An Efficient hole Recovery Method in Wireless Sensor Networks

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***Abstract*—Wireless sensor networks are used to monitor and control the area in a variety of military and civilian sectors, such as battlefield surveillance, intrusion detection, disaster recovery, biological detection, and environmental surveillance. Since sensor nodes are randomly placed in the region of interest, there are cases where separation of the sensor network region occurs due to environmental obstacles or where no sensor exists in some regions. Also, in situations where sensor nodes are not repositionable, coverage holes can occur because some nodes run out of energy or physical destruction of sensor nodes. Coverage holes can reduce the data reliability of the sensor network, and can affect the performance of the entire sensor network, such as changing network topology, disconnecting data links, and worsening transmission loads. By discovering the coverage hole in the sensor network and additionally placing a new sensor node in the detected coverage hole, the problem caused by the coverage hole can be solved. Recovery of the coverage hole needs to be designed so that the coverage area is maximized with minimal consumption of sensor resources. In this paper, we propose a method for adding a mobile sensor node at the optimal location by exchanging information with one-hop neighbor border nodes. The proposed method is very intuitive and simple compared to other methods of identifying and restoring holes by structuring nodes in the form of Bornoy polygons in the sensor network, so it is easy to apply to real environments.**

***Keyword*—Coverage holes, Border nodes, Adjacency matrix, Heal node, Isosceles triangle**

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