

RANGED SUBGROUP PARTICLE SWARM OPTIMIZATION FOR LOCALIZING MULTIPLE ODOR SOURCES

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Abstract- A new algorithm based on Modified Particle Swarm Optimization (MPSO) that follows a local gradient of a chemical concentration within a plume and follows the direction of the wind velocity is investigated. Moreover, the niche or parallel search characteristic is adopted on MPSO to solve the multi-peak and multi-source problem. When using parallel MPSO, subgroup of robot is introduced then each subgroup can locate the odor source. Unfortunately, there is a possibility that more than one subgroup locates one odor source. This is inefficient because other subgroups locate other source, then we proposed a ranged subgroup method for coping for that problem, then the searching performance will increase. Finally ODE (Open Dynamics Engine) library is used for physical modeling of the robot like friction, balancing moment and others so that the simulation adequate to accurately address the real life scenario.

Index terms: Modified Particle Swarm Optimization, Multiple Odor Sources Localization, Parallel Search, Subgroup, Open Dynamic Engine, Real Life Scenario