International Journal of Research and Development in Applied Science and Engineering (IJRDASE)
ISSN: 2454-6844

Smart Clustering Scheme for Performance Enhancement of Wireless Sensor Network (WSN)

Ravishankar Kumar Varma[1], Sumit kumar Gupta[2]
Electronics and Communication Engineering Department,
Bansal Institute of Engineering and Technology, Lucknow
rkvarma6553@gmail.com

Abstract: This paper proposes work of fluffy rationale strategies as a man-made consciousness strategy for advancement of remote correspondence of gadgets with "insightful calculation" and "variation" capacity for remote sensor organizations to work on their usefulness, utility and endurance viewpoints. The objective is to provide wireless sensor networks with the computational intelligence necessary for intelligent behavior and adaptive adaptation to a variety of operational contexts.

Keywords: Keywords: ERDL, Clustering, LEACH, WSN

1. Introduction:

There have been continuous advances in small scale electro-mechanical structures (MEMS) development, far off correspondences, and mechanized equipment. These advances have enabled the improvement of negligible cost, low-power, multifunctional sensor centers that are minimal in size and talk with each other using radio frequencies [1]. A singular sensor center has confined limit in identifying and isn't sufficient for get-together supportive information from a specific space. This data gathering cycle can be accomplished by the total work of different sensor centers. The number of sensor hubs could be hundreds or thousands in many applications. These helpfully working sensor center points structure an association which is known as a far off sensor association (WSN).

Remote sensor networks have a ton of advantages. Because they do not require a proper foundation, WSNs can be sent more quickly and easily than wired sensor organizations or other remote organizations [10]. Since sensor centers are thickly sent in most of the cases, they can get through the association frustrations. Self-designing remote sensor networks do not require a focal association [10].

There are a couple of sorts of far off sensors, for instance, seismic, low testing rate alluring, warm, visual, infrared, acoustic and radar sensors [1]. These sensor centers can screen different biological conditions. A part of these conditions are temperature, pressure, sogginess, soil beauty care products, vehicular turn of events, noise levels, lighting conditions, the presence or nonattendance of explicit kinds of things and mechanical sensations of nervousness on joined objects [3].

There are a variety of applications for remote sensor networks. Military applications, natural applications, wellness applications, home applications, and other business applications are the initial WSN applications [1]. The following are brief descriptions of some of these WSN applications:

Applications in the military: Properties, for instance, weakness tolerability, quick sending and self affiliation make WSNs supportive in military applications. They can be used for observing and following agreeable powers, observing war zones, and discovering atomic, compound, and natural attacks.

2. Related Work:

In probabilistic gathering moves close, every center point in the far off sensor network picks its occupation without any other person. This sort of collection estimations mean to restrict the correspondence between sensor centers. Probabilistic gathering estimations guarantee speedy mixing and give changed bundle sizes [21]. In a general sense, each center point consigns itself a probability which is a number some place in the scope of and 1. That hub becomes a bunch head if this likelihood falls below a predetermined threshold. Considering this rule, different probabilistic grouping computations are proposed. Here we frame Channel [9], Respect (Cream Energy-Capable Scattered Gathering) [20] and the estimation proposed by Kuhn et al. [12].

Limiting energy dispersal in sensor organizations is the goal of filter convention. Channel has appropriated mastery and control parts for pack set-up and movement processes [9]. Static gathering computations select bundle sets out toward WSNs simply a solitary time, and these gathering heads fill in as gathering head until they pass on. Since bundle heads consume significantly more energy than customary sensor center points, energy use over the association can't be conveyed similarly by using static gathering. As a result, WSN can quickly degenerate into nothingness as the number of group leaders drastically decreases. In Channel show, clusterheads are turned in randomized way, and pack head political race is done every so often. The stretch between two successive pack advancement process is called as round. A lone round consits of two phases which are set-up and predictable state stages [7]. The pack head political race and gathering improvement are done during set-up stage. In steady state stage, the data, which is gathered from bunch part centers, is gathered at neighboring pack head and shipped off the base station. We contrast our strategy EAUCF and this striking probabilistic gathering show, in light of the fact that EAUCF includes randomization for picking temporary bundle heads in each round.

3. Methodology:

The Drain (Low-Energy Versatile Grouping Order) convention as proposed by Heinzelman et al. is depicted in this section: Channel is a prominent pack head political choice methodology that contains a justification for by far most various procedures [8] [7] [19] as communicated in [4]. The chief gigantic show means to restrict the overall energy used in data gathering undertakings in distant sensor networks [4].

