
Drowsiness DETECTION
A classification problem

Background

THE PROBLEM

- 100,000 crashes per year
  - 71,000 injuries & 1,550 fatalities
- Contributes to an estimated 9.5% of all crashed

Introduction

GOAL

- Reduce accidents from drowsy driving
- Save lives

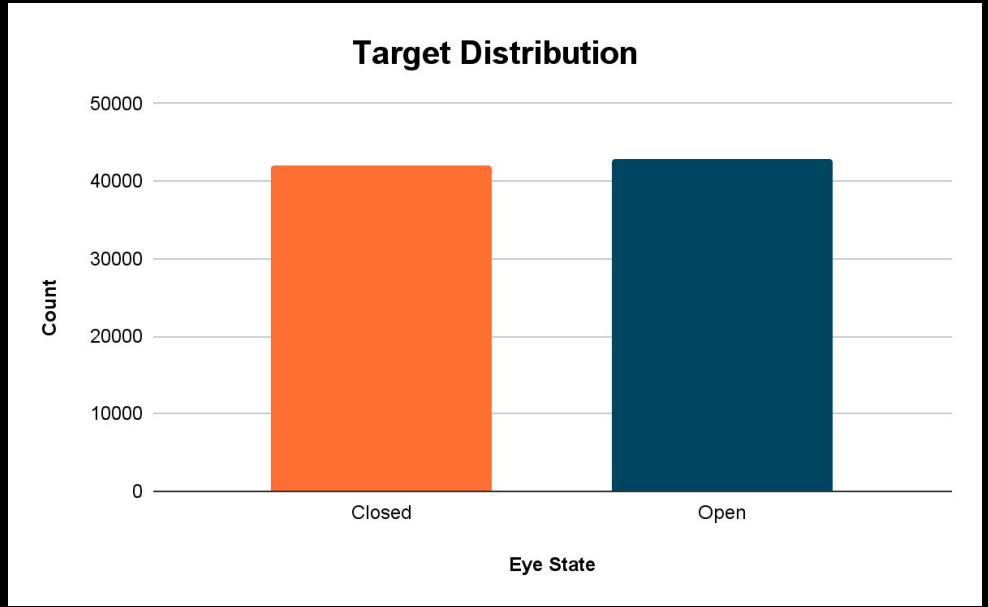
SOLUTION

- Construct neural network for eye state classification
- Implement classification network in real time with OpenCV

