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Microcontroller Based Automatic Engine Locking System for Drunken Drivers

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Abstract: This project presents a novel approach to prevent accidents caused by drunk driving. The proposed system is sufficient, reliable and can be integrated with existing vehicle system. This innovation has the potential to significantly reduce the risk of accidents caused by drunk driving, promoting road safely and responsible driving habits. The system consists of a microcontroller, breathalyzer sensor, relay module, LCD display, motor driver and buzzer. The micro controller processes the sensor data and controls the engine locking system. The system provides a safe and efficient solution to prevent accidents caused by drunken driving. Its accuracy, reliability, and ease of use make it a viable solution for implementation in vehicles.

Keywords: Power supply, Arduino Uno, L293D, LCD, BO motor, Buzzer, MQ3

I. INTRODUCTION

If any person drunk and drive then the engine will automatically off and here the lot of information is Most of these days, we hear a lot of accidents that happens all over the world. The National crime records bureau's report on accidental deaths in India 2015 suggests that about 1.5 percent of total 4.64 lakh road accidents were caused by drunken drivers or influence of drug or alcohol resulting injuries . The report of Road Accidents in India 2015 puts the number of accidents caused by drivers under the influence of alcohol as the fatalities, much 3.3 percent of road accidents and 4.6 percent of fatalities from road accidents.

In Jan 2019 alone is 2,046. This shows that the drunken driving is cumulative as years passes by and the measures taken were seem to be having no effect in the reduction of the drunken drivers. Indicates the global burden of road traffic injuries is excessive in countries that can least afford to meet the health services, economic, and social challenges that are faced by them.

These project the highlights of the basis needs and priority of road traffic affecting the low-income and middle-income countries to take preventive to safe guard the life and provide better road for travelling and reduce the rate of road traffic that cumulates and to stop them from being the victim's here after. States that majorly three groups are affected mainly road accidents, about 70% of fatalities are pedestrians, next is the passengers commuting on buses, minibuses, trucks., and the last is the cyclists. Even much more protection is needed based on the local evidence and research by the road safety management in the developing countries, buses, minibuses, trucks., and the last is the cyclists.

The who accounts state nearly 5-35% of the cases registered are ones due to the drunk driving and raise the risk of crashing into pedestrians and self- -injury through insolent behavior of reckless driving.

II. LITERATURE SURVEY

The development of microcontroller-based automatic engine locking systems to prevent drunken driving has garnered significant attention due to its potential to save lives. This literature survey explores various research efforts, technologies, and methods used in these systems, along with the key authors and contributions.

Introduction to Microcontroller-Based Engine Locking Systems

Microcontroller-based systems are essential in automotive safety, and the integration of alcohol detection systems with

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these devices has gained momentum. These systems primarily use sensors like alcohol detectors, interfaced with microcontrollers (MCUs) to prevent the engine from starting if the driver is found to be intoxicated. Some notable works on this topic include the development of microcontroller-based systems using alcohol detection sensors, various mechanisms of engine locking, and the integration of intelligent systems.

Singh et al. (2018) – "Design of a Microcontroller-Based Vehicle Anti-Drunk driving system″ In this study, Singh and colleagues proposed an alcohol detection system that uses a gas sensor connected to a microcontroller. The system is designed to prevent the vehicle from starting if the detected alcohol level exceeds the legal limit (0.08

Reference: Singh, A., Mehta, N., & Kapoor, R. (2018). Design of a microcontroller-based vehicle anti-drunk driving system. International Journal of Innovative research in Electrical, Electronics, Instrumentation, and Control Engineering, 6(2), 1-8.

Sharma et al. (2019) – "Automated Vehicle Engine Locking System Based on, Alcohol Detection" Sharma and his team worked on integrating an alcohol detection system using electrochemical sensors with a microcontroller to automate the vehicle's engine locking mechanism. Their work highlighted the use of real-time monitoring and the incorporation of GSM modules.

Moulick er al. (2020)- "Development of Alcohol-Based Engine Locking System for preventing drunken driving". In this work, the authors designed a microcontroller-based system using a fuel cell sensor for alcohol detection. The system was built to provide a reliable solution for preventing drunk driving. The authors explored various sensor technologies, including semiconductor and electrochemical sensors.