Channel is a coursed computation which seeks after neighboring decisions to pick bunch heads. Assuming that the bundle heads are picked for once and don't change all through the association lifetime, then obviously these static gathering heads kick the pail sooner than the customary center points. Thus, Channel integrates randomized upheaval of bundle head regions to fairly flow the energy dispersal over the association [9]. Channel similarly performs close by data strain in clusterheads to lessen how much data that is shipped off the base station. In Drain, political races between bunch heads are held from time to time to enable a random revolution of bunch heads.

Each round includes two phases, explicitly set-up stage and reliable state stage. In set-up stage, pack heads are picked and bunches are outlined. In reliable state stage, data moves to the base station are performed through the gathered association. A particular sensor center point closes whether or not it will turn out to be a gathering head by making an unpredictable number some place in the scope of and 1. If this number isn't the very predefined edge T(n), the sensor center transforms into a pack head. G tends to the course of action of sensor centers that needy individual been bundle heads in the last 1/P changes where P is the ideal degree of gathering heads. r tends to the continuous round number.

1: P ← desired percentage of cluster-heads
2: currentRound ← currentRound + 1
3: nodeS tate ← CLUSTERMEMBER
4: clusterMembers ← empty
5: myClusterHead ← this
6: if notClusterHeadCount < 1/P then
7: notClusterHeadCount ← notClusterHeadCount + 1
8: else
9: T ← threshold for current round that is calculated by Equation 3.3
10: μ← rand(0,1)
11: if μ < T then
12: nodeS tate ← CLUSTERHEAD
13: notClusterHeadCount ← 0
14: Advertise ClusterHeadMessage(ID)
15: end if
16: end if
17: On receiving all ClusterHeadMessages
18: if nodeS tate = CLUSTERMEMBER then
19: my Cluster Head ← the closest cluster-head
20: Send Join Cluster Head Message(ID) to the closest cluster-head
21: end if
22: On receiving JoinClusterHeadMessage from node N
23: if nodeS tate = CLUSTERHEAD then
24: add node N to the cluster Members list
25: end if

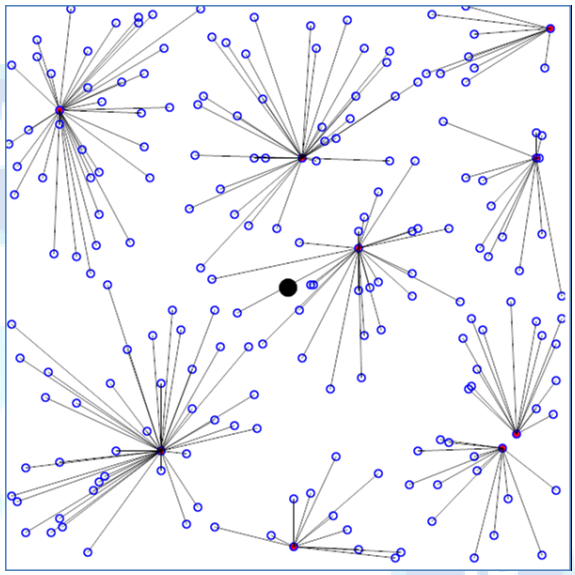

Fig 1: Cluster-head distribution example for LEACH with P = 0:05.

4. Result and Discussion:

In the context of wireless sensor network applications, the results of the proposed algorithm based on cluster head selection employing the fuzzy logic selection algorithm are discussed in this chapter. In the figure 1 the field area of 100m x 100 m is shown.total number of N=100 sensors hubs are circulated arbitrarily. Figure 2 depicts the sensor nodes as black circles o and the base station as the sink in the middle (red asterisk *).

