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Alcohol Ascertain and Fooboard Evasion System on Footboarding in Buses

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Abstract:- The project "Alcohol Ascertain and Footboard Evasion System on Footsteps in Buses" aims to develop a comprehensive system to enhance safety measures within public transportation, specifically focusing on buses. This system combines two critical elements: alcohol detection and footboard evasion prevention, addressing major safety concerns prevalent in public transport systems . The alcohol ascertain component involves implementing advanced technology within buses to detect alcohol levels among passengers. Utilizing sensors or breath analyser systems, this feature will identify individuals exhibiting inebriated behaviour and alert the bus driver in real-time, enabling timely intervention to maintain a secure environment for all passengers . Simultaneously, the footboard evasion system targets the safety hazards posed by passengers attempting to board or alight from a moving bus. Through sensors strategically placed on foot steps and entrances, this system will detect unauthorized attempts to access or exit the bus while it's in motion. It will trigger alarms or mechanisms to prevent such actions, mitigating the risks associated with footboard accidents and ensuring passenger safety . By integrating these innovative technologies, the project aims to significantly reduce the occurrence of accidents, injuries, and untoward incidents within buses. This system not only enhances passenger safety but also contributes to a more secure and reliable public transportation experience for everyone involved

Keywords*: Ascertain,Evasion, Public transportation safety , Alcohol detection , Footboard safety*

1.1 Introduction

In the realm of modern transportation, buses serve as the lifeblood of urban and intercity mobility, facilitating the movement of millions of passengers daily. However, this vital mode of transportation is not without its challenges, and one of the most pressing concerns is ensuring the safety of passengers and pedestrians on the road. Among the many factors that contribute to bus-related accidents, alcohol consumption by both drivers and passengers remains a significant and recurring issue. In response to this challenge, we present a pioneering project that leverages Arduino technology to develop a comprehensive Alcohol Detection and Passenger Safety System for buses. Road safety has been a long-standing global concern, with accidents resulting from impaired driving posing a particularly grave threat. The consumption of alcohol by drivers can impair their judgment, reaction time, and motor skills, increasing the risk of accidents that can lead to injury or loss of life. According to the World Health Organization (WHO), road traffic accidents are a leading cause of death globally, with alcohol being a contributing factor in a substantial number of cases. The need for innovative solutions to combat the menace of drunk driving is therefore apparent, and our project aims to tackle this issue head-on. Moreover, the safety of passengers boarding and alighting from buses is equally critical. Every day, countless passengers use public transportation, including buses, as their preferred mode of commuting. Ensuring their safety is of paramount importance, and this extends beyond their journey 2 on the bus to include safe boarding and alighting procedures. In many instances, passengers attempt to board or alight from buses through the foot board or steps, endangering their lives and the lives of others on the road. This reckless behavior necessitates an intelligent system to prevent such practices and minimize the associated risks. Our project bridges these two significant concerns by creating an integrated solution: An Alcohol Detection and Passenger Safety System that enhances road safety by detecting alcohol consumption in both drivers and passengers while simultaneously discouraging

unsafe boarding practices. The foundation of this system lies in Arduino, a versatile open-source electronics platform known for its flexibility and adaptability. Through the use of alcohol sensors, passive infrared (PIR) sensors, relays, and buzzers, our system can accurately identify alcohol consumption in the driver's area, alert the driver or conductor about intoxicated passengers, and automatically shut down the engine when passengers attempt to board or alight in an unsafe manner. This project represents a multi-faceted approach to addressing road safety challenges within the context of bus transportation. By combining alcohol detection technology with smart automation and safety measures, we aim to significantly reduce accidents attributed to drunk driving, enhance the security of passengers, and discourage risky boarding behaviors. The following sections of this paper will provide a detailed exploration of the project, its components, and the rationale behind each feature. We will delve into the technical aspects of the Arduino-based system, highlighting its capabilities and the ways in which it contributes to safer bus transportation. Additionally, we will discuss the implications and potential benefits of our project for the broader field of transportation safety.

