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# **The driver drowsiness detection system using Raspberry Pi with a night vision camera, and facial landmarks**

A Final Project Report by

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## **ABSTRACT**

Driving while fatigued is a serious issue that raises the possibility of vehicular accidents. Driver drowsiness is a primary contributor to sleep deprivation, which is dangerous for road safety. The purpose of this research is to develop assistive application that can measure a driver's level of alertness and issue alerts for sleepy driving in order to lessen the frequency of accidents brought on by fatigued drivers. Two methods for determining driver fatigue based on yawning measurement are introduced in this thesis. To accurately identify tiredness and avert accidents, these methods use real-time recognition of the driver's face, eyes, lips, and yawning, among other processes. These techniques are specifically designed to be successful even at night, when drowsy driving incidents are more likely to occur.

The system uses a digital night vision camera to record video of the driver, utilizing the Viola-Jones theory to recognize faces and lips and the color detection theory to recognize yawning in the mouth. This technique has been found to be the most accurate in detecting yawning as a sign of driver fatigue. The system also uses the Raspberry Pi, a well-liked and adaptable embedded computing platform, to process video input and apply the detection algorithms in real-time. The system can measure a driver's alertness effectively and send out timely alerts for drowsy driving, potentially preventing accidents caused by driver fatigue, especially when driving at night. This is made possible by the combination of the night vision camera, facial and lip recognition, eye blinks, and Raspberry Pi.

Based on the results of the tests that were done, the suggested system efficiently measures the properties of yawning and recognizes the yawning condition as an indication of driver tiredness. The technology also keeps track of eye blinks as another sign of the driver's awareness. The device raises an alert to warn the driver when it detects yawning and eye blinks, potentially reducing accidents brought on by drowsy driving.

**Keywords:** Face Detection, Eye Detection, Mouth Detection, Yawning Detection, Drowsiness Monitoring, Viola-jones theory.

**Subject Descriptors:** Driver drowsiness, Facial landmarks, Raspberry Pi, Night vision camera, Drowsy driving, Fatigue detection, Real-time monitoring, Alert systems.