



AUTOWAKE-"Driver's Drowsiness Detection System"

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INTRODUCTION

AutoWake is a smart drowsiness detection system designed to address the serious issue of fatigue-related road accidents. Drowsy driving impairs reaction time and judgment, leading to numerous crashes each year. Current solutions often fail to detect fatigue in real time, creating a critical gap in road safety. **AutoWake** aims to fill this gap by providing reliable, real-time detection and alerts.

The system monitors key indicators like eye movement, head position, and reaction time to detect drowsiness. Once fatigue is detected, AutoWake issues audio alerts to prompt the driver to take corrective action, preventing accidents before they happen.

AutoWake is built for individual drivers, transport companies, and vehicle manufacturers, offering a scalable solution. Future improvements may include AI-driven fatigue prediction and integration with smart vehicle systems to further enhance road safety.

ABSTRACT

Driver fatigue and drowsiness are among the leading causes of road accidents, posing a significant threat to road safety. Traditional drowsiness detection methods, such as vehicle-based sensors or manual monitoring, often fail to provide real-time, interactive, and intelligent responses. To address this issue, this project aims to develop an AI-powered Driver Drowsiness Detection System integrated with a Voice Assistant using Google AI Studio.

The system will leverage computer vision and deep learning to analyse facial features and eye movements in real-time. Upon detecting signs of drowsiness, the integrated voice assistant will initiate a real-time conversation with the driver, providing verbal alerts, safety recommendations, and interactive engagement to ensure the driver remains awake and attentive.

By combining drowsiness detection with conversational AI, this system enhances road safety through an intelligent, proactive, and user-friendly approach, helping to reduce fatigue-related accidents and promote safer driving behaviour.

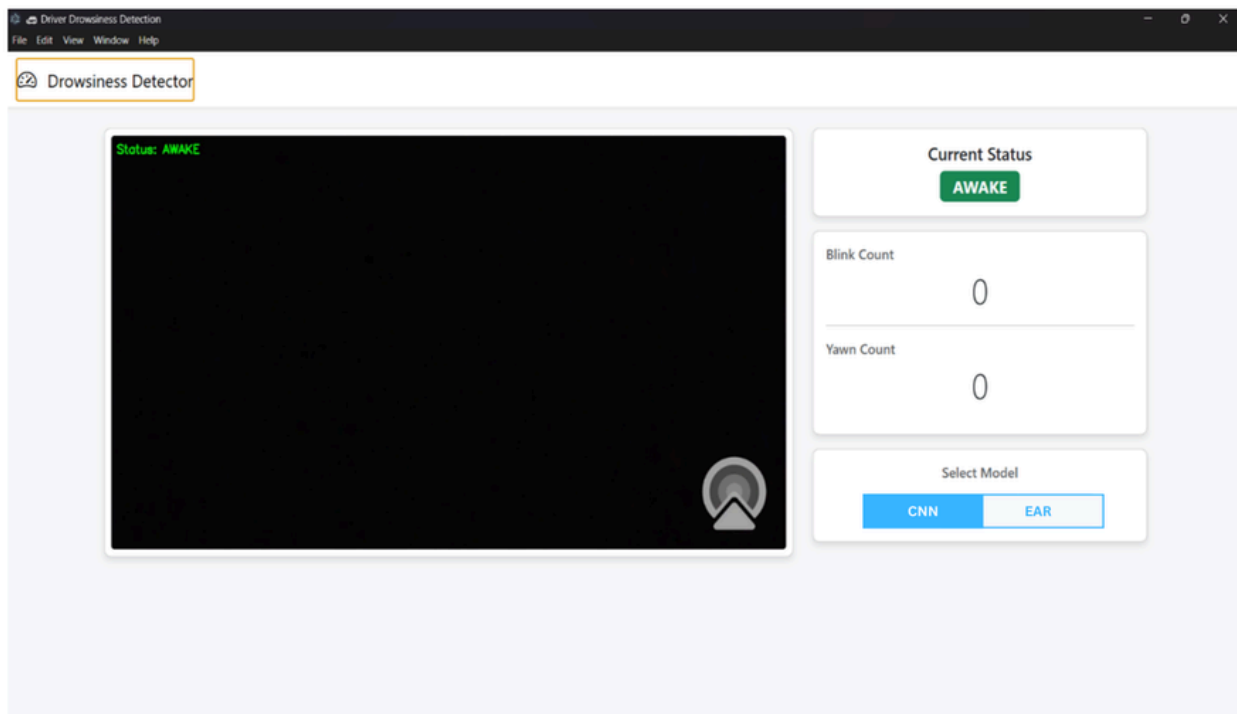
STUDY OF EXISTING SYSTEMS

A review of existing driver drowsiness detection systems reveals challenges in real-time accuracy and user comfort.**AutoWake** addresses these gaps by providing a reliable, non-intrusive solution with real-time detection and audio alerts, effectively reducing fatigue-related accidents.