1.2 Objectives

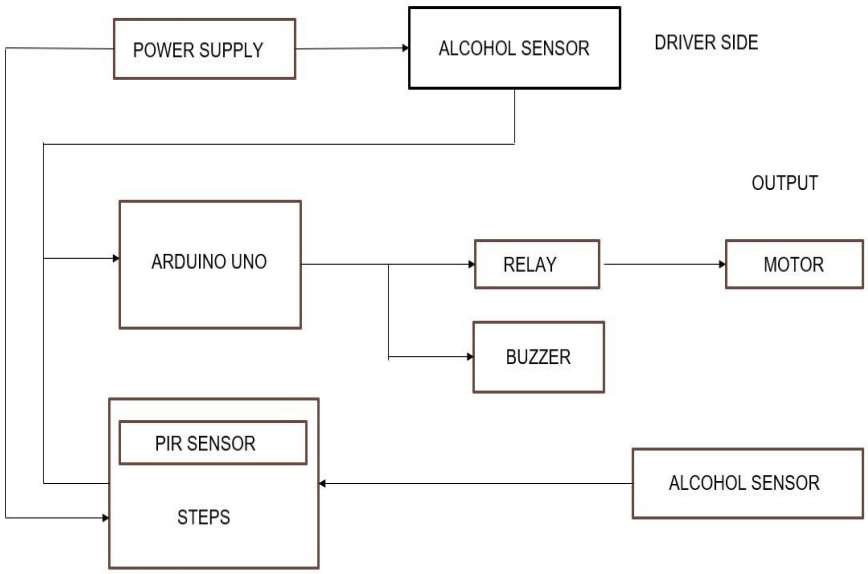
The Alcohol Ascertain and Footboard Evasion System on Footboarding in Buses project is to enhance passenger safety and prevent accidents caused by intoxicated individuals boarding buses or attempting to travel on footboards. Through the implementation of advanced alcohol detection technology and footboard evasion detection systems, the project aims to identify and mitigate potential risks associated with alcohol-impaired passengers and unauthorized boarding. By integrating these systems into buses, the project seeks to minimize the occurrence of accidents, ensure compliance with safety regulations, and ultimately safeguard the well-being of passengers and pedestrians alike.

2.1 Literature Survey

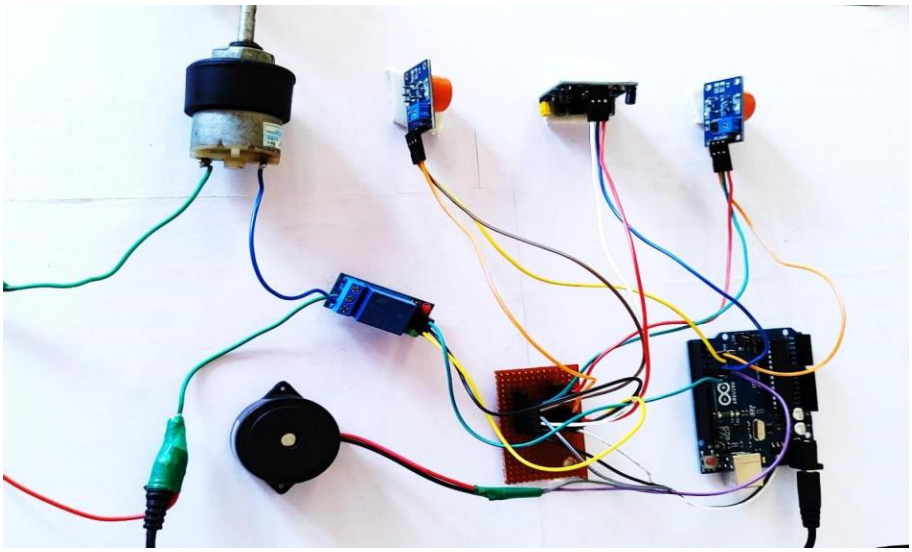
In this literature survey, K. Nirosha et al [1], "Drunk and Drive detection" is the project's primary goal. These days, drunk driving is a major contributing factor in many incidents. Thus, one of the main causes of accidents worldwide is intoxicated driving. Sensors are used in the creation of alcohol detection systems in cars to ensure the safety of those seated within. This gadget needs to be mounted inside the car. If the user is intoxicated, messages are transmitted to the local police station via the micro controller via GPRS. Pallavi R. Mishra et al [2] , This technology offers a special way to stop intoxicated individuals. An alcohol sensor is integrated into the car's steering system. When the driver turns on the ignition, a sensor detects the amount of alcohol in his breath and, if the driver is intoxicated, turns off the vehicle immediately. From zero to extremely high concentrations, the sensor in this device provides a current that has a linear connection to the alcohol molecules. The picmicrocontroller receives the sensor's output and compares it. The buzzer sounds and the relay automatically cuts off when the measured value crosses the threshold. Shahad Al-Youif et al [3] , The ultimate objective of this prototype project is to create a locking system that prevents cars from starting without an alcohol detection mechanism. The technology will make use of an alcohol sensor that is already in place. Actually, the goal of the study is to provide a foundation for future research. The goal of this project was to continue developing accident prevention systems with the hope of putting them into practice to improve road safety. L. Sakkanan et al [4] , Public transport accidents are an issue in emerging and populous nations like India. Every year, the percentage of accidents involving various forms of public transportation, such as railroads, roadways, and all other means, rises, particularly in the case of cooperative and municipal bus transportation.The primary cause of this is the foot boarding of passengers during rush hour, which makes daily transportation for college and school students dangerous and increases the risk of injuries and fatalities.In this research, an infrared ray sensor and microcontroller were used to develop a footboard avoidance system for public transportation. Both the front and rear staircases of the bus had infrared sensors positioned along them, in addition to ultrasonic sensors for blind spot identification. The conductor, driver, and passenger are all alerted when the sensor loses connectivity as a result of a person getting on or off the bus. The buzzer will automatically transmit a message to the "RTO" office via the GSM module if it is silent for longer than ten minutes or if its power source is cut off. The bus owner, driver, and conductor can be held accountable by the RTO officer using this message. Through this research, we will be able to improve bus transit system safety while also efficiently reducing passenger footboard travel. Melanie Anthony et al [5] , The likelihood of traffic accidents is sharply increasing due to the quick rise in the

