IEEE MOVE INDIA

PRESENTS

MOVE-A-THON

A PROJECT ON

DRIVER-DROWSINESS DETECTION

TEAM NAME

"SERENE"

COMPUTER VISION

DOMAIN NAME

IDEA OVERVIEW

Drowsy driving is a major cause of traffic accidents. It is estimated that 100,000 crashes occur each year in the India due to drowsy driving, resulting in over 1,500 fatalities.A driver drowsiness detection app can help to prevent drowsy driving accidents by monitoring the driver's alertness level and providing warnings when the driver is at risk of falling asleep.A driver drowsiness detection app could be implemented as a mobile app or a standalone device. The app could be used on a smartphone, tablet, or other mobile device. The standalone device could be mounted on the dashboard or windshield of the vehicle.The CNN model is trained on a dataset of images of drivers in both drowsy and awake states. The model learns to identify the features that are most indicative of drowsiness, such as closed eyes or opened yes

Once the model is trained, it can be deployed in the vehicle to monitor the driver's alertness level. The model takes an image of the driver's face as input and classifies it as drowsy or awake. If the model detects that the driver is drowsy, it can provide a warning, such as an audible alarm or a visual cue.

MODEL ARCHITECTURE

The model we used is built with **Keras using Convolutional Neural Networks (CNN)**. A convolutional neural network is a special type of deep neural network which performs extremely well for image classification purposes. A CNN basically consists of an input layer, an output layer and a hidden layer which can have multiple layers. A convolution operation is performed on these layers using a filter that **performs 2D matrix** multiplication on the layer and filter.

The CNN model architecture consists of the following layers:

Convolutional layer; 32 nodes, kernel size 3
Convolutional layer; 32 nodes, kernel size 3
Convolutional layer; 64 nodes, kernel size 3
Fully connected layer; 128 nodes

TECHNOLOGY STACK

Libraries used for train and test the model

OpenCV –Face and eye detection

TensorFlow – Keras uses TensorFlow as backend

Keras-To build the classification model

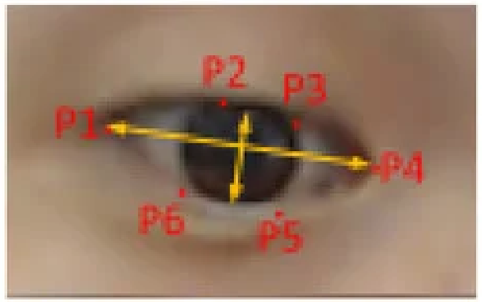
Software Used

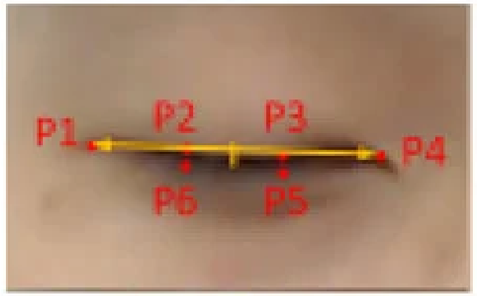
Visual studio Code

A Webcam

TECHNICAL OVERVIEW

- This program utilizes a pre-trained face detector and dizziness detection model to identify signs of dizziness in a driver. It serves as a driver dizziness detector.



