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Go To Drowsy and Yawing Driver Alert System

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Abstract: Driver drowsiness is a major contributor to road accidents worldwide. Fatigue and lack of sleep are common issues among drivers, often resulting in decreased alertness and increased risk of collisions. One effective way to prevent such accidents is by detecting and alerting drivers about their drowsiness in advance. Various methods exist for identifying signs of drowsiness.

In this study, we propose a deep learning-based solution for detecting driver fatigue. Our approach leverages transfer learning using MobileNet, a lightweight convolutional neural network architecture. We utilized a dataset focused on the eye region to accurately identify signs of drowsiness.

I. INTRODUCTION

Falling asleep while driving poses a significant safety risk. According to the United States Department of Transportation, male drivers are about twice as likely as female drivers to report dozing off during driving. Operating a vehicle without adequate rest, often referred to as drowsy or fatigued driving, results in mental impairment.

This greatly heightens the likelihood of accidents, as sleep deprivation affects the brain in ways similar to alcohol. In the United States, nearly 23 percent of adults admit to falling asleep at the wheel, while around 54 percent say they drive while drowsy at least once yearly.

II. LITERATURE SURVEY

1) S. Kaplan, M. A. Guvensan, A. G. Yavuz, and Y.Karalurt This study presents an in-depth review of research on driver behavior, with a strong focus on enhancing road safety. It investigates a range of factors that influence driving habits, including environmental conditions, psychological states, and physiological responses.
2) A. Guettas, S. Ayad, and O. Kazar The authors provide an overview of the current advancements in driver monitoring technologies, particularly those designed to detect signs of fatigue, distraction, and cognitive decline. Their work highlights the growing impact of big data analytics and Internet of Things (IoT) technologies in enabling responsive, real-time driver assessment systems.
3) M.Simon et al. This research explores the application of EEG-based alpha spindle activity as a tool for identifying driver fatigue under actual driving scenarios. The study confirms that neurophysiological markers offer a reliable method for detecting fatigue in real-time settings.

III. EXISTING SYSTEM

This model is based on a previously developed approach that utilizes certain machine learning algorithms. However, the performance of the detection process was not optimal, as the algorithms used did not achieve the desired level of accuracy.

IV. PROPOSED SYSTEM

We focus on detecting driver drowsiness using a deep learning model in the proposed approach. Specifically, we employ a CNN-based transfer learning technique with MobileNet to train the dataset. Once the training phase is complete, the OpenCV library is used to handle real-time video input. The system captures a live video stream from the camera, processes each frame, and feeds it into the model to determine the driver's state. The eyes are analyzed frame by frame to assess whether they are open or closed. If the eyes remain closed for a duration exceeding a predefined threshold, the system interprets this as drowsiness and triggers an alert by activating a siren to warn both the driver and passengers.

V. MODULES

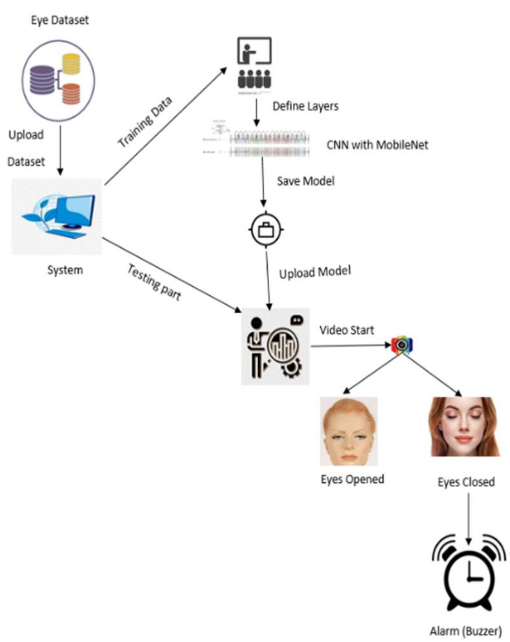
A. System Functionality

1) Dataset Storage: The system is designed to store the dataset provided by the user for further processing.
2) Model Training: This phase involves training a machine learning model to perform accurate classification or prediction tasks. The dataset is preprocessed and divided into training, validation, and testing subsets. The chosen algorithm learns patterns from the training data by adjusting its internal parameters to reduce prediction errors, commonly using optimization techniques such as gradient descent.
3) Making Predictions: Once trained, the system uses the model to analyze new input data from the user and generates predictions based on that input.

