A presentation on

REAL-TIME DROWSINESS DETECTION WITH ALARM SYSTEM FOR HIGHWAY DRIVERS USING OPENCV, DLIB & PYTHON

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Purpose of the project

➢ Issues that inspired building the project: Road Accidents

❖ **Causes behind the "Road Accident" issue:**

- Drowsiness
- Drunkenness
- Rash Driving

✓ **Issues of previously proposed methods in solving "Road Accident" issue:**

- Can't provide real-time drowsiness detection
- Complex algorithm
  - ➢ CAMSHIFT
  - ➢ PERCLOS
- Complex data processing(DEEP LEARNING BASED)
  - ➢ RNN
  - ➢ CNN
- Lack of easy optimization features for drivers
- Light intensity-based issues

➢ What our proposed method offers:

- Real-time drowsiness detection with almost 100% accuracy rate
- Refined algorithm(that can be implemented in replace of previously proposed methods for reducing their complexity)
- Solutions for light intensity based issues involved in drowsiness detection using polylines
- Alarm system
- Easy optimization features for drivers
- More user friendly and less resource hungry system

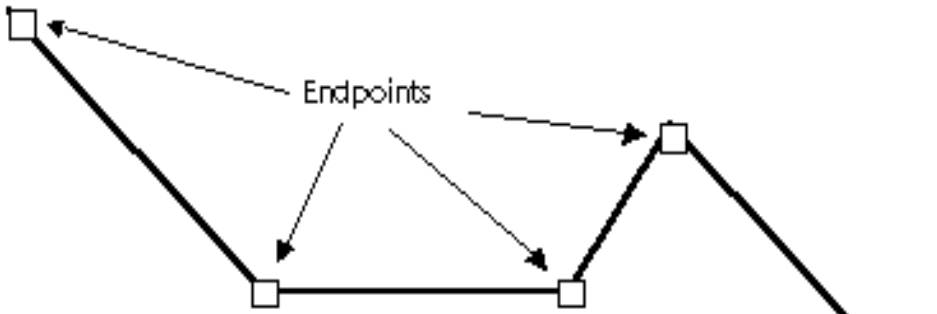


Fig: Polylines

➢System architecture

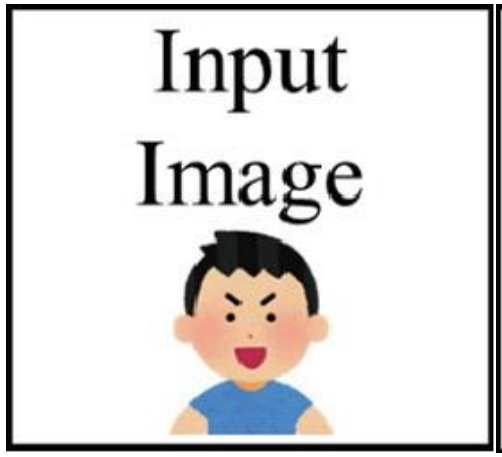
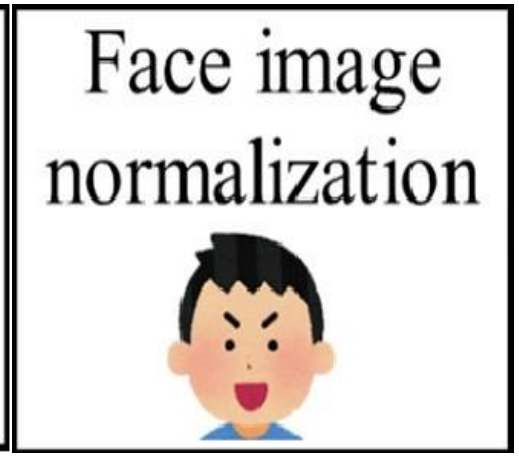
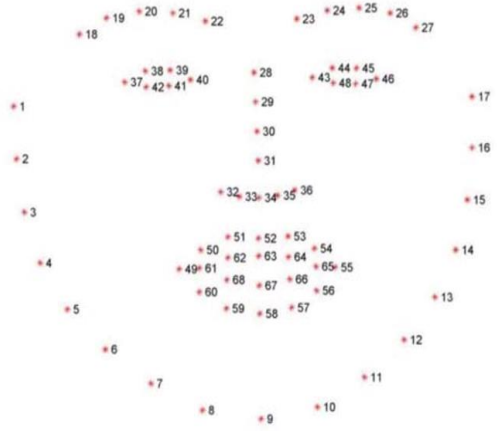