Venkatesh, S., & Ramesh, G. (2021). A smart drunken driving prevention system using microcontroller and alcohol sensor. International Journal of Engineering and Advanced Technology (IJEAT), 9(4), 112-117. & Pate (2022) – "Drunk Driving Prevention System Using Microcontroller and Alcohol. This paper presents a system that integrates a smartphone app with the vehicle's onboard microcontroller to manage drunk driving prevention

Patel, S., & Pate, R. (2022). Drunk driving prevention system using microcontroller and alcohol sensor. International Journal of Computer Science and Mobile Computing, 11(3), 56-63.

III. EMBEDDED SYSTEMS

An embedded system is a specialized computer system designed to perform one or a few specific functions. It often has to work in real-time, meaning it must respond quickly and reliably. These systems are typically built into a larger device that includes both hardware and mechanical components.

An embedded system combines both hardware and software. Unlike general-purpose computers, such as personal computers, which can be programmed to perform various tasks, embedded systems are built for a specific function. They are becoming increasingly important in today's world as they control many common devices we use every day. Because embedded systems are focused on a single task, engineers can design them to be more efficient and cost-effective, improving reliability and performance.

Some embedded systems are mass-produced, which allows for cost savings through economies of scale. Embedded systems can be found in a wide range of products, from small devices like digital watches and MP3 players, to large fixed installations such as traffic lights, factory controls, and systems that manage nuclear power plants. The term "embedded system" is not strictly defined, as many systems have some level of programmability.

For example, handheld computers share some features with embedded systems, like an operating system and a microprocessor, but they are not considered true embedded systems because they can run different software and connect to various peripherals. An embedded system is a combination of computer hardware and software, either fixed in its capabilities or programmable, that is specifically designed for a particular application. These systems can be found in many devices, such as industrial machines, automobiles, medical equipment, cameras, household appliances, airplanes, vending machines, toys, as well as more obvious devices like cell phones and PDAs.

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IV. EXISTING SYSTEM

The existing system for preventing drunk driving is marred by limitations, including inconvenience, ineffectiveness, and limited coverage. Ignition interlock devices, breathalyzers, and sobriety checkpoints can be time-consuming and may not always detect drunk drivers. Moreover, DUI laws and penalties may not be effectively enforced, allowing drunk drivers to continue posing a risk on the roads. In contrast, a microcontroller-based automatic engine locking system for drunken drivers offers a more comprehensive and effective solution.

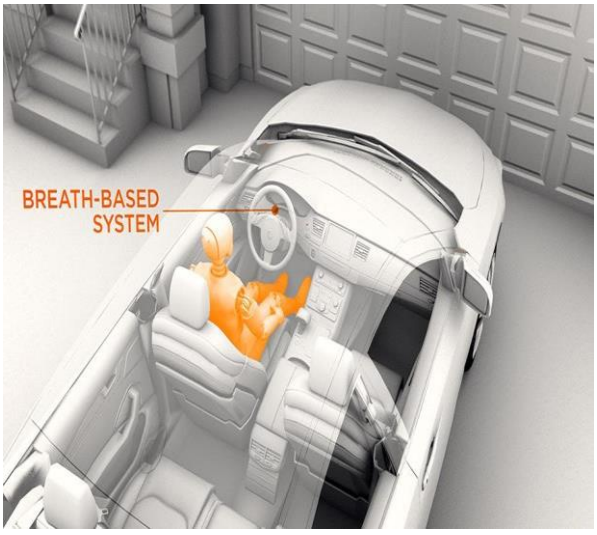
In this existing system is more helpful in this generation. This system can be installed in all vehicles, providing real-time detection and prevention of drunk driving. By leveraging advanced technology, this system can help reduce the incidence of drunk driving and improve road safety. The system can also provide valuable data and insights to support enforcement efforts and inform policy decisions. Furthermore, the system can be integrated with other safety features, such as advanced driver-assistance systems (ADAS), to provide a more robust safety net.

Overall, a microcontroller-based automatic engine locking system for drunken drivers has the potential to significantly enhance road safety and reduce the risks associated with drunk driving. By adopting this technology, we can take a major step towards creating a safer and more responsible driving environment.

