

Improving Passenger Safety in Cars Using Novel Radar Signal Processing

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Abstract

We present a novel radar signal processing technique to identify the presence or absence of a living body in a vehicle using a mm-wave frequency-modulated continuous-wave radar. Unlike traditional detection methods which are mostly based on constant false alarm rate (CFAR), our proposed method extracts and monitors the consistent Doppler effect of received signals from the radar antenna resulting from the consistent breathing of living bodies over time. The proposed method works in all types of cars without the need for threshold definition for tracking as well as no need for training. Hence, the algorithm is more robust, accurate and fast. We assess our proposed signal processing with two phantoms mimicking the breathing of children and with adults in the vehicle in various conditions. The system has been proven to be robust in extensive studies over the course of multiple months.

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