Image capturing



Face detection & cropping the image



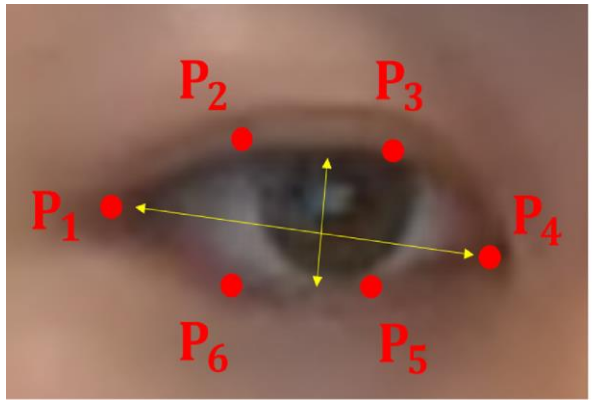
Morphological processes

Drowsiness detection using EAR calculation

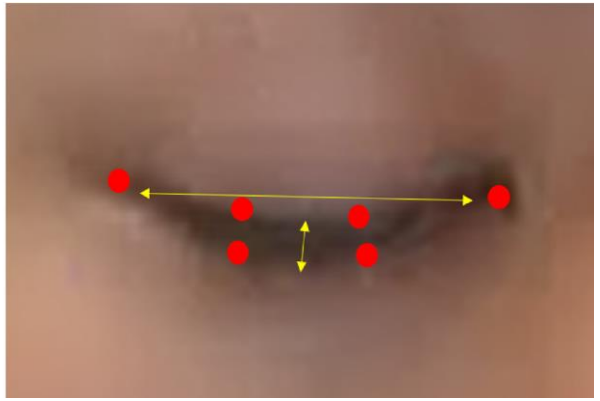
Actuating signal(alarm)

- Python libraries used in the project:
  - ✓ OpenCV
    - Tool for image processing and performing computer vision tasks
    - Open source library
    - Tasks like face detection,object tracking
  - ✓ DLIB
    - dlib library outputs 68 points on the face
- Mathematical concept OF EAR

