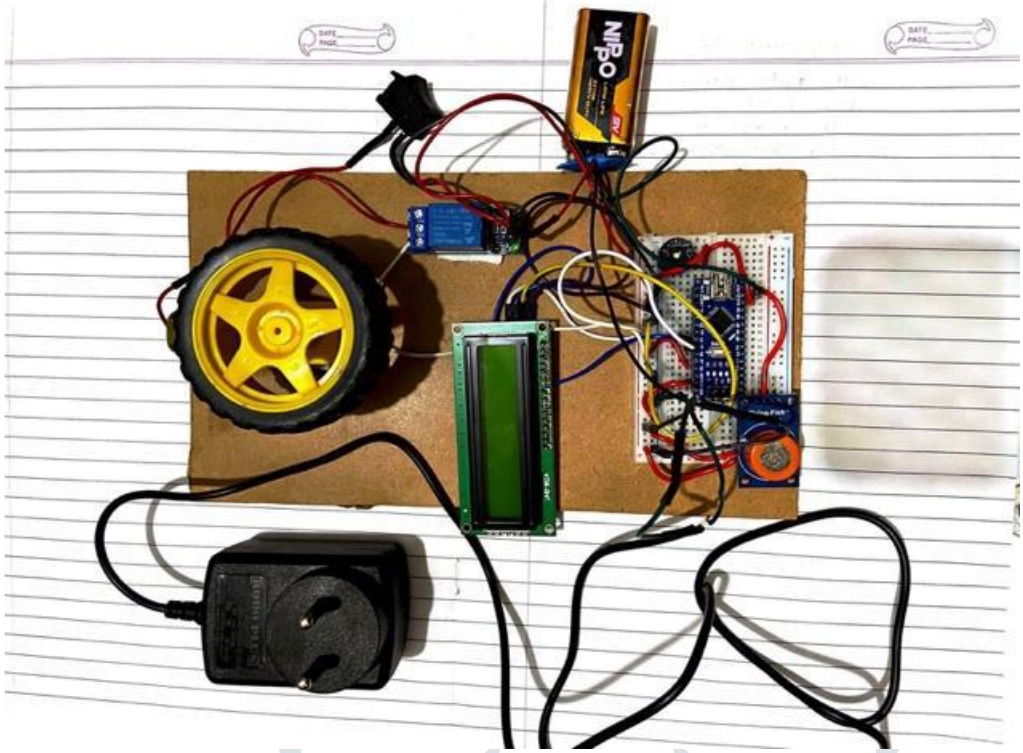


FIG.9. FINAL SETUP OF OUR PROJECT

When a drunken individual attempts to take control of the car, the alcohol sensor detects the presence of alcohol, and if alcohol is discovered, the sensor shuts down the vehicle's engine & sounds an alarm, notifying anybody around. The "Alcohol Detected" message will appear on the vehicle's LCD screen, alerting passengers to the danger and allowing them to take any necessary action. As a result, any loss of human life or property damage can be averted when this system is used on a vehicle. All of the parts have been checked & linked as needed, yielding the intended outcome as seen in the figure above.

9. CONCLUSIONS

We devised an effective strategy to combat the dangers of drunk driving in this project. Our major goal is to reduce the number of people killed or injured as a result of drunk driving. The system as a whole also has the benefit of being compact & reliable. When deployed on a broad scale, this technology will be extremely useful in turning down the vehicle's engine and warning surrounding persons in the event of an accident. The sensor utilized inside the project is extremely precise and can be modified to meet specific needs, resulting in increased efficiency.

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