

# Anomaly recognition method of perception system for autonomous vehicles based on distance metric

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## Abstract

Environmental perception system is the premise of the safety and stability of the autonomous vehicle system. However, studies have shown that the on-board sensors included in the perception system are extremely vulnerable to external attacks and interference, leading to incorrect driving strategies and bringing great security threats. Aiming at the problem, this paper divides the vehicle-mounted sensors into a positioning group and an identification group according to their role in the perception system. Then, based on the information correlation between sensors in the same group and the information correlation of a single sensor on adjacent time series, the distance metric model between sensors in a group and the distance metric model for each sensor of this group on time series is established. And the normal distance intervals corresponding to the confidence interval are calculated respectively. According to the distance metric model between sensors, we can detect anomalies in the perception system in real-time. Further, according to the distance metric model for each sensor on adjacent time series, we can identify anomaly sensors. Our experimental results quantitatively show that the method achieves real-time anomaly recognition, and demonstrate the effectiveness and robustness of the method on the open-source KITTI dataset.

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