B. User Interaction

1) Real-Time Prediction: Upon activation, the system accesses the camera to capture live video. It then evaluates facial features, specifically eye and mouth movements, to provide real-time feedback on drowsiness and yawning levels.

VI. SYSTEM ARCHITECTURE



VII. DATA FLOW

1) Data Acquisition: Physiological signals are collected using wearable sensors, which then transmit the gathered data to a mobile application.
2) Data Transmission: The mobile app forwards the acquired data to a backend server for further analysis.
3) Data Processing: On the backend, the data undergoes cleaning and preprocessing. Relevant features are extracted to prepare it for model training.
4) Model Training: Deep learning models are trained using the processed data. Performance metrics are used to evaluate and select the most effective model.
5) Real-Time Prediction: The trained model continuously monitors live data from the wearable sensors to assess and classify stress levels in real time.
6) User Interaction: The mobile application notifies users about their current stress levels, helping them take timely actions to manage their well-being.

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VIII. RESULT AND ANALYSIS

The drowsy and yawning driver alert system accurately detects signs of fatigue by monitoring eye closure and mouth opening. It utilizes facial landmarks and head pose estimation to ensure reliable alerts. The system performs effectively in real-time and can help prevent accidents caused by driver drowsiness.

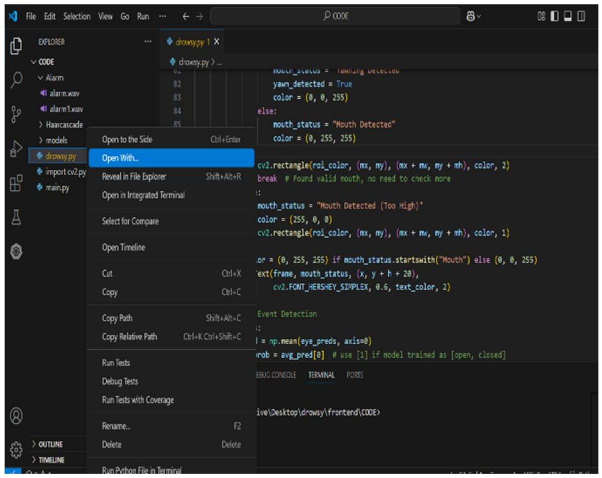

Fig 1: Open the file

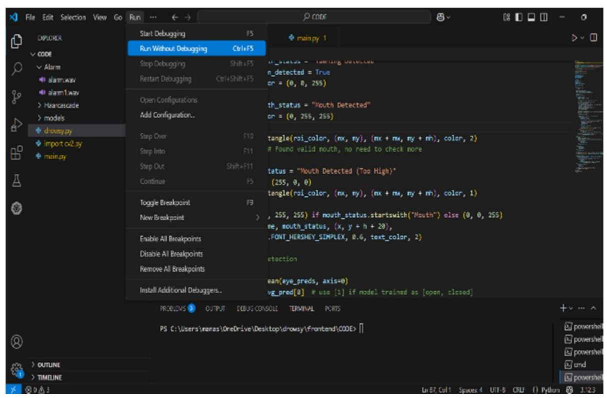

Fig 2: Run the code

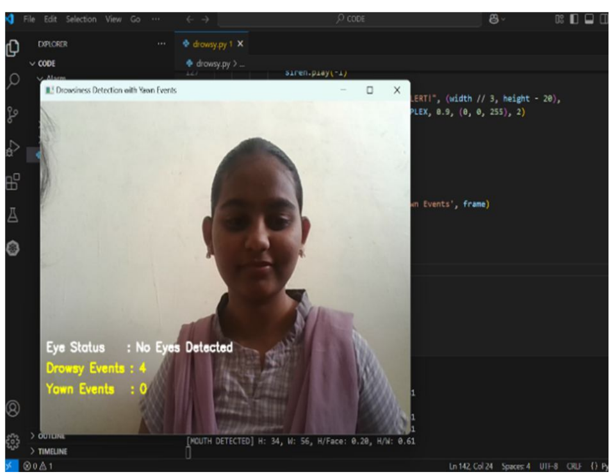

Fig 3: Drowsiness Detection Interface

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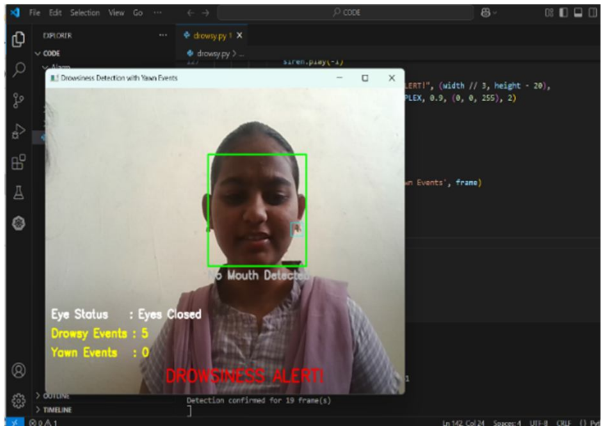

Fig 4: Drowsiness Alert with Eye

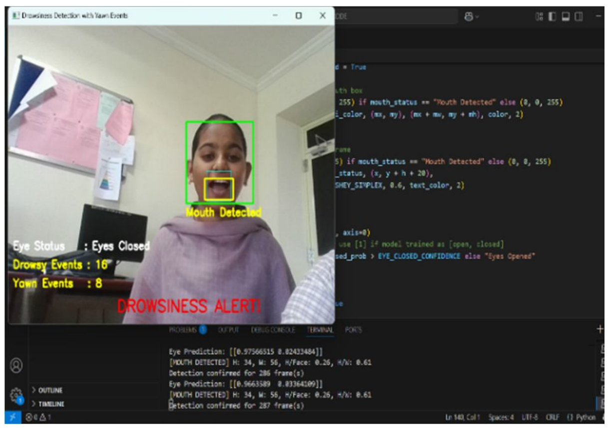

Fig 5: yawning alert with mouth

