

A Modified Particle Swarm Algorithm for Robotic Mapping of Hazardous Environments

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This paper describes a modification of the Particle Swarm Optimization (PSO) algorithm for mapping hazardous areas. The proposed algorithm applies to a swarm of intelligent mobile robots, which have a task of mapping the perimeters of environmental hazards. The algorithm recognizes hazard intensity variation, with the potential to track temporal and spatial changes in the hazardous region. A graphical visualization of the algorithm using simulation is presented. The simulator is capable of providing a variety of schemes for depicting prevalence of hazard types and intensities. The simulator allows changing the numbers in a swarm and other control parameters. The representation of the objective function for the PSO is adapted for use in this problem. This algorithm is applicable for ad-hoc wireless networks of intelligent robots, searching the source of an environmental or biological radiation hazard using appropriate sensors.

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