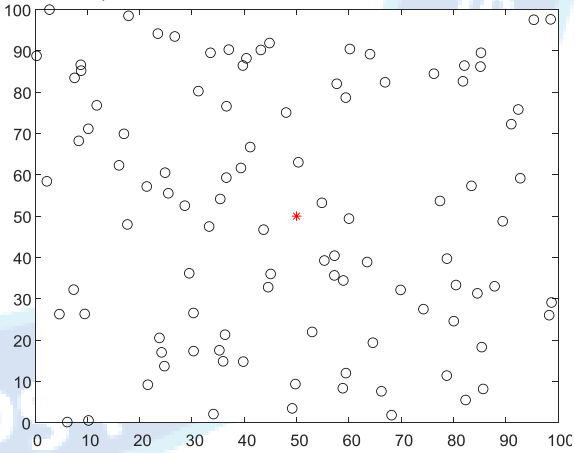

Fig 2: Wireless sensor network nodes distribution

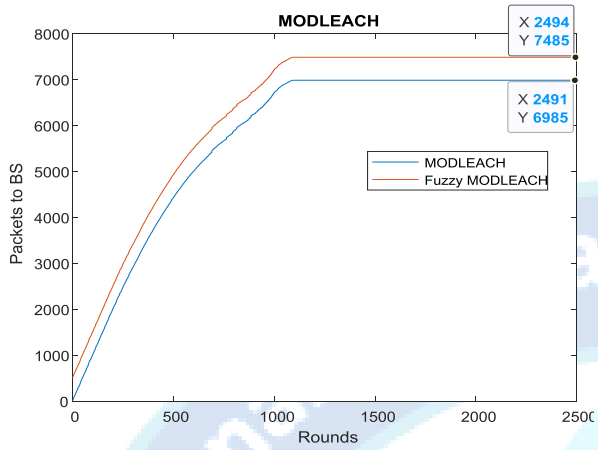

Fig 3: Variation of number of packet sent to base station wrt rounds as a comparison for Modified leach and proposed Fuzzy logic added modLEACH

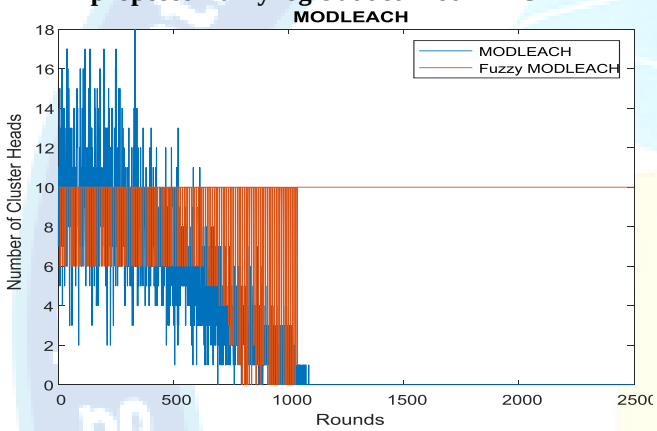

Fig 4: Variation of number of cluster head selected wrt rounds as a comparison for Modified leach and proposed Fuzzy logic added modLEACH

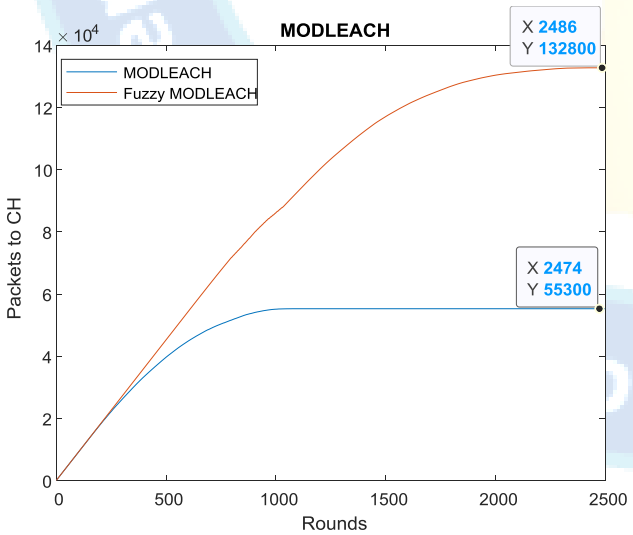

Fig 4: Variation of number of packet sent to cluster head wrt rounds as a comparison for Modified leach and proposed Fuzzy logic added modLEACH

5. Conclusion:

Wireless sensor network is an organization comprising of circulated sensors to convey constant information streams for applications, for example, natural checking, primary designing and medical care and so on. We zeroed in on the decent choice of sensor hub as group head which partaking the remote organization. In the event that the sensor hub has high info parametric quality worth, different hubs can believe the sensor hub as bunch head and sending and getting an information securely with it. In future, we intend to recreate the recommended model and expect to gauge the soundness of our model with variety in responsibility.

References:

[1] I. F. Akyildiz, W. Su, Y. Sankarasubramaniam, and E. Cayirci. Wireless sensor networks: a survey. Comput. Netw., 38(4):393–422, 2002.

