Talk 1: Intelligent Optimization and Decision-making in Multi-Agent Systems

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Abstract: Multi-agent systems are rapidly developing, demonstrating tremendous potential in fields such as UAVs and autonomous driving. This talk addresses issues of intelligent optimization decision-making, unfolding discussions in two parts: intelligent optimization and game-theoretic decision-making. The optimization section encompasses distributed optimization, key node identification, and separability analysis. For asynchronous fixed optimization and synchronous online optimization problems, dynamic event-triggered and edge-based event-triggered mechanisms are introduced to reduce communication resource consumption, simultaneously identifying key nodes that play a pivotal role in large-scale clusters, and further establishing the criteria for decoupling separable large-scale optimization problems. Game-theoretic decision-making includes analytic games and reinforcement learning-based games. Analytic games construct inter-cluster member game models to derive individual optimal strategies through mathematical analysis, while reinforcement learning-based games emphasize resolving game strategies under imperfect information through trial-and-error using deep learning methods.

Talk 2: Intelligent Perception, Understanding, and Manipulation in Complex Situations

Abstract: The perception and understanding of intelligent autonomous unmanned systems are current research hot topics in the field of artificial intelligence, where the accuracy and generalization of perception capabilities are crucial for system reliability. This report will focus on how to enhance the accuracy and transferability of system perception with low-cost sensing units, as well as achievements in embodied manipulation. In particular, the situations under weak lighting are studied under depth estimation and robotic manipulation, under the help of deep learning and large language models (LLM). Finally, the report summarizes and prospects future research directions in perception, understanding, and manipulation within intelligent unmanned systems.