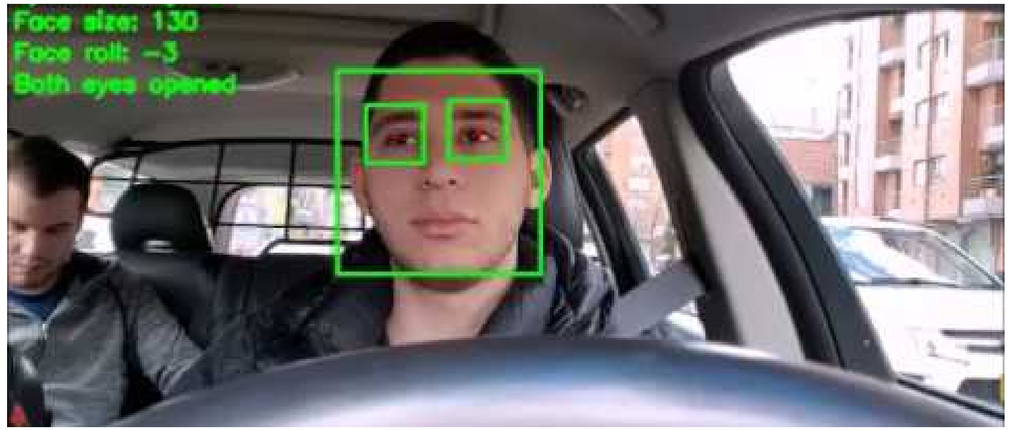


- The program starts by importing the necessary libraries such as os, numpy, cv2, and tensorflow.keras. It then defines a function called `detect_dizziness()` that contains the main logic of the program.

- Within the `detect_dizziness()` function, the program loads the pre-trained face detector and dizziness detection model. It then opens the video capture device and starts reading frames from it. For each frame, the program converts it to grayscale and detects faces in the grayscale frame using the face detector.

TECHNICAL OVERVIEW

- For each face detected, the program predicts dizziness using the dizziness detection model. If the driver is dizzy, the program prints a message and breaks out of the loop. If the driver is not dizzy, the program draws a rectangle around the face and continues to the next frame.

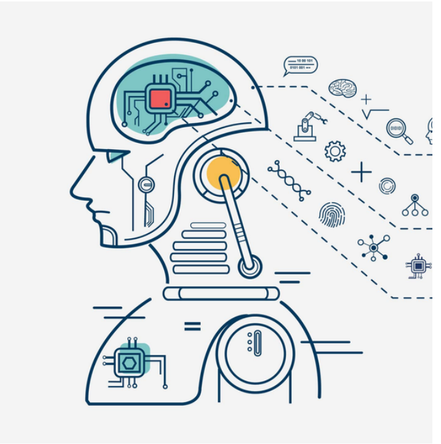


- The program displays the video feed with rectangles drawn around the detected faces and waits for a key press. If the user presses the 'q' key, the program releases the video capture device and closes all windows.

- Finally, the program prints whether the pre-trained dizziness detection model exists or not.

MARKET PROSPECTS

1. The market for driver dizziness monitoring systems is expected to grow significantly in the coming years due to a number of factors, including the increasing awareness of the dangers of driver fatigue, the growing adoption of advanced driver assistance systems (ADAS), and the increasing demand for safety features in vehicles.
2. There are some companies that are developing driver dizziness monitoring systems such as "Seeing Machines", "Smart Eye".These companies are developing a variety of different systems, including systems that use cameras, infrared sensors, and other sensors to monitor the driver's alertness.
3. The market for driver dizziness monitoring systems is still in its early stages of development, but it has the potential to become a major market in the coming years. As the technology continues to improve the cost of the systems will decrease and we will see more more vehicles equipped with driver dizziness monitoring systems.
4. We can even sell the camera module as a product which can be bought by cab companies to enchance their safety and experience even during long time works



EXECUTION

Data collection: A dataset of images of drivers in both drowsy and awake states is collected. This dataset can be collected using a camera mounted in the vehicle or by using a dataset of publicly available images.

Data preprocessing: The images in the dataset are preprocessed to ensure that they are consistent in size and format. This may involve resizing the images, converting them to grayscale, and normalizing the pixel values.

Model training: A deep learning model, such as a convolutional neural network (CNN), is trained on the preprocessed dataset. The model is trained to classify the images as either drowsy or awake.

Model deployment: The trained model is deployed in the vehicle. The model is used to monitor the driver's alertness level and provide warnings when the driver is drowsy.