PYTHON HACKATHON

Control of Swarm of Mobile Robots in Unknown Environment

A few elementary and one advanced project in the domain of swarm robotics will be covered. I shall focus more on developing control algorithms to facilitate navigation of swarm of mobile robots in an unknown environment.

Topics to be covered

1. Introduction to Swarm Robotics.
2. *Go To Goal* behavior.
3. *Obstacle Avoidance* behavior.
4. Simple Navigation using a **Hybrid Automata** in circular environment.
5. Solving Consensus Problem or Rendezvous problem.
6. Consensus with obstacle avoidance and flocking using **Null Space Behavioral (NSB) control**.

Pre-requisites

1. Good understanding of Linear Algebra, Differential Equations.
2. Programming in any language.

Difficulty Level

The initial control algorithms and their computer implementation will be very simple but advanced swarm robotics problems will be difficult to realize and implement. I shall do my best to make it look less scary!!!

Organization

I shall initially discuss mathematical formulations, followed by the involved control algorithm, implementation subtleties and then the participants are supposed to code and visualize the end result by means of computer simulations. I shall be using MATLAB for demonstration. Participants have freedom to code in any programming

language of their interest. Prior exposure to MATLAB is not necessary but will definitely be helpful.

Hoping to see you at the **SWARM HACKATHON** on **29th March, 2014, NIT GOA at 2:00 PM.**

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