UNITED UNIVERSITY

Drowsiness Detection

preventing accidents through eye traching

Presented by :-
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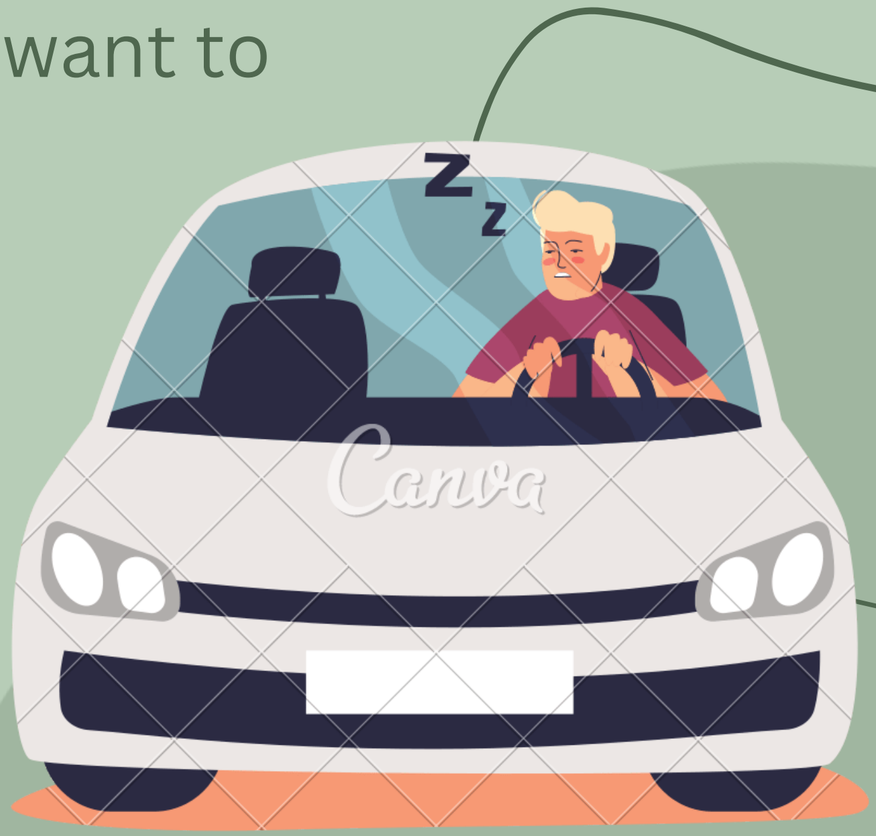
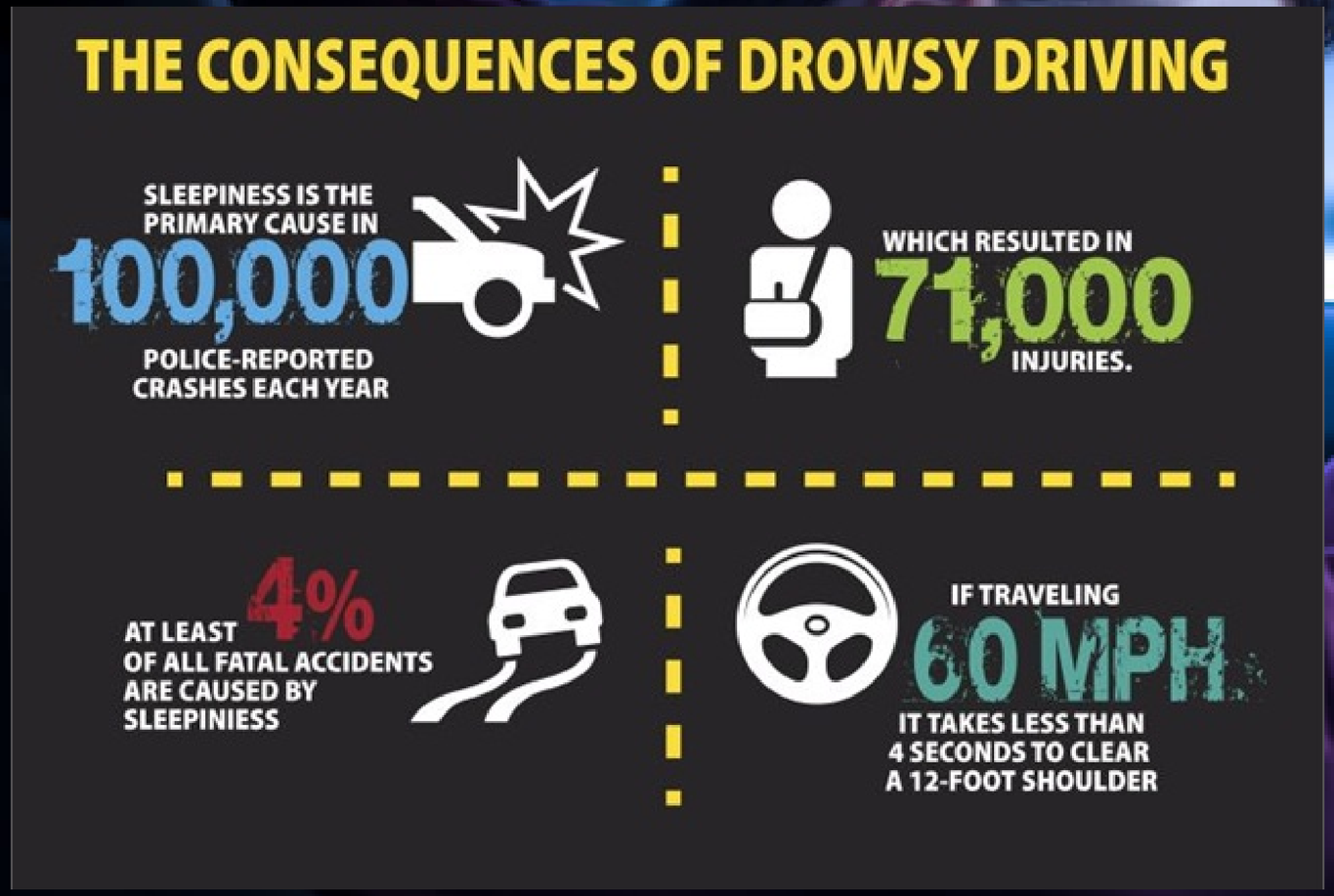
WHAT IS DROWSINESS?

