A New Learning Automata-Based Algorithm to the Priority-Based Target Coverage Problem in Directional Sensor Networks

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Abstract : Directional sensor networks (DSNs) have recently attracted a great deal of attention due to their extensive applications in a wide range of situations. One of the most important problems associated with DSNs is covering a set of targets in a given area and, at the same time, maximizing the network lifetime. This is due to limitation in sensing angle and battery power of the directional sensors. This problem gets more complicated by the possibility that targets may have different coverage requirements. In the present study, this problem is referred to as priority-based target coverage (PTC). As sensors are often densely deployed, organizing the sensors into several cover sets and then activating these cover sets successively is a promising solution to this problem. In this paper, we propose a learning automata-based algorithm to organize the directional sensors into several cover sets in such a way that each cover set could satisfy coverage requirements of all the targets. Several experiments are conducted to evaluate the performance of the proposed algorithm. The results demonstrated that the algorithms were able to contribute to solving the problem.

Keywords : directional sensor networks, target coverage problem, cover set formation, learning automata
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