Abstract

In wireless rechargeable sensor networks (WRSN), wireless charging stations can recharge batteries of sensor nodes so that they can operate sustainably. Since wireless charging stations are costly and have limited charging distances, how to deploy minimize charging stations to cover all sensor nodes and satisfy the energy requirements of all sensor nodes is an important and challenging problem. Most of the researches focus on reducing the number of the charging stations and doesn’t consider the overall charging power. Actually, increase the overall of charging power allows the charging stations to not always replenish the sensor nodes’ power and contributes to the planning of the charging schedule. Therefore, this study will simultaneously consider reducing the number of charging stations and increasing overall charging power. Furthermore, a non-dominated sorting genetic algorithm-II (NSGA-II) based is proposed for solving this multi-objective problem. The simulation results revealed that the overall charging power obtained using the proposed approach is 5% and 8% higher than that obtained using simulated annealing-based charging algorithm (SABC) and layoff simulated annealing-based charging algorithm (LSABC) approaches, respectively. Moreover, the experimental results show that this method can achieve higher charging power with SABC and LSABC at the same or even less than the number of charging stations.

**Keywords**: Wireless rechargeable sensor networks, Wireless charging stations deployment, NSGA-II