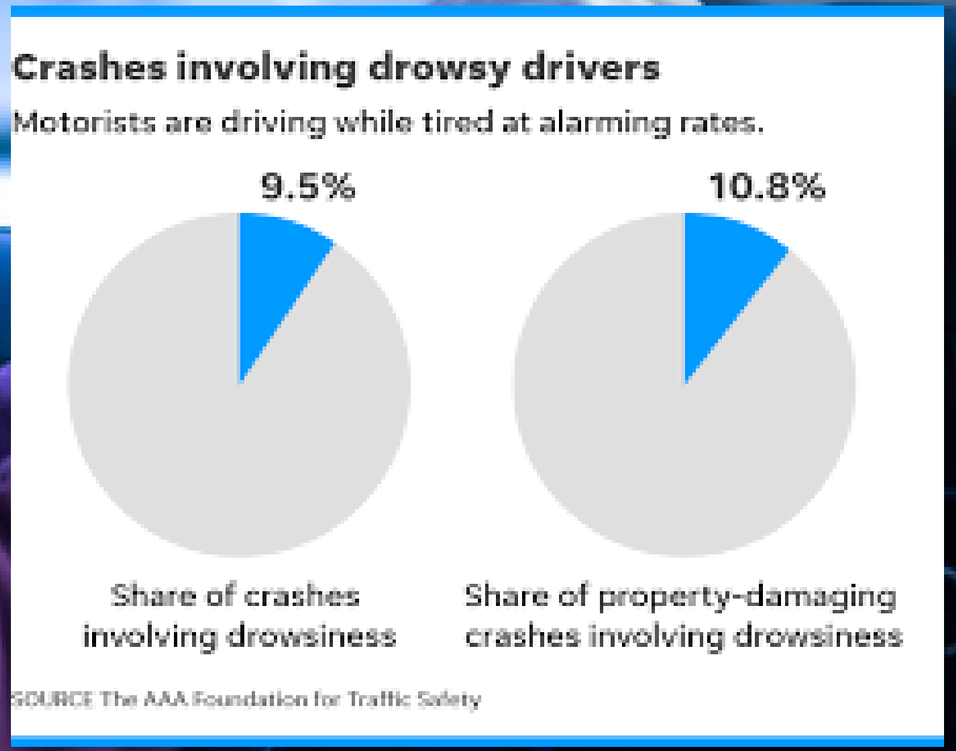
Drowsiness is a state of feeling more sleepy than normal during the day. People who are drowsy may:

