Drowsiness Detection using CNN

Countless people experience drowsiness at the most undesirable times, from drivers on highways to students in afternoon classes due to lack of sleep. The study conducted by the World BankSleep describes that sleep disorders increase the risk of road accidents by 300%. Drowsy driving results in over 71,000 injuries and 1500 deaths. Central Road Research Institute's (CRRI) study on the 300 km Agra-Lucknow expressway shows that 40% of road accidents result from drivers dozing off at the wheels. As per the Ministry of Road Transports and Highways (MoRTH), the socio-economic cost of road crashes in India is Rs. 1,47,114 crores, which is equivalent to 0.77 % of the country’s GDP.

We aim to build a model that will detect and set off an alarm if a person is on the verge of falling asleep through this project. To achieve this, we plan to extract features using haar cascades (from openCV) to identify a ‘region of interest’ around a person's eyes. Information from the region of interest is passed as input to a classifier, classifying the eyes as open or closed. The classifier consists of 2D convolution layers, pooling layers, and a fully connected layer with two nodes at the end. Each of these nodes will correspond to the probability of eyes being closed or open. We plan to use categorical cross-entropy as a loss function, which measures the ‘distance’ between the actual and predicted probability distributions. Training, testing, and validation will be performed using Yawn\_eye\_dataset\_new from Kaggle.

References:

1. <https://data-flair.training/blogs/python-project-driver-drowsiness-detection-system/>
2. <https://www.firstpost.com/india/centres-newest-way-to-address-road-fatalities-cash-rewards-for-good-samaritans-10034401.html>
3. <https://timesofindia.indiatimes.com/india/uttar-pradesh-has-highest-number-of-road-accident-deaths-in-country-central-government-report/articleshow/84039854.cms>
4. <https://www.kaggle.com/serenaraju/yawn-eye-dataset-new>