IX. CONCLUSION

The Connectivity-Aware Graph Neural Network (CAGNN) provides a powerful and efficient method for detecting driver drowsiness in real time. It combines Graph Neural Networks (GNNs), Gated Recurrent Units (GRUs), and Random Forest classifiers to effectively learn both spatial and temporal features from the data. Its ability to adapt well to real-world driving conditions and maintain strong performance makes it a promising tool for enhancing road safety and minimizing fatigue-related incidents.

X. FUTURE SCOPE

In the future, the CAGNN framework could be further developed by incorporating additional data inputs, such as wearable and physiological sensors, to gain a more comprehensive understanding of driver fatigue. Utilizing edge computing would help reduce response time, enhancing the system's responsiveness. Additionally, integrating real-time feedback mechanisms and expanding multi-modal sensing capabilities, such as infrared imaging and vehicle telemetry, could strengthen the system's reliability across varied driving environments.

REFERENCES

[1] G. Sikander and S. Anwar, “A review of driver fatigue detection systems,” IEEE Trans. Intell. https://ieeexplore.ieee.org/document/8460900

[2] M. S. Clayton, N. Yeung, and R. Cohen Kadosh, “The role of cortical oscillations in sustained attention,” Trends Cognit. Sci., vol. 19, no. 4, pp. 188–195, Apr. 2015. https://www.sciencedirect.com/science/article/pii/S1364661315000285

[3] L. De Gennaro and M. Ferrara, “An overview of sleep spindles,” Sleep Med. Rev., vol. 7, no. 5,pp.423–440,Oct.2003. https://www.sciencedirect.com/science/article/pii/S1087079202902522

[4] G. Borghini, L. Astolfi, G. Vecchiato, D. Mattia, and F. Babiloni, “Neurophysiological measurements of pilots and drivers to assess mental workload, fatigue, and drowsiness,” Neurosci. Biobehavioral Rev., vol. 44, pp. 58–75, Jul. 2014. https://www.sciencedirect.com/science/article/pii/S0149763412001704

