Model Free Reinforcement Learning

Application to Area Coverage Optimization

Amr Elhussein
Advisor: Dr. Suruz Miah

Department of Electrical and Computer Engineering
Bradley University
1501 W. Bradley Avenue
Peoria, IL, 61625, USA

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BRADLEY University

Outline

- Recap
- Results
- Current Milestone
- Upcoming Milestones

Objective

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

$$u = [v, \gamma] \tag{1}$$

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

Problem Setup

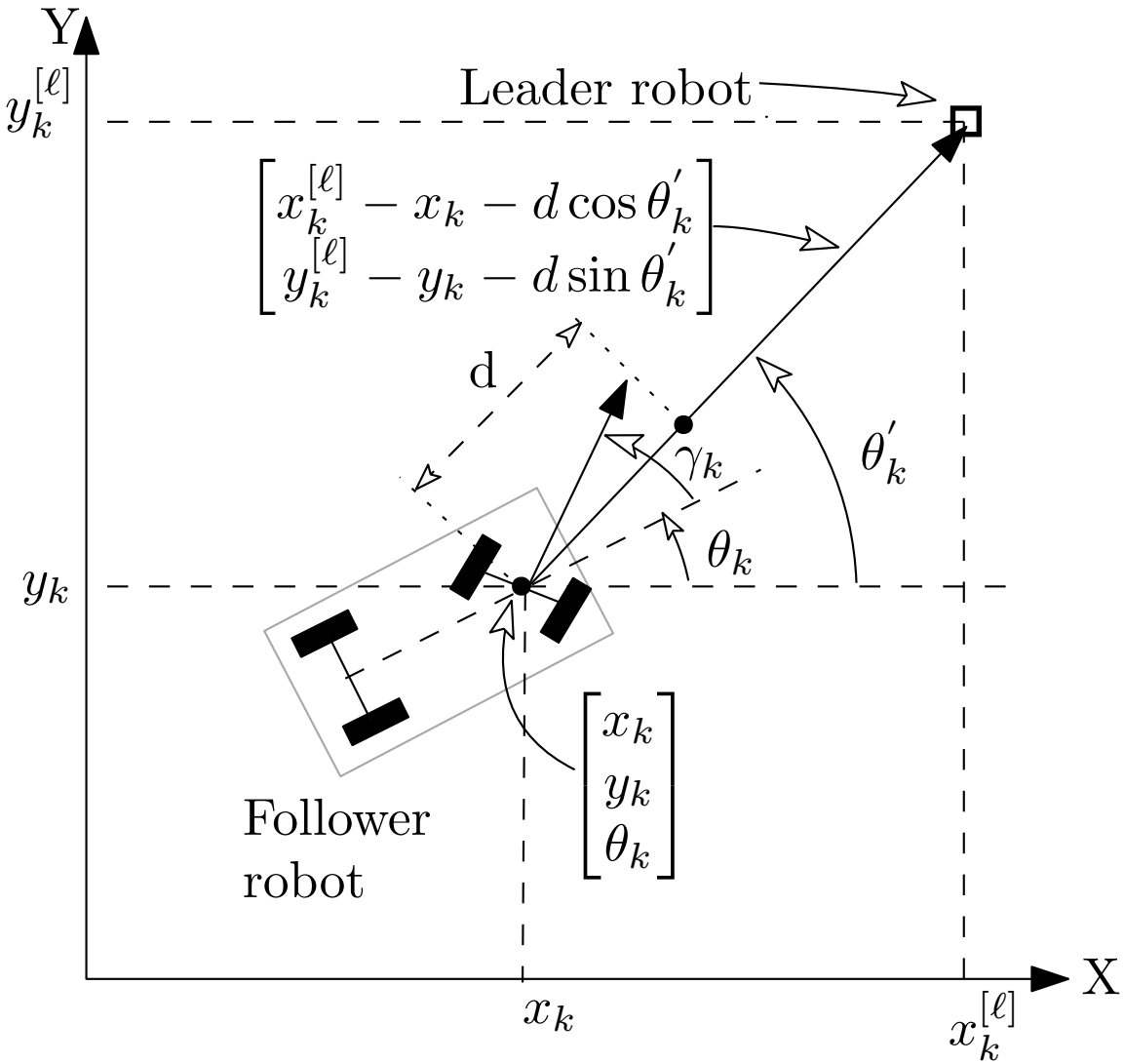

Figure: Problem Setup

Random Path

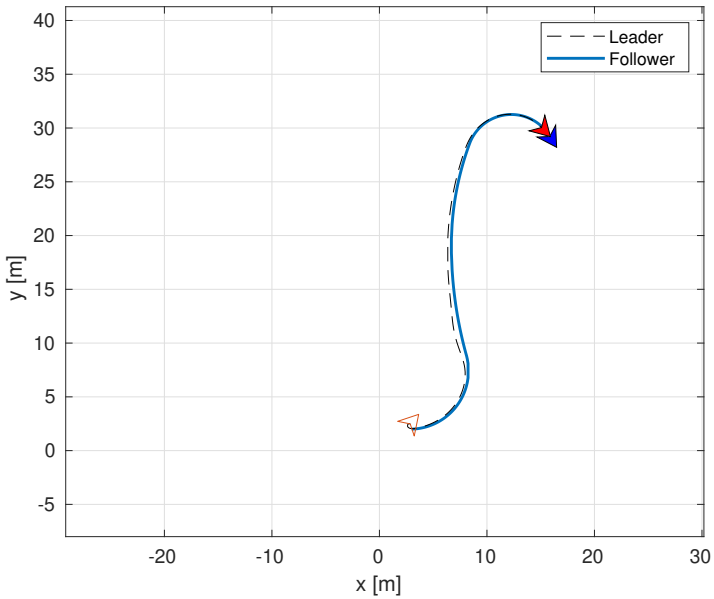

Figure: trajectory

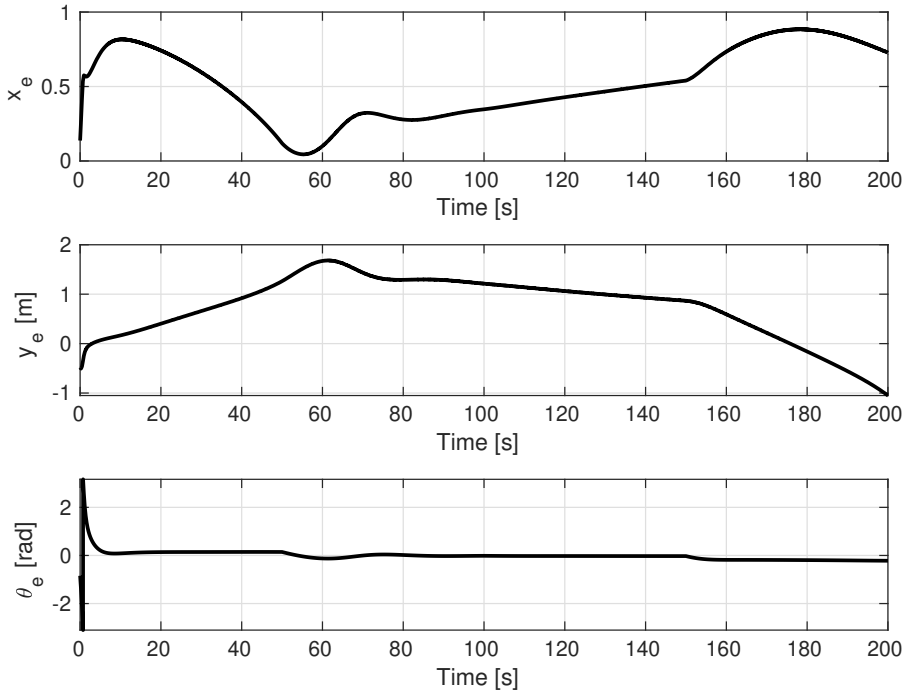

Figure: Error

Latest Achievement

Objective

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

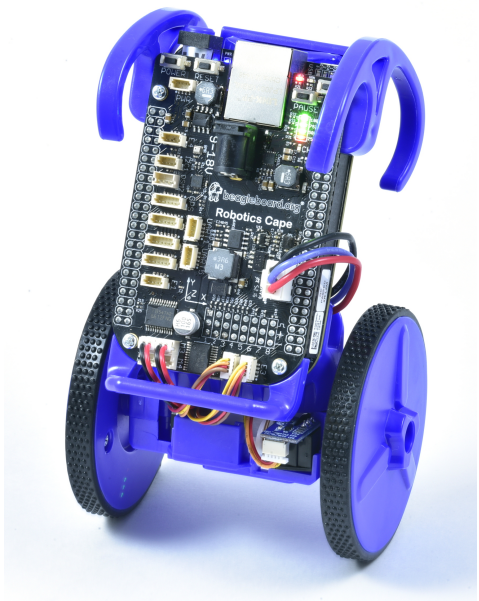

Figure: EduMip robot

Upcoming Milestones

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?