

## FATIGUE AND DROWSINESS DETECTION BASED ON EYES ANALYSIS IN IMAGES

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### Objective

Fatigue is considered an impairment caused by a continuous task which results on the increase of the response time [1]. Vehicles conductors tend to fatigue after long hours driving thus can be the cause to several accidents. Therefore, being able to detect fatigue through an application and alert the driver before a tragedy happens brings safety to its users.

### Materials and Methods

From a sequence of images captured from the driver, the application applies transformations that facilitate both face and eye detection using the Adaboost algorithm. Having these regions detected, there should be estimated the eye condition and the eye blink rate, which can be done using the Template Matching or a high image threshold [2]. The eye condition allows the PERCLOS (PERcentage eye CLOSure) to be calculated. The PERCLOS is based on the percentage of time that an eye remained closed in, at least, 80% of one minute. In case of fatigue detection, the driver is alerted to take the precautions to its.



Picture 1: Eye detection using a template.

### Results

The negative characteristics of the surroundings of the images, such as low light, can interfere in the eye detection. However, the appropriate images for the algorithm were about 91% correct based on the eye condition. This percentage is used to whether detect or not the driver's fatigue.

### Conclusions

Based on the analysis of the results it was identified a certain difficulty in the eye condition detection regarding the driver environment, for example, the luminosity. On the other hand, the fatigue detection and the alert to the driver is of utmost importance for the traffic crashes to be avoided or minimized. For that reason, the development of this work becomes feasible and applicable.

### References

- [1] PATEL, M.; LAL, S.; KAVANAGH, D.; ROSSITER, P. Fatigue Detection Using Computer Vision. Available in [http://ijet.pl/old\\_archives/2010/4/62.pdf](http://ijet.pl/old_archives/2010/4/62.pdf). Access in 09 feb. 2018.
- [2] QUEIROZ, K. L. de. Sistema baseado em vídeo para detecção de sonolência em motoristas. Available in <http://repositorio.unb.br/handle/10482/10704>. Access in 27 feb. 2018.