

An Improved, Efficient and Cost-Aware Approach to Hole Restoration in Heterogeneous Wireless Sensor Networks Using Geometric Inversion

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Current hole restoration algorithms in wireless sensor networks use imprecise heuristics and sub-optimal geometric calculations to calculate the location for new node deployment. Present hole restoration algorithms are also overwhelmingly restricted to homogeneous WSNs. This paper proposes the Heterogeneous Geometric Inversion Based Hole Restoration Algorithm (H-GIBHRA) that utilizes geometric inversion to calculate the precise location in a coverage void that maximizes coverage restored as well as by incorporating a cost-benefit analysis to select which sensor provides the greatest coverage gain for its cost. Extensive simulation demonstrates H-GIBHRA is effective in efficiently patching coverage holes and often requires fewer nodes to reach a coverage target.