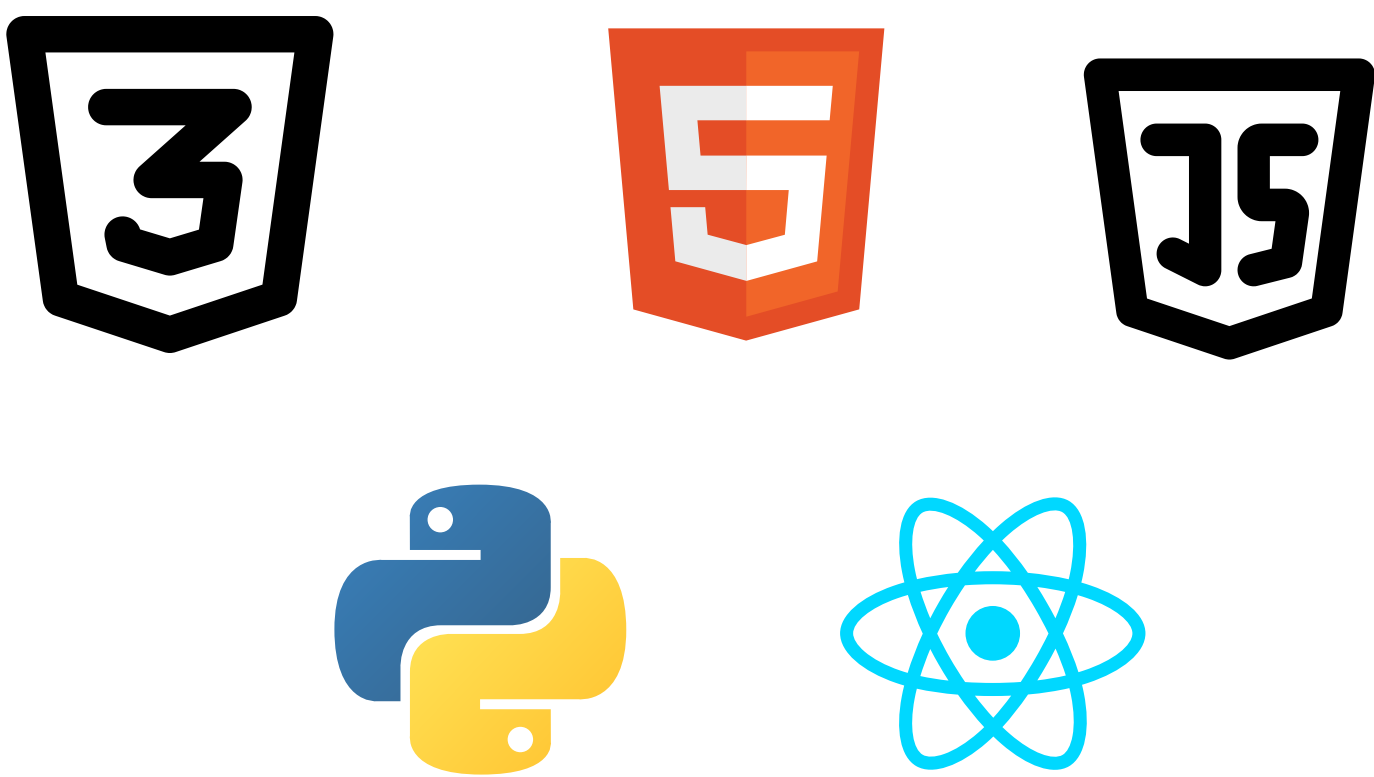
Platform	Problem Addressed	Advantages	Disadvantages
Eye-Tracking-Based Detection Systems	Monitors eye movements and blinks to detect drowsiness.	Non-intrusive, can provide early warnings.	May struggle in low-light or with glasses.
Wearable Drowsiness Detection Devices	Uses smart headbands or glasses to track brain activity and fatigue levels.	Directly measures brain signals, providing high accuracy.	Expensive, uncomfortable for long-term use.
Steering Behaviour Monitoring Systems	Analyses erratic steering patterns as an indicator of drowsiness.	Non-intrusive, does not require additional hardware.	May not detect early signs of drowsiness, only reacts to later fatigue.
Smartphone-Based Detection Apps	Uses phone cameras and sensors to analyze facial features and head movements.	Easily accessible, does not require specialized hardware.	Relies on phone placement, accuracy depends on lighting and camera quality.

RESULTS

The **AutoWake** Drowsiness Detection System has been successfully developed, utilizing advanced deep learning models and computer vision to monitor driver facial features and eye movements for signs of fatigue. The system is designed to provide immediate audio alerts when drowsiness is detected, helping to maintain driver alertness and reduce the risk of accidents. While the system performs well under standard conditions, it has the potential for future enhancements to optimize its performance in low-light environments or with facial obstructions. This system serves as a crucial step toward ensuring road safety by proactively addressing driver fatigue.

