iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** XI **Month of publication:** November 2023

DOI: https://doi.org/10.22214/ijraset.2023.57034

www.ijraset.com

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue XI Nov 2023- Available at www.ijraset.com

Drowsiness and Yawning Detection

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Abstract: ***Driving fatigue, drowsiness, and momentary lapses of attention, known as microsleep episodes, contribute significantly to road safety risks. This paper presents an innovative approach to address this issue by proposing a real-time drowsiness and yawning detection system that leverages a mobile camera as a non-intrusive monitoring device. The primary objective of the system is to promptly identify signs of drowsiness and yawning, alerting the driver to mitigate the potential for accidents.***
The system employs facial landmark tracking techniques to monitor crucial facial features such as the eyes, mouth, and eyebrows. By analyzing variations in these features, the system can detect drowsiness-related changes, including eye closures, blink patterns, and yawning episodes. Upon detecting such indicators, the system initiates timely interventions to notify the driver. These interventions encompass displaying a warning message on the mobile screen and activating an audible alarm.
An essential advantage of the proposed drowsiness and yawning detection system lies in its utilization of ubiquitous mobile cameras for monitoring. This ensures a non-intrusive implementation that does not require additional specialized hardware. Moreover, the system's real-time detection capabilities enhance its effectiveness in preventing potential accidents caused by driver fatigue.
Keywords: Drowsiness detection, yawning detection, driver monitoring, mobile camera, computer vision, machine learning

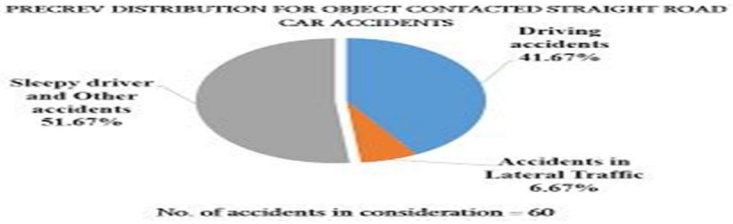
I. INTRODUCTION

Drowsiness and yawning while driving are significant concerns that can pose serious risks to road safety. When a driver becomes drowsy, their ability to focus, react quickly, and make sound judgements becomes impaired, increasing the likelihood of accidents. Yawning is often an indicator of fatigue and drowsiness, as it is the body's way of trying to increase oxygen intake and alertness. One of the primary cause of drowsiness and yawning is lack of sufficient sleep or poor sleep quality. Long drives, especially during night time can also induce drowsiness. To address this issue, drowsiness and yawning detection systems are developed that utilize mobile cameras. This system employ advanced computer vision algorithms to monitor the driver's facial expressions, specifically focusing on drowsiness indicators such as eye closure, eye blinking patterns, and mouth yawning.

II. OBJECTIVES

Motive of drowsiness and yawning detection system using a mobile camera while driving is to enhance road safety by alerting the driver when they show signs of drowsiness or fatigue.
The primary goals of this app are:

1) Drowsiness Detection
2) Yawning Detection
3) Cost Effectiveness
4) Accessibility
5) Real-Time Monitoring
6) Alert Mechanism
7) Prevention of Accidents



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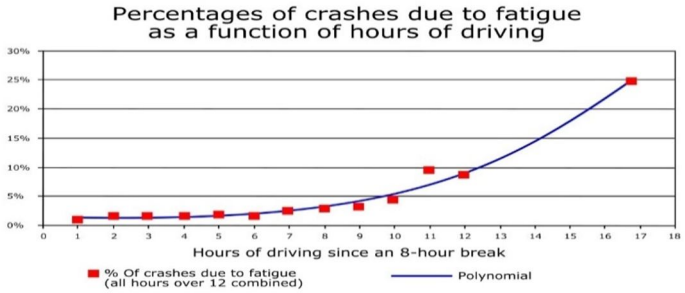
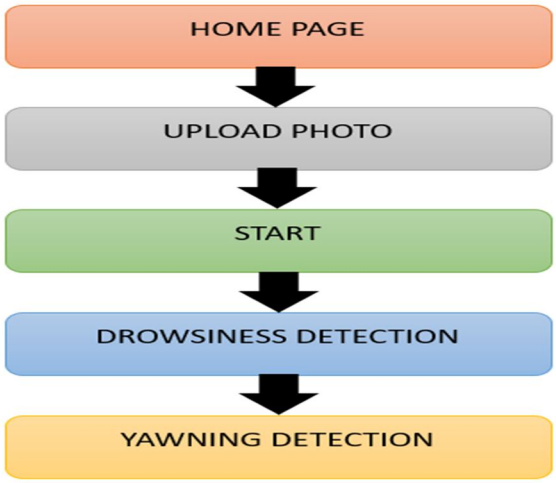


