

Deep learning model to detect driver drowsiness



Research Guide:

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INTRODUCTION

- Driver drowsiness detection is a car safety technology which helps prevent accidents caused by the driver getting drowsy.
- Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads.
- We aim to implement a model for drivers and it can also prevent accidents from happening.

Objective

Our Objective is to create a project for extra safety on the road that will assist a driver to alert him when he feels drowsy while driving by face detection (eye lid movement and oral movements).

#1

Eye State Detection

- Training our model to see whether it's closer or open with a predefined sample dataset containing pictures as data

#2

Mouth Detection

- Training our model to observe mouth movements with a predefined sample dataset containing pictures as data and comparing it with training data (real-time data)

#3

Alert Activity

- Alert the driver if the activity (close eyelid, mouth movement – yawn) is live.

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Literature survey



face cascade and eye cascade

- Face Detection
- Eye Detection
- Eye State Analysis
- Drowsiness Prediction



mouth cascade/smile cascade

- Face Detection
- Mouth Detection
- State Analysis
- Drowsiness Prediction

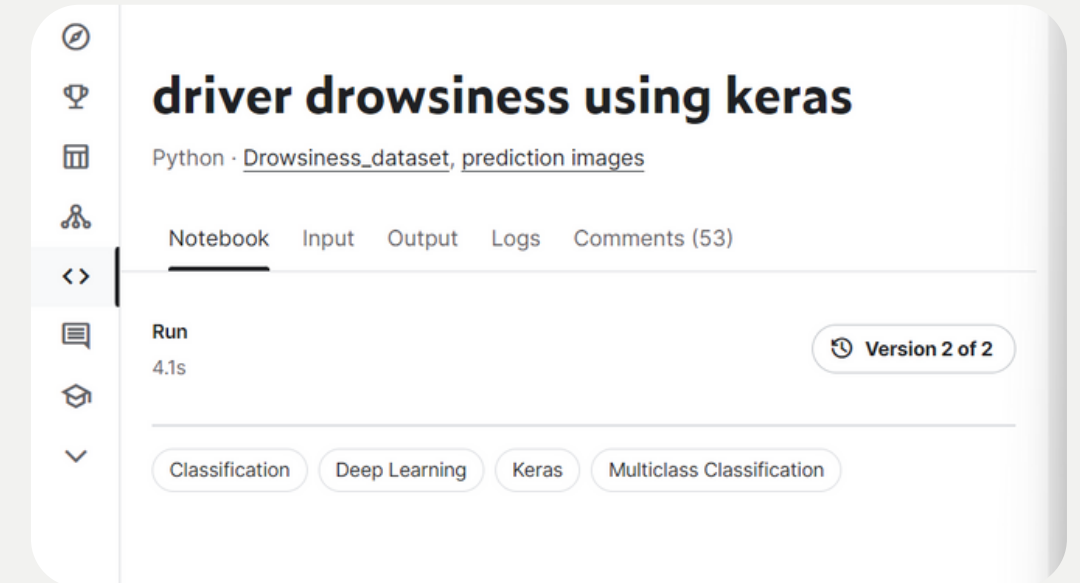


image prediction

- Model Training
- Detection
- prediction

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Inference

We are utilising a transfer learning model to reuse a mobile network that has already been trained. We are modifying the input layer, dropout layer, dense layer, and activation layer of the mobile network, which sets the model network into which we will feed the data set. Then, using binaural cross entropy as a gradient descent process and running it over a number of iterations, we train our data set to forecast the test data, in this case, the video capture.

We use the sygmoid function as the activation function, and the category for the eye data set has been set (open eye = 0, and closed eye = 1), thus if the model is predicting a value bigger than the thrushhold 0.5, it predicts that the eye is closed.

The yawn dataset is trained using the same posedicture, and its category has been set (no yawn = 0, closed yawn = 1).

The prediction algorithm is set to run in two circumstances.

- **Case 1: When you yawn while your eyes are closed, the alarm system will sound and gives a red warning signal.**
- **Case 2: closed eyes + No_yawn ,The system generates an alarm with a yellow warning signal**

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Proposed solutions

face haar cascade + eye haar cascade + mouth haar cascade

We separately train the data sets for the eyes and mouth and then we assign the results to two different variables that we feed to our primary driver algorithm.

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Reference

Youtube

- <https://www.youtube.com/watch?v=FPRFYyMIhyw>
- <https://www.youtube.com/watch?v=qwUIFKi4V48>

Kaggle

- <https://www.youtube.com/watch?v=FPRFYyMIhyw>

geeksforgeeks

- <https://www.geeksforgeeks.org/face-detection-using-cascade-classifier-using-opencv-python/>

Thank You