



EchoAlert

A Futuristic Approach to Control Accident and to Manage Traffic Noise

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ABSTRACT

This project aims to revolutionize city noise and road safety management by integrating advanced sensor technologies with vehicle systems. Traditional methods of monitoring and controlling vehicle behaviour, such as speed and horn usage, are insufficient in today's fast-paced urban environments. This paper proposes a comprehensive solution that not only regulates horn volume in designated areas but also ensures driver compliance with safety measures.

The system begins by employing an IR sensor to detect the presence of a seatbelt, ensuring that the driver is securely fastened. Subsequently, an MQ2 sensor assesses whether the driver has consumed alcohol, mitigating the risk of intoxicated driving. Additionally, a vibration sensor constantly monitors for any indications of an accident.

Relay activation is contingent upon the driver wearing a seatbelt and being sober, as confirmed by the sensors. Upon meeting these criteria, the system proceeds to the next stage. In the event of speeding in designated honking zones, an alert is triggered through a GSM module, notifying a registered phone number of the violation. Moreover, if an accident is detected by the vibration sensor, an alert message containing the precise location is dispatched to the driver's phone as well as an alternative contact.

This integration of sensor technology with vehicle operations presents a proactive approach to enhancing road safety and noise regulation in urban environments. By employing a multi-faceted system that addresses both driver behaviour and environmental factors, this project exemplifies the potential of smart solutions for modern cities.

Keywords : Seatbelt Sensor, Alcohol Detection, Vibration Sensor, Relay, GSM Module, Road Safety, Urban Environment, Smart Technology.

I. INTRODUCTION

Road accidents remain a persistent threat due to reckless driving and excessive speeds, posing significant risks to human life. Despite governmental efforts to curb such incidents, the proliferation of vehicles continues to escalate accident rates. While laser-based control systems offer potential solutions,

their high cost and limited effectiveness in detecting pedestrians present challenges.

In response, this project endeavors to address these issues through a comprehensive system that integrates sensor technologies with vehicle operations. Initially, an IR sensor verifies the driver's

compliance with safety measures by detecting seatbelt usage. Following this, an MQ2 sensor assesses the driver's sobriety, mitigating the dangers of alcohol-impaired driving. Additionally, a vibration sensor serves as a vigilant monitor for potential accidents.

The system's operation is contingent upon the driver's adherence to safety protocols. Relay activation occurs only when the driver is wearing a seatbelt and is sober, as confirmed by the sensors. Upon meeting these criteria, the system proceeds to its next phase.

In areas where honking is restricted, the system employs further measures to regulate noise pollution and promote road safety. When a vehicle enters a designated honking zone, the system dynamically adjusts horn volume, ensuring compliance with regulations. Simultaneously, an accelerometer monitors vehicle speed, triggering alerts via a GSM module if speeds exceed prescribed limits within these zones.

This integrated approach not only enhances road safety but also addresses environmental concerns by minimizing noise pollution. By employing advanced sensor technologies and intelligent systems, this project aims to mitigate accidents and promote responsible driving behavior in urban environments.

II. RESEARCH BACKGROUND

System consists of Admin panel, municipal corporation and hardware module which include of buzzer, GPS, arduino board, an accelerometer sensor, IR sensor, vibration sensor, mq2 sensor, relay and gsm module.

1. Admin:

Admin can add the municipal corporation and view the honking zones which are included by the municipal corporation on GPS. He also view and

delete the of municipal corporation and also view all details and data of others which is included by the municipal corporation.

2. Municipal Corporation:

In our system the municipal corporation can add the honking zones like hospital, school, college, old age home and government offices in cities as a honking zone with their longitude, latitude, Name, Type, and other description and decide the speed level of the vehicle which is travel from near the honking zone.

3. Vehicle Registration Login

In our system the vehicle registration login can add the vehicle owner information like Name, Address, self contact number, vehicle number, alternative contact number, email etc.

4. System:

In this web application when any car or vehicle goes from any honking zone the accelerometer can track the current speed limit of that vehicle. This accelerometer can built-in the vehicle which is note the speed of vehicle during honking zone which is declare and saved on GPS by municipal corporation, if the detected speed of vehicle is greater than the speed which is allowed in honking area then the pizzobuzzer will buzz and get alert to driver to drive slowly in honking zone area. It also check the horn of vehicle if it on then the in-built switch press action will automatically decrease the noise level of the horn and keep safe and noise pollution free drive.

III. LITERATURE SURVEY

Currently Indian cities are ranked thrice in Top 10 nosiest city in the world according to Citi quite. The cities that rank in these are Kolkata, Delhi and Mumbai. The effects of Noise pollution which is generated from the high speed vehicle it is mainly affected on honking zone area which is declare by municipal are being taught from 4th Grade of

Author - Ising H., Kruppa B. Paper- Health effects caused by noise. In this research paper the author shows what was the effects on human health because of noise. How that bad effect was reduce.

- **Decision Logic (Control Unit):** Receives inputs from the sensors and processes them to make decisions based on predefined criteria. This component governs the operation of the system, including relay control, horn volume adjustment, and alert generation.

Output:

1. **GSM Module (Alert Transmission):** Sends alert messages to the driver in case of speeding violations or alcohol consumption. These alerts serve as warnings to the driver, promoting safer driving behavior.
2. **Horn Control:** Adjusts the horn volume automatically when the vehicle enters a no honking zone, minimizing noise pollution in sensitive areas.

