

Pierce Walker-Howell

Herz Global Impact Award

Ph.D. Student, Robotics

First Year ARCS Scholar

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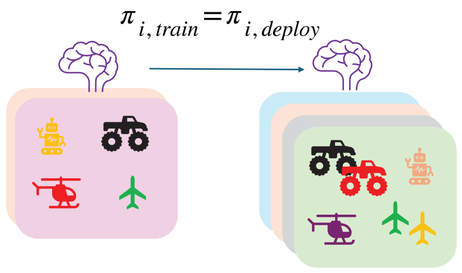
Improving Representations and Neural Architectures for Multi-Robot Learning

Solving real-world problems, like fighting wildfires, can benefit from multi-robot teams capable of autonomous communication and coordination. My research aims to achieve these capabilities by advancing multi-robot learning algorithms to be more adaptable, scalable, and efficient.

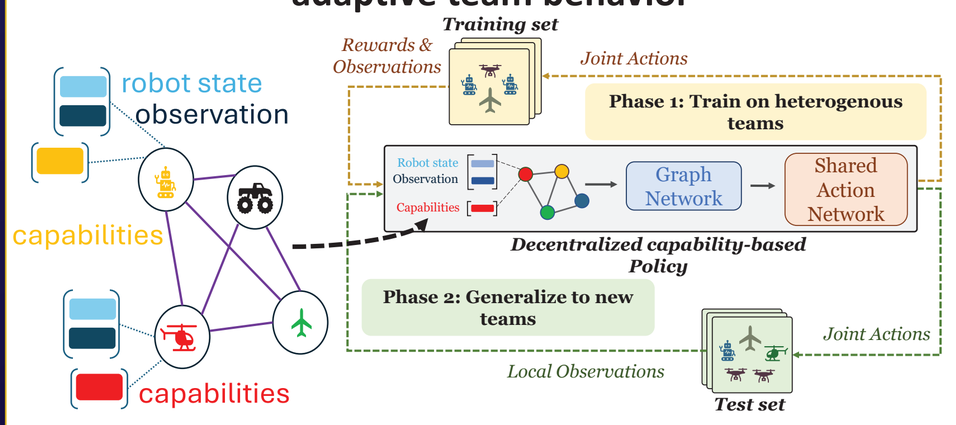
Robots must be able to reason about individual and collective capabilities to adopt the best possible roles within a team





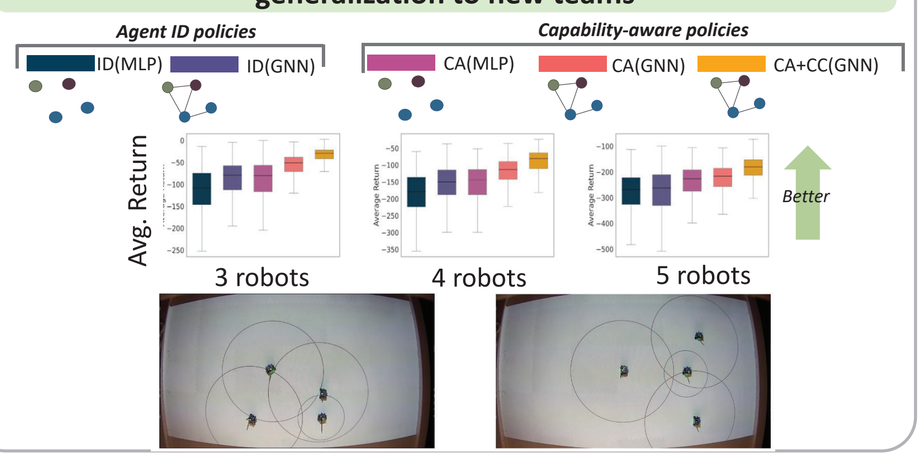
We need team behaviors that can transfer and adapt to new teams with minimal tunning or retraining

Learning with explicit reasoning of capabilities enables adaptive team behavior

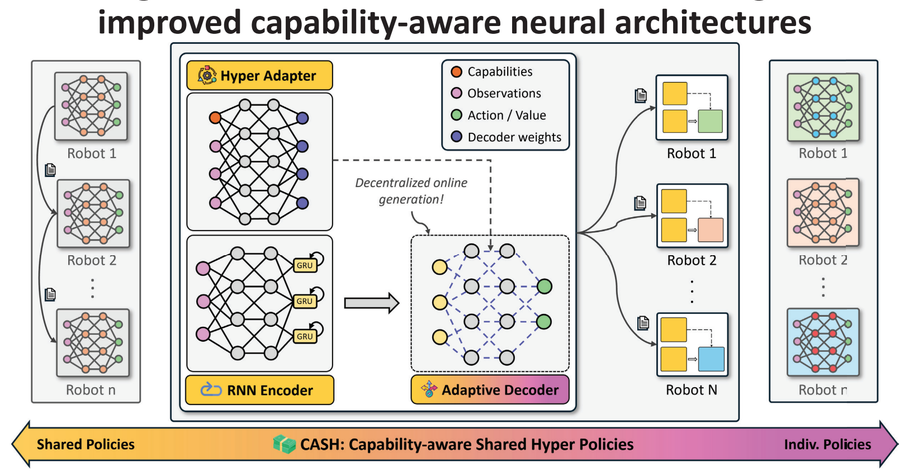


P. Howell, M. Rudolph, R. Torbati, K. Fu, H. Ravichandar. *Generalization of heterogeneous multi-robot policies via awareness and communication of capabilities.* CoRL, 2023.

Capability-awareness improves learned behaviors and generalization to new teams



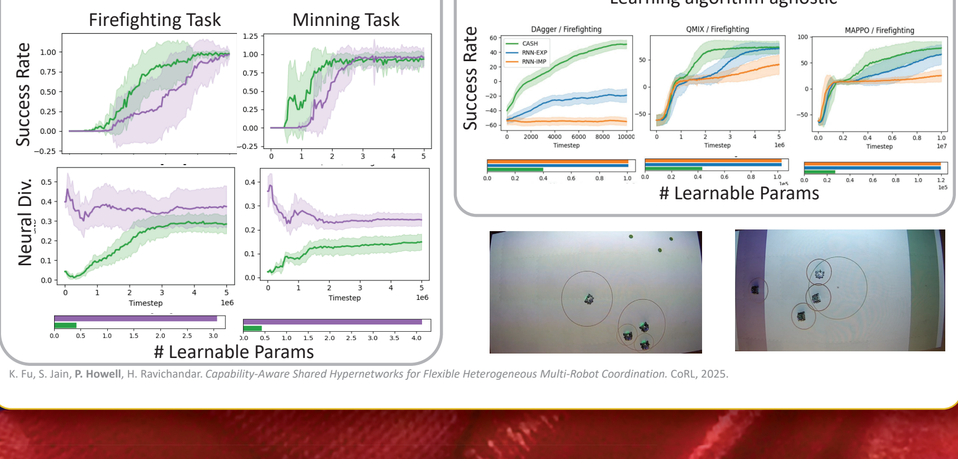
Learning flexible and diverse coordination strategies with improved capability-aware neural architectures



K. Fu, S. Jain, **P. Howell**, H. Ravichandar. *Capability-Aware Shared Hypernetworks for Flexible Heterogeneous Multi-Robot Coordination.* CoRL, 2025.

Achieve comparable diversity with individual parameter methods, but do so more efficiently

Improve performance compared to shared-parameter methods, also more efficiently



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