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Alcohol Sensing Alert with Engine Locking System

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Abstract: *This system is a visionary approach to help accidents caused by drunk driving, rather than staying for an accident to be and also trying to remedy the situation. The use of technology in precluding drunk driving has proven to be an effective tool in saving lives and precluding injuries on the road. The perpetration of the alcohol machine cinch system with MQ3 detector has been met with some resistance from those who feel that it infringes on their particular freedoms. still, it's important to flash back that the safety of all road druggies should be a top precedence. The use of the system can help reduce the number of accidents caused by drunk driving and eventually save lives. It's a small price to pay for the safety of all road druggies. In conclusion, the alcohol machine cinch system with MQ3 detector is a critical technology in precluding alcohol-related accidents on the road. This system has been successfully enforced in colorful countries around the world and has proven to be an effective tool in reducing the number of accidents 4 caused by drunk driving. As the notorious saying goes, "Safety does not be by accident." It's over to all of us to take visionary measures to insure the safety of ourselves and others on the road.*

I. INTRODUCTION

The alcohol sensor and machine locking system is designed to help drunk driving, which is a major cause of accidents and losses on the road. It has been enforced in colorful forms in different countries, and in some places, it's obligatory for certain motorists, similar as those with previous DUI persuasions or marketable motorists. Drunk driving is a serious problem in numerous countries around the world. According to the National Highway Traffic Safety Administration (NHTSA), in 2019, 10,142 people failed in alcohol-bloodied crashes in the United States alone. To address this issue, colorful technologies have been developed to help drunk driving, including the alcohol sensor and machine locking system.

II. RELATED WORK

Multitudinous sweatshave been made in recent times to develop systems that help help drunk driving, especially by exercising detector-grounded technologies and bedded systems.

- 1) Alcohol sensing with MQ3 Detector : The MQ3 detector has been extensively used in earlier systems for detecting alcohol situations through breath analysis. utmost of these systems were limited to simple cautions like buzzers or advising lights, without taking any direct action to control the vehicle.
- 2) Engine Start Prevention Systems: Some marketable results incorporate breath analyzers linked to the vehicle's ignition. However, the machine remains locked, If alcohol is detected. still, similar systems are frequently expensive and aren't designed for nonstop, real-time monitoring while the vehicle is in use.
- 3) Vehicle Speed Regulation : Being exploration has explored automatic speed regulation in vehicles, primarily for safety or comfort purposes. still, integration of these features with alcohol discovery has infrequently been explored in a single, unified system.
- 4) Emergency Alert: Using GSM Modules GSM technology has been preliminarily used in safety systems to notify connections in case of extremities like theft or accidents. A many prototypes included drunk driving cautions, though utmost demanded active vehicle intervention capabilities.
- 5) Use of Microcontrollers : Microcontrollers similar as the Arduino Uno and Raspberry Pi have been used in earlier designs to manage detectors and cautions. Compared to these, the Arduino Nano offers a more compact and effective option for bedded automotive systems.

III. SYSTEM DESIGN AND ARCHITECTURE

A. Hardware Components

The alcohol sensing alert system is built around the following key hardware components

- 1) Alcohol Sensor (e.g., MQ-3): This sensor detects the presence and concentration of alcohol in the driver's breath.
- 2) Microcontroller (e.g., Arduino): This processes the data from the alcohol sensor and controls the other components, such as the relay and buzzer.

- 3) Relay: This acts as a switch to control the engine's ignition or other functions, such as locking the engine if alcohol levels exceed a threshold.
- 4) Buzzer: This provides an audible alert to the driver when alcohol is detected.
- 5) LCD Display (Optional): This can display the alcohol level or other relevant information.
- 6) GSM Module (Optional): This allows the system to send alerts to authorities or designated contacts via SMS or other communication method

B. Pin Configuration Overview

The following table outlines the pin configuration for the ATmega328P microcontroller and its connection to other components:

Components ATmega328P pinno.

12V battery Arduino Nano MQ-3 sensor Relays

12V DC supply to 5V DC voltage regulator (LM7805) Buzzer

LED indicator

GSM module (SIM800L or SIM900A)

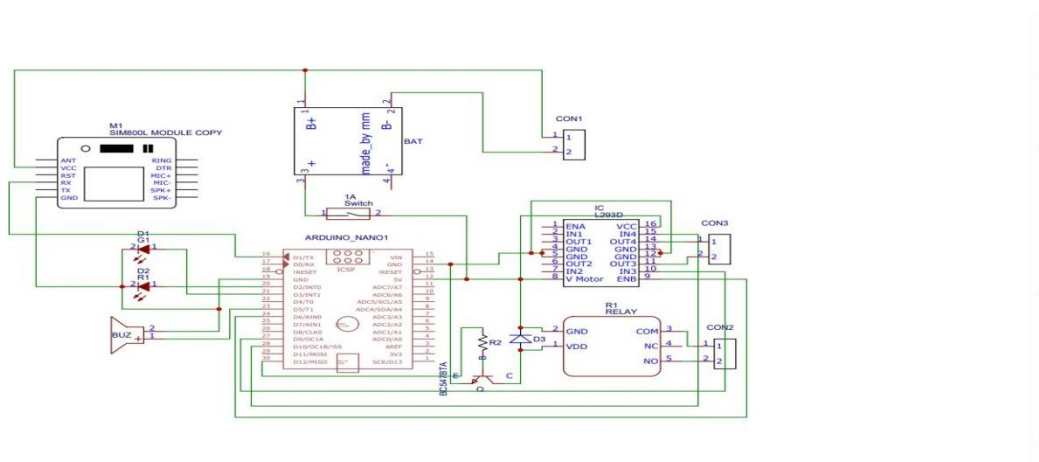
C. Circuit Operation

The system operates as follows:

- 1) Alcohol Sensor: The core component is an alcohol sensor, often an MQ3 module, which detects ethanol in the air.
- 2) MQ-3 Gas Sensor – Detects alcohol concentration in the air.
- 3) Microcontroller (e.g., Arduino, 8051, or Raspberry Pi) – Processes data from the sensor.
- 4) Buzzer or Alarm – Alerts when alcohol is detected.
- 5) LED Indicators – Shows status (e.g., green for safe, red for alert).
- 6) Display (Optional) – Shows alcohol level or warning messages.
- 7) Relay (Optional) – Can be used to disable vehicle ignition.

D. Circuit Operation

The complete circuit illustration of alcohol seeing alert system is illustrated in below illustration. The illustration shows the connection of all the factors with the ATmega328P Microcontroller, including the accompanied operation for sure alcohol discovery and alert functionality



IV. SYSTEM WORK FLOW

The alcohol sensing alert system follows a structured workflow to ensure secure and efficient operation.

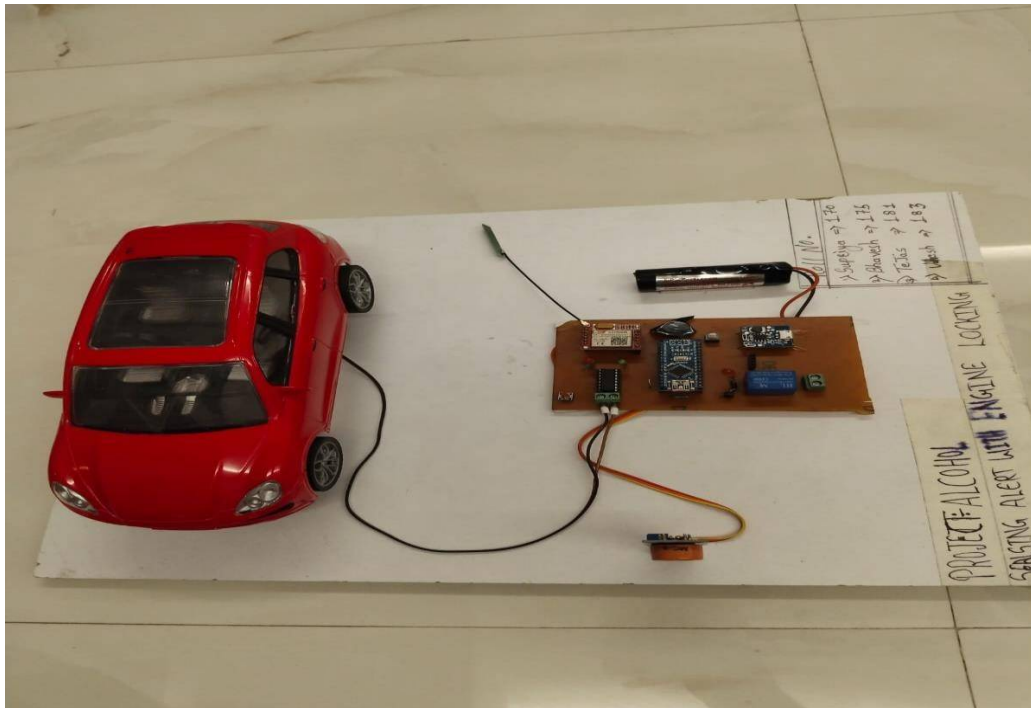
1) Case 1: Alcohol Detected Before Driving (Car is Stopped)

- The driver enters the vehicle and tries to start the ignition.
- The MQ3 sensor detects alcohol in breath.
- If alcohol is above the legal threshold, the ignition remains locked.

- Thedrivermustsoberuptostartthevehicle.
- 2) *Case2:AlcoholDetectedWhileDriving(CarisinMotion)*
- Thedriverstartsdriving.
 - TheMQ3sensorcontinuouslymonitorsalcohollevels.
 - Ifalcoholisdetected,theArduinosendssignaltothespeedcontrolsystem.
 - Thevehiclespeedgraduallydecreasesuntilitcomestoasafestop.
 - Theignitionremainslockeduntilthedriveris inanormalcondition.

V. RESULT AND DISCUSSION

Thefully implementedalcoholsensingalertsystemwastestedunderthevarious scenarios:



VI. CONCLUSION

In conclusion, the alcohol sensor and machine locking system is an important safety point that can potentially save lives and help accidents. It directly measures a motorist's Bac position and prevents them from operating their vehicle if their position is above the legal limit. still, the system also has limitations, similar as the possibility of motorists trying to bypassitandthecostofinstallation.Overall,thealcoholsensorandmachinelockingsystem is a precious tool in precluding drunk driving, but it is n't a cover for responsible driving geste and public education juggernauts about the troubles of drunk driving.

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