$$EAR = \frac{||p2 - p6|| + ||p3 - p5||}{2||p1 - p4||}$$

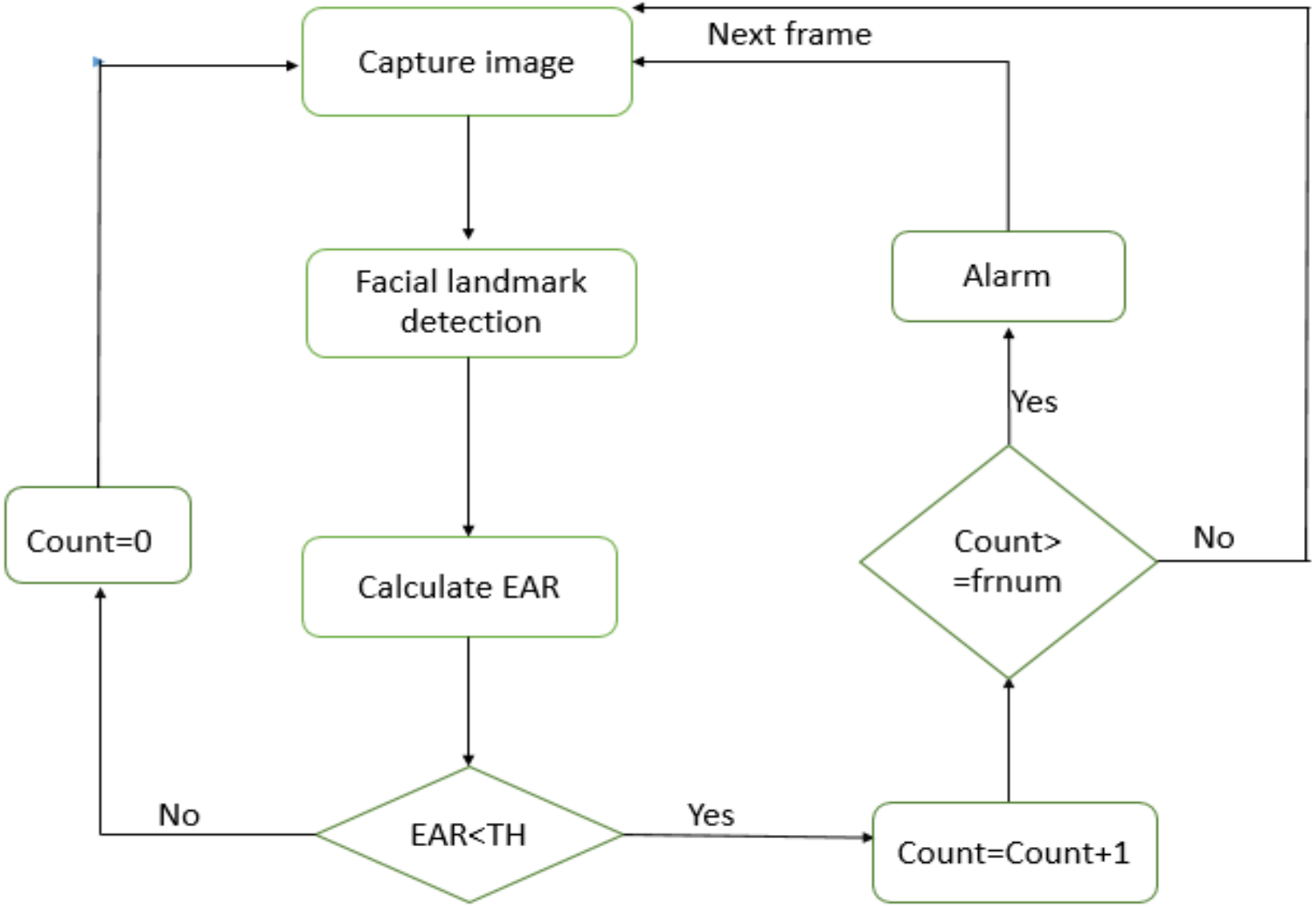


Open eye will have more EAR

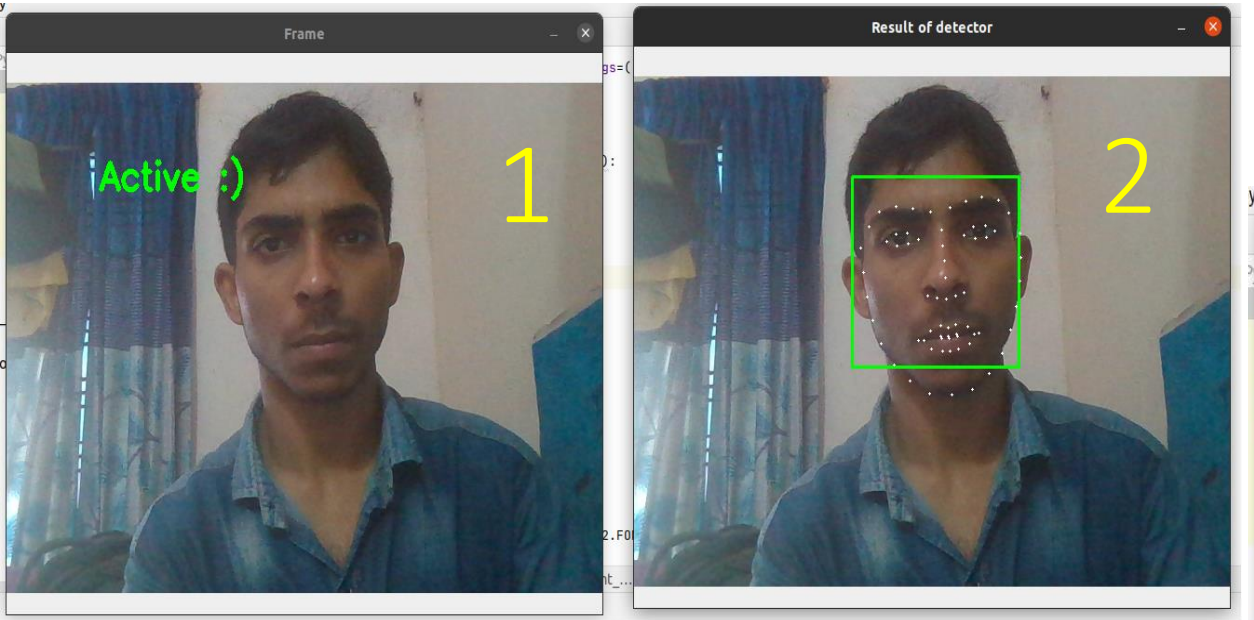


Closed eye will have less EAR

