Automatic Engine Locking System and GPS Tracking For Drunken Drive Using Arduino

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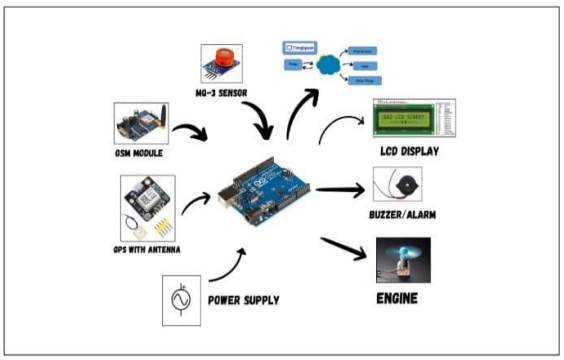
***Abstract*—The "IoT-Based Automatic Engine Locking System and GPS Tracker for Drunken Drivers using Arduino" is an innovative solution aimed at enhancing road safety by preventing incidents of drunk driving. Leveraging the capabilities of the Internet of Things (IoT) and the Arduino, this system offers a proactive approach to accident prevention.**

This project demonstrates the potential of IoT in transforming vehicle safety and management. By addressing the critical issue of drunk driving, it aims to significantly reduce road accidents and enhance public safety, showcasing the practical applications of lot in everyday life.

I. INTRODUCTION

These days, majority of road accidents are caused by drunk and driving. Drunken drivers are in an unstable condition and so, rash decision are made on highway which condition endangers the lives of road users, the driver inclusive.

This project developed a prototype alcohol detection and engine locking system by using Arduino interface with an alcohol sensor along with an led screen and a DC motor to demonstrate the concept Road safety is appearing as a big social concern around the world especially in India..



II. EXISTING MODEL

In the existing system, manual checking of alcohol is done where many people get escaped and accident are occurring every day. Checking each and every person is not possible manually.

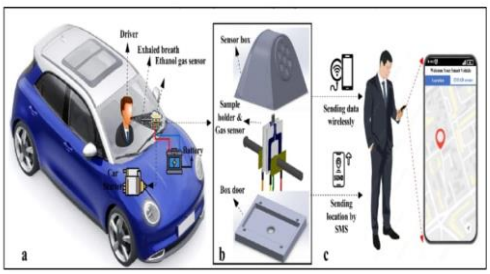
DISADVANTAGES OF EXISTING MODEL:

Time consuming and less
effective
High cost
More man power

III. PROPOSED MODEL

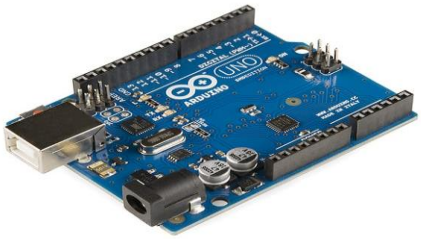
The core functionality revolves around the detection of alcohol consumption in the driver using an alcohol sensor. If the sensor detects alcohol levels above a pre-defined limit, the system automatically triggers an engine locking mechanism, preventing the vehicle from starting or operating.

In addition to the engine locking feature, the system incorporates a GPS tracker to monitor the vehicle's location in real-time. This GPS data can be transmitted to designated contacts or authorities, enabling timely intervention and assistance.



IV. COMPONENTS

1.Arduino



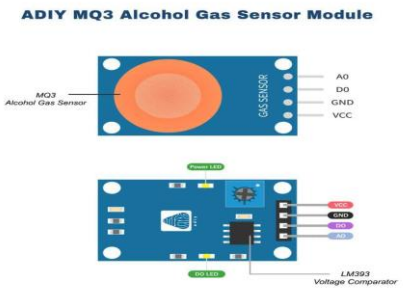
Arduino is an open-source electronics platform that enables users to create interactive electronic projects. It consists of microcontroller boards, such as the popular Arduino Uno, and a software IDE (Integrated Development Environment) for writing, compiling and uploading code. Arduino boards read inputs from sensors, buttons and other devices, and control outputs like LEDs, motors and displays.

Users can program Arduino boards using the Arduino programming language, similar to C++. The platform simplifies electronic project development for hobbyists, students and professionals, making it ideal for robotics, IoT devices, home automation and wearable technology..

Arduino applications span various fields, including engineering, art, design and education, fostering innovation, creativity and hands-on learning.

2.MQ3 Sensor

The MQ-3 sensor is a type of gas detector that measures alcohol concentration in the air. It belongs to the MQ sensor series, widely used in various applications for gas detection. The MQ-3 is sensitive to ethanol vapor and is commonly employed in breath analyzers, alcohol detectors and industrial safety systems.



The MQ-3 sensor enables effective alcohol detection, enhancing safety and facilitating compliance with regulations.

3.GMS Module

A GSM (Global System for Mobile Communications) module is a wireless communication module that enables devices to send and receive data through cellular networks. It's essentially a miniature mobile phone chip, allowing microcontrollers, computers or other devices to communicate via SMS, MMS, GPRS, EDGE or 3G/4G networks.

The GSM module simplifies wireless communication for devices, fostering innovation in IoT, automation and mobile applications.

