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A Stable Energy Balancing Based Clustering Routing Protocol for IoUT using Meta-heuristic Technique
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Abstract
Energy consumption and network longevity are important factors in Internet of Underwater Things (IoUT) networks. In such networks, clustering approach enable to reduce the energy consumption in notable rate. In clustering based routing protocols, the cluster head (CH) must be carefully chosen. By avoiding premature energy exhaustion during certain underwater nodes (UNs) and CHs duration network operation, the energy balancing strategy approach is suitable to improve the network's stability and dependability. Accordingly, this paper provides an energy-balancing based on artificial bee colony (ABC) to select and replace an optimal CHs according to energy levels, UNs depth, and distance from the surface base station (SBS). The proposed method enable to optimization the IoUT energy efficiency by balancing strategy that uses the Q-learning algorithm to ensure more balanced distribution of tasks across UNs and CHs. Q-learning is used to make tradeoff decision between the random and ABC fitness functions solutions. The simulation compares the ABC Stable Election Protocol (ABC-SE) to the Energy Balancing ABCSE (ABC-EBSE). The results indicate that the ABC-EBSE scheme outperforms the ABC-SE in term of energy and network efficiency © 2024 IEEE.

Author Keywords
ABC; Clustering Approach; Energy Balancing; Energy Distribution; IoUT; Meta-heuristic; Q-learning

Index Keywords
Energy efficiency, Heuristic algorithms, Heuristic methods, Learning algorithms, Optimization, Power management (telecommunication), Reinforcement learning, Routing protocols; Artificial bee colony, Artificial bees, Clustering approach, Energy, Energy distributions, Energy-balancing, Energy-consumption, Internet of underwater things, Metaheuristic, Q-learning; Energy utilization

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