DXC in-vehicle occupant monitoring with the NVIDIA platform

Occupant monitoring systems enhance vehicle safety and user experience by continuously assessing the state and behavior of a vehicle's driver and passengers.

DXC Technology provides in-vehicle embedded software development and testing of autonomous driving and related data engineering and cloud processing, such as occupant monitoring. Our scalable, collaborative services use near-shore capabilities to deliver automotive-grade software that aligns with Automotive SPICE, ISO 26262 and SOTIF standards.

Challenge

Occupant monitoring systems are generally built with proprietary hardware, which can be expensive and often come with high power needs. Development times can be lengthy with specialized hardware integration. Scalability is limited, and specific hardware compatibility is required.

In addition, custom hardware and software dependencies make maintenance and upgrade a complex process.

Solution

Deploy embedded/edge supercomputing applications using the NVIDIA Jetson Orin Nano platform. DXC uses GPU capabilities to implement automotive-grade safety features.

We successfully deployed and used Open Source Computer Vision Library (OpenCV) and MediaPipe on the NVIDIA platform, allowing pretrained artificial intelligence models to be configured by our applications, developed with CUDA, C++ and Python, achieving a high frame rate.

Outcomes

Our approach enables:

- Cost efficiency and affordability

- Power efficiency

- Shorter development times due to transfer learning with pretrained models

- High scalability and flexibility across platforms with minimal adaptation

- High performance for real-time monitoring with optimized pretrained models

- Easy integration with AUTOSAR and standard automotive architectures

- Easy updates due to compatibility with NVIDIA SDKs and libraries

- A well-designed user experience

- Alignment with safety standards such as ISO 26262, ISO PAS 8800 and ISO PAS 21448

This technology can be used to monitor driver attention and fatigue in support of safety-related decision making.

Gaming for safety

We leverage GPU capabilities to implement automotive-grade safety features, such as monitoring driver attention and fatigue. For the NVIDIA GTC 2025 event, these capabilities are presented as two interactive demonstrations:

- **How Long Can You Stare?:** This application tracks eye movement to monitor blinking. It records the number of blinks, the interval between consecutive blinks and the maximum stare duration.

- **Paddle Game:** This application tracks face and head movements. The player moves a paddle using their own head movements while competing in a pong-like game against a paddle controlled by an AI.
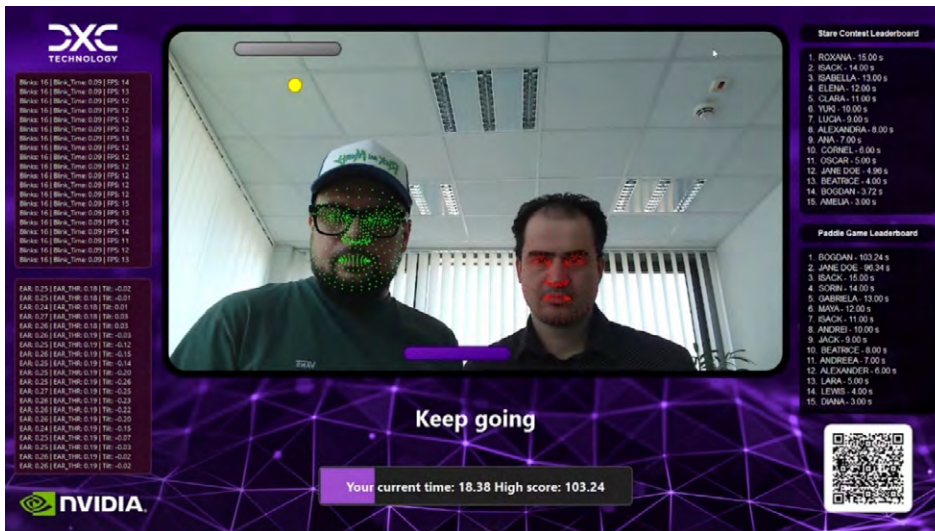
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