[2] E.M. Belding-Royer. Hierarchical routing in ad hoc mobile networks. Wireless Communications and Mobile Computing, 2(5):515–532, 2002.

[3] D. Estrin, R. Govindan, J. Heidemann, and S. Kumar. Next century challenges: Scalable coordination in sensor networks. In Proceedings of the 5th annual ACM/IEEE international conference on Mobile computing and networking, page 270. ACM, 1999.

[4] I. Gupta. Cluster head election using fuzzy logic for wireless sensor networks. Master's thesis, Dalhousie University, Halifax, Nova Scotia, March 2005.

[5] I. Gupta, D. Riordan, and S. Sampalli. Cluster-head election using fuzzy logic for wireless sensor networks. In Communication Networks and Services Research Conference, 2005. Proceedings of the 3rd Annual, pages 255–260, 2005.

[6] Y. Han, S. Park, J. Eom, and T. Chung. Energy-Efficient Distance Based Clustering Routing Scheme for Wireless Sensor Networks. LECTURE NOTES IN COMPUTER SCIENCE, 4706:195, 2007.

[7] MJ Handy, M. Haase, and D. Timmermann. Low energy adaptive clustering hierarchy with deterministic cluster-head selection. In IEEE MWCN. Citeseer, 2002.

[8] W. Heinzelman, A. Chandrakasan, and H. Balakrishnan. An application-specific protocol architecture for wireless microsensor networks. IEEE Transactions on Wireless Communications, 1(4):660–670, 2002.

[9] W.R. Heinzelman, A. Chandrakasan, and H. Balakrishnan. Energy-efficient communication
protocol for wireless microsensor networks. In Proceedings of the 33rd Hawaii International Conference on System Sciences, volume 8, page 8020. Citeseer, 2000.

[10] J. Ibriq and I. Mahgoub. Cluster-based routing in wireless sensor networks: issues and challenges. In Proceedings of the 2004 Symposium on Performance Evaluation of Computer Telecommunication Systems (SPECTS), 2004.

[11] J.M. Kim, S.H. Park, Y.J. Han, and T.M. Chung. CHEF: cluster head election mechanism using fuzzy logic in wireless

sensor networks. In Proceedings of the ICACT, pages 654–659, 2008.
[12] F. Kuhn, T. Moscibroda, and R. Wattenhofer. Initializing newly deployed ad hoc and sensor networks. In Proceedings of the 10th annual international conference on Mobile computing and networking, pages 260–274. ACM New York, NY, USA, 2004.
[13] C. Li, M. Ye, G. Chen, and J. Wu. An energy-efficient unequal clustering mechanism for wireless sensor networks. In Proceedings of the 2nd IEEE International Conference on Mobile Ad-Hoc and Sensor Systems, page 8. Citeseer.
[14] M. Lotfinezhad and B. Liang. Effect of partially correlated data on clustering in wireless sensor networks. In Proc. of the IEEE International Conference on Sensor and Ad hoc Communications and Networks (SECON). Citeseer, 2004.
[15] V. Mhatre and C. Rosenberg. Design guidelines for wireless sensor networks: communication, clustering and aggregation. Ad Hoc Networks, 2(1):45–63, 2004.
[16] M. Negnevitsky. Artificial intelligence: A guide to intelligent systems. Addison-Wesley, Reading, MA, 2001.
[17] C.E. Perkins and E.M. Royer. The ad hoc on-demand distance-vector protocol. 2001.
[18] T. Shu, M. Krunz, and S. Vrudhula. Power balanced coverage-time optimization for clustered wireless sensor networks. In Proceedings of the 6th ACM international symposium
on Mobile ad hoc networking and computing, page 120. ACM, 2005.
[19] T. Voigt, A. Dunkels, J. Alonso, H. Ritter, and J. Schiller. Solar-aware clustering in wireless sensor networks. In Proceedings of the Ninth IEEE Symposium on Computers and Communications, 2004.
[20] O. Younis and S. Fahmy. HEED: a hybrid, energy-efficient, distributed clustering approach for ad hoc sensor networks. IEEE Transactions on Mobile Computing, pages 366–379, 2004.
[21] O. Younis, M. Krunz, and S. Ramasubramanian. Node clustering in wireless sensor networks: Recent developments and deployment challenges. IEEE Network, 20(3):20– 25, 2006.
[22] JY Yu and PHJ Chong. A survey of clustering schemes for mobile ad hoc networks. IEEE Communications Surveys & Tutorials, 7(1):32–48, 2005.