1. Fall asleep when they do not want to
2. Yawn or blink frequently
3. Miss their exit
4. Drift from their lane



GRAPHICAL REPESENTATION OF ACCIDENTS & DATA





SOLUTION

INTRODUCTION....

- Drowsiness detection is a critical aspect of ensuring road safety, particularly for drivers. It's well-established that drowsy driving can lead to accidents, injuries, and fatalities.

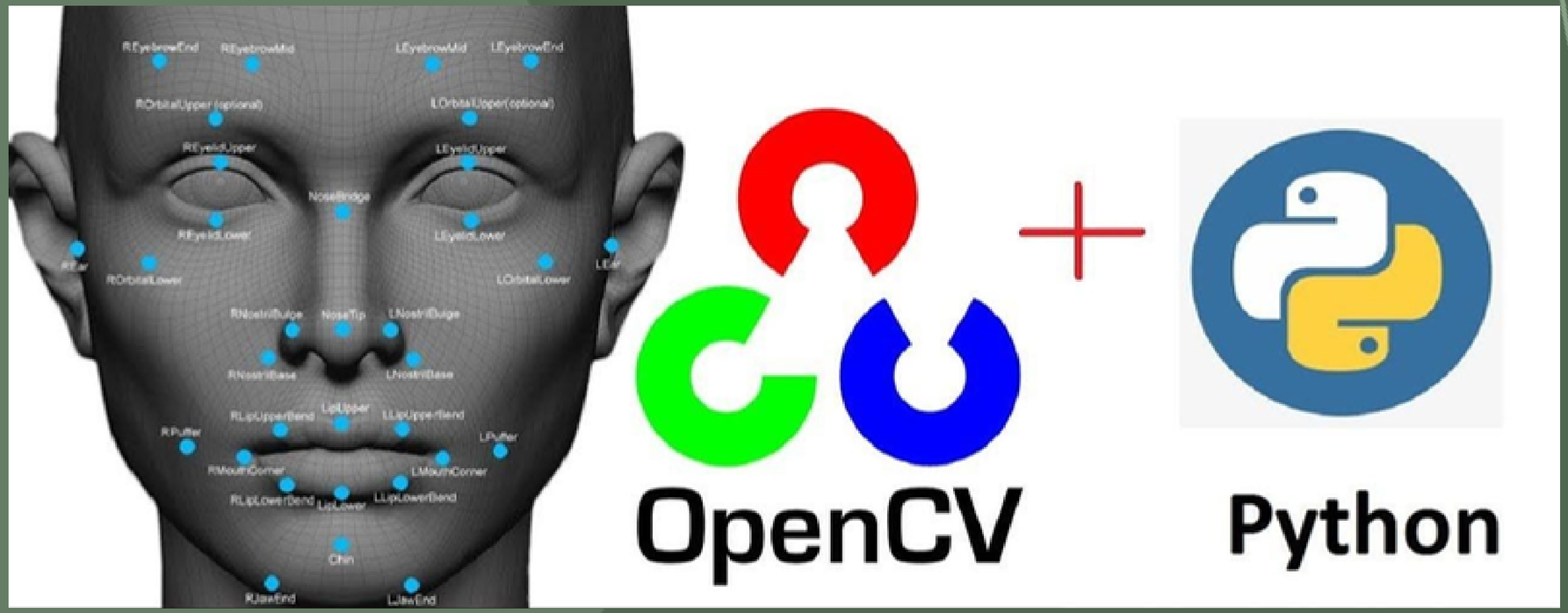
TOOLS AND LIBRARIES....

