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Smart Car for V2V Communication and Engine Locking System for Drunken Drivers

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Abstract:

Nowadays, the high number of accidents are caused by vehicle collisions and drunk driving. Despite the efforts of law enforcement agencies, many people continue to drive under the influence of alcohol, posing a serious threat to other road users. This problem is exacerbated by the fact that human error is the leading cause of accidents on the road, making it difficult to prevent accidents caused by drunk driving & vehicle collisions.

In this paper to address this issue, proposed system that combines vehicle-to-vehicle communication and an automatic engine locking system to prevent drunk driving and reduce the risk of accidents on the road. The system uses advanced technology such as four sensors, an Arduino board, and an LCD screen to detect collisions, lock the engine if alcohol is detected, and display warning messages to the driver. The ultimate goal of this project is to provide a comprehensive solution to prevent accidents caused by human error and improve road safety.

Keywords **—Arduino Uno ,LCD display, Ultrasonic sensors.**

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I. INTRODUCTION

ThisThe automotive industry is undergoing major changes due to technological advances, especially improvements in road safety. One of the biggest challenges facing the industry is the problem of drunk driving, which leads to many accidents and fatalities. To address this issue, we developed a project to integrate an automatic engine lock system for drunk drivers and vehicle-to-vehicle communication.

Our project includes a model car equipped with his four sensors placed around it to detect an impending collision. If sensors detect an unavoidable collision, the system applies the brakes sharply to prevent an accident. In addition, the model car has an automatic engine lock, which can detect the alcohol content in the driver's breath and blood. If the alcohol concentration exceeds a certain limit, the engine will shut off and the car will not start until the driver stops drinking. The system also includes an LCD screen that displays warning messages to warn the driver of potential dangers. This project is driven by an Arduino board that controls the various components of the system. The ultimate goal of this project is to demonstrate how technology can be used to reduce drunk driving problems and improve road safety. Various technologies have been developed over the years to improve road safety, such as vehicle-to-vehicle (V2V) communication. V2V communication allows vehicles to communicate with each other in real

time and exchange important information such as speed, position and direction. This reduces the risk of accidents due to human error. The project seeks to integrate V2V communication with an automatic engine lock system to make roads safer. Our system uses four sensors placed around the model car to detect collisions and communicate with other vehicles on the road. If a collision is unavoidable, apply hard braking to minimize impact. If the sensor detects alcohol concentration, the engine will lock and a warning will be displayed on the LCD screen. This project aims to improve road safety by providing comprehensive solutions to avoid accidents caused by human error.

Drunk driving is a serious threat that causes many accidents and fatalities each year. In response to this challenge, automakers have developed automatic engine lock systems

that prevent drunk drivers from operating the vehicle and reduce the risk of accidents on the road. The automatic engine lock system uses advanced technology such as breathalyzers and blood alcohol concentration (BAC) sensors to detect if the driver is under the influence of alcohol. When the driver's BAC exceeds a predetermined threshold, the engine will shut off and the car will not start until the driver stops drinking.

Vehicle-to-vehicle communication (V2V) is an advanced technology that allows vehicles to exchange information in real time. V2V communication allows vehicles to exchange vital data such as speed, position and direction and adjust their movements accordingly. The technology is designed to prevent accidents caused by human error, improve traffic flow, and improve overall traffic safety and efficiency. V2V communication systems use various tools such as sensors, cameras, and wireless networks to transmit data between vehicles so they can work together to avoid obstacles and potential hazards on the road.

II. RELATED WORK

Meena et al. [1] proposed a technology to reduce traffic congestion and improve road safety, as well as investigate situations such as collision, delay, and redundancy, all of which can be improved or eliminated by sending a simple warning message. The proposed system is designed as a prototype into two small car models to control the distance between the car and the car ahead of it, as well as the distance between the front obstacles, and to initiate automatic braking.

