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Energy Efficient Architecture for Intra and Inter Cluster Communication for Underwater Wireless Sensor Networks

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Abstract Underwater Wireless Sensor Networks (UWSNs) consume a significant amount of energy because of high transmission power and lengthy data packet transmission time. Sensors of UWSNs, which perform numerous tasks like target tracking, intrusion detection etc. can preserve energy and attain longer network life time by appropriate selection of cluster head (CH), cluster size (CS), and routing scheme. In order to achieve this, an Intra and Inter Cluster Communication (IICC) for data aggregation in UWSN have been proposed here. In our approach, the CH selection and CS are determined by using fuzzy logic. The main strength of our paper is to provide an optimal selection for CH as well as optimal intra and inter cluster communications based on energy and multiple paths. Minimum Average Routing Path Clustering Protocol method is implemented for intra-clustering communication in the network. Hierarchical Multi-path Routing-LEACH method is implemented for inter-cluster communication in the network. Experimental simulation shows that IICC improves the performance of UWSN in terms of end-to-end packet delay, energy consumption and packet delivery ratio. The proposed approach is adaptive in nature as it reduces the average energy consumption and end-to-end delay, thereby improving the packet delivery ratio.

Keywords Clustering · Communication · Energy efficiency · Fuzzy logic · Routing · Underwater wireless sensor networks

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