Abstract

Driver drowsiness is a significant factor contributing to road accidents, resulting in severe injuries and fatalities. To mitigate this risk, this project presents a Driver Drowsiness Detection system utilizing computer vision and machine learning techniques. The system is designed to monitor the driver's eyes and facial expressions in real-time through a webcam. By analyzing blink patterns, eye closure duration, and other facial cues, the system can accurately detect signs of drowsiness.

The core components of the system include image acquisition, facial feature detection, feature extraction, and drowsiness classification. OpenCV is used for real-time image processing and eye detection, while Dlib facilitates facial landmark detection. The system employs a machine learning algorithm to classify the driver's state as either drowsy or alert based on the extracted features. If drowsiness is detected, an auditory alert is triggered to wake the driver.

The implementation of this system involves creating a comprehensive project environment with Python, necessary libraries, and Visual Studio Code for development. Testing is conducted using a set of pre-defined test cases to ensure accuracy and reliability. The system's performance is evaluated in various lighting conditions and angles to simulate real-world driving scenarios.

This Driver Drowsiness Detection system aims to enhance road safety by providing an automated solution to monitor driver alertness, thus preventing accidents caused by drowsy driving.

Acknowledgement

It is our proud privilege and duty to acknowledge the kind help and guidance received from several persons in preparation of this Mini Project Work Report. It would not have been possible to prepare this report in this form without their valuable help, cooperation and guidance.

We express our sincere gratitude to our beloved guide **Mr. Abhinandan Mangaonkar,** Assistant Professor in the Dept. of Computer Science and Engineering S.G.B.I.T., Belagavi for guiding us in investigations for this project. Our numerous discussions with him/her were extremely helpful. We hold him/her in esteem for guidance, encouragement and inspiration received from him/her.

Our sincere thanks are also due to **Dr. B. S. Halakarnimath**, Head, Department of Computer Science and Engineering in SGBIT, Belagavi for the valuable suggestions and guidance through the period of preparation of this report.

We wish to record our sincere gratitude to our beloved principal, **Dr. B. R. Patagundi**, S. G. Balekundri Institute of Technology, Belagavi for his constant support and for making available library and laboratory facilities needed to prepare this report.

We are also indebted to **Management of S. G. Balekundri Institute of Technology** for providing an environment which helped us in completing the project.

Also, we thank all the teaching and non-teaching staff of Department of Computer Science & Engineering for the help rendered.

Finally, we would like to thank my parents and friends whose encouragement and support was invaluable.

Belagavi   **Ms. Annapurna Lingadalli**   **2BU21CS018**

Date: **Ms. Anuli Malalikar**   **2BU21CS019**

                                                Ms. Shreya Itnal   **2BU21CS136**

                                                Ms. Tanvi Manish Kolhapuri   **2BU21CS168**

Table of Contents

List of Figures

List of Abbreviations

- **Cv2:** OpenCV
- **Dlib**: A modern C++ toolkit containing machine learning algorithms and tools for creating complex software in C++ to solve real-world problems.
- **CNN** - Convolutional Neural Network
- **ML** - Machine Learning
- **HCI**: Human-Computer Interaction
- **ML**: Machine Learning
- **NB**: Naive Bayes
- **CSV**: Comma-Separated Values
- **DFD:** Data Flow Diagram
- **OCR**: Optical Character Recognition
- **PERCLOS**: Percentage of Eyelid Closure Over Time
- **SVM**: Support Vector Machine
- **VS Code**: Visual Studio Code
- **XML**: Extensible Markup Language