Lalonde, M., Byrns, D., Gagnon, L., Teasdale, N. and D. Laurendeau. “Real-time eye blink detection with GPU-based SIFT tracking” In *Proceedings of the International Workshop on Video Processing and Recognition (VidRec07), Fourth Canadian Conference on Computer and Robot Vision (CRV07)*. Montreal, Quebec, Canada, May 28-30, 2007.

Abstract

This paper reports on the implementation of a GPUbased, real-time eye blink detector on very low contrast images acquired under near-infrared illumination. This detector is part of a multi-sensor data acquisition and analysis system for driver performance assessment and training. Eye blinks are detected inside regions of interest that are aligned with the subject’s eyes at initialization. Alignment is maintained through time by tracking SIFT feature points that are used to estimate the affine transformation between the initial face pose and the pose in subsequent frames. The GPU implementation of the SIFT feature point extraction algorithm ensures real-time processing. An eye blink detection rate of 97% is obtained on a video dataset of 33,000 frames showing 237 blinks from 22 subjects.