### Software Development Kit Release Notes





### Optalert Automotive Drowsiness Detection Software Development Kit Release 7.0

- Objective and predictive drowsiness protection
- Now with real-time driver state detection and KSS
   Compliant with Euro NCAP, GSR and worldwide measures
   Rapid integration with existing Driver Monitoring Systems
   Built in filtering to better adapt to combined DMS/OMS system
   Add a scientifically validated measure to your system

Level 6, 3 Newton Street Cremorne VIC3121, AUSTRALIA Email: info@optalert.com

www.optalert.com +61 3 9425 5000 ABN 90 121 747 699





#### **Optalert Software Development Kit**

Easily integrate the Optalert industry standard and scientifically validated measure of drowsiness to your Driver Monitoring system. Using the Optalert Software Development Kit (SDK) drowsiness monitoring can be readily integrated into almost any video-based driver monitoring system to provide a real-time and predictive drowsiness measure.

#### Easy integration. Single input required.

The SDK only requires a single input from your system; a measure of the eyelid opening of the subject, from either eye. Eyelid opening can be derived from eyelid landmarks from any facial tracking solution.

#### Scientifically validated measure of drowsiness used in industry for 15 years

The Optalert *Johns Drowsiness Scale* (JDS) of drowsiness has been used in commercial environments for nearly 15 years and has achieved recognition from scientific and medical bodies such as the Harvard Medical School as an effective and objective measure of drowsiness. The JDS can measure drowsiness across the full spectrum from highly alert to the edge sleep. Consequently, it has the advantage of being able to predict and avoid events such as dangerous microsleeps.

#### Minimal footprint. Simplified execution context.

- Single threaded
- Thread safe
- C library with no external dependencies
- Minimal memory footprint
- Hardware and processor architecture agnostic
- Minimal processing overhead (orders of magnitude less that image processing)

These features mean that with most DMS systems a successful integration can be performed in under a day.

#### Engine save and restore API for convenient demonstration

Engine state may be saved and restored later for the rapid adaptation to known drivers. Drowsiness is notoriously difficult to demonstrate, this feature permits the rapid calibration to a subject for demonstration purposes and has the potential to emulate multiple drowsiness scenarios at will.





#### New features in release 7.0:

#### Real-time eyelid closure events

Now with the inclusion of an eyelid closure engine, the Optalert SDK can provide realtime alerts in response to longer eyelid closures. Coupled with Optalert's industry standard drowsiness measure, this enables the detection of many of the industry measures defined by entities such as Euro NCAP and General Safety Regulation (GSR) as well as many others.

#### **Noise reduction filter**

Newer generation of DMS systems are now combined with an Occupant Monitoring System (OMS) that necessitate a wider field of view camera. This may cause additional noise in the determination of the eyelid opening. Optalert now has a built-in noise reduction filter that may be optionally enabled to ensure accurate results.

## Improved occlusion and dropped frame handling

Improved handling of occlusions or dropped frames where the eyelid signal may be discontinuous.

# Built-in Interface for external validation against ground truth

Optalert can assist Tier1's from the integration phase to the final validation with the OEM. The Optalert SDK has an internal interface for validation with an impairment-based ground truth for drowsiness. Contact <u>automotive@optalert.com</u> for more information.



Eyelids closed









#### Industry standard Outputs.

Drowsiness is now output as KSS (Karolinska Sleepiness Scale), as well as JDS. Eyelid closure warnings may be enabled based on latest global safety standards:

- Euro NCAP Safety Assist Assessment Protocol (from 3 Jan 2023)
  - Drowsiness
  - Microsleep
  - o Sleep
  - Unresponsive Driver
- GSR (EU) 2021/1341 (from 6 July 2022)
  - Drowsiness
- China T/GDRTA 001-2020 (from 1 Jan 2021)
  - Drowsiness Threshold (KSS 9)

More measures will be added in future versions as they are defined within the industry.

C library (static or dynamic) for target platform
Header files
Developer Documentation
Windows, Linux, MacOS, Embedded
Intel x86, x86_64, ARM & others
C99
~ 12MB
~ 1.1 MIPS (Intel x86_64)
Provided from each video frame:
<ul> <li>Eyelid opening value – floating point (0.0-1.0)</li> </ul>
Valid flag – integer (0 or 1)
Timestamp (or frame number) – seconds floating point
30 fps
JDS (0.0 – 10.0)
KSS (Low, 6, 7, 8, 9)
Realtime notifications for safety assessment protocols, currently:
Euro NCAP
• EU GSB

#### **Specifications:**









automotive@optalert.com

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