

Model Free Reinforcement Learning

Application to Area Coverage Optimization

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Friday, January 31, 2020

Outline

- Recap
- Results
- Current Milestone
- Upcoming Milestones

Objective

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Our Goal is to find optimum policy that eliminates the tracking error

$$u = [v, \gamma]$$

(1)

$$\mathbf{e}_k = \begin{bmatrix} x_k^{[\ell]} - x_k - d \cos \theta'_k \\ y_k^{[\ell]} - y_k - d \sin \theta'_k \\ \theta'_k - \theta_k \end{bmatrix} \quad (2)$$

Problem Setup

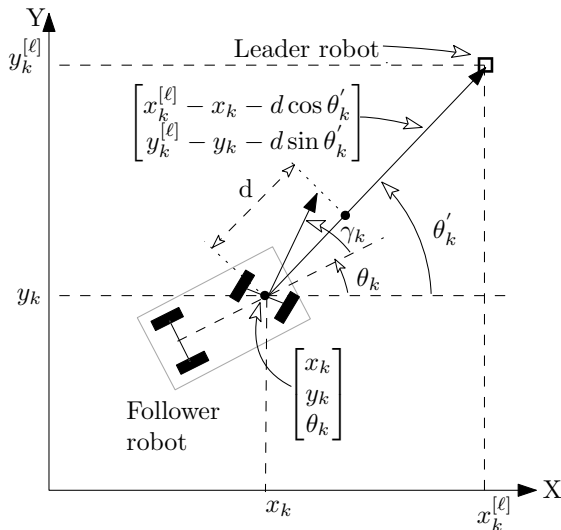


Figure: Problem Setup

Random Path

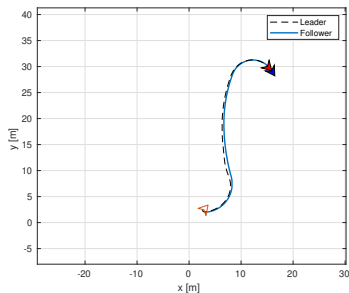


Figure: trajectory

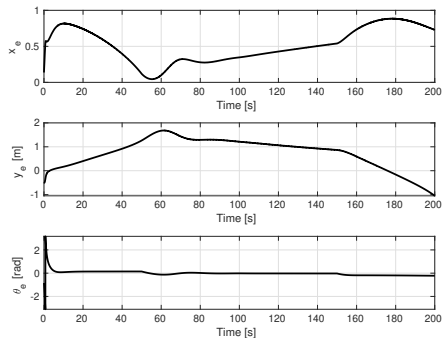


Figure: Error

Latest Achievement

Objective

Successfully Simulated the EDU-Mod in V-rep simulation platform and integrated with matlab.

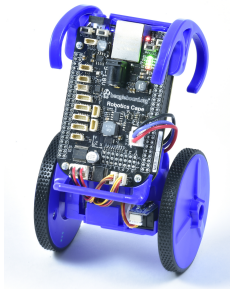


Figure: EduMip robot

Objective

Generalize the application of the Model Free Reinforcement Learning algorithm to solve the area coverage problem and simulate the results using V-rep platform which now known as CoppeliaSim.

Questions?