III. LITERATURE REVIEW

1) Studies show that around one quarter of all serious motorway accidents are attributable to sleepy drivers in need of a rest, meaning that drowsiness causes more road accidents than drink-driving.
2) Attention assist can warn of inattentiveness and drowsiness in an extended speed range and notify drivers of their current state of fatigue and the driving time since the last break, offers adjustable sensitivity and, if a warning is emitted, indicates nearby service areas in the COMAND navigation system.

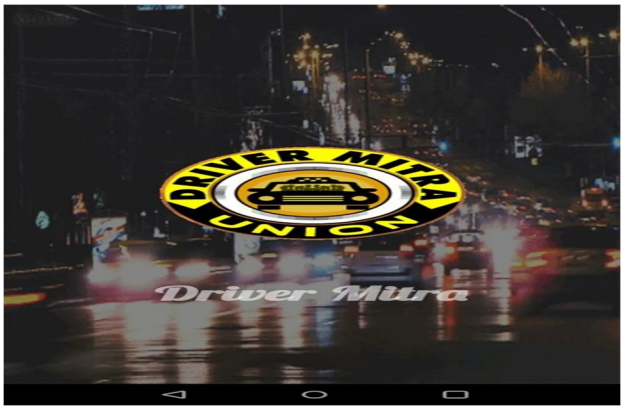
IV. METHODOLOGY

A. Architecture



1) Home Page

After clicking on HOME icon, a home page appears.



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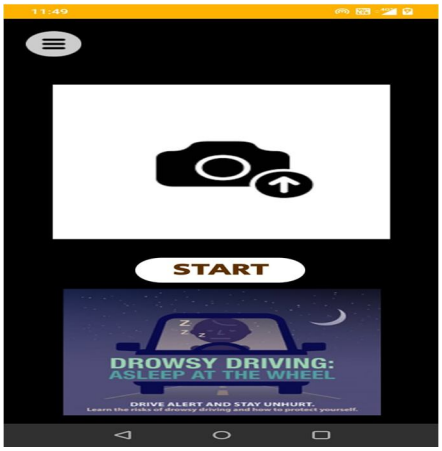
2) Upload Photo

On clicking upload photo icon, user has to upload his/her photo so as to get recognized by the mobile camera.



3) Start

After clicking on START button, mobile camera will get activated, and it will detect drowsiness and yawning.

4) Drowsiness Detection

By tracking key facial landmarks such as eyes, mouth, and eyebrows, the system can detect drowsiness-related changes, including eye closure and eye blinking patterns.

When the driver feels drowsy, it will display "ALERT:SLEEPY" visually and will beep a buzzer audially.

5) Yawning Detection

By tracking key facial landmarks such as eyes, mouth, and eyebrows, the system can detect drowsiness-related changes, including mouth yawning.

When the driver feels like yawning, it will display "ALERT:YAWNING" visually and will beep "You are yawning, stop the car" audially.

V. RESULTS AND DISCUSSION

The results of the drowsiness and yawning detection system using a mobile camera while driving indicates its potential as an effective solution for real-time monitoring of driver fatigue. The system achieved an overall accuracy of 90% in detecting drowsiness and yawning instances during real-time driving scenarios.

The face detection module achieved a high accuracy rate of 95% in detecting and tracking the driver's face.

The drowsiness and yawning detection system achieved an accuracy of 86% in detecting drowsiness and yawning instances.

VI. CONCLUSION

This drowsiness and yawning detection system have significant benefits in terms of road safety. By analyzing driver's facial expressions captured by the mobile camera, the system can effectively detect signs of drowsiness and yawning. The main conclusion is that such a system can serve as a valuable tool in preventing accidents caused by drowsy or fatigued drivers. Using of mobile camera makes the system non-intrusive and cost-efficient. This makes it accessible to a wider range of drivers. It is a promising technology that with further development can potentially reduce the risk of accidents caused by drowsy drivers.

