Driver Drowsiness with Deep Learning

Writeup

Abstract

With this Python project, we will be making a drowsiness detection system. A countless number of people drive on the highway day and night. Taxi drivers, bus drivers, truck drivers and people traveling long-distance suffer from lack of sleep. Due to which it becomes very dangerous to drive when feeling sleepy.The majority of accidents happen due to the drowsiness of the driver. So, to prevent these accidents we will build a system using Python, OpenCV, and Keras which will alert the driver when he feels sleepy.

Data

A dataset provided by Kaggle contains four classes: yawn, not yawn, closed, and opened. There are total of 4799 images in the dataset.

Algorithms

- **Label Binarizer** is used to transform multi-class labels to binary labels
- **Data Augmentation** is used to improve model performance
- **Building a Convolutional Neural Network** (CNN) with Keras Sequential model were used, built four convolutional layer with LeakyReLU activation function and MaxPooling, then the Flatten layer, and finally the dense layer.
- **Compiling the model** we used 'Adam' as an optimizer, used 'categorical_crossentropy' for our loss function, used the 'accuracy' metric to see the accuracy score on the validation set when we train the model.
- **Training the model** we fit our training data and validation data and number of epochs For our model, we will set the number of epochs to 50.
- **Printed Classification Report** for every class ("yawn", "no_yawn", "Closed", "Open")
- **Using our model to make predictions** the model can predict image class (0,1,2,3)

Tools and libraries

- Python JupyterNotebook Visual Studio Flask
- Keras, Tensorflow Pandas
- Numpy
- Seaborn
- Sklearn Computer Vision

Communication

In addition, we made a dashboard to use our model to make predictions of the image class (0,1,2,3)