

Special Issue

Bridging the Gap between Deep Learning and Probabilistic Inference for Advancements in Robotics

Message from the Guest Editors

In recent times, the field of robotics has witnessed remarkable advancements propelled by the integration of artificial intelligence (AI) and machine learning (ML), particularly deep learning, into robotic systems. These developments have propelled robots to accomplish tasks with unprecedented levels of performance. This has spurred a reconsideration of the traditional probabilistic inference algorithms that have long been relied upon for reliable operation in uncertain and unstructured environments.

Concurrently, the paradigm of robot learning has gained significant momentum. It holds the promise of enabling robots to generalize their capabilities across a spectrum of scenarios, mitigating the necessity for the meticulous engineering of task-specific models, which is a hallmark of classic probabilistic methods. Yet, a fundamental question persists: can we entrust robots with dependable and adaptive behaviors solely through data-driven learning approaches?

Addressing this question lies at the heart of this Special Issue: Bridging the Gap between Deep Learning and Probabilistic Inference in Robotics.

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