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(54) METHOD FOR ENERGY EFFICIENT ROUTING IN WIRELESS SENSOR NETWORK BASED ON MULTI-AGENT DEEP REINFORCEMENT LEARNING

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(57) **ABSTRACT**

A method for energy efficient routing in wireless sensor network based on multi-agent deep reinforcement learning, predefines a to-be-deployed wireless sensor network and creates a cooperative routing decision system including A decision networks and one sink module, A decision networks deployed on the agents a^i, i=1, 2, . . . , A, of the sensor nodes, the sink module deployed on the sink node n^0. The decision network obtains a probability vector according to its local observation and position vectors. The sink module calculates a routing for each sensor node according the probability vectors of A decision networks and sends the routings to corresponding sensor nodes. A multi-agent deep reinforcement learning algorithm is adopted to train the decision networks of A agents a^i, i=1, 2, . . . , A of the cooperative routing decision system, deploys the to-be-deployed wireless sensor network into an environment and updates the routing policy of the deployed wireless sensor network at each update cycle of routing.