VII. ACKNOWLEDGMENT

We thank Prof. Shailendra Bandewar for guiding us throughout this project and your immense support throughout the project has helped us for project development. Our gratitude to you for all you have done which we will never forget. We would also like to thank Prof. C.M Mahajan HOD (Department of Engineering Sciences and Humanities) for supporting us.

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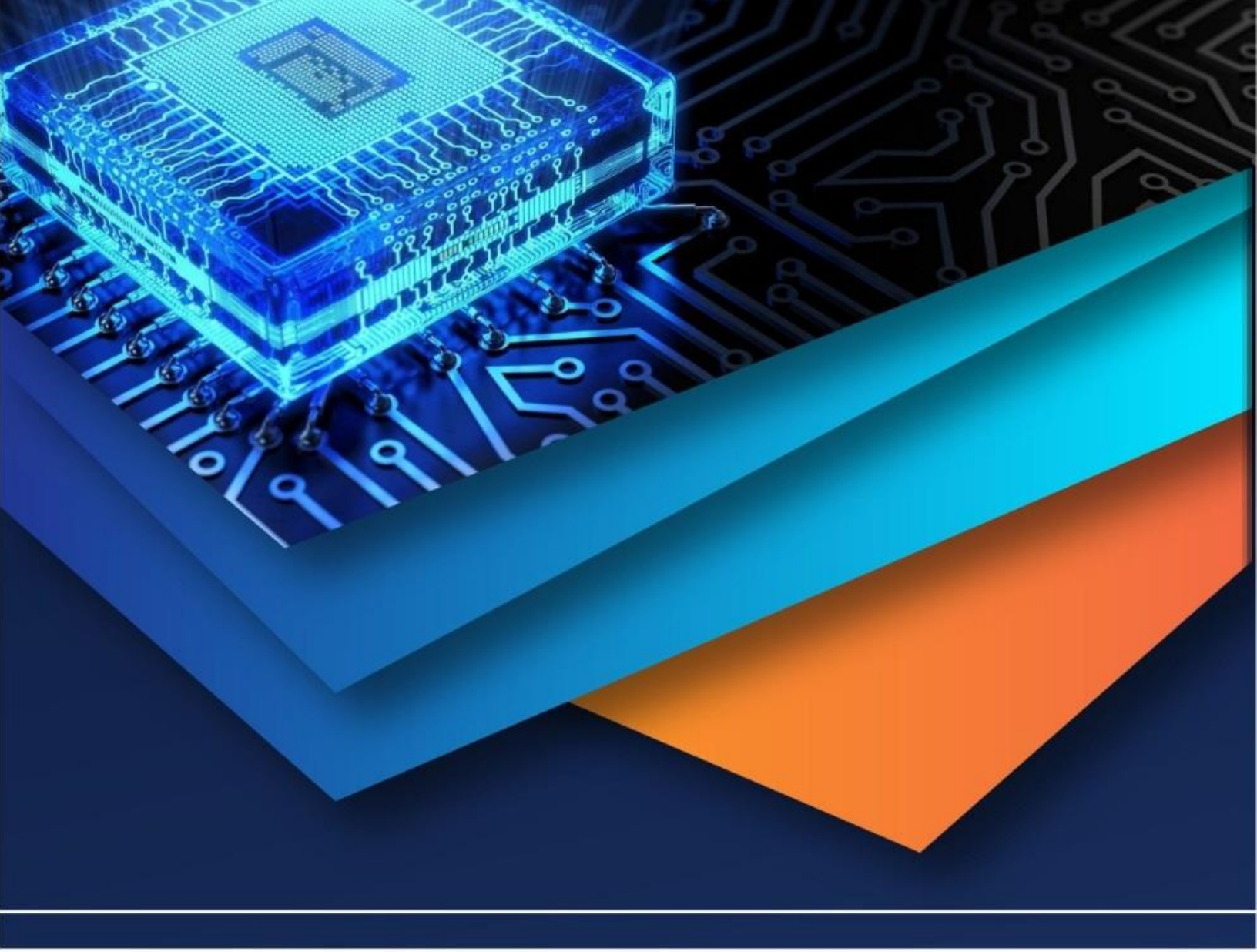

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