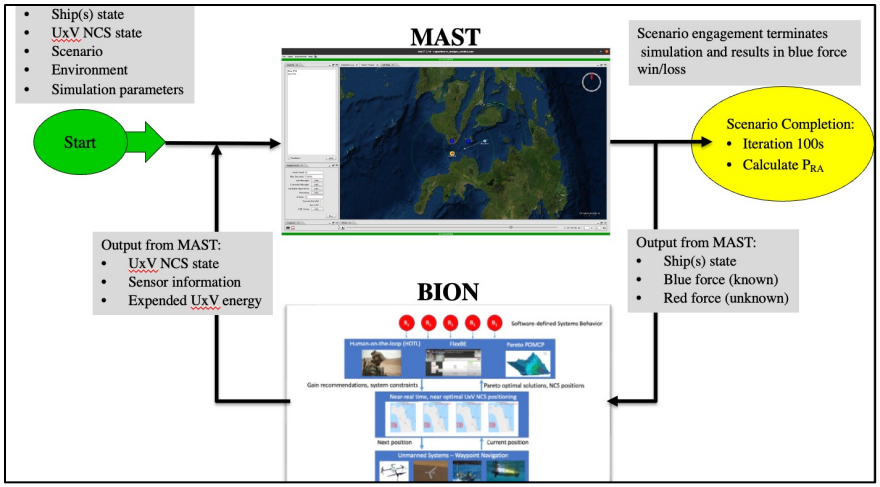
Generative AI for Temporal Policy Planning for Robotic Collaborative Control

CRUSER
Consortium for Robotics and Unmanned Systems Education and Research



Problem Statement

- **Overview**: In path planning, reward functions are a key component that are currently arbitrarily defined by information-theoretic measures. This results in limited performance for many problems
- **Goal**: Develop a generative AI spatial "reward surface" for information-theoretic path planning for collaborating unmanned systems.
- **Approach**: Use a combination of Recurrent Neural Networks (RNNs), POMCP for gain selection and Reinforcement Learning through Demonstration for learning reward surfaces over time to ensure effective mission performance.

Impact

- **Contributions**: This is a novel approach. The development of a generative process of a control function z=(x,y,t) with guarantees of strong mission performance is significant. It can be used to overcome the known limitations associated with techniques similar to artificial potential fields.
- **Warfighter impact**: Leveraging the strength of iterative computation enables develop of policies with far better performance and greater autonomy for coordinated behaviors.
- **Success measured**: How the generated surfaces over time help to produce policies over time that significantly improve mission performance.

Transition

- Anyone fielding unmanned systems interested in greater autonomy.
- ONR, DARPA, PMS-340, PMS-408, PMS-406, MCTSSA, NSW, EOD

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