number of vehicles on the road. Worldwide, drunk driving is thought to be a significant contributing factor in traffic accidents. The primary goal of this research is to create a system that can gauge how much alcohol a driver has ingested while operating a car. The alcohol detection sensor (MQ-3) and Arduino Uno are the main components used in the development of the suggested model. The car's ignition system (DC Motor) will cut off as a safety precaution when the alcohol content exceeds a permitted limit, and the GSM module will notify the relevant authority. A. Dinakaran et al [6] , One of the biggest transportation networks in India is the railway system, which carries 23 million passengers per day mostly because it is inexpensive and does not have any traffic issues. Although some locomotives have automated doors, accidents frequently happen as a result of driver and passenger irresponsibility. Footboard accidents frequently occur as a result of ignorance, trains not always being available, and even unanticipated natural events. An accident prevention module built on an Arduino platform is included in the proposed system to identify and notify anyone positioned close to the locomotive footboards. The ultrasonic sensor detects it and relays the information to the loco pilot by sending and receiving signals. The proposed system uses the locomotive as its source of power, and it is operated by Android-based smartphones that have a customised app installed. Samuel Owoeye et al [7] , One of the most basic forms of transportation is the road. Accidents on the road are usually the result of human mistake, but they can also occasionally be caused by alcohol use, which causes the victim's perspective to change. Though none have been able to considerably reduce the risk, law enforcement agencies have made major efforts to do so. Because of this, the suggested approach was created to reduce the possibility that drunk drivers could cause accidents on our roadways. In addition to prohibiting intoxicated drivers from operating a car, the gadget can notify a pre-programmed number of the position of the vehicle in the event of an accident. An alcohol sensor, a vibration sensor, and a microprocessor form the foundation of the entire software . With the help of the sensor, an alcohol threshold can be established, above which the car will buzz and the fuel supply to the engine would cut off, resulting in a halt. The subscriber identity module (SIM) of the project's microcontroller would receive input from the linked vibration sensor in the event of an auto accident, and it would then transmit the location of the vehicle to a phone number that had been pre-registered. Aditya Pratap Singh Jadaun et al [8] , This project tackles the problem of property damage and fatalities caused by drunk driving. Presenting the initiative, which attempts to improve human driving safety and reduce collisions, is the aim. This project made use of an Arduino Nano microcontroller equipped with an alcohol sensor, allowing for the breath analysis of the driver to detect alcohol consumption. The vehicle's engine is turned off and the warning alarm is activated as soon as spirits is found, minimising the possibility of any possible mishaps. Consequently, no one is killed or any property is lost. Shyam Sundar D S et al [9] , A significant segment of the populace depends on public transportation, namely buses, for their daily commutes. This leads to tragic incidents involving passengers, particularly when they are riding on the bus' footboard. In order to protect passenger safety, buses must have an automated footboard accident prevention system. The current project, which involves designing and developing an autonomous footboard accident prevention system, aims to protect bus passengers from mishaps while they are riding. An Arduino board and a load cell make up the current setup. By prohibiting the bus from accelerating while a passenger is on the 10 footboard during the bus's stationary position, the current approach assures the safety of the passengers during the boarding and deboarding process. The above system's hardware just takes up less room and uses less energy. Ugochi A. Okongwu et al [10] , Three main factors that lead to car accidents include driving too fast, acting recklessly, and drinking while driving. Using an Arduino Nano microcontroller linked to an LCD display, a DC motor, and an alcohol sensor—as well as a Bluetooth Low Energy (BLE) application and the Blynk Cloud Server for remote control and monitoring—this study has constructed an Internet of Things (IOT) based in-vehicle alcohol detection and speed control system to introduce this concept. This technology detects the presence of alcohol during breathing and continually measures the blood alcohol content (BAC) using the MQ-3 sensor. With a steering wheel sensor installed, this device can continuously check the driver's breath alcohol content. This device was designed to send out an SMS alert in the event that it detected speeding. Testing revealed that the proposed method complied with requirements for starting an automobile's engine. Via GSM, pertinent parties and authorities will be alerted if the driver's breath alcohol content (BAC) is found to be higher than the legal limit of 0.5 mg/mL.

