

There has been tremendous interest in self-driving automobiles over the recent past. According to market predictions, achieving advanced levels of autonomous driving may still be significantly far from large-scale commercial deployment. One of the challenges is to obtain reliable environmental perception from onboard automotive sensors, and possibly external sensors, to support safety-critical driving. Automotive perception includes processed and learned information from multi-modality sensors like lidar, camera, ultrasonics, and radar. Conventionally, these sensor functions have been categorized as advanced driver-assistance systems (ADAS) used for applications like emergency braking, adaptive cruise control, and self-parking systems. This special issue will explore advances in sensors, sensor system architectures, data processing and machine learning for automotive perception. This special issue also aims to bridge the traditional model-based automotive sensing field with the rapidly emerging data-driven field that uses machine learning methods and focuses on feature representation for high-level semantic understanding. Driven by the efforts on automotive sensor hardware platforms and open datasets, vision-inspired deep learning has shown great potential to achieve state-of-the-art performance and yield better results than traditional signal processing methods in object detection, multi-object tracking, simultaneous localization and mapping (SLAM), trajectory prediction, multi-modal sensor fusion, scene understanding, and interference mitigation. This special issue will highlight advances in machine learning architectures and methods for automotive perception. Of interest are also performance evaluation methodologies, field test results and sensor datasets for automotive applications.

This Special Issue will showcase the state-of-the-art in Sensing and Machine Learning for Automotive Perception. Original research contributions and review papers are sought in related areas including (but not limited to):

- Sensors and sensor architectures for automotive perception
- Learning-based automotive sensor object detection
- Multiple object tracking
- Learning-based automotive sensor imaging
- Point Cloud Segmentation
- Physics-driven deep learning for reliable automotive sensor perception
- Interference-robust automotive sensing
- Cross-modal supervised learning from other sensor modalities
- Self-supervised learning for automotive sensor perception
- Automotive multi-sensor fusion
- Automotive sensor SLAM
- V2X and V2V enabled perception
- Automotive-sensor datasets and field results
- Validation and evaluation methods for data-driven sensor systems

Manuscripts submitted to the special issue should maintain an explicit focus on sensors, sensor architectures, sensor data processing or sensor systems, to be considered within the scope of the IEEE Sensors Journal. All solicited and invited papers shall undergo the standard IEEE Sensors Journal peer review process. All manuscripts must be submitted on-line, via the *IEEE Manuscript Central*, see <http://mc.manuscriptcentral.com/sensors>. Choose the special issue listed in the dropdown menu during submission. For manuscript preparation and submission, please follow the guidelines in the *Information for Authors* at the IEEE Sensors Journal web page, <http://www.ieee-sensors.org/journals>

Deadlines

- Manuscript Submission: September 1, 2022
- Notification of Acceptance: January 31, 2023
- Final Manuscripts published in IEEExplore: March, 2023

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