Distributed Intelligent Systems
Lab 8 Tutorial

Zeynab Talebpour

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Exploring PSO

- First portion of lab: run PSO on two benchmark functions: Sphere and Rastrigin function using SwarmViz
- Observe how swarm acts when varying parameters
PSO for Robotic Learning

- Second part of lab: PSO with an Artificial Neural Network to do unsupervised robotic learning
- Design a fitness function for obstacle avoidance
  – Compare with the fitness proposed by Floreano and Mondada
- How is the performance affected by PSO parameter variations
SwarmViz

- Make sure you only have the indicated plots marked
- Fitness landscape plot
  - A history of all particles
  - Colors indicate fitness values
- Trajectory plots
  - Movement of particles
  - Previous positions can also be plotted
SwarmViz

Fitness Landscape

Euclidean Distance

Comparison of Fitness (Best and average)
Pso_sup.c

• Main()
  – Initialize world
  – Best = pso()
  – Evaluate best

• Calc_fitness()
  – Reposition robots randomly
  – Send candidate solutions to robots
  – Evaluate fitness
  – Return fitness

Pso.c

• Pso()
  – Initialize swarm
  – For each iteration
    • Move particles
    • Evaluate particles
  – Return best particle

Obs_con.c

• Main()
  – Initialize robot
  – Receive weights from supervisor
  – Run controller with weights
  – Send sensor data to supervisor
Notes and Clarifications

• Please fill in the Feedback Forms on Moodle
• The performances for robotic learning are printed in the console of Webots