[5] T. Åkerstedt, G. Kecklund, and A. Knutsson, “Manifestations of sleepiness and EEG spectral content during shift work,” Sleep, vol. 14, no. 3, pp. 221–225, May 1991. https://pubmed.ncbi.nlm.nih.gov/1896723/

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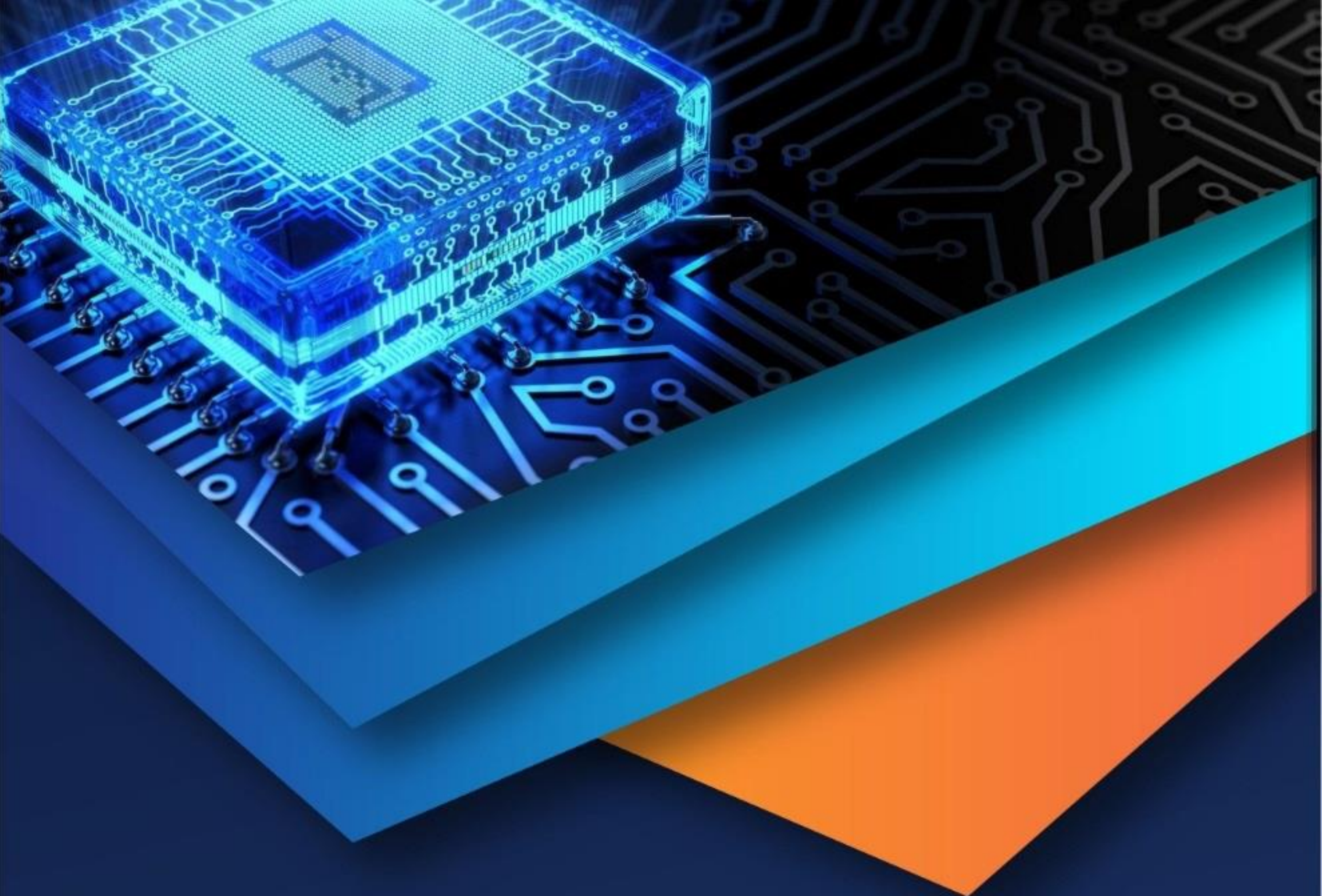

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