

Uncertainty-Aware Action



[Credit: Image is generated by AI]

Overview

Robots operating in real-world environments must continuously make decisions under uncertainty arising from incomplete observations, imperfect models, changing environments, and human interactions. While modern learning-based policies can achieve impressive performance, they often struggle to assess the reliability of their actions and may fail unpredictably when faced with unfamiliar situations.

This research direction focuses on developing uncertainty-aware decision-making and control frameworks that enable robots to act safely, efficiently, and robustly in complex environments. We are particularly interested in combining machine learning, probabilistic inference, and robotics to create autonomous systems that can reason about uncertainty while interacting with the physical world.

Research Topics

Examples of topics of interest include, but are not limited to:

- Shared Autonomy
- Active Learning
- Decision-Making Under Uncertainty
- Visual Imitation Learning

- Vision-Language-Action (VLA) Models
- World Models for Robotics
- Safe Robot Learning

with an emphasis on:

- Probabilistic Inference
- Uncertainty Quantification
- Bayesian Decision Making

Prospective Students and Researchers

We welcome highly motivated PhD students and postdoctoral researchers with backgrounds in Robotics, Machine Learning, Artificial Intelligence, Computer Vision, Control, Applied Mathematics, Statistics, or related fields.

Candidates interested in this research direction are encouraged to follow the instructions on the PI website and make an application.