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OVER SPEED INDICATION AND ACCIDENT PREVENTION SYSTEM

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ABSTRACT

This literature review examines various over-speed detection and accident prevention systems, highlighting their methodologies and technologies. The studies reviewed employ proximity sensors, microcontrollers, Doppler radar, IoT integration, GPS, and ultrasonic sensors to monitor vehicle speed and prevent accidents. Emphasis is placed on cost-effective solutions adaptable to various vehicle types. Future enhancements suggested include replacing mechanical components with electronic sensors, optimizing motor performance, and expanding system applicability to improve road safety. Identified research gaps involve integrating advanced technologies, comprehensive driver behavior monitoring, environmental adaptability, user acceptance, system reliability, and cost-effectiveness analysis for large-scale deployment. Addressing these gaps is essential for developing more robust and widely accepted solutions to mitigate road accidents caused by over-speeding and other hazardous driving behaviors.

I. INTRODUCTION

Over speeding of the cars and bikes are major factor for road safety and it will needs proper minimize in speed to prevent the accidents. Extra Speed is a reason of all crashes. Vehicle speed detection is dependent on the principle of Dopplar Radar to ensure the speed of vehicles. The change in frequency between transmitted and reflected high frequency wave is cause used to calculate speed. High Definition camera attached to the system which can be used to provide view of the road The system can be connected to the server and the images can be transmitted to the server for future processing.

II. LITERATURE REVIEW

1. Khadakkar, Awhale, and Brokar (n.d.) present a cost-effective over-speed indication and accident prevention system using proximity sensors and microcontrollers. Designed for low-budget commercial vehicles, the system detects over-speeding and applies automatic braking with visual and auditory alerts. Unlike costly systems relying on GPS and complex computing, this approach uses simple mechanical and electronic components for speed detection and braking control. The system's advantages include affordability, ease of production, and adaptability to various vehicle types, such as small cars, SUVs, and trucks. Future improvements suggest replacing the mechanical governor with electronic sensors for enhanced performance and lower costs. This system has the potential to significantly improve road safety by reducing accidents caused by over-speeding.

Let me know if this works!

2. Tale, Magdum, Pakade, Pawar, and Jadhav (2021) propose a system to address over-speeding, a major cause of road accidents. Their over-speed indication and accident prevention system employs a Doppler radar principle for vehicle speed detection and uses visual and auditory warnings, along with an automatic braking mechanism, to prevent accidents. The system integrates proximity sensors, electronic relays, and braking mechanisms to control vehicle speed effectively.
3. Sapkal et al., 2018 proposed an IoT-based over-speed indication and accident prevention system using proximity sensors and GPS to detect over-speeding. The system provides audio alerts to drivers, and if speed remains excessive, a message is sent to the toll station to deduct fines and limit speed using a governor. This builds on previous work using RFID and GSM for automated toll collection and crime

prevention by blocking vehicles at toll booths. Future enhancements include automated toll deduction, tire pressure monitoring, and temperature control to improve safety and convenience.

4. Tale et al., 2021 Previous studies have explored similar concepts. Chrysler et al. emphasized the importance of effective traffic control devices in conveying information to drivers on unfamiliar roads. Ye Sun et al. developed an in-vehicle, non-intrusive bio-potential measurement system to monitor driver health and safety remotely, incorporating features such as ECG monitoring The proposed system's future development includes optimizing motor performance, using advanced technology for more accurate results, and expanding its applicability to improve road safety further.
5. Salve et al., 2024 proposed an advanced over-speed detection system using IoT, GPS, and real-time alerts to enhance road safety. The system monitors speed, sets thresholds, and alerts drivers and authorities of violations to prevent accidents.Prior research includes automated license plate recognition in low-resource environments LSTM-based traffic predictionand machine learning-driven traffic congestion control These technologies highlight the potential of AI and IoT in improving traffic management and safety.
6. Makandar et al.,2021 developed a Vehicle Accident Prevention System using ultrasonic sensors, LEDs, and IR sensors to provide audio-visual collision warnings and speed alerts on curved roads and expressways. Previous research includes cloud-based accident detection systems with GPS and GSM for real-time notifications and blackspot alert systems that warn drivers of high-risk areas IoT-enabled brake systems and collision avoidance mechanisms further enhance vehicle safety These technologies highlight the role of IoT and sensor integration in improving road safety.

III. RESEARCH GAPS

While various over-speed detection and accident prevention systems have been developed, several gaps persist:

1. **Advanced Technology Integration**: Limited use of machine learning and real-time data analytics to enhance system responsiveness.
2. **Comprehensive Driver Monitoring**: A lack of systems that assess a broad range of driver behaviors, such as distraction and fatigue.
3. **Environmental Adaptability**: Insufficient focus on creating systems adaptable to diverse driving conditions, including varying weather and traffic scenarios.
4. **User Acceptance and Reliability**: A need for more research into driver trust and the dependability of automated interventions like automatic braking.
5. **Cost and Scalability**: Limited analysis on the affordability and scalability of these systems, particularly in low-income regions

IV. CONCLUSION

Existing literature provides foundational frameworks for over-speed detection and accident prevention. To effectively enhance road safety, future research should focus on integrating advanced technologies, developing comprehensive driver behavior monitoring, ensuring environmental adaptability, assessing user acceptance and system reliability, and evaluating cost-effectiveness for large-scale deployment. Addressing these gaps will lead to more robust and widely accepted solutions for reducing road accidents caused by over-speeding and other hazardous driving behaviors.

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