

*Optimal task assignment in Holonic Multi-Agent Systems has emerged as a pivotal problem in modern distributed systems, improving both resource efficiency and system scalability. Despite substantial gains in agent coordination, many large-scale systems still suffer from poor job allocation, resulting in performance bottlenecks and resource waste. Effective task assignment is critical for these systems, since it influences individual agent performance and overall adaptability. Holonic Multi-Agent Systems provide a flexible and robust approach to managing complex, distributed systems by organizing agents into hierarchical structures, known as holons. These holons operate autonomously yet cooperate to achieve system-wide goals. A significant challenge within HMAS is ensuring optimal task assignment while resolving performative inconsistencies, such as role conflicts and coordination failures among agents. This research proposes a novel optimization framework to address these inconsistencies, enabling more efficient task allocation in HMAS. The proposed method integrates hierarchical task decomposition, agent capabilities, and system constraints to dynamically assign tasks in real-time. We present an objective function that minimizes task completion time, resource usage, and task priority while accounting for performative inconsistencies. The effectiveness of the approach is demonstrated through real-world scenarios, including smart transportation system.*