

عنوان مقاله:

Multi-layer Clustering Topology Design in Densely Deployed Wireless Sensor Network using Evolutionary Algorithms

محل انتشار:

مجله هوش مصنوعی و داده کاوی، دوره 6، شماره 2 (سال: 1397)

تعداد صفحات اصل مقاله: 15

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خلاصه مقاله:

Due to the resource constraint and dynamic parameters, reducing energy consumption became the most important issues of wireless sensor networks topology design. All proposed hierarchy methods cluster a WSN in different cluster layers in one step of evolutionary algorithm usage with complicated parameters which may lead to reducing efficiency and performance. In fact, in WSNs topology, increasing a layer of cluster is a tradeoff between time complexity and energy efficiency. In this study, regarding the most important WSN's design parameters, a novel dynamic multilayer hierarchy clustering approach using evolutionary algorithms for densely deployed WSN is proposed. Different evolutionary algorithms such as Genetic Algorithm (GA), Imperialist Competitive Algorithm (ICA) and Particle Swarm Optimization (PSO) are used to find an efficient evolutionary algorithm for implementation of the clustering proposed method. The obtained results demonstrate the PSO performance is more efficient compared with other algorithms to provide max network coverage, efficient cluster formation and network traffic reduction. The simulation results of multilayer WSN clustering design through PSO algorithm show that this novel approach reduces the energy communication significantly and increases lifetime of network up to 2.29 times with providing full network coverage (100%) till 350 rounds (56% of network lifetime) compared with WEEC and LEACH-ICA clustering.

کلمات کلیدی:

Wireless sensor networks, cluster head, Genetic Algorithm, Imperialist Competitive Algorithm, Network Lifetime

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