Distributed Coverage-Enhancing Algorithms in Directional Sensor Networks with Rotatable Sensors

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Abstract

Directional sensor network is composed of many directional sensor nodes. Unlike conventional sensors that always have an omni-angle of sensing range, directional sensors may have a limited angle of sensing range due to technical constraints or cost considerations. Therefore, it is possible that when a directional sensor node is randomly deployed and scattered in the environment, some interested targets cannot be covered even if these targets are located in the sensing range of the sensor. We propose a Maximum Coverage with Rotatable Sensors (MCRS) problem in which coverage in terms of the number of targets to be covered is maximized whereas the rotated angles of sensors are minimized. We present two distributed greedy algorithm solutions for the MCRS problem. Simulation results shows that to apply angle adjustment algorithm can enhance the coverage rate of the directional sensor network.

Keyword：Directional Sensor Networks, Target Coverage Problem, Rotatable Sensors, Distributed Greedy Algorithms.