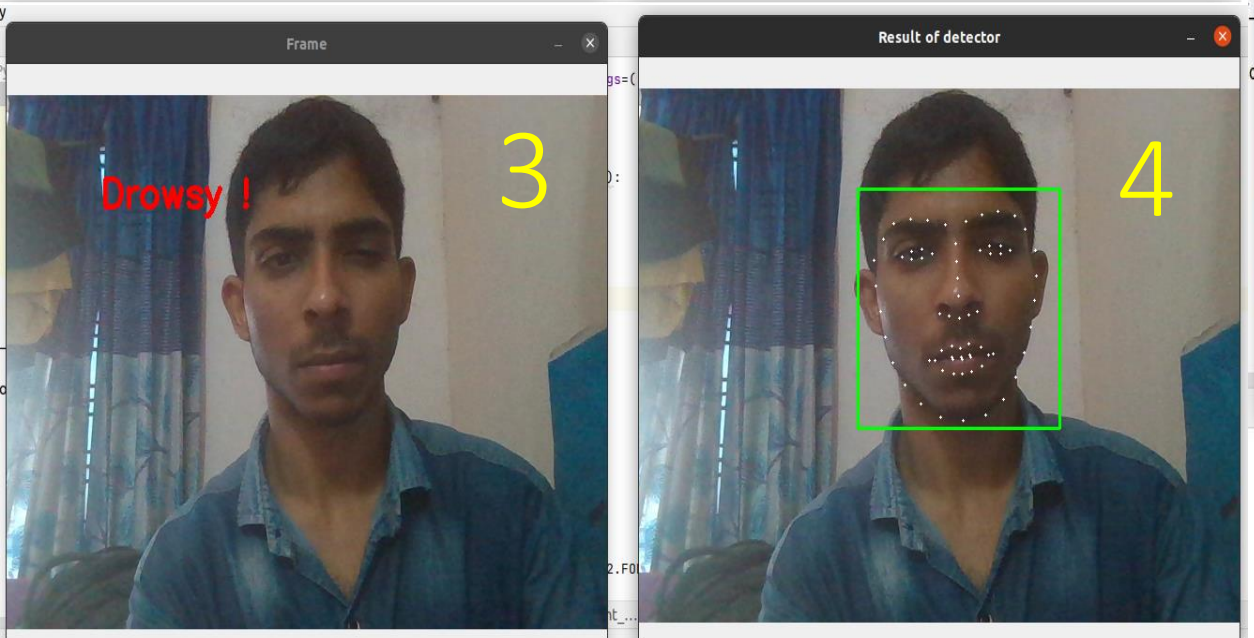
FLOWCHART


Capture image
Next frame
Facial landmark detection
Alarm
Yes
Count=0
Calculate EAR
Count> =frnum
No
No
EAR<TH
Yes
Count=Count+1

