

Real-time planning for the cooperative discovery of unknown graph by the multi-agent dynamical system

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We propose a solution to the problem of discovering an unknown graph by the multi-agent dynamical system.

The basic idea for the proposed algorithm comes from the HEDAC (Heat Equation Driven Area Coverage) method introduced by Ivić, Crnković and Mezić in [1]. This method has already been successfully applied for motion control for multi-agent non-uniform spraying [2] and for motion control for autonomous heterogeneous multi-agent area search in uncertain conditions [3].

The proposed algorithm uses a potential field to discover an unknown graph with a built-in cooperative behavior of agents which includes collision avoidance, coverage coordination, and optimal path planning. The algorithm is robust, adaptive, scalable and computationally inexpensive which enables real-time planning.

We will present the application of the proposed algorithm for discovering different types of graphs.

As the problem of discovering an unknown graph is related to the examination of social networks, computer networks and maze exploration, the proposed algorithm will be applied in solving problems in this area.

References

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