DRIVER AWARENESS DETECTION IN AUTONOMOUS CARS

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Overview

In recent years, driver drowsiness has been one of the major causes of road accidents and can lead to severe physical injuries, deaths and significant economic losses. Statistics indicate the need of a reliable driver drowsiness detection system which could alert the driver before a mishap happens. Researchers have attempted to determine driver drowsiness using the following measures:
(1) vehicle-based measures;
(2) behavioral measures and
(3) physiological measures.
A detailed review on these measures will provide insight into the present systems, issues associated with them and the enhancements that need to be done to make a robust system. In this paper, we review these three measures as to the sensors used and discuss the advantages and limitations of each. We are planning to implement that by designing a hybrid drowsiness detection system that combines non-intusive physiological measures with other measures one would accurately determine the drowsiness level of a driver. A number of road accidents might then be avoided if an alert is sent to a driver that is deemed drowsy.

Goals

A driver who falls asleep and when the wheel loses control of the vehicle, an action which often results in a crash with either another vehicle or stationary objects. In order to prevent these devastating accidents, the state of drowsiness of the driver should be monitored. The major goal of these project is to compare the previous methods used using EarSVM and dlib with the deep learning nets.

The major goal of this project includes Use of Deep learning techniques for using image processing and giving the new and improved way with new data set.

Use Cases

Drivers Drowsiness and rash driving

- Front line workers in the factory
- Security officers
- Students monitoring in class

Reverse Used cases

- Monitor babies

Data

1. AT&T "The Database of Faces"
2. FacesDB
3. Closed Eye Database
4. Japanese Female Facial Expression (JAFFE) Database

Process Outline

1. Integrate multiple facial recognition datasets and CEW(closed eye in the wild)
2. Data preprocessing and dataset formation (conversion of all images to a standard format and standard color scale)
3. Create a bottleneck feature using a top CNN architecture RESNET/Densenet or anyone and apply transfer learning.
4. Designing and training a convolutional neural network on our dataset.
5. Creating an inference model to test on real world image
6. Integrating the model with real-time streaming with opencv feature

Milestones

Timeframe	Delivery
Day 1-2	Dataset gathering, Integration and image reshaping
Day 3-6	Creating bottleneck features from ResNet model and training Model Building for static images.
Day 7-9	Building a system to detect emotions in real-time (live stream)
Day 9-11	Testing and documentation

Deployment Details:

1. Language: Python
2. Webcam

Libraries Used

1. Open CV
2. Scipy
3. KERAS
4. Resnet
5. Numpy

USER INTERFACE DESIGN PLAN

1. Get the facial data from the webcam
2. Use classification for blinks and facial expression
3. Make decisions based on the calculated results
4. Perform actions in the gym environment based on the above decisions

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