

DRIVER DROWSINESS DETECTION MINI REPORT 5

BASU VERMA
(142002007)

under the guidance of

Dr Satyajit Das



IIT PALAKKAD

**INDIAN INSTITUTE OF TECHNOLOGY PALAKKAD
PALAKKAD - 678557, KERALA**

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Part. 1

Eye Detection in video

1.0.1 Haar Cascade Classifier

Haar Cascade classifier uses Haar-like features for object recognition. This name is due to its similarity with Haar wavelets. It uses "Integral Images" for rapid computation, Haar-like features and AdaBoost classifier that combines various weak classifiers to do final classification.

Haar-like features

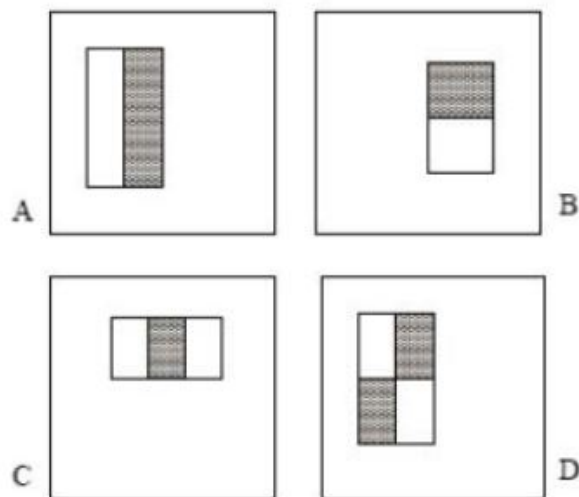


Fig. 1.1 Different rectangles for Haar-like features

The value of a two-rectangle feature is the difference between sum of pixels that falls within two rectangles (black and white). A three rectangle feature computes the sum within two outside rectangles subtracted from the sum in a center rectangle. A four rectangle feature computes the difference between diagonal pairs of rectangle.

AdaBoost Learning

AdaBoost Classifier is a non-linear classifier that combines several weak classifiers to do the final predictions. It is the family of ensemble learning. In this classifier, the weights of all data is initialized as same but after every classification, the weight's of wrongly classified data gets increased and the weight's of rightly classified data gets decreased.

Implementation

For implementation of the eye detection using Haar-like features, I used "**haarcascade_eye.xml**" file and read the drowzy videos frames continuously (30fps). Converted the frame to gray scale and applied pretrained eye_cascade model on it to detect the eye. The following result was recorded.

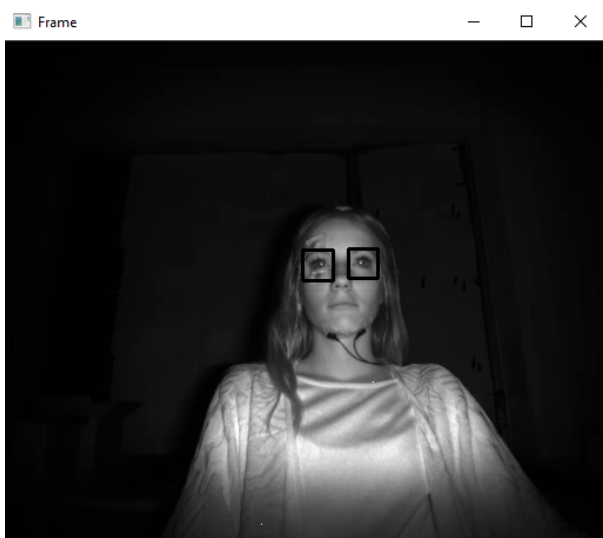


Fig. 1.2 Haar-Cascade model detecting both eyes.

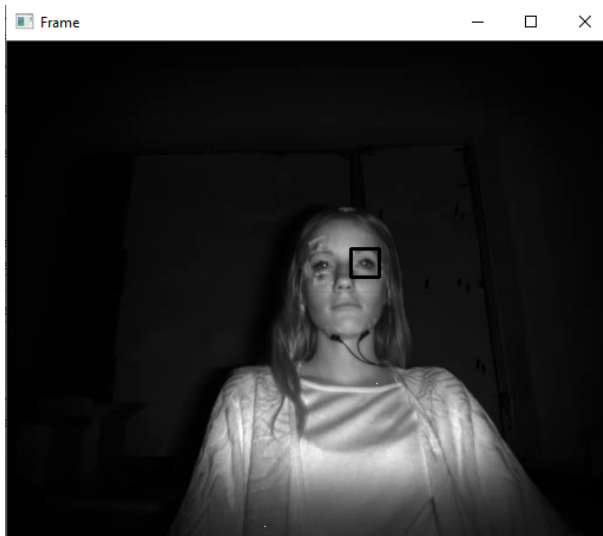


Fig. 1.3 Haar-Cascade model detecting only one eye.