Juan Liu et al. proposed an online intelligent drunk driving detection system based on multi-sensor data fusion technology[2.] This study improves and supplements data fusion theories for online automobile drunk driving detection, allowing for the online identification of inebriated drivers and the locking of their vehicles to prevent drunk driving. It offers technical assistance in improving the accuracy of online systems that detect drunk driving in automobiles.

Okengwu et al [3] presented an effective method for reducing the rise in the number of road accidents caused by excessive alcohol consumption among Nigerian drivers. Despite the implementation of speed limits and other preventative measures, traffic accidents continue to occur on a daily basis. Overspeeding, rash driving, and drunk driving are all major causes of car accidents. This study built an IOT-based in-vehicle alcohol detection and speed control system using the Arduino Nano microcontroller connected to the alcohol sensor, LCD display, and DC motor with the Bluetooth Low Energy (BLE) Application and Blynk Cloud Server for remote control and monitoring to demonstrate this concept.

DetectDUI, a contactless, non-invasive, real-time system that combines vital signs (heart rate and respiration rate) extracted from the in-car WiFi system and the driver's psychomotor coordination via steering wheel operations, was presented by Yanjiao Chen et al [4]. The framework consists of a set of signal processing algorithms for extracting clean and informative vital signs as well as psychomotor coordination, and it integrates the two data streams with a self-attention convolutional neural network (i.e., C-Attention). In safe laboratory experiments with 15 participants, DetectDUI achieves a drink driving detection accuracy of 96.6% and BAC predictions with an average mean error of 2.5mg/dl. These encouraging findings make a strong case for continued progress.

Riaz Ahmed Shaikh et al [5] proposed several extensions to the fuzzy risk-based decision model in order to achieve greater robustness, reliability, and completeness. We have presented a thorough theoretical and simulation-based analysis and evaluation of the proposed scheme. Furthermore, the theoretical and simulation-based results were cross-validated analytically. This work also includes a qualitative comparison of the proposed scheme.

Talib et al [6] revealed numerous challenges in the areas of trust management, routing, security, and the majority of the ongoing research to link the VANET difficulties with Intelligent Transportation Systems (ITS).

III. PROPOSED METHODOLOGY

The main block in the center of the diagram is an Arduino Uno board. This board serves as the main controller for the system, receiving input from various sensors and controlling output devices. The first set of sub-blocks are four ultrasonic sensors. These sensors are used to detect distances to nearby objects. They are connected to the Arduino Uno board via digital input pins. Next, there is a 5V power supply. This power supply provides the necessary voltage to power the various components of the system,including the Arduino Uno board itself. There is also a buzzer model included in the diagram. This component is used to generate sound alerts based on the input received from the ultrasonic sensors or other sensors in the system. It is connected to the Arduino Uno board via a digital output pin. An LCD I2C display is another sub-block shown in the diagram. This display is used to provide visual feedback to the user about the status of the system. It is connected to the Arduino Uno board via the I2C bus. Another sensor in the system is an MQ05 sensor. This component is used to detect levels of various gases in the environment. It is connected to the Arduino Uno board via an analog input pin. Finally, there are two driver motors shown in the diagram. These motors are used to control movement in the system, such as in a robotic vehicle. They are connected to the Arduino Uno board via digital output pins and a motor driver module

Overall, the diagram shows how these various components are connected to the Arduino Uno board, and how they work together to create a functioning model for smart car for v2v communication and engine locking system for drunken drivers.