Why these tools are suitable for drowsiness detection
These are the libraries used in drowsiness detection :-

1. opencv-python
2. pyttsx3
3. dlib
4. numpy
5. scipy

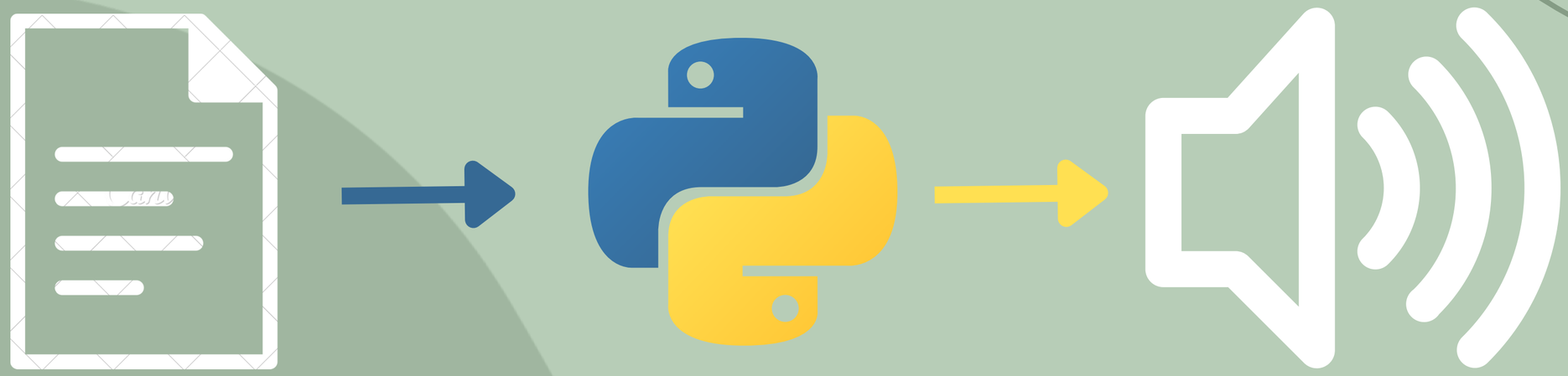
OpenCV Library....

- **OpenCV is a Python library that allows you to perform image processing and computer vision tasks.**



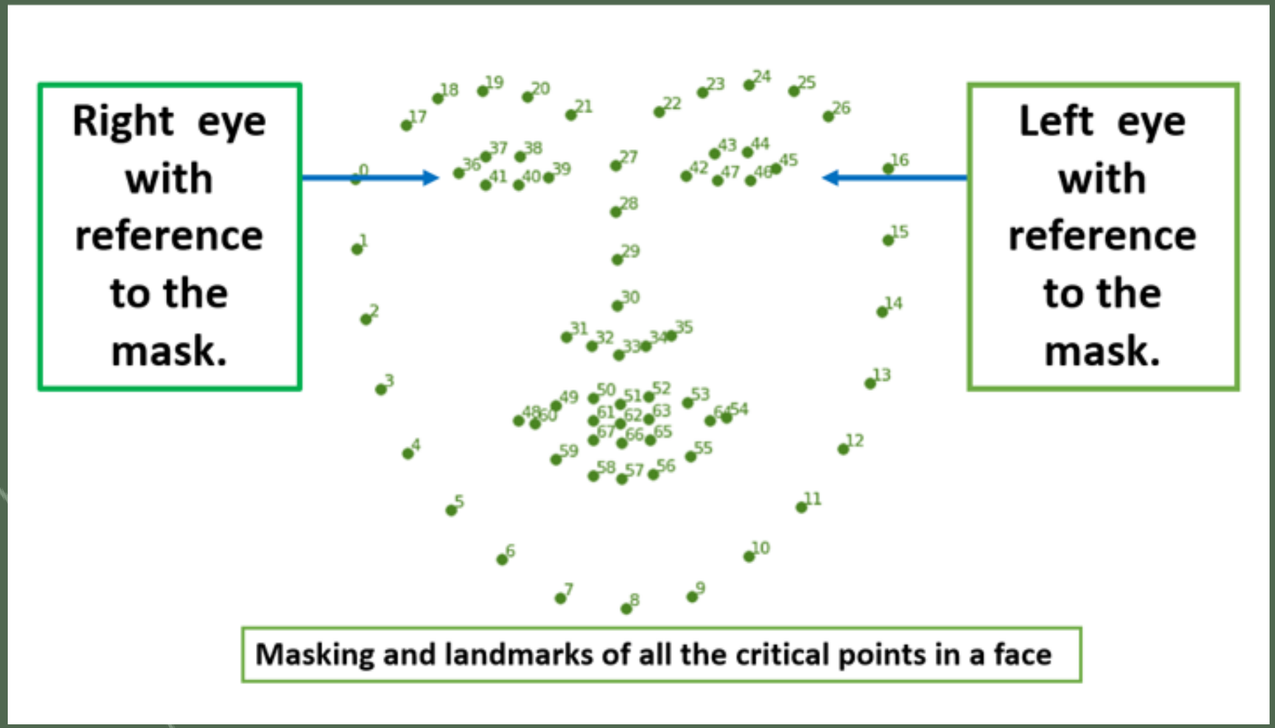
pyttsx3 Library....