Data

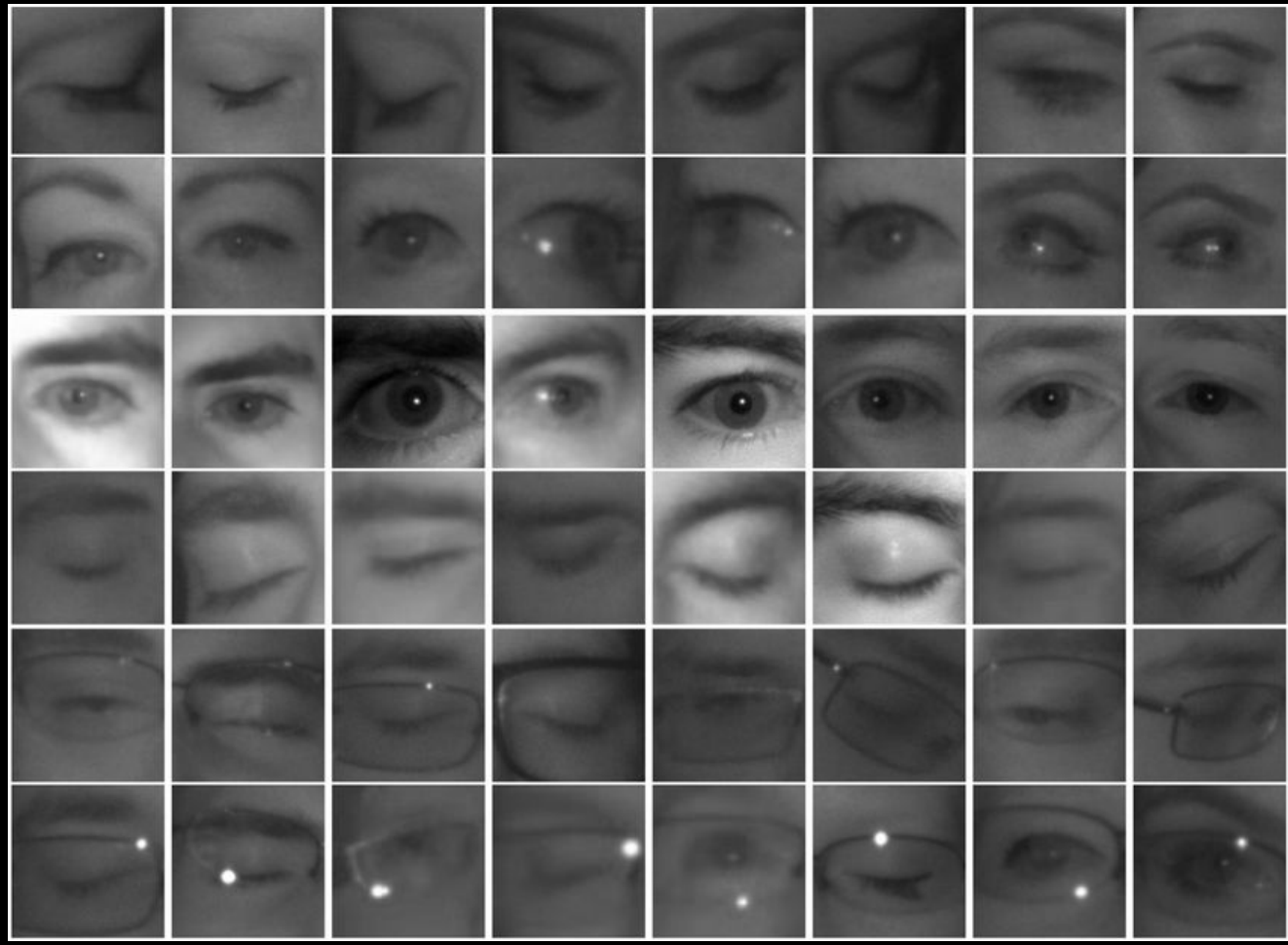
MRL Eye Dataset

- 84,989 images



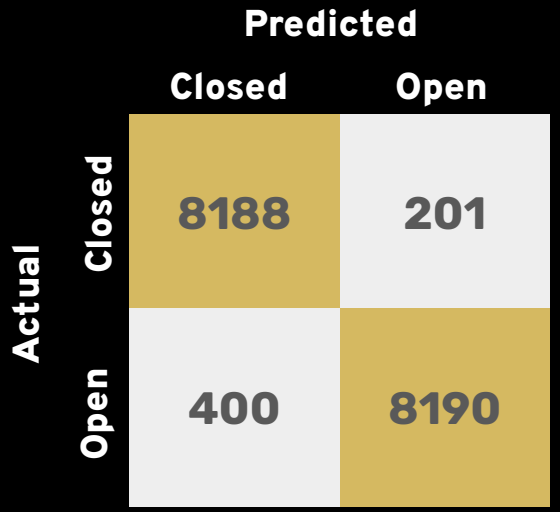
Data

- 37 different people
- infrared
- Gender
- Glasses
- Reflection
- Lighting Condition
- Capturing Device