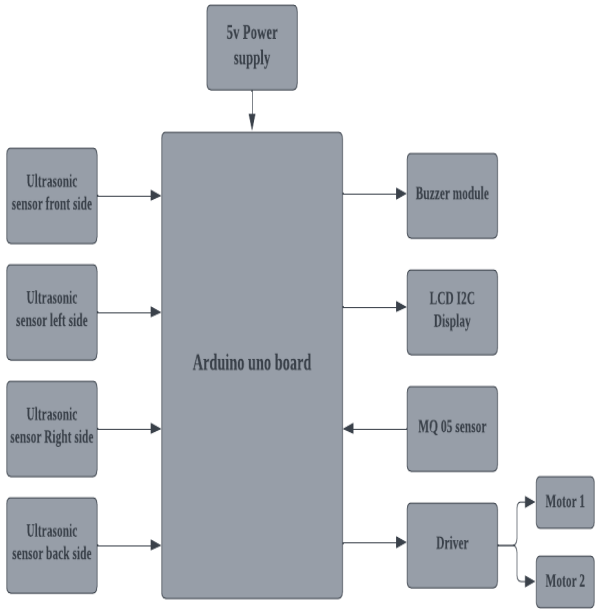

Fig:1 Block diagram of smart car for v2v communication and engine locking system for drunken drivers

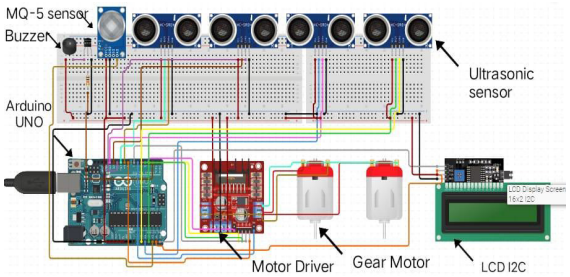

Fig:2 Circuit Connections of smart car for v2v communication and engine locking system for drunken drivers.

The connections are made as shown in the circuit diagram. In circuit diagram gnd pin of buzzer module and the ardinouno board are connected in

serial fashion. The ultrasonic sensors are used to measure the distance between target object by emitting electronic sound waves, if the object falls under the predefined range then the buzzer will be switched on, the remaining connections are made as shown in the circuit diagram, the programming is done for the arduinouno board by using Arduino IDE software by considering the working condition of the system. A motor driver is interfaced with the arduinouno board as shown in the figure, the two gear motors m1 and m2 are connected to the motor driver, the first motor is considered as the engine of the car/system, and the second motor is used to demonstrate the working condition of ABS(anti braking system). MQ-05 sensor [alcohol detector sensor]is interfaced with the microcontroller according to the figure mentioned above. Four ultrasonic sensors are connected to the LCD display screen and the LCD display is interfaced with the arduinouno board, the LCD display used to warn the user about the collision. When an object issensed by the ultrasonic sensor then the message will be displayed on the LCD screen. If the left sensor senses the object LCD display will display the message as "left collision", similarly other three sensors are sensed and the message will be given by the LCD display. But in front collision condition, if the collision is inevitable in other word the accident is about to take place then the brakes are applied using ABS, motor 2 will be turned on to indicate that the brakes are applied. The system also comprises of alcohol detection operation, for this MQ - 05 sensor is used, if the sensor senses the alcohol content or the if the driver or user found to be drunk then the engine will be locked, the engine will not be turned on unless the driver is completely sober, the gear motor one is represented as engine for the proposed system.

IV. RESULTS & DISCUSSION

The integration of vehicle-to-vehicle communication and an automatic engine lock system for drunk drivers, along with sensors, relays, and an Arduino microcontroller, has the potential to revolutionize road safety. The project uses four sensors placed around the vehicle to detect collisions and apply hard braking if a collision is unavoidable. The system can also detect alcohol levels and lock the engine to prevent drunk driving. A warning is displayed on the LCD screen to alert the driver of potential hazards.

