ENHANCING ROAD SAFETY THROUGH INTEGRATED DRIVER DROWSINESS DETECTION AND PEDESTRIAN ROAD CROSSING ASSISTANCE

Our Team

T. Jalaja
Project Guide

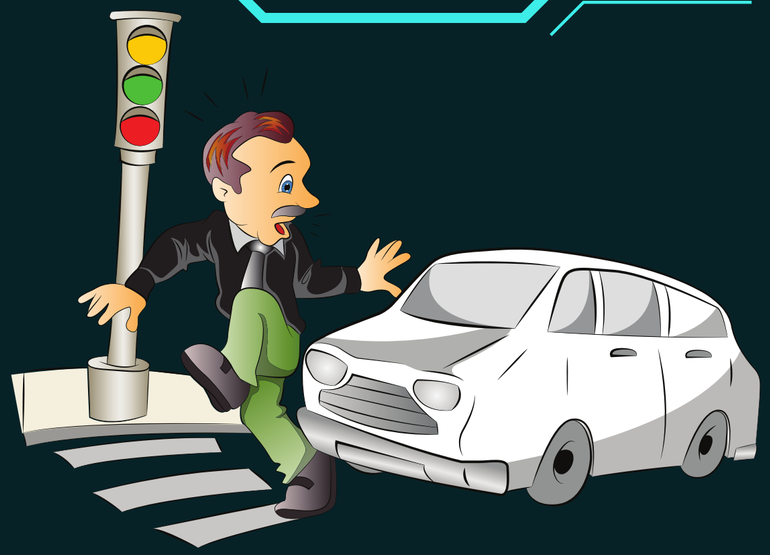
V. Spoorthi
1602-21-748-052

D. Vamsi
1602-21-748-059

Abstract

This project aims to enhance road safety by developing a comprehensive system for detecting driver drowsiness and assisting pedestrian road crossing. The system utilizes advanced technologies to monitor driver alertness in real-time and provides timely alerts to prevent accidents caused by drowsy driving. Additionally, it detects pedestrians attempting to cross roads and alerts drivers to reduce collision risks. By integrating these features, the system aims to improve overall road safety and reduce accidents

Introduction



Importance of road safety and the need for drowsiness detection and pedestrian assistance systems

Road safety is a paramount concern worldwide, with thousands of lives lost each year due to road accidents. Among the leading causes are driver drowsiness and pedestrian-related incidents.

To address these issues, this project focuses on developing a comprehensive system for enhancing road safety through integrated driver drowsiness detection and pedestrian road crossing assistance. The system aims to detect and mitigate the risks associated with drowsy driving by monitoring real-time driver alertness and providing timely alerts. Additionally, it seeks to improve pedestrian safety by detecting individuals attempting to cross roads and alerting drivers to reduce collision risks.

Literature Survey

ADAS Features

Some vehicles come equipped with integrated ADAS that include features such as lane departure warning, forward collision warning, and pedestrian detection. These systems use a combination of cameras, radar, and sensors to monitor the surroundings and provide alerts to the driver.

Drawbacks

- No Driver Drowsiness Detection

Zebra Crossing

A regular zebra crossing is a designated pedestrian crossing marked by white stripes on the road. Pedestrians have the right of way, signaling their intent to cross by stepping onto the markings. Drivers are legally required to yield to pedestrians at zebra crossings, promoting road safety and minimizing pedestrian accidents.