- **Pyttsx3 is a Python library that allows developers to create text to speech (TTS) applications in a simple and easy manner. It is a cross-platform library that supports various operating systems, including Windows, Linux, and macOS.**



dlib Library....

- **Dlib is a modern C++ toolkit containing machine learning algorithms and tools for creating complex software in C++ to solve real world problems.**

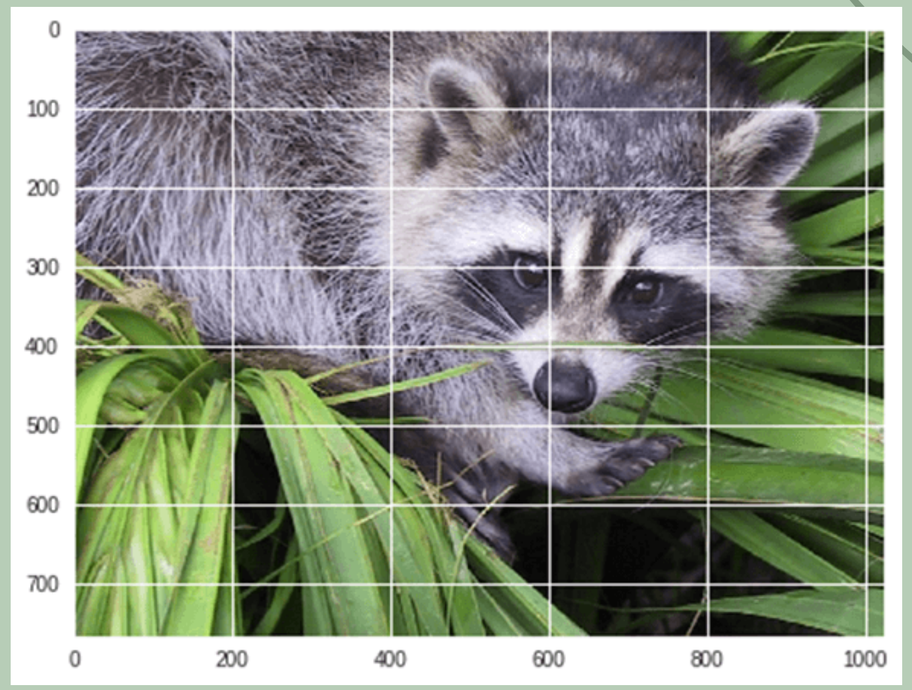


NumPy Library....