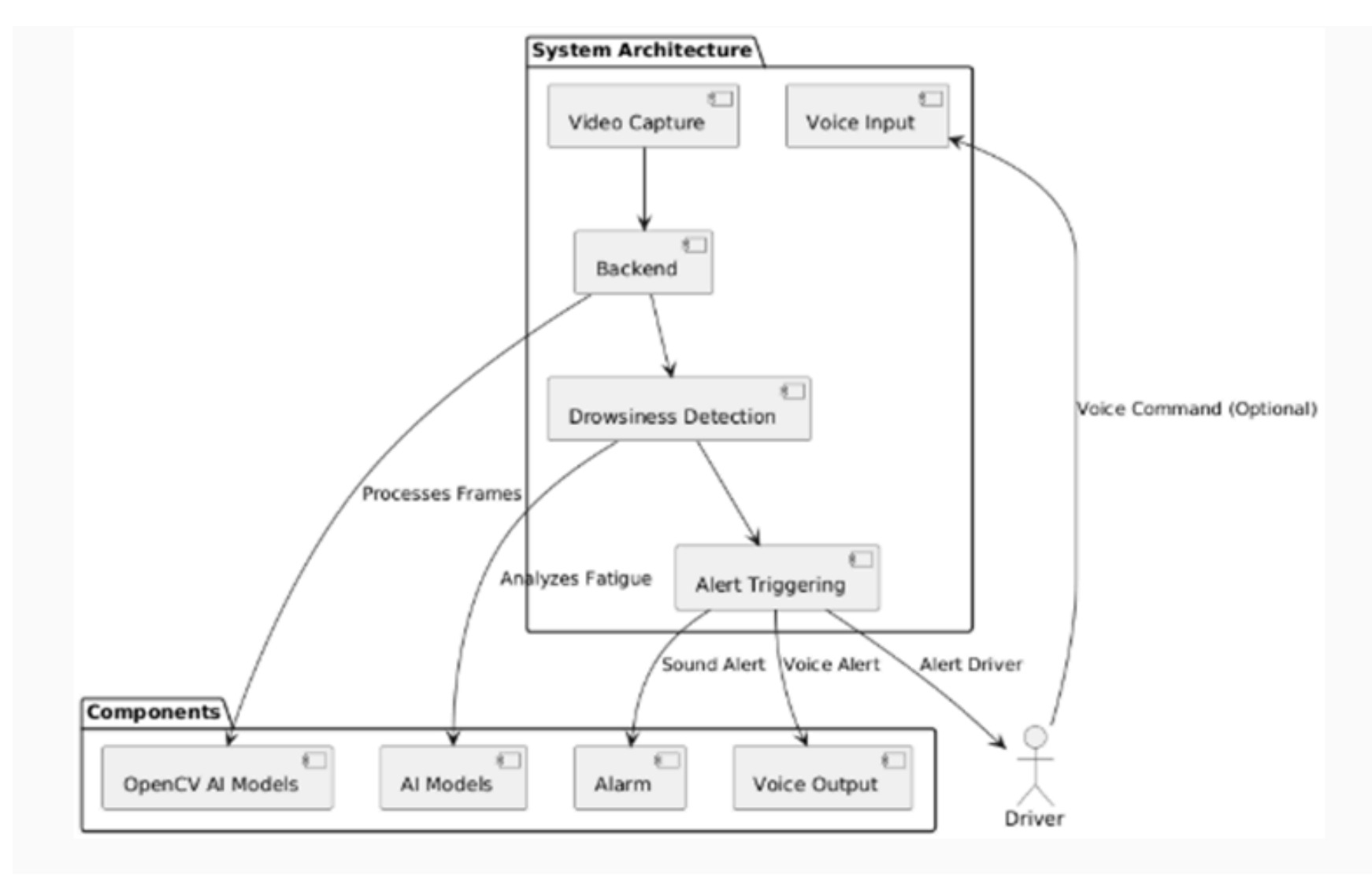


Landing Page



Technology Stack

RESULTS



LIMITATIONS

- **Lighting Sensitivity:** Poor performance in low-light conditions affects camera-based detection accuracy..
- **Obstruction Issues:** Sunglasses, masks, or hair covering the face may hinder accurate facial recognition.
- **Hardware Dependence:** Real-time processing demands high-performance systems; low-end devices may cause delays.
- **Behavioral Variance:** Natural driver behavior (e.g., frequent blinking or looking around) can trigger false alerts.

OBJECTIVES

- **Real-Time Detection:** Instantly detect driver drowsiness.
- **Accident Prevention:** Alert drivers before fatigue leads to accidents.
- **Accurate Technology:** Ensure reliable and precise fatigue detection.
- **Behavioral Analysis:** Monitor eye movement, head position, and reaction time.
- **Safer Roads:** Minimize fatigue-related accidents.

CONCLUSIONS

AutoWake is an AI-powered, real-time driver drowsiness detection system that leverages deep learning and computer vision to monitor facial features and eye movements. When signs of fatigue are detected, it issues immediate voice alerts to help the driver stay attentive and avoid potential accidents. Though effective, **AutoWake** faces some limitations, such as reduced accuracy in low-light conditions or with facial obstructions. Future enhancements like infrared cameras and optimized detection models can help address these gaps. Overall, **AutoWake** is a practical and scalable solution to improve road safety by reducing fatigue-related incidents.

REFERENCES

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