

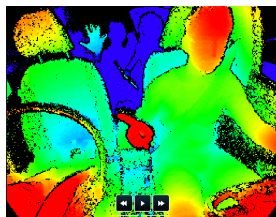


Application brief

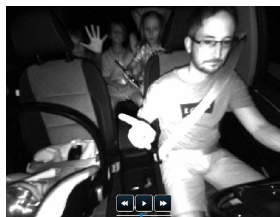
3D in-cabin sensing

Using the 3D Time-of-Flight imager IRS1125A

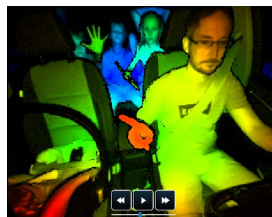
With increasing degrees of automated driving, the driver is more and more released from the original driving tasks and becomes a passenger. As such the car turns into a living place with completely new interior concepts to offer entertainment and possibilities to work or relax. How to support such new HMI concepts? How to ensure high passive safety standards for changing seat positions? The solution is an intelligent car that knows what's happening inside. A Time-of-Flight (ToF) camera is the best option for an in-cabin camera. It provides the most robust 3D data of the interior environment: highly accurate depth data in each pixel and simultaneously a sunlight independent amplitude picture.



Depth data



Amplitude data



ToF: depth + amplitude

The reliable 3D ToF data can be used to support many use-cases:

Enhanced comfort

- › Gesture control and finger tracking
- › Dedicated search lights or functions depending on body pose and movement
- › Passenger classification for automatic setting of pre-defined preferences
- › Recommendation on optimized mirror or seat position

Enhanced occupant safety

- › Passenger detection and seat allocation
- › Fastened seat belt detection
- › Smart airbag: adapt pressure or switch-off depending on situation
 - Head position to airbag (e.g. changing seat positions such as lean back position during autonomous driving modes)
 - Rear-facing baby seat
 - Object on seat or carried by passenger
- › Driver out of position; driver distraction; hands on steering wheel detection
- › Rear seat detection: “Forgotten child and/or pet”

Reach out for the REAL3™ image sensor IRS1125A, a highly flexible ToF single-chip imager with CIF resolution (352 x 288 pixels) tailored for automotive applications – part of Infineon's broad sensor portfolio XENSIV™.

www.infineon.com/real3-automotive

Key features

The Infineon ToF solution based on IRS1125A provides

- › Best performance in strong sunlight conditions with minimum amount of active light
 - ToF-optimized CMOS process
 - Patented Suppression of Background Illumination (SBI) circuitry in every pixel
 - Support of highly modulated infrared light
 - Independent data streams for brightness and distance
- › Small form factor and monocular system architecture
 - Highly integrated single-chip
 - No mechanical baseline
 - No risk of de-calibration over lifetime
- › Reliable mass production
 - Standard soldering process: optical BGA package without need of underfiller material
 - AEC-Q100 grade 2 qualified
 - Fast and easy once-in-a-lifetime camera calibration

In corporation with
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In addition to the use-case optimized ToF camera, application software is key for functionality, performance and user experience. Gestoos, an independent software partner, is a leading provider of gesture detection & human behavior recognition technology. The company's core technology is a Computer Vision based Artificial Intelligence solution that detects, understands and responds to natural human behavior. From explicit hand gestures to implicit expressions and movements, Gestoos' patented technology enables high precision tracking of shapes, objects and movements. Gestoos' embedded solutions are hardware agnostic and available for multiple industries.

Whether for today's cars or tomorrow's level 5 autonomous vehicles, Gestoos' ability to precisely track and detect any combination of shape plus movement enables the creation of new, enhanced multimodal user experiences. Users can interact naturally with any device, software solution or application either proactively by the user or reactively through cabin and occupant monitoring. Automotive applications are many including: driver and passenger monitoring for increased safety, much improved infotainment ergonomics, enriched content interaction and behavior understanding – all of which will be increasingly important in upcoming autonomous vehicles.

Gestoos artificial intelligence for automotive uses shape and object recognition to detect human gestures and behaviors in context. Used in combination with voice assistance and other multimodal interactions, Gestoos software provide solutions for the following use cases and applications:



Infotainment interaction

Gestoos allows drivers and passengers to interact freely using air-gestures connecting each gesture with a command to the main infotainment system as well as the backseat system. It provides easy multi-user, touch-free interaction with the infotainment system, which is less distracting to the driver and more comfortable for the other passengers in the car.



Driver awareness

Gestoos' in-car environment detection solution keeps track of driver's attention on the street. Gestoos can detect driver carelessness or signs of drowsiness. By keeping track of the position of the head of the driver, the system can warn the driver to keep an eye on the road or take a rest. Knowing the driver status can be key for transitioning control from car to driver. (upcoming release).



Passenger monitoring

Gestoos' driver monitoring solution detects the existence of both driver and passengers and can monitor for specific activities or behaviors. Automatically adjust vehicle climate control systems and seat configuration according to passenger size and location. Help avoid accidents of children or pets through Gestoos' detection and understanding of car occupants.

Gestoos' unique features

Gestoos provides gesture control and passenger detection simultaneously for every person in the car. Technology benefits include lower CPU requirements, higher flexibility, no connectivity requirements and on-device incremental learning. Solutions are available for multiple software platforms (Linux, Android, Windows and Mac OS) and camera technologies (depth/RGB/IR).

For more information visit gestoos.com or contact us at info@gestoos.com

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