



Apr 11th, 2007 - 10:00 AM

Comparison of Particle Swarm Optimization and Greedy Search for Collective Robotic Search in a Complex Environment

Lisa L. Smith

Missouri University of Science and Technology

Follow this and additional works at: <https://scholarsmine.mst.edu/ugrc>

Smith, Lisa L., "Comparison of Particle Swarm Optimization and Greedy Search for Collective Robotic Search in a Complex Environment" (2007). *Undergraduate Research Conference at Missouri S&T*. 5.
<https://scholarsmine.mst.edu/ugrc/2007/oure/5>

This Presentation is brought to you for free and open access by Scholars' Mine. It has been accepted for inclusion in Undergraduate Research Conference at Missouri S&T by an authorized administrator of Scholars' Mine. This work is protected by U. S. Copyright Law. Unauthorized use including reproduction for redistribution requires the permission of the copyright holder. For more information, please contact scholarsmine@mst.edu.

Lisa L. Smith

Department:	Electrical & Computer Engineering
Major:	Electrical Engineering
Faculty Advisor(s):	Dr. G. K. Venayagamoorthy
Advisor's Department:	Electrical & Computer Engineering
Funding Source:	UMR Opportunities for Undergraduate Research Experiences (OURE) Program

Comparison of Particle Swarm Optimization and Greedy Search for Collective Robotic Search in a Complex Environment

Collective Robotic Search (CRS) is useful in applications such as radioactive source detection where little to no human intervention is desired. In CRS, a group of intelligent mobile robots collectively explores a dangerous environment in order to locate and converge on a specified target. This project applies two search algorithms, Particle Swarm Optimization (PSO) and greedy search, to a CRS problem containing an environment with multiple targets and obstacles where the entire swarm of robots is needed to complete the desired task. The simulation results for both methods are compared on the following: simulated run time, number of evaluations, distance traveled by the robots, resilience against communication and robot loss, and target convergence percentage. Simulation results show that PSO performs better than greedy search in terms of convergence time, distance traveled, and adaptability, for CRS problems requiring the entire swarm of robots for collective mission completion.

Lisa Lorena Smith is a senior undergraduate student at the University of Missouri-Rolla, majoring in Electrical Engineering. Lisa is a member of the Real-Time Power and Intelligent Systems Laboratory at UMR.