RESULTS

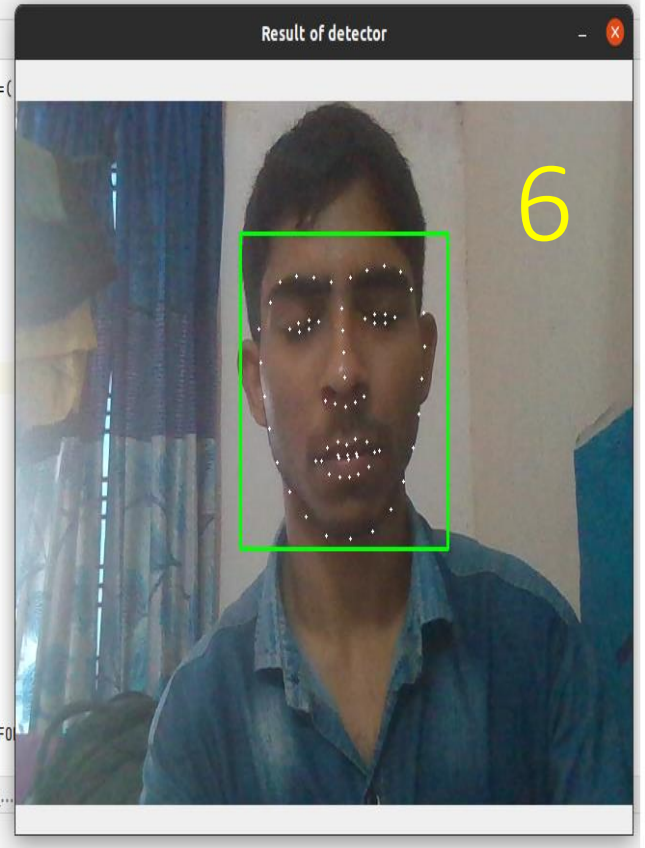

Frame
Active :)
1

Result of detector
2


Frame
Drowsy !
3

Result of detector
4


Frame
SLEEPING !!!
5


Result of detector
6

RESEARCH FINDINGS

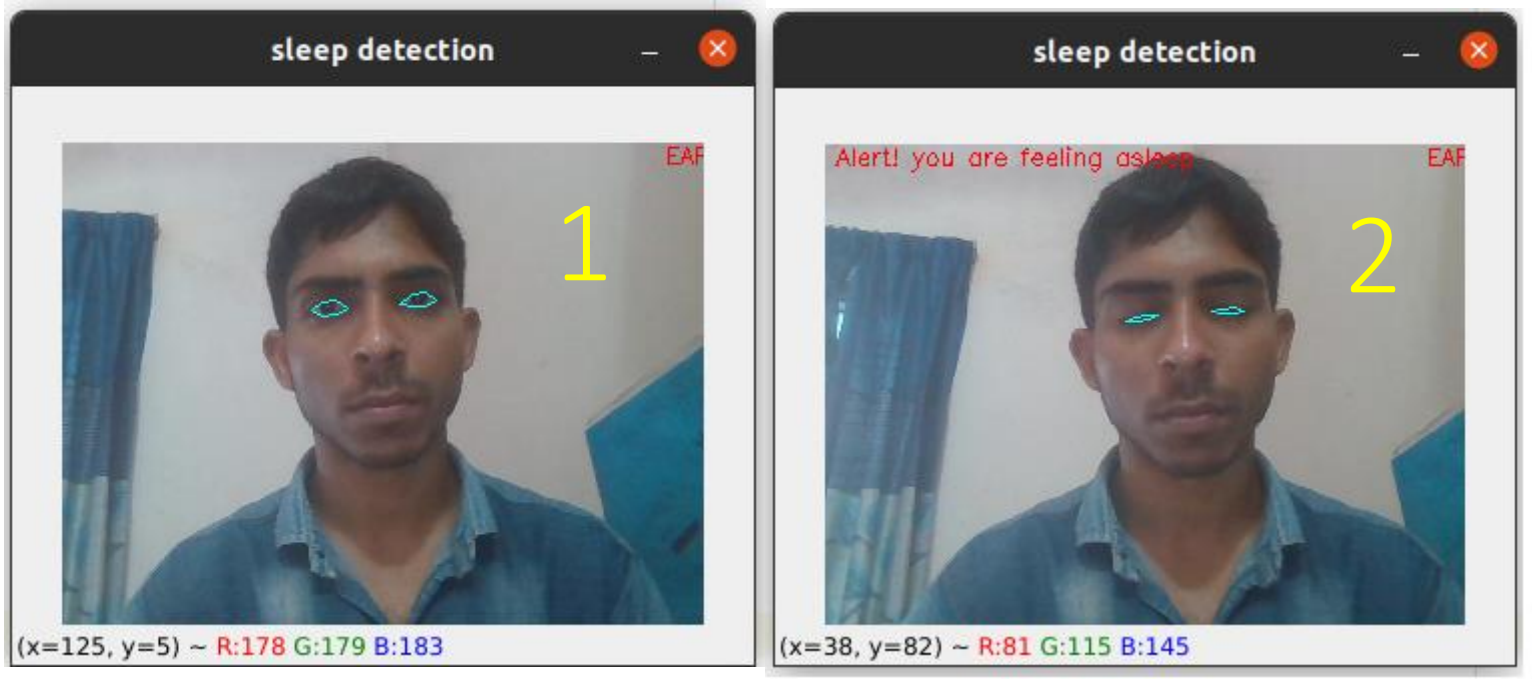
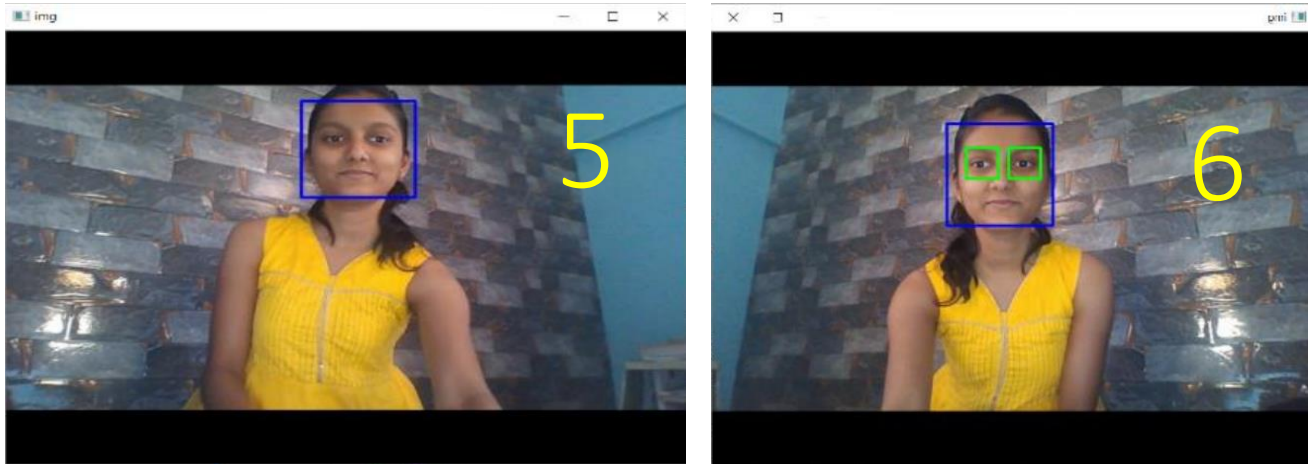


Figure: Eye detection using polylines

COMPARISON WITH OTHER METHODS



LIMITATIONS/UPGRADATION POSSIBILITIES

1. Obstacles between eyes and the camera
2. Auto adjustment mode of the camera
3. Infrared camera for any lighting conditions

FUTURE WORK

Implementing the prototype in vehicles and building up a total project on “drowsiness detection system with automatic vehicle control” for optimal and effective results.

THANK YOU FOR YOUR KIND ATTENTION AND PATIENCE