4.GPS Tracker

A GPS tracker is an electronic device that uses Global Positioning System (GPS) technology to monitor and record the location of vehicles, people, pets or valuable assets in real-time.

Key Features

1. Location Tracking: Provides precise location coordinates (latitude, longitude and altitude) using GPS satellites.

2. Real-Time Monitoring: Tracks movement, speed and direction.

3. Data Logging: Stores location history for later analysis.

4. Alarm Systems: Sends alerts for unauthorized movement, geofencing breaches or low battery.

5. Remote Access: View tracking data via mobile apps or web platforms.

5.16*2 LCD Display

A 16x2 LCD (Liquid Crystal Display) is a type of display screen commonly used in electronic devices. It features:

- 16 characters per line (horizontal resolution)

- 2 lines of text (vertical resolution)

- Dot matrix LCD technology

The 16x2 LCD display simplifies user interaction, providing an intuitive interface for various electronic applications.

6.Buzzer

A buzzer is an electronic device emitting a buzzing or beeping sound to signal events, alerts or notifications. It's commonly used in:

1. Alarm systems: Security, fire, smoke and intrusion detection.

2. Electronic devices: Computers, smartphones, microwaves and doorbells.

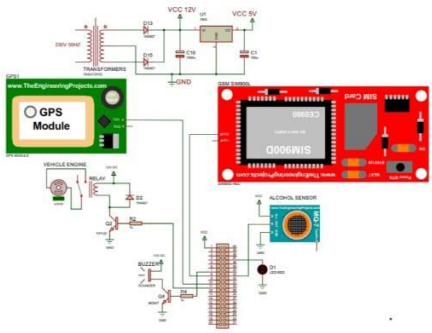
3. Industrial automation: Machine alerts, timer signals and warning systems.

4. Medical equipment: Patient monitoring, ventilators and dialysis machines.

5. Vehicles: Reversing alerts, seatbelt reminders and alarm systems.

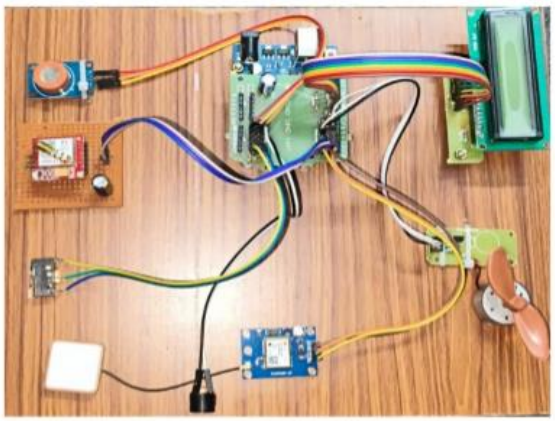
The buzzer provides an essential auditory feedback mechanism, enhancing user experience and safety across various applications.

V. CIRCUIT



VI. WORKING PRINCIPLE

When a driver attempts to start the vehicle, they must blow into the sensor. The sensor converts the alcohol measurement into an analog signal, which the Arduino processes. If the detected alcohol level exceeds a pre-defined threshold, the Arduino activates an engine locking mechanism, preventing the vehicle from starting.



The system also provides immediate feedback to the driver through visual and audio alerts, such as an LED indicator and buzzer, ensuring they are aware of their inability to drive. The system can send notifications to designated contacts via SMS or app alerts if a driver attempts to start the vehicle while intoxicated. Overall, this innovative system significantly reduces the risks associated with drunk driving, promoting safer roads for everyone.

VII. APPLICATIONS

1. Road Safety: Prevents drunken driving, reduces road accidents, and enhances public safety.

2. Vehicle Management: Enables fleet management, vehicle tracking, and fuel monitoring for efficient operations.
3. Law Enforcement: Facilitates real-time tracking, evidence collection, and automated alerts for authorities.
4. Personal Security: Provides vehicle protection, driver monitoring, and family safety for peace of mind.
5. Transportation Regulation: Supports safe ride-sharing, secure logistics, public transportation safety, and data-driven policy making for insurance and governance.

VIII. FUTURE SCOPE

1. Technological Advancements: A1, 5G, and edge computing integration.
2. Expanded Features: Biometric authentication, smart alarms, and V2X communication.
3. Increased Road Safety: Reduced drunk driving accidents and enhanced public awareness.
4. Business Growth: Subscription-based models, partnerships with automotive/insurance companies.
5. Global Expansion: Entry into new markets, localization, and strategic partnerships for widespread adoption.

IX. CONCLUSION

In this research, we proposed and implemented Arduino based automatic engine locking system aimed at preventing drunk drivers from operating vehicles.
The system utilized alcohol sensing technology to detect alcohol levels in the driver's breath and initiated an automatic engine lock if the alcohol concentration exceeded a predetermined threshold.
Through a series of experiments and evaluations, the system demonstrated reliable performance and effectiveness in achieving its intended goal.

ACKNOWLEDGMENT

We acknowledge the contributions of researchers, scientists, and engineers who have worked tirelessly to develop this technology. Your dedication to creating a cleaner and more sustainable energy future is truly commendable.

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