Bayesian Aggregation for Deep Reinforcement Learning in Swarms

**Description**

In this work, we want to apply Bayesian aggregation [3] as a new compact representation of neighborhood constellations in deep reinforcement learning for swarms. In previous work [2], simple mean aggregation was used which gave equal weight to all pieces of information in a neighborhood. With this new approach, we believe we can automatically give more weight to more important information while neglecting less useful information. This should result in better and faster policy learning in swarms.

**Tasks**

In this thesis, you should

- Get familiar with Deep RL methods (PPO, SAC)
- Implement baseline method
- Implement Bayesian Aggregation for swarm state processing
- Evaluate on simple point mass swarm task and more complex swarm robotics environments

![Figure 1: A swarm of robots collaborates to collect four separate objects and assembles them (picture taken from [1])](image)

**References**