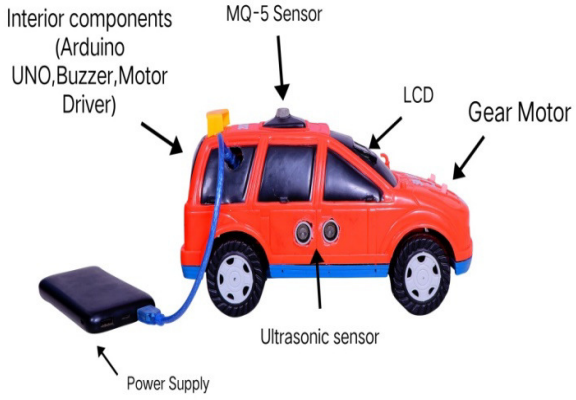

Fig.3. Prototype of Smart Car

Fig.4.Front Collision

Fig.5.Left Collision

Fig.6.Right Collision

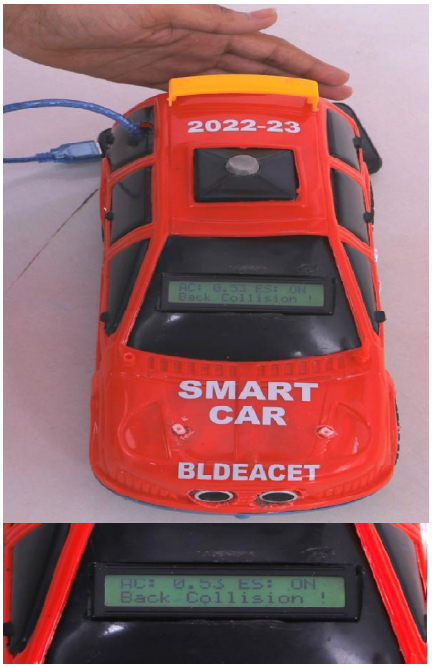

Fig.7.Back Collision

Fig.8. Alcohol Detection

V. CONCLUSION & FUTURE SCOPE

Overall in our project, the use of sensors, relays, and an Arduino microcontroller, as well as the integration of vehicle-to-vehicle communication and an automatic engine lock system for drunk drivers, has the potential to significantly improve road safety. Four sensors placed around the model detect collisions and, if a collision is unavoidable, apply hard braking to minimize impact. Also, if the system detects alcohol, it will lock the engine to prevent drunk driving. A warning is displayed on the LCD to warn the driver of potential hazards. With these features, the system helps prevent accidents caused by human error and drunk driving, ultimately making roads safer for everyone. Vehicle-to-vehicle communication and integration with an automatic engine lock system for drunk drivers, with collision detection and hard braking capabilities, is a major advance in automotive technology.

As these technologies evolve, we can expect a future where self-driving cars communicate seamlessly with each other to improve traffic flow and keep everyone on the road safe. When it comes to mobility, V2V technology can help alleviate traffic congestion in a number of ways. First, connecting cars to a central hub will provide traffic authorities with real-time traffic data so they can better manage their facilities to maximize efficiency and reduce congestion. V2V communication systems may allow vehicles to cooperate on the road by clashing in trains with other vehicles moving in the same direction.

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REFERENCES

[1]. Meena, Mahendra & Prakash, Ved. (2018). Vehicle to Vehicle Communication for Collision Avoidance. Engineering, Technology and Applied Science Research. 6. 1380-1386.

[2]. Liu, Juan, Yang Luo, Liang Ge, Wen Zeng, ZiyangRao, and Xiaoting Xiao. 2022. "An Intelligent Online Drunk Driving Detection System Based on Multi-Sensor Fusion Technology" Sensors 22, no. 21: 8460. https://doi.org/10.3390/s22218460.

[3]. Okengwu, Ugochi&Taiwo, Aminat. (2022). Design and Implementation of In-Vehicle Alcohol Detection and Speed Control System. European Journal of Electrical Engineering and Computer Science. 6. 10-16. 10.24018/ejece.2022.6.5.464.

[4]. "Automatic Drunk Driving Detection System Based on Vehicle-to-Vehicle Communication" by S. Kim et al., published in the International Journal of Automotive Engineering in 2021.

[5]. Shaikh, Riaz Ahmed, and VijeyThayananthan. 2019. "Risk-Based Decision Methods for Vehicular Networks" Electronics 8, no. 6: 627. https://doi.org/10.3390/electronics806062.

[6]. Talib, Mohammed & Hassan, Aslinda&Hussin, Burairah& Mohammed, Ali & Hassan, Ali &Mutlag, Ammar. (2018). Vehicular Ad hoc Network for Intelligent Transport System: A review. 7. 350-353. 10.14419/ijet.v7i4.36.23803.

