

Research on global path planning based on ant colony optimization for AUV^(PDF)

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Title: Research on global path planning based on ant colony optimization for AUV

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摘要: Path planning is an important issue for autonomous underwater vehicles (AUVs) traversing an unknown environment such as a sea floor, a jungle, or the outer celestial planets. For this paper, global path planning using large-scale chart data was studied, and the principles of ant colony optimization (ACO) were applied. This paper introduced the idea of a visibility graph based on the grid workspace model. It also brought a series of pheromone updating rules for the ACO planning algorithm. The operational steps of the ACO algorithm are proposed as a model for a global path planning method for AUV. To mimic the process of smoothing a planned path, a cutting operator and an insertion-point operator were designed. Simulation results demonstrated that the ACO algorithm is suitable for global path planning. The system has many advantages, including that the operating path of the AUV can be quickly optimized, and it is shorter, safer, and smoother. The prototype system successfully demonstrated the feasibility of the concept, proving it can be applied to surveys of unstructured unmanned environments.

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