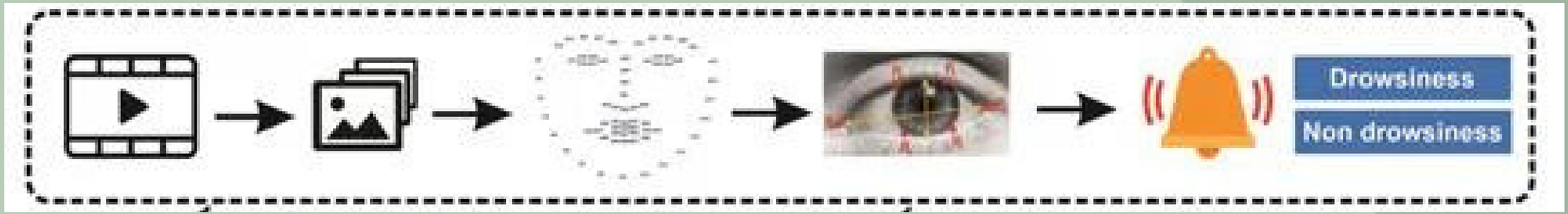
- **NumPy use for working with arrays are optimized for complex mathematical and statistical operations. They are faster than Python lists and can be used to perform calculations on large datasets.**

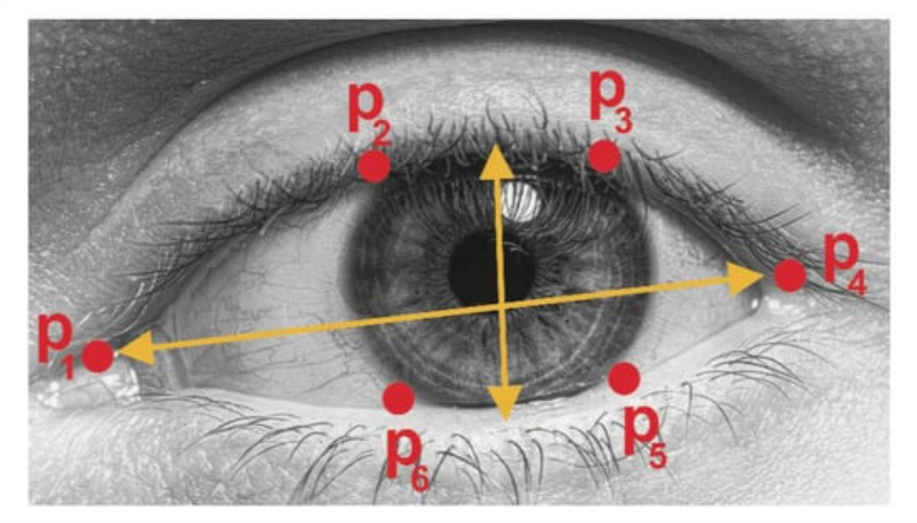
Scipy Librariy....

- **SciPy is a free and open-source Python library used for scientific computing and technical computing. It is a collection of mathematical algorithms and convenience functions built on the NumPy extension of Python.**



Eye Aspects Ratio(EAR):