Operation:

1. Upon vehicle ignition, the IR sensor checks for seat belt insertion. If the seat belt is not inserted, the system prevents the relay motor from starting, ensuring compliance with safety regulations.
2. After confirming seat belt usage, the MQ2 sensor detects alcohol consumption. If alcohol is detected, the relay motor remains inactive to prevent driving under the influence.
3. Simultaneously, the GPS module continuously tracks the vehicle's location. When the vehicle enters a no honking zone, the system automatically adjusts the horn volume to comply with regulations.
4. The accelerometer monitors the vehicle's speed in real-time. If speeding is detected within a no honking zone, the GSM module sends an alert message to the driver, notifying them of the violation.
5. Additionally, the system logs data related to driving behavior and violations in a MySQL database, allowing experts to analyze and provide feedback to the driver. This promotes conscious driving and helps reduce repeated violations over time.

Components:

- **Arduino Board:** Acts as the central processing unit, interfacing with sensors and controlling system operations.
- **Power Supply:** Provides the necessary power to all system components, ensuring continuous operation.
- **MySQL Database:** Stores data related to driving behavior and violations for analysis by experts.

Conclusion: The system architecture facilitates comprehensive monitoring of vehicle safety parameters and promotes responsible driving behavior. By integrating sensor data processing, alert transmission, and data logging functionalities, the system contributes to enhanced road safety and reduced environmental impact.

V.Technology Necessity

In urban environments characterized by high vehicle density and construction activities, mitigating noise pollution is crucial for public health and well-being. The integration of innovative technologies is essential to address these challenges effectively. Here's how the proposed technology meets the necessity:

1.Noise Reduction Equipment for Construction Sites:

Installing noise reduction equipment on hydraulic breakers at construction sites helps mitigate noise pollution in honking zones. By reducing the noise generated during construction activities, this technology minimizes disturbances to nearby institutions such as hospitals, schools, colleges, and old-age homes.

2.Comprehensive Noise Evaluation Method:

Developing a method to evaluate not only the physical level of noise but also the level of displeasure felt by individuals due to vehicle-related

noise pollution enhances the effectiveness of noise reduction efforts. This comprehensive approach enables targeted interventions to address specific sources of noise and their impact on communities.

3.Noise-Reducing Materials: Utilizing noise-reducing materials developed through research on vibration characteristics enables the creation of effective noise reduction solutions. These materials, tested through mock-up tests and measurements, provide a practical means of mitigating noise pollution from various sources, including vehicle traffic.

4.Technological Advances in Noise Monitoring: Leveraging technological advancements allows for real-time monitoring and control of noise levels in urban environments. By integrating sensors and intelligent systems, such as those used in the proposed project, it becomes possible to measure and regulate noise pollution dynamically, ensuring compliance with noise regulations and promoting a healthier urban environment.

5.Enhanced Vehicle Alert Systems: Extending existing vehicle alert systems, such as buzzer systems, to include functionalities for smart honking zones improves road safety and reduces noise pollution. By integrating these systems with the infrastructure of honking zones, drivers can be alerted to comply with regulations regarding horn usage, thereby minimizing unnecessary noise.

6.Promotion of Responsible Driving Behavior: Encouraging responsible driving behavior through education and awareness initiatives reinforces the importance of adhering to speed limits and noise regulations. By instilling a culture of compliance with traffic rules, cities can create safer and more livable urban environments for all residents.

By addressing these technological necessities, the proposed project aims to significantly reduce noise pollution in honking zones and improve the overall quality of life in urban areas. Through the integration of innovative solutions and collaborative efforts, cities can effectively manage noise pollution and promote sustainable development.

VI. CONCLUSION

This system offers a comprehensive solution to tackle road safety and noise pollution issues. By addressing factors like excessive speed, alcohol consumption, and unnecessary honking, it enhances safety and promotes a peaceful commuting experience. Utilizing GPS technology for precise interventions and curbing noise pollution contribute to a safer and more serene environment for travelers. Overall, this initiative fosters responsible driving behavior and promotes a safer, more harmonious journey for all.

SOME OF THE ADVANAGES FROM THE ABOVE RESULTS

- a) Prevention of Accidents: By controlling vehicle speed and reducing noise pollution in honking zones, the system effectively reduces the risk of accidents caused by high-speed driving.
- b) Driver Awareness: Real-time alerts about exceeded speed limits and horn noise levels in honking zones keep drivers informed and encourage them to drive responsibly.
- c) Automatic Speed and Noise Control: The system automatically adjusts vehicle speed and horn noise levels, contributing to a safer and quieter environment on the roads.
- d) GPS Location Tracking: Utilizing GPS technology to track honking zones enables users to proactively manage vehicle speed and reduce noise pollution in designated areas, enhancing overall road safety.
- e) Improved Health and Well-being: By decreasing noise pollution and promoting silence in honking zones, the system helps alleviate headaches and

creates a more peaceful driving experience for users and residents alike.

f) Enhanced Safety and Security: The system provides an added layer of safety and security by actively monitoring and controlling vehicle speed and noise levels, ultimately contributing to safer roads and communities.

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