V. PROPOSED METHOD

The proposed microcontroller-based automatic engine locking system for drunken drivers aims to prevent impaired driving by using an alcohol detection sensor, such as the MQ-3 the microcontroller triggers a relay to lock the ignition, preventing the engine from starting. Additionally, the system includes a status indicator (LED or LCD) to inform the driver whether they are safe to drive and an alarm to alert them if they are over the legal limit.

In future purpose this drunken driving detections is more developing in multiple ways.For added security, a user authentication system (such as a PIN code or fingerprint scanner) can be incorporated to ensure only authorized users can bypass the system. Furthermore, a backup power supply ensures that the system remains operational even in the event of power failure. This advanced system offers an enhanced, reliable solution for preventing drunk driving and improving road safety.



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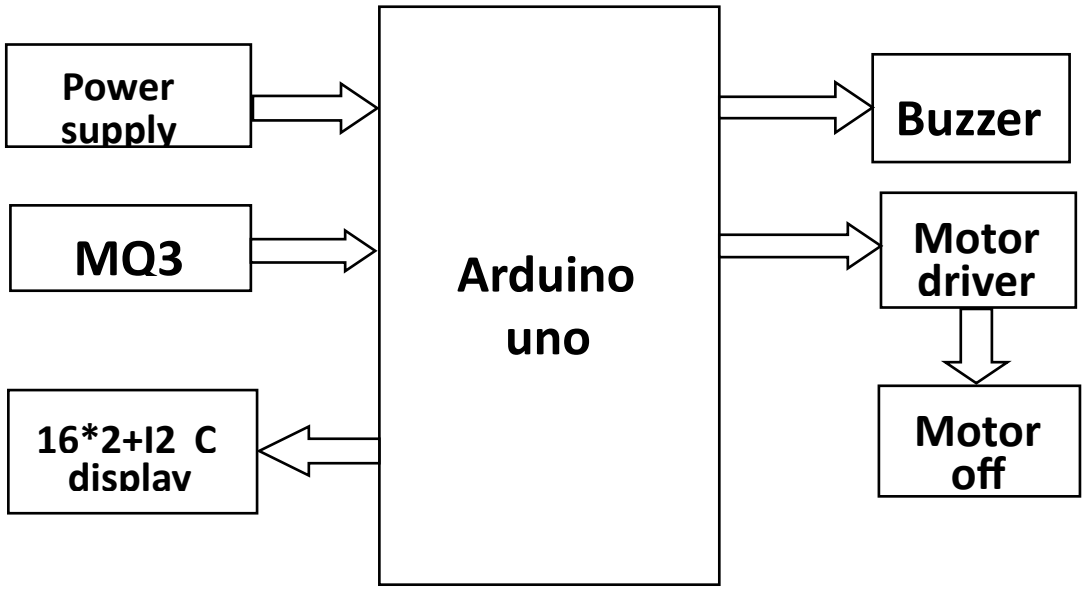
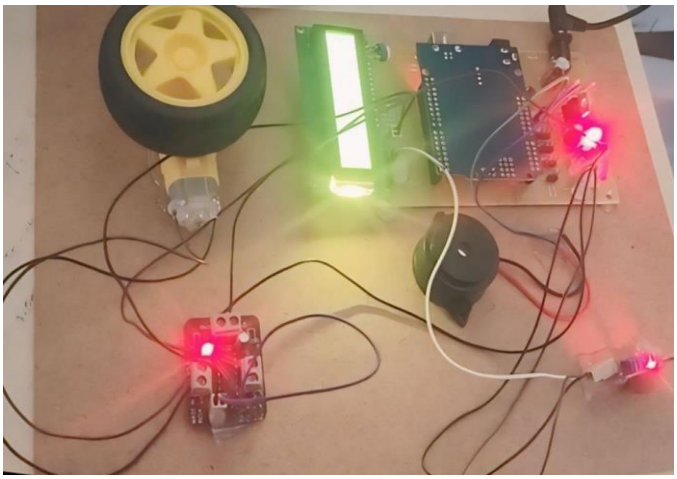
BLOCK DIAGRAM OF PROPOSED SYSTEM



VI. RESULTS



A microcontroller-based automatic engine locking system for drunken drivers aims to prevent accidents by detecting alcohol levels in the driver's breath and automatically locking the engine
If the limit is exceeded, thereby preventing intoxicated individuals from driving.