Convolutional Neural Network Performance

Accuracy = 96.5%



False Negatives

Predicted Closed
Labeled Open

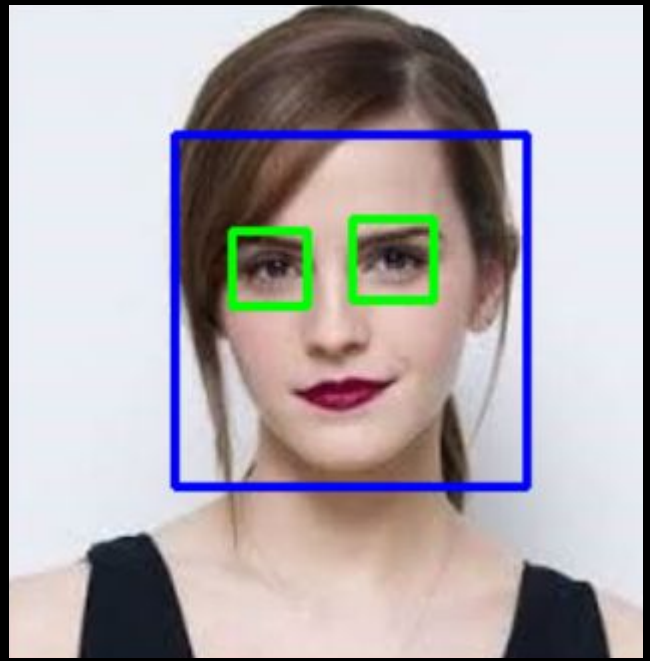
False Positives

Predicted Open
Labeled Closed

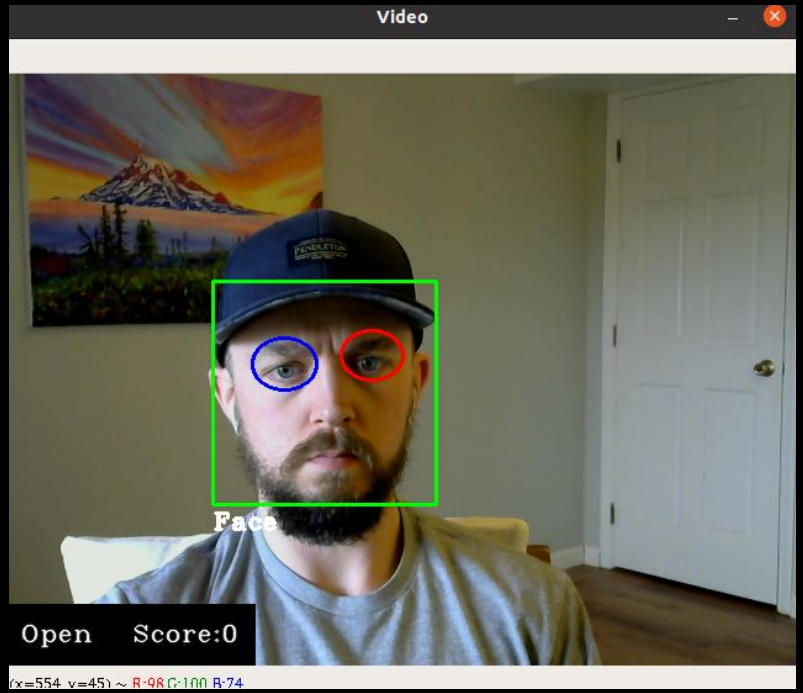
Computer Vision Application

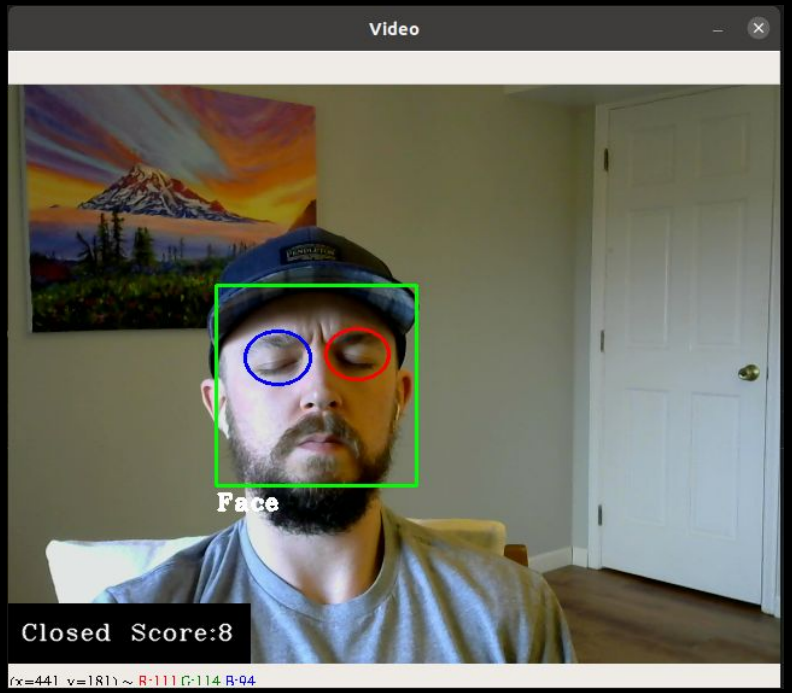
OpenCV

- Webcam Interface
  - Convert each frame to image
- Pretrained object detection classifier
  - Face
  - Right Eye
  - Left Eye
- Used CNN to predicted eye state

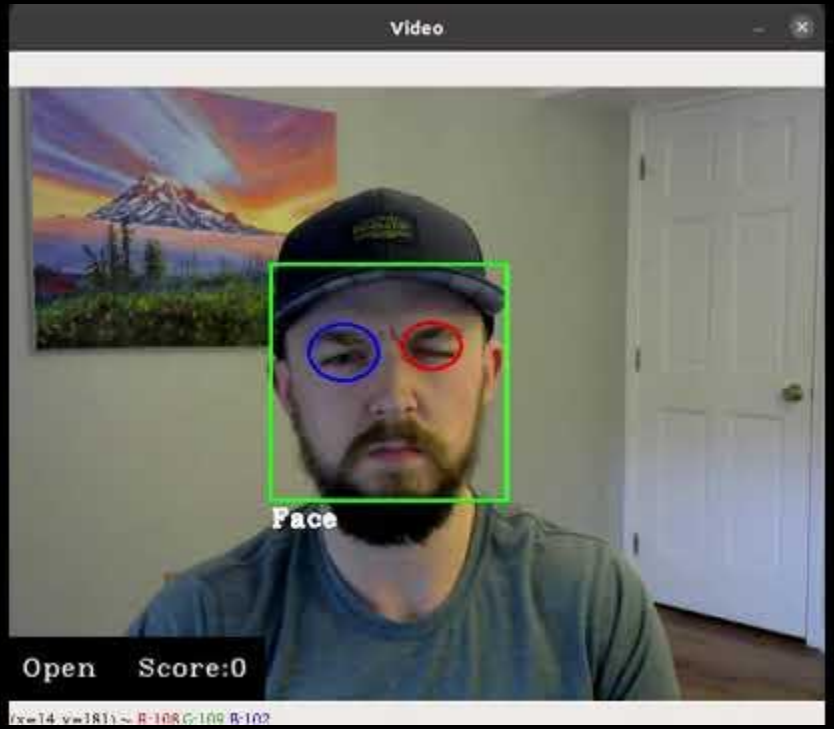


Computer Vision Application





Computer Vision Application



Future Work

- Construct a more accurate edge detection program for eyes
- Collect more images in different lighting for the CNN

THANKS!

Do you have any questions?