Patent Search

Invention Title	ENHANCING ROAD SAFETY IN CRITICAL ZONES WITH AN AUTOMATIC SPEED CONTROL SYSTEM
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Abstract:

Ensuring road safety in critical zones, such as school zones, high-density residential areas, and accident-prone intersections, remains a crucial public safety objective. measures, such as static signage and routine law enforcement, often fall short in preventing speeding and reducing accident risks in these sensitive areas. This work p innovative Automatic Speed Control System (ASCS) that actively monitors and manages vehicle speeds in real-time within critical zones, aiming to enhance safety and compliance. The ASCS combines advanced sensor networks, real-time camera-based speed detection, and wireless communication technologies to identify vehicles e established speed limits. Upon detecting a speed violation, the system triggers a series of automatic responses, including real-time alerts to drivers and notifications authorities. In certain environments, ASCS can communicate directly with vehicle systems to initiate speed reduction protocols autonomously, minimizing the need fo enforcement intervention and reducing human error. An adaptive feature of the ASCS is its ability to dynamically adjust speed thresholds based on factors such as tra time of day, and environmental conditions, allowing it to respond flexibly to changing road conditions. This dynamic adjustment enhances driver compliance and redu likelihood of accidents by tailoring speed limits to real-time needs. Preliminary field tests have demonstrated the potential for a significant reduction in average vehic near-miss incidents, and overall accident rates in critical zones. The ASCS, by combining proactive speed management with responsive adaptation to road conditions, promising advancement in automated road safety technology, contributing to safer and more sustainable urban traffic management.

Complete Specification

Description:This innovative system is designed to control vehicle speed and enhance safety in hazardous zones, significantly reducing the risk of accidents. By lever
advanced technologies such as LoRa communication, speed encoders, motor drives, and DC motors, the system ensures precise vehicle control in areas where cau
paramount. At the heart of the system is the LoRa-02 Ai-Thinker, which facilitates wireless communication between the vehicle and an external control unit. This lor
communication technology allows for effective data transmission between the transmitter shown in figure 1 installed in the vehicle and the receiver as shown in fig
located in critical zones. This real-time communication is essential for implementing timely safety measures.
The speed encoder plays a crucial role by enabling real-time monitoring of vehicle speed. It continuously provides feedback to the control unit, ensuring that the sy
aware of the vehicle's current speed at all times. This data is vital for determining when speed adjustments are necessary, particularly as the vehicle approaches da
areas.
To manage speed and torque, the system utilizes a motor drive connected to a DC motor. The motor drive is responsible for adjusting the vehicle's speed, ensuring
operates within safe limits. When the vehicle enters a designated danger zone—such as school zones, hospital zones, or sharp U-turns—the LoRa communication s
activates. The external control unit receives data from the vehicle and sends commands to the motor drive to gradually reduce the vehicle's speed.
As the vehicle approaches the danger zone, the system automatically initiates a deceleration process. This controlled reduction in speed enhances safety for pedest
cyclists, and other road users who may be in the vicinity. This ensures that the vehicle can respond appropriately to various conditions, further enhancing overall ro
safety. Overall, this comprehensive approach to vehicle speed control in critical zones not only improves safety but also promotes responsible driving behaviors. By
automatically adjusting vehicle speed in response to real-time data, the system effectively minimizes risks and fosters a safer environment for everyone on the roa

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