VII. CONCLUSION

The Microcontroller-based Automatic Engine Locking System for Drunken Drivers is a crucial innovation aimed at improving road safety by preventing intoxicated individuals from operating vehicles. The system works by detecting alcohol levels through a breathalyzer module interfaced with a microcontroller. Once the alcohol concentration exceeds a predefined limit, the system automatically disables the vehicle's ignition, effectively locking the engine and preventing the driver from starting the vehicle.

The system is an effective solution to reduce the number of alcohol-related accidents. By integrating a microcontroller with sensors and an engine-locking mechanism, it provides an automated, reliable way to ensure that a vehicle can't be driven by a person under the influence of alcohol.

The microcontroller-based automatic engine locking system represents a significant advancement in automotive security, offering a sophisticated, reliable, and cost effective solution to prevent unauthorized access and theft. By

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utilizing a microcontroller to control the locking and unlocking mechanism based on predefined conditions such as proximity or authentication, the system provides enhanced safety features. The integration of sensors, actuators, and intelligent software allows for real time monitoring and seamless operation, ensuring that the vehicle's engine remains locked when not in use. The conclusion is If any person drunk and drive then the engine will automatically off.

This automatic system reduces the chances of human error and enhances the overall user experience, providing convenience and peace of mind. Furthermore, as vehicle security needs evolve, this system can be easily adapted to integrate with other advanced security features like biometric authentication or remote control, proving the versatility and scalability of microcontroller-based solutions in the automotive industry.

VIII. FUTURE SCOPE

We can implement GSM technology to inform the relatives or owner of the vehicle about the alcohol consumption. We can directly make this product to inbuilt with the existing automobiles. By using such technique, the rate of road accidents can be prevented whose main cause is drink and drive. It can also prevent the vehicles from theft. This could even be extended by incorporating an extra alcohol odor sensor at the traveler seats to discover the presence of alcohol within the air within the vehicle cabin. Once alcohol is detected, the system problems each a voice alert and a message alert on the navigation system monitor.

The Microcontroller-based Automatic Engine Locking System for Drunken Drivers has a promising future scope, with potential integrations with emerging technologies like Artificial Intelligence, Internet of Things, and Cloud Computing. The microcontroller-based automatic engine locking system for drunken drivers has a promising future scope. With advancements in sensor technology, artificial intelligence, and machine learning, the system can become even more accurate and effective. Integration with the Internet of Things (IoT) and cloud connectivity can enable remote monitoring and control, making it a valuable tool for improving road safety. The system can also be integrated with autonomous vehicles, smart cities, ridesharing services, and commercial vehicles to prevent drunk driving. However, regulatory frameworks, public acceptance, technical challenges, and cost affordability need to be addressed to promote widespread adoption. Collaborations and partnerships with industry partners, governments, and other stakeholders can help overcome these challenges and make the technology a reality.

REFERENCES

[1]. Vinand M Nantulya, Michael Rerich. The neglected epidemic: road traffic injuries in developing countries. BMJ, 2002, 324; 11391~141.

[2]. Hayakawa H, Fischbeck PS, Fish boff B. Traffic accident statistics and risk perception in Japan and the United States[J]. Accid and Prev,2000,32:827~835.

[3]. Norris FH, Matthens BA, Raid JK. Characterological, situational and behavioral risk factors for motor vehicle accident: a prospective examination[J] Accid Anal Prev,2000, 32:505~515.

[4]. Kenneth heng, Stephen hargarten, Peter layde. etal. Moderate alcohol intake and motor vehicle crashes. The conflict between health advantage and at-risk use [J]. Alcohol & alcoholism, 2006, 41:451~454.

[5]. Rod G. Gullberg. Accreditation and Quality Assurance: Journal for Quality, Comparability and Reliability in Chemical Measurement, 2006(11):562~568.

[6]. Kenneth heng, Stephen hargarten, Peter layde.et al. Moderate alcohol intake and motor vehicle crashes. The conflict between health advantage and at-risk use [J]. Alcohol &alcoholism, 2006, 41:451~454.

[7]. Arnedt JT, Wilde GJ, MuntPW, etal. Simulated driving performance following prolonged wakefulness and alcohol consumption: separate and combined contributions to impairment [J]. Sleep Res, 2000, 9:233~234.