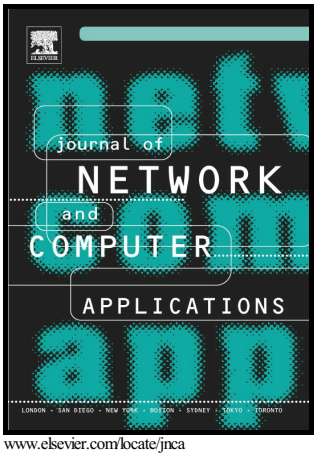
Author's Accepted Manuscript



www.elsevier.com/locate/jnca

Energy efficient clustering protocol based on improved metaheuristic in wireless sensor networks

Palvinder Singh Mann, Satvir Singh

PII: S1084-8045(17)30051-6
DOI: http://dx.doi.org/10.1016/j.jnca.2017.01.031
Reference: YJNCA1847

To appear in: *Journal of Network and Computer Applications*

Received date: 22 February 2016
Revised date: 16 August 2016
Accepted date: 24 January 2017

Cite this article as: Palvinder Singh Mann and Satvir Singh, Energy efficien clustering protocol based on improved metaheuristic in wireless sensor networks *Journal of Network and Computer Applications* http://dx.doi.org/10.1016/j.jnca.2017.01.031

This is a PDF file of an unedited manuscript that has been accepted fo publication. As a service to our customers we are providing this early version o the manuscript. The manuscript will undergo copyediting, typesetting, an review of the resulting galley proof before it is published in its final citable form Please note that during the production process errors may be discovered whic could affect the content, and all legal disclaimers that apply to the journal pertain

ACCEPTED MANUSCRIPT

Energy efficient clustering protocol based on improved metaheuristic in wireless sensor networks

Palvinder Singh Mann[a,*], Satvir Singh[b]

[a]*Research Scholar, I K Gujral Punjab Technical University, Kapurthala, Punjab, India.144008.*
[b]*S B S State Technical Campus, Ferozepur, Punjab, India.152004.*

Abstract

Energy efficient clustering is a well accepted NP-hard optimization problem in Wireless sensor networks (WSNs). Diverse paradigm of Computational intelligence (CI) including Evolutionary algorithms (EAs), Reinforcement learning (RL), Artificial immune systems (AIS), and more recently, Artificial bee colony (ABC) metaheuristic have been used for energy efficient clustering in WSNs. Due to ease of use and adaptive nature, ABC arose much interest over other population-based metaheuristics for solving optimization problems in WSNs. However, its search equation, which is comparably poor at exploitation and require storage of certain control parameters, contributes to its insufficiency. Thus, we present an improved Artificial bee colony (iABC) metaheuristic with an improved solution search equation to improve its exploitation capabilities. Additionally, in order to increase the global convergence of the proposed metaheuristic, an improved population sampling technique is introduced through $Student's - t$ distribution, which require only one control parameter to compute and store, hence increase efficiency of proposed metaheuristic. The proposed metaheuristic maintain a good balance between exploration and exploitation search abilities with least memory requirements, moreover the use of first of its kind compact $Student's - t$ distribution, make it suitable for limited hardware requirements of WSNs. Further, an energy efficient clustering protocol based on iABC metaheuristic is introduced, which inherit the capabilities of the proposed metaheuristic to obtain optimal cluster heads (CHs) and improve energy efficiency in WSNs. Simulation results shows that the proposed clustering protocol outperforms other well known protocols on the basis of packet delivery, throughput, energy consumption, network lifetime and latency as performance metric.

Keywords: Energy efficient clustering, Wireless sensor networks, improved Artificial bee colony (iABC) metaheuristic.

*Corresponding author.Tel.:+91-9888395367 fax:+91-0181-2205852
E-mail addresses: psmaan@hotmail.com (Palvinder Singh Mann), drsatvir.in@gmail.com (Satvir Singh)

Accepted manuscript

Download English Version:

https://daneshyari.com/en/article/4956012

Download Persian Version:

https://daneshyari.com/article/4956012

Daneshyari.com