Deep Reinforcement Learning for Complete Coverage Path Planning in Unknown Environments

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Motivation

▶ Planning, on the fly, a path from a starting position such that the **robot covers every point in an initially unknown spatial environment**.

▶ Currently,

    ▶ Finding an optimal path that visits every node in a graph exactly once is **NP-hard problem**.

    ▶ **Approximate and heuristic solutions** are usually used for the complete coverage path planning task.

    ▶ Most methods rely on the **a priori knowledge of the map of the environment** and cope with unknown obstacles detected by range sensors.

▶ Objectives:

    ▶ **Partially or completely unknown environments** (i.e. exploration task).

    ▶ Cover as close to 100% of the land as possible.

    ▶ Avoid double coverage of areas.

    ▶ Avoid obstacles and impassable areas.

    ▶ Be as efficient as possible, i.e., keep costs to a minimum to prevent unnecessary, wastage of time and resources

Contributions

Part 1 : Learning Correlated Equilibria

Motivation

Part 2 : Constrained Correlated Equilibria

Motivation

Thank you!

Questions?

For more information:

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