Drawbacks

- Jumping of Signals

Problem Statement

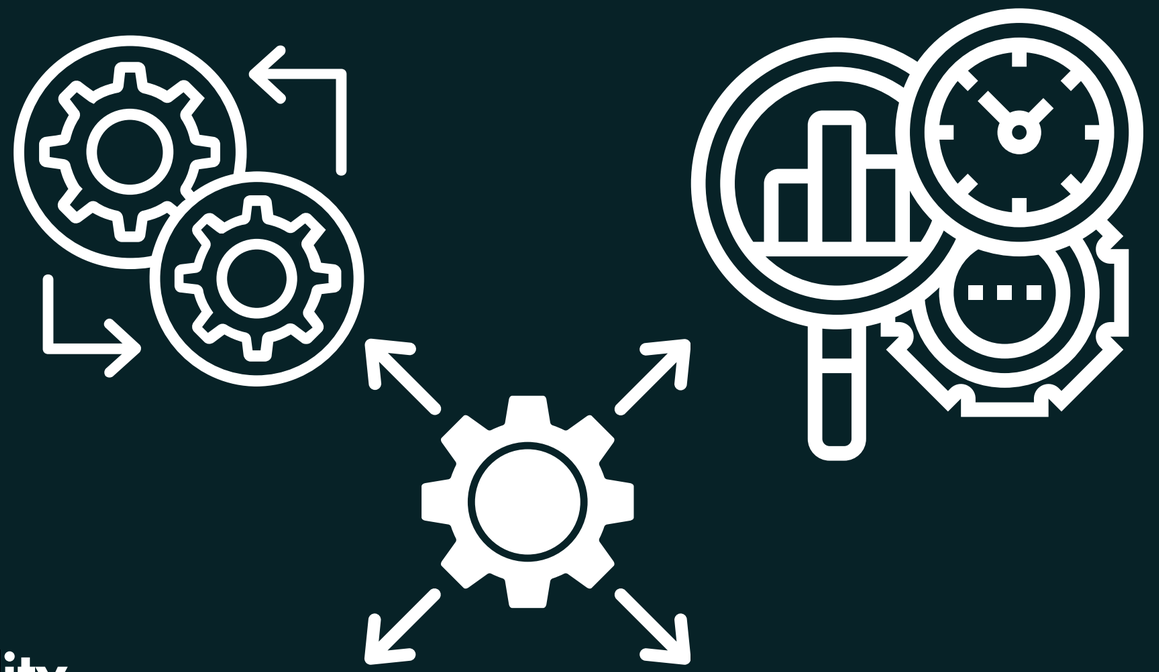
Increasing instances of road accidents caused by drowsy driving and pedestrian-related incidents highlight the pressing need for innovative solutions to enhance road safety. Current systems often lack comprehensive integration, leaving gaps in real-time monitoring of driver alertness and pedestrian assistance. Addressing these challenges requires the development of a unified system capable of efficiently detecting driver drowsiness and assisting pedestrian road crossings, ultimately reducing the risk of accidents and promoting safer road environments.

Motivation

The decision to pursue this problem statement stems from a combination of statistical trends and a personal experience. With road accidents attributed to drowsy driving and pedestrian-related incidents on the rise, statistical data underscore the urgent need for effective solutions. Additionally, a personal encounter with a near-miss accident involving a drowsy driver and a pedestrian served as a poignant reminder of the potential consequences of inadequate road safety measures. This firsthand experience further fueled our determination to address these challenges comprehensively. By focusing on integrated driver drowsiness detection and pedestrian road crossing assistance, we aim to bridge the gaps in existing systems and make meaningful contributions to the improvement of road safety. Our ultimate goal is to prevent accidents, save lives, and create safer road environments for all.

Features

- Real-time Monitoring
- Seamless Integration
- Automated Alerts
- Scalability and Compatibility



Hardware and Software Requirements

- Arduino Nano Microcontroller
- IR Sensor
- Buzzer
- Battery for Power
- Ultrasonic Sensor
- Servo Motor
- Light Emitting Diode’s
- Jumper Wires
- Ardunio IDE

Conclusion

Our system will incorporate steering wheel angle and speed data in future iterations for more accurate drowsiness detection and pedestrian hazard prediction. By analyzing these additional parameters alongside existing inputs, we aim to provide even timelier alerts to drivers, reducing the risk of accidents caused by fatigue or distraction. Through ongoing refinement and integration of emerging technologies, we remain dedicated to advancing road safety and creating smarter transportation systems for the future.

References

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THANK YOU

Better Late than Never!