3 Block Diagram



4 Hardware design



5 Results and Discussion

The implementation of the Arduino-based alcohol detection and safety system for buses yielded robust results, demonstrating its efficacy in addressing critical safety concerns. In the driver's area, the alcohol sensor exhibited high sensitivity, accurately detecting alcohol concentrations in the driver's breath. Upon detection, the relay mechanism promptly executed an engine shutdown, providing an immediate intervention to prevent alcohol-impaired driving. This feature ensures the safety of passengers and other road users by mitigating the risks associated with intoxicated drivers. Simultaneously, the system successfully identified passengers attempting to board the bus under the influence of alcohol using an entry-side alcohol sensor.

6 Conclusion

The development and implementation of the Arduino-based alcohol detection and safety system mark a significant stride toward enhancing public safety in the realm of bus transportation. With a keen focus on mitigating the perils of alcohol-impaired driving and unauthorized boarding, this system leverages advanced sensor technology and automation to proactively address critical safety concerns. In the face of a persistent challenge—alcohol-impaired driving—the system's success in promptly detecting alcohol in the driver's breath and initiating an immediate engine shutdown stands as a formidable safeguard. This not only prevents potential accidents caused by intoxicated drivers but also underscores the commitment to prioritizing the well-being of passengers, pedestrians, and other road users. The system's high sensitivity and swift response contribute to its effectiveness as a deterrent against the grave consequences of alcohol-related incidents on the roads. The integration of an entry-side alcohol sensor and a buzzer alert system adds an additional layer of safety by identifying and notifying authorities of intoxicated passengers attempting to board the bus. This preventive measure not only ensures a secure environment for passengers but also positions the system as a proactive tool in maintaining order and safety during transit. Furthermore, the inclusion of a Passive Infrared (PIR) sensor to detect unauthorized foot boarding addresses the safety risks associated with such practices. The automatic engine shutdown in response to unauthorized attempts to board enhances security, reinforcing the principle that passengers should only board through designated entry points. This multifaceted approach to safety makes the system comprehensive and well-equipped to handle diverse safety challenges within the bus transportation context. The successful calibration mechanism further ensures the reliability and accuracy of the system, accounting for variations in environmental conditions. As the system adapts to different scenarios, it solidifies its position as a dependable and consistent safety solution, ready for deployment in real-world settings. In conclusion, the Arduino-based alcohol detection and safety system not only demonstrates technological innovation but also signifies a commitment to creating safer and more secure public transportation systems. As the project evolves, feedback from real-world implementations will be invaluable in refining the system and addressing emerging challenges. In an era where technology continues to play a pivotal role in shaping our daily lives, this system stands as a testament to its potential in fostering a safer and more responsible transportation ecosystem. By integrating such advancements, we move closer to a future where public safety is not merely a goal but an assured reality for all bus commuters.

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