FATIGUE DETECTION

PEARL GLOBAL SOLUTIONS

Contents

Introduction

The project aims to detect the onset of drowsiness in drivers, while the vehicle is in motion. Detection is done by continuously looking out for symptoms of drowsiness, while considering physical signs. Physical factors include yawning, drooping eyelids, closed eyes and increased blink durations.

Business Requirement

Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads. Fatigue detection is a technology which helps prevent accidents caused by the driver getting drowsy.
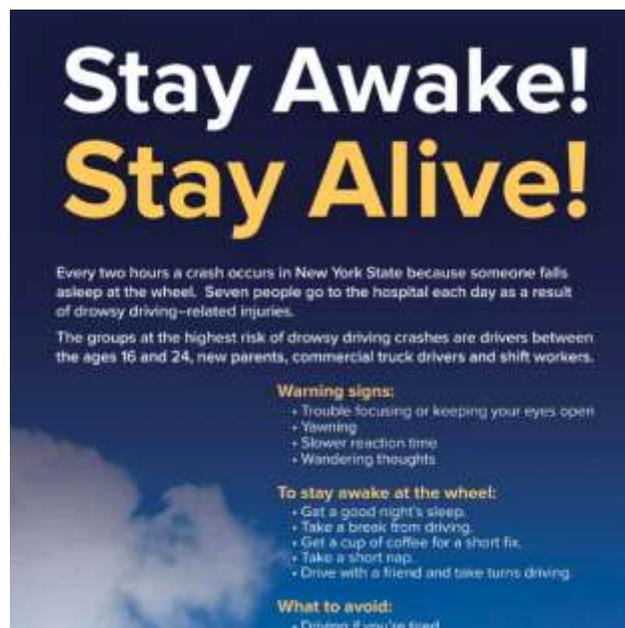
The AI system is to be used for real-time detection of drowsiness in drivers and to alert them. It works in three phases:

- First phase: face recognition.
- Second phase: Extract indexes of facial landmarks for both eye and mouth
- Third phase: Display alert if detected.

This system helps the concerned authorities detect drowsiness in drivers.

Proposed System

A video camera installed provides input to the system. The fatigue detection system does the following:

- ✓ Frame extraction: Each frame is extracted from the video and front face recognition is done. This is done by pre trained haarcascade classifier.

- ✓ Landmark detection: Extract indexes of facial landmarks for both eye and mouth using dlib python library.

- ✓ Display Alert: Alert the person if drowziness is detected.

The live video input continuously goes through the following steps:

```
┌────────────────────────┐
│    Capture a frame     │
└────────────────────────┘
            │
            ▼
┌────────────────────────┐
│   Detection of front   │
│          face          │
└────────────────────────┘
            │
            ▼
┌────────────────────────┐
│  Extract indexes of facial │
│   landmarks(eyes and   │
│        mouth)          │
└────────────────────────┘
            │
            ▼
┌────────────────────────┐
│  Display alert if fatigue │
│       detected         │
└────────────────────────┘
```
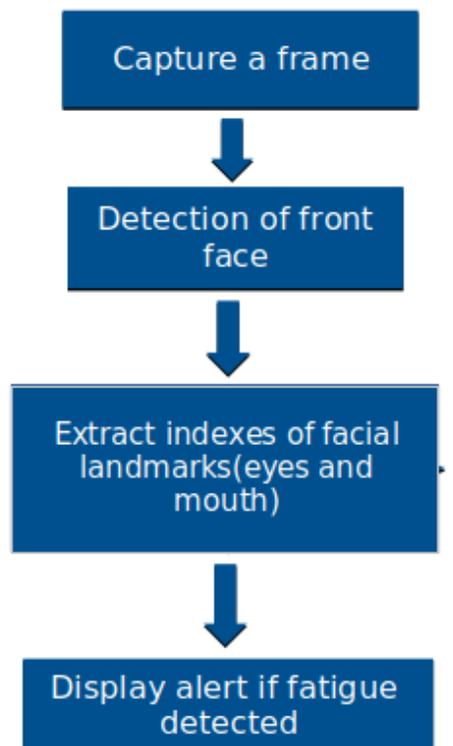
Technologies Used

- ➢ Python
- ➢ AI and Deep learning
- ➢ TensorFlow
- ➢ OpenCV
- ➢ Dlib

Risks and Challenges

 • Real-time implementation
 • Changes in posture of the person
 • Quality of video feed

Results/ Output

The main accomplishment of the Fatigue detection system is:
   • Lessen the number of road accidents by detecting drowziness in a driver

Figure 1 Fatigue identification from image

Conclusion

These proposed system hence significantly reduce accidents caused by the driver getting drowsy. This way Pearl helps the authorities and the public in reducing vehicle fatalities.

Future Enhancements

More methods and architectures should be tested in future research and a better method might be obtained to improve detection results. Also an alarm can be included to alert the drowsy person. prediction of mobile usage can also be added as an improvement.