

K-BARRIER COVERAGE WITH A DIRECTIONAL SENSING MODEL

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Abstract- The use of wireless sensor networks to protect sensitive facilities or international borders has attracted more and more attention. In contrast to previous studies in which the barrier coverage problem was solved under the assumption of an omni-directional sensing model, the current study presents a scheme for constructing k-barrier coverage using randomly deployed sensors with directional sensing model. The performance of the proposed scheme was evaluated using the ns-2 network simulator and compared with that of an omni-directional sensing scheme. Overall, the results show that for a given sensing range, the proposed directional sensing scheme achieved k-barrier coverage with a fewer number of active sensor nodes than the omni-directional sensing method. Moreover, the directional sensing scheme demonstrates a more robust ability than the omni-directional sensing method in constructing kbarrier coverage as the length of the belt increases or the node density within the sensing field decreases.

Index terms: Wireless sensor networks, directional sensing model, barrier coverage.