



IEEE Transactions  
on Radar Systems

## CALL FOR PAPERS

IEEE Transactions on Radar Systems (T-RS)

*Special Section on Artificial Intelligence Approaches  
for Radar Processing and Applications*

### Aims and Scope

In recent years, the combination of Artificial Intelligence (AI) and Machine Learning (ML) approaches with radar technology has revolutionized multiple domains and applications. This special section explores AI approaches for radar processing and applications, demonstrating their transformative potential and challenges in diverse areas, from automotive to human healthcare and gesture recognition, to more conventional domains of radar surveillance and remote sensing. The potential applications of AI in radar technology are vast, spanning beyond the conventional notion of automatic target recognition to also include areas such as radar resource management via reinforcement learning and hardware design, whereby AI techniques can support the design and optimization of radar components and subsystems.

Despite this great promise, challenges remain. The complexity of radar data and the need for large-scale training datasets pose hurdles, especially when confidentiality issues hamper the public sharing of data. Furthermore, ensuring generalization and interpretability of AI-driven radar systems is crucial, especially in safety-critical domains such as automotive and defense. This special section aims to be a platform to showcase the latest research and insights in this area, promoting further collaboration among experts.

### Topics of Interest include:

**All aspects of AI radar techniques, system designs, and applications involving:**

- AI/ML methods in automotive radar: object detection, tracking, and classification
- AI/ML methods for radar-based ego-motion estimation and SLAM approaches
- AI/ML methods in healthcare applications of radar: human activity recognition, gait analysis, and vital signs monitoring
- AI/ML methods in gesture sensing classification and sign language interpretation
- AI/ML methods for cognitive radar and radar resource management
- AI/ML methods for spectrum sensing, sharing, and usage optimization
- AI/ML methods for automatic target classification for SAR and ISAR images
- AI/ML methods for radar-based surveillance and safety
- AI/ML methods for target and intent recognition based on radar signatures
- AI/ML methods for radar imagery classification in through-wall, ground penetrating, and non-line-of-sight conditions
- AI/ML methods for radar hardware components and sub-system design
- Experimental verification and prototypes of implementation of AI based methods for radar applications
- Techniques and approaches for explainable and interpretable AI in radar
- Techniques for neural network based radar signal processing, and hybrid techniques combining model-based approaches with neural networks
- Techniques for augmentation, generation, and annotation/labeling of radar data

### Important Dates:

Manuscript submission due: ~~15 July 2024~~ – extended to 29 July 2024  
First review completed: 31 August 2024  
Revised manuscript due: 1 October 2024  
Second review completed: 1 November 2024  
Final manuscript due: 30 November 2024  
Publication date: December 2024

Submitted manuscripts will be reviewed according to standard T-RS procedures for regular papers. Prospective authors should visit <https://iee.atyponrex.com/journal/tradar-ieee> for additional information. When submitting, use the category **AI-Radar**. Manuscripts deemed to be outside the scope of the special section but otherwise still appropriate for T-RS will be redirected internally.

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