A DRL-Based Partial Charging Scheme of Multiple Mobile Chargers for Maximizing Survival Rate and Energy Usage Efficiency

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***Abstract*—Wireless Rechargeable Sensor Network (WRSN) is a new paradigm that prolongs the lifetime of Wireless Sensor Network (WSN). To improve the survival rate of sensor nodes and energy usage efficiency, this paper studied how to schedule charging paths of multiple mobile chargers and allocate charging time simultaneously. We propose an on-demand partial charging scheme for multiple mobile chargers. First, to balance the charging workload of multiple mobile chargers, we proposed a new clustering algorithm to divide the sensor nodes into several clusters. Then, we proposed an algorithm of determining the target charging sensor node. Finally, based on deep reinforcement learning technique, the charging duration calculation strategy is designed to automatically allocate charging duration for the sensors. Extensive simulations show that, compared with baseline algorithms, our scheme can increase the survival rates of sensor nodes by 3.62%~11.95% and increase the energy usage efficiency by 1.57%~6.15% in different network scale.**

***Keyword*—deep reinforcement learning, multiple mobile chargers, partial charging scheme, wireless rechargeable sensor network**

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