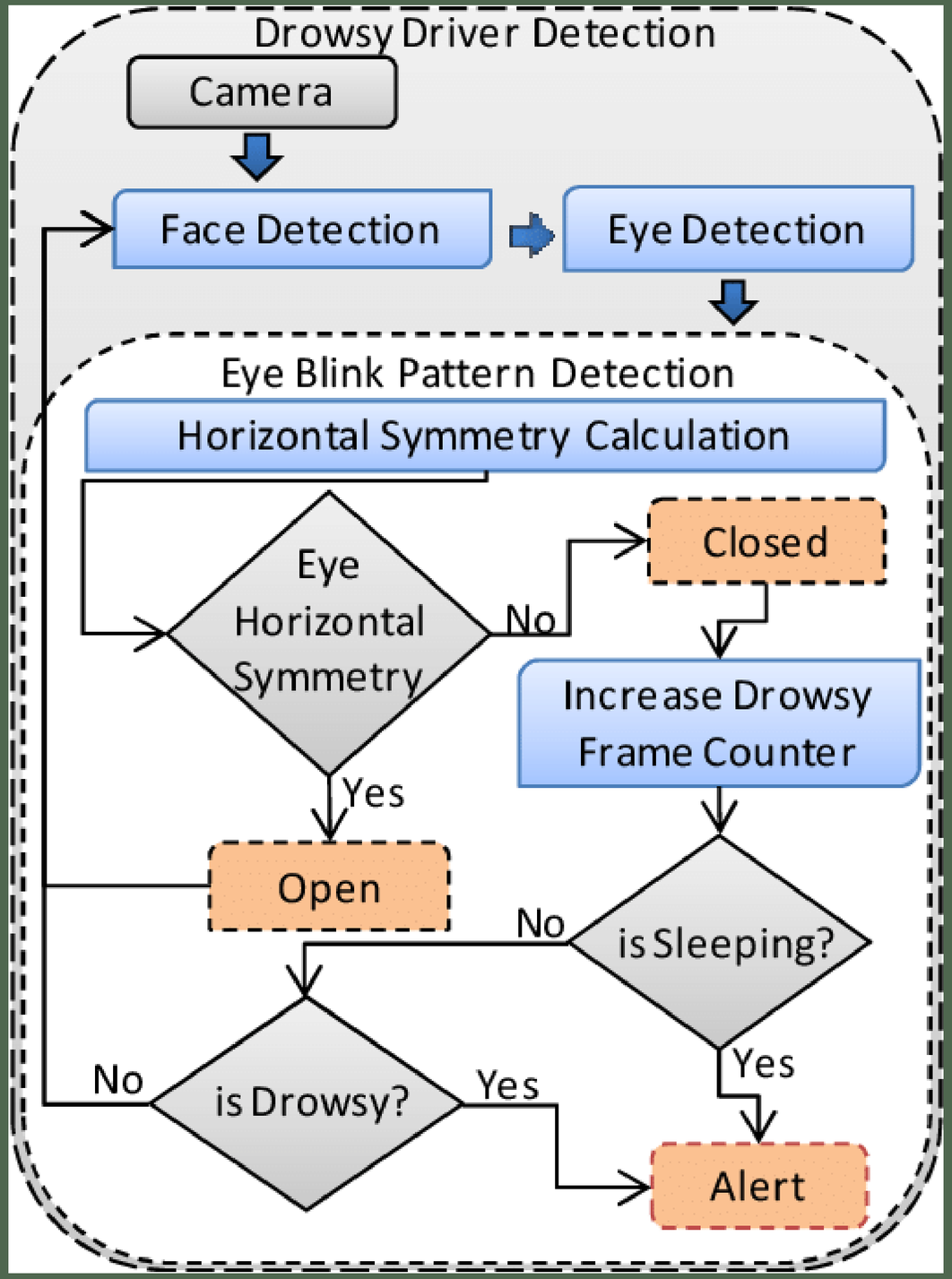




Compute the eye aspect ratio for each eye, which gives us a singular value, relating the distances between the vertical eye landmark points to the distances between the horizontal landmark points

$$EAR = \frac{||P_2 - P_6|| + ||P_3 - P_5||}{2||P_1 - P_4||}$$

FLOW CHART OF DROWSINESS DETECTION.....



Use of Important functions in a program:

- **pyttsx3.init():** This function is used to initialize the text to the audio conversion of modules and libraries used inside for the alerting purpose in the code.
- **VideoCapture():** The function is used to declare the parts of the camera used for the OpenCV and to turn on the camera.
- **cap.read():** Store all the camera parameters inside the function that can be used for different purposes, such as deciding the width height Channel and even used for setting the color of the camera output.

CONTI.....

- **cv2.imshow():** To display the camera output that is prior set by the user. It is the visual display by the camera on the screen.
- **dlib.shape_predictor(“location of the .dat file”):** The face landmark features will be stored inside the “.dat file”.
- **destroyAllWindow():** Kill all the opened cv2 windows used inside the program.
- **cap.release():** It will release all the stored parameters inside the cap function.
- **cv2.waitkey(“time limit set by the user”):** This will keep open the cv2 interface for the given declared time by the user.
- **Detect_Eye():** Function calculating the aspect ratio for the eye by using the Euclidean distance function.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Future Improvement

- We can Collab with the government and install the devices at the reasonable price range in the citizens vehicles. So that the chances of accidents get reduced.

Thank you!

By- Nitya chaurasiya