Real-Time Drowsiness Detection System using Computer Vision and Deep Learning

Name:C B Sumanth **Internship:CloudyML**

List of content section headings: Drowsiness Detection System

1. Introduction
2. Project Overview
3. System Components
    - Haar Cascades
    - Deep Learning Model
    - Visual and Audible Alerts
4. Implementation Details
5. Results and Evaluation
6. Conclusion
7. References
8. Appendix

1. Introduction:

Brief overview of the project's objective: To develop a system capable of detecting drowsiness in real-time using computer vision and deep learning techniques.

2. Project Overview:

- Description of the problem statement: Drowsiness while driving can lead to accidents, necessitating the development of an automated system to detect and alert drivers in real-time.
- Overview of the solution approach: Utilizing Haar cascades for facial and eye detection, and a pre-trained deep learning model for eye state classification.

3. System Components:

- **Libaries used to generate a code:**
  - **Python**
  - **OpenCV**
  - **Pandas and Numpy**
  - **Keras and Tensorflow**
  - **Alarm Window**
- **Haar Cascades:**
  - Explanation of Haar cascades and their role in detecting faces and eyes.
- **Deep Learning Model:**
  - Description of the pre-trained model used for eye state classification.
- **Visual and Audible Alerts:**
  - Explanation of the alert mechanisms triggered upon detection of drowsiness.

4. Implementation Details:

- Detailed explanation of the provided Python code:
  - Initialization of Haar cascades and webcam.
  - Frame processing: conversion to grayscale, face and eye detection.
  - Eye state classification using the pre-trained model.
  - Triggering visual and audible alerts.

5. Results and Evaluation:

- Discussion of the system's performance in real-world scenarios.
- Evaluation metrics: accuracy of eye state classification, responsiveness of alert system.

6. Conclusion:

- Summary of achievements: Successful implementation of a real-time drowsiness detection system.
- Potential applications: Deployment in driver assistance systems, workplace safety monitoring, etc.
- Future enhancements: Integration of additional features (e.g., head pose estimation) for improved accuracy.

7. References:

- Citation of relevant literature, resources, and libraries used in the project.
- I take the youtube code reference about the Drowsiness Detection System.
- **Youtube Link**: https://youtu.be/qwUIFKi4V48?si=34EbqkmMVqb9y-kj
- Through video I understand the opencv and how to generate a code.
- I took help of chat-GPT to add description to the code and Document preparation.

8. Appendix:

- Source code of the implemented solution link.
- Project code Link:C:\Drowsiness Detection System using CV and DL algo
- Instructions for setting up and running the system.

Summary: This document outlines the development of a real-time drowsiness detection system using computer vision and deep learning techniques. By combining Haar cascades for facial and eye detection with a pre-trained deep learning model for eye state classification, the system provides effective monitoring and alerting capabilities. The integration of visual and audible alerts enhances its utility in various safety-critical applications.