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**The Target-Barrier Coverage Problem in Wireless Sensor Networks**

**Abstract:**

In this paper, we define a new type of coverage problem named target-barrier coverage problem in wireless sensor networks. A target-barrier is a continuous circular barrier formed around the target. The target-barrier has a *dbound* constraint that is set depending on applications and needs, where *dbound* is the minimum distance of the constructed barrier from the target. Target-barrier coverage is very suited for application in defense surveillance, including detection of intrusion from outside and prevention of barrier breaching from inside. For instance, in a jail scenario, sensors can be deployed to enclose a jail with the constraint of *dbound* to detect escape of prisoners or unauthorized entry into the jail for rescuing prisoners. We focus on how to minimize the number of members required to construct target-barriers in a distributed manner while satisfying the *dbound* constraint and minimizing the amount of message exchange required. In performance evaluation, we compare our solution with the solution of related work and the Brute-Force algorithm which can find the minimum number of target-barrier members required. Our experimental results show that the proposed algorithm delivers satisfactory results in terms of the number of target-barrier members required and the amount of message exchange required.

**Existing System:**

For different applications, different coverage methods are needed, and the number of sensors required will also be different. For example, target coverage is to ensure that all targets in the area are covered, so it requires a smaller number of sensors; area coverage is to cover the entire area, so it requires a larger number of sensors; barrier coverage is to form a continuous barrier that extends from left to right or from top to bottom of the area. For areas of the same size, the number needed to form a barrier coverage is between that needed by target coverage and that needed by area coverage. However, a greater number of sensors needed means a higher hardware cost. Thus, choosing an appropriate type of coverage based on application needs can effectively reduce the deployment cost of a WSN.

**Proposed System:**

Hence, multiple rounds of deployment might be needed. In their study, they proposed a multi-round sensor deployment method to fill the gaps in barrier coverage by dropping sensors in batch. Moreover, they also found the optimal density of sensors in each round that could minimize the total expected cost of deployment. In the above-mentioned multi-round sensor deployment method, we can also use mobile sensors to reduce the number of stationary sensors that need to be deployed. Studied how to efficiently improve barrier coverage using mobile sensors with limited mobility. Their work is the first study to explore the fundamental limits of sensor mobility on barrier coverage. They proposed an efficient sensor mobility scheme that can achieve the maximum barrier coverage and minimize the maximum sensor moving distance. Indicated when the number of mobile sensors deployed in a mobile WSN is not enough for constructing a full barrier, the dynamic sensor patrolling method can be adopted to achieve the barrier coverage. In their study, two algorithms were proposed, one called periodic monitoring scheduling (PMS) algorithm and the other called Coordinated Sensor Patrolling (CSP) algorithm. Using dynamic sensor patrolling to solve the barrier coverage problem in a large mobile sensor network is a cost-effective approach.