Chapter-1:

TOOLS AND TECHNOLOGY USED

->PYTHON - Python is an interpreted, high-level, general-purpose programming language. Python's design philosophy emphasizes code readability with its notable use of significant whitespace. Its language constructs and object-oriented approach aim to help programmers write clear, logical code for small and large-scale projects. Python is dynamically typed AND supports multiple programming paradigms, including procedural, object-oriented, and functional programming.

Libraries

• opencv-OpenCV is the open-source library for the computer vision, machine learning, and now it plays a major role in real-time operation such as detection of face in real time.Computer vision is powering face application likes detection, verification, and recognition to a great extent.

• Scipy- we can compute the Euclidean distance between facial landmarks points in the eye aspect ratio calculation.

• Dlib -Dlib library is used for prediction of eye and mouth landmarks in real time video frameframe using svm +hog algorithm

Histogram of oriented gradients (HOG) is used for feature extraction in the human detection process, while linear support vector machines (SVM) are used for human classification.

• Imutils-imutils library is used for basic image processing functions such as resizing,displaying etc

Operating System • Windows

Hardware Requirements Specification

I. Laptop with basic hardware.

II. Webcam

Application:

This project can be used in every vehicle currently on road to ensure the safety and reduce the chances of an accident due to drowsiness or distraction of driver.

Chapter -2

Implementation

Facial Landmark Detection:

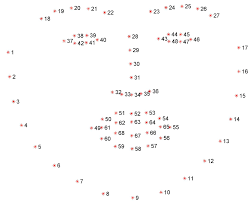
Face landmark detection is actually a two-step process:

First, we need to detect the face of the person in an image or frame.

The second step is to detect the landmarks for the faces detected in the first step.

Face key points or landmarks represent very specific and important features on a person’s face.

These features are mostly located around the eyes, lips, nose, and around the face in general.



Eye Aspect Ratio

Mouth Aspect Ratio

Results:

Test Cases and Test Result

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test ID | Test Condition | System Behaviour | Expected Result | Test Result |
| T-01 | Straight face with good light with glasses | Non-drowsy | Non-Drowsy | Pass |
| T-02 | Tilted face with dim light no glasses | Drowsy | Drowsy | Pass |
| T-03 | Tilted face with good light with glasses | Drowsy | Drowsy | Pass |

Note: Testing is performed Manually.