

In-vehicle detection of distracted driving using mmwave radar technology

Background

Distracted driving is a serious problem that can lead to fatalities. Identification of distracted driving is commonly performed with machine learning methods using cameras. The use of cameras is invasive and requires significant amounts of processing power to be performed in real time. Additionally, current solutions lack the ability to rapidly calibrate to different operators. Mmwave devices require smaller data input sizes, potentially allowing for rapid calibration of devices before use, in addition to being non-invasive since no optical data is recorded. Mmwave devices also generate a 3D scattered image of the interior of the vehicle, which gives more spatial information than optical imaging, which generates a 2D image, potentially allowing for more precise classifications given more identifiable information.

Description of the invention

This technology employs a wireless transceiver in the millimetre-wave (mmwave) frequency range of 30GHz to 300GHz. Designed to be mounted on the dashboard of a vehicle, the device transmits a sequence of signals that are reflected by the upper body of the vehicle operator. The received signals are then processed to determine the direction the operator is facing and to assess if the operator is distracted while driving the vehicle. Prior to vehicle operation, the device will calibrate to the operator, allowing for accurate classification of the current actions of the operator for more precise detection of distracted operation.

Advantages

This technology makes use of off the shelf vehicle sensors and is able to identify a distracted or drowsy driver anonymously as it uses mmwave radar sensors and not optical sensors. This protects the drivers privacy and does not run afoul of any privacy laws. This mmwave sensors are also able to penetrate large winter coats and monitor a drivers vital signs. This technology has low processing requirements and offers rapid calibration to different operators.

Potential applications

- Detection of distracted or drowsy driver.
- Anonymous operation, no optical sensors are used, hence a driver's privacy is maintained.
- Detection even in winter time when a driver may be wearing a thick winter coat.

Reference

10171

Patent status

Patent Pending

Stage of development

Prototyped
Ongoing research

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