

An Energy Holes Avoidance Routing Protocol for Underwater Wireless Sensor Networks

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Abstract : In Underwater Wireless Sensor Networks (UWSNs), sensor nodes close to water surface (final destination) are often preferred for selection as forwarders. However, their frequent selection makes them depleted of their limited battery power. In consequence, these nodes die during early stage of network operation and create energy holes where forwarders are not available for packets forwarding. These holes severely affect network throughput. As a result, system performance significantly degrades. In this paper, a routing protocol is proposed to avoid energy holes during packets forwarding. The proposed protocol does not require the conventional position information (localization) of holes to avoid them. Localization is cumbersome; energy is inefficient and difficult to achieve in underwater environment where sensor nodes change their positions with water currents. Forwarders with the lowest water pressure level and the maximum number of neighbors are preferred to forward packets. These two parameters together minimize packet drop by following the paths where maximum forwarders are available. To avoid interference along the paths with the maximum forwarders, a packet holding time is defined for each forwarder. Simulation results reveal superior performance of the proposed scheme than the counterpart technique.

Keywords : energy holes, interference, routing, underwater

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