

Standardization for Vehicle Occupant Monitoring Systems (VOMS)

Use cases



Driver attention and drowsiness detection

Monitor the driver's focus on the road and alert them when signs of fatigue or inattention are detected
Mostly cameras (to track eye movements, head pose) and infrared sensors (for eyelid monitoring)



Traffic violation assistance

Detect driver behavior that violates laws (e.g. texting while driving)



Driver identification

Vehicle access and anti-theft protection for commercial vehicles
Detect unauthorized use (car sharing, car rental)



Passenger presence and classification

Detect who is inside the vehicle (adults, children, pets) and their respective locations

Cameras, weight sensors in seats, infrared sensors



Behavior and posture analysis

Monitor passenger and driver posture for signs of discomfort, stress, or unsafe behavior

Provide ergonomic adjustments to seats, warn of unsafe movements



Personalized cabin environment

Adjust the cabin environment based on occupant preferences (including seat position, temperature, lighting)



Detect sleeping children

Adjust cabin conditions



Health and wellness monitoring

Assess the driver's and passengers' vital signs such as heart rate, respiratory rate, or body temperature

Detect medical emergencies like heart attacks, or assess stress levels to adjust vehicle behavior (e.g., comfort settings)

Cameras, radar, wearables integration



In-cabin safety alerts

Detect unsafe conditions such as unfastened seat belts, passengers leaning dangerously out of windows

Cameras, weight sensors, LIDAR



Automatically detect and respond to emergencies

Cameras, microphones, radar (to detect unresponsive passengers)

Trigger emergency calls, provide medical data to first responders, or enable self-driving mode to safely stop the car



Object and luggage detection

Identify objects left behind in the vehicle and alert users before locking the car

Cameras, LIDAR



Emotional state monitoring

Analyze facial expressions, voice tone, and physiological signs to detect anger, stress, happiness

Adjust driving assistance systems (e.g., more supportive braking), suggest calming environments (music or lighting changes)



Gesture recognition

Detect and interpret gestures made by the driver or passengers to control comfort functions such as adjusting music and A/C

Enable touchless control of infotainment systems, improving convenience and reducing distractions