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Abstract

Finding cluster head (CH) is an important issue in WSN. A new optimization algorithm Imperialist Competitive Algorithm (ICA) has been introduced recently, inspired by socio-political process of imperialistic competition. We use ICA for CH selection according to the communication energy (CE) cost. We demonstrate that ICA is an effective method for selection of CH in WSN. ICA either finds one or at most a few CHs within 500 decades. The tie is broken by use of a heuristic. CE stabilizes after 225 decades in the case of 300-size, after 150 decades for 200-size, and after 140 decades for 100-size WSNs. For 100-size, 1 CH is selected after 260 decades, for 200-size and 300-size 7 and 21 CHs, respectively are selected after 500 decades. For reducing the number of final CHs, the algorithm should be run for more than 500

decades for larger-size WSNs. For smaller size (100) networks, time increases very slowly with decades. For higher size networks, it increases nonlinearly and takes almost exponential shape with a network of 300 sensors. This is a preliminary study and we plan further investigation in this direction.

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Index Terms

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Keywords

WSN   Cluster Head   Imperialist