以多目標磁力驅動基因演算法解決採用天線陣列之無線感測網路佈署問題

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摘要

Deploying a wireless sensor network (WSN) considering multiple objective cost functions and environment constraints is an important issue in real-world WSN applications. In many previous studies, a circle or a sphere is usually used to approximate the radiation pattern of a WSN node. However, many obstacles may block signals of WSN in outdoor environments. Therefore, some recent WSN studies adopted antenna array in designing their sensor nodes. Nevertheless, no study investigates how to deploy WSNs using antenna array. In this paper, Cassini oval is used to approximate radiation pattern of antenna array. A force-driven genetic algorithm is used to solve multi-objective deployment problems in differentiated wireless sensor network (WSNs), considering three optimization goals: coverage, detection satisfaction and energy consumption. Our experimental results demonstrated that the proposed approach is capable of obtaining a set of non-dominated solutions for multi-objective differentiated WSN deployment problems using antenna array.

關鍵字：wireless sensor networks, antenna array, Cassini oval, genetic algorithms, multi-objective optimization