Literature survey

Malla et al. develop a light- insensitive system.They used the Haar algorithm to detect objects and face classifier implemented by in OpenCV libraries. Eye regions are derived from the facial region with anthropometric factors. Then, they detect theeyelid to measure the level of eye closure.

Vitabile et al. implement a system to detectsymptoms of driver drowsiness based on an infrared camera. By exploiting the phenomenon of bright pupils,an algorithm for detecting and tracking the driver'seyes has been developed. When drowsiness isdetected, the system warns the driver with an alarm message.

Bhowmick et Kumar use the Otsu thresholding to extract face region. The localization of the eye is done by locating facial landmarks such as eyebrow and possible face center. Morphological operation and Kmeans is used for accurate eye segmentation. Drowsiness Detection No Bad No Bad Good Good Yes Yes Yes No Face Detection Eyes Localization Face Tracking Eyes Tracking Initialization set of shape features are calculated and trained using non- linear SVM to get the status of the eye.

Hong et al. define a system for detecting the eye states in real time to identify the driver drowsiness state. The face region is detected based on the optimized.

Jones and Viola The eye area is obtained by an horizontal projection. Finally, a new complexit y function with a dynamic threshold to identify the eye state.

Tian et Qin build a system that checks the driver eye states. Their system uses the Cb and Cr components of the YCbCr color space. This system locates the face with a vertical projection function, and the eyes with a horizontal projection function. Once the eyes are located the system calculates the eyes states using a function of complexity.

Lee and Chung propose a method to monitor driver safety levels using a data fusion approach such as: eye characteristics, variation of biological signals, temperature inside the vehicle and vehicle speed.

Roberson : the front camera of the smartphone to capture images of the driver and then uses advanced algorithms of computer vision to detect his face and eyes.

Robert Gabriel Lupu eye pupil/iris detection have been developed. Depending upon the source light point of view there are two approaches namely based on ambient or infrared light.

Dongheng Li, Derick J. Parkhrust a robust eye-tracking algorithm that combines feature-based and model-based approaches to achieve a good trade-off between run-time performance and accuracy for dark-pupil infrared imagery.