

Improved Clustering Algorithm Based On Randomization Coupled with G.A. process

¹Deepika, ²Mohinder Malhotra

¹MTech Student, Deptt. Of ECE,RIMT,Chidana, India

²Assistant Professor, DCRUST,Murthal(Sonipat), India

idsdeepika09@gmail.com, zmalhotramohinder@yahoo.com

Abstract: WSN uses many protocols for the communication among the sensor nodes. Initially LEACH removes the restrictions on the energy efficiency for the wireless sensor networks by providing the heirarchical approach for the communication between nodes and the base station and the mechanism for the election of the cluster heads which are responsible for the communication to base station. SEP is one of energy efficient protocol among these protocols which are developd as an improvement over LEACH. SEP changes the environment to the heterogenous environment and introduce the concept of advance nodes The stability and the life time of the network are the main issues focused in the previous developments.The work presented in this paper focuses on the same issuses and for this purpose the G.A. approach is used. This approach is combined with the randomization process so that we may have the maximum dynamic behaviour in the network. The behaviour of the network is further improved with the help fitness function designed to get the best suited node for the cluster head election.

Keywords: Genetic algorithm(G.A.), MATLAB, WSN, Clustering, Stable Election Protocol (SEP)

I. INTRODUCTION

The name wireless sensor network (WSN) consists of three words wireless + sensor + network Wireless:-having no wired connection, using wireless media for communication. Sensor:-device having some sensing capability, like sensing the humidity. Network: -collection of different types of nodes like sensor nodes, routers, printers, etc. A WSN consists of a large number of sensor nodes in hundreds or thousands. Each sensor node consists of different components which work together to act like as sensor and can sense for some particular application. These units are: - a) Sensing unit:-this unit is used to sense the events. b) Processing unit:-the results which is based on sensed information are computed by them. c) Transmission unit:- this unit transmit result to base station d) Mobility monitoring unit: - it checks the result of mobility of nodes e) Position finding unit: - for the calculation of distance of nodes this unit finds the position of each node. f) Power Supply unit: - it provides the energy to all components . g) ADC: - converts the alternating voltage to direct voltage

II. AN INTRODUCTION TO GENETIC ALGORITHMS

A genetic algorithm is a probabilistic search technique that computationally simulates the process of biological evolution. It mimics evolution in nature by repeatedly altering a population of candidate solutions until an optimal solution is found.

The GA evolutionary cycle starts with a randomly selected initial population. The changes to the population occur through the processes of selection based on fitness, and alteration using crossover and mutation. The application of selection and alteration leads to a population with a higher proportion of better solutions. The evolutionary cycle continues until an acceptable solution is found in the current generation of population, or some control parameter such as the number of generations is exceeded.

The smallest unit of a genetic algorithm is called a *gene*, which represents a unit of information in the problem domain. A series of genes, known as a *chromosome*, represents one possible solution to the problem. Each gene in the chromosome represents one component of the solution pattern.

The most common form of representing a solution as a chromosome is a string of binary digits. Each bit in this string is a gene. The process of converting the solution from its original form into the bit string is known as *coding*. The specific coding scheme used is application dependent. The solution bit strings are decoded to enable their evaluation using a fitness measure

III. RELATED WORK

In [1], LAVEENA MAHAJAN et al: - Provides the over view and comparison of Leach and Stability

Election Protocol. All nodes are assumed to be heterogeneous and divided into two groups one is normal nodes and other is advance nodes. If there are 'n' total nodes in the network a fraction 'm' of 'n' is assumed to act as advance nodes. In Leach protocol an additional factor 'a' is added to the initial energy of advance nodes. An optimal probability 'p' is associated with each node which decides their chance to become the cluster head. All nodes are equally likely to become the cluster heads which limits the stability region of the protocol.

In SEP protocol advance nodes are more likely to become the cluster heads to calculate the threshold value ($T(n)$), optimal probabilities of advance and normal nodes are assigned a weight p_{adv} and p_{nm} respectively. Because advance nodes are most likely to be the cluster heads, the energy consumed in transmission is provided by the additional energy factor, which helps to improve the stability of the network and hence the life time of the network. Scope provides fair leach protocol which can be the enhancement of leach, having some features of SEP.

In [2], GEORGIOS SMARAGDAKIS et al :- In this paper we study the impact of heterogeneity of nodes, in terms of their energy, in wireless sensor networks that are hierarchically clustered. In these networks some nodes become cluster heads, collect the data and transmit it to the destination. In this additional energy resources are equipped with the population of sensor nodes and may result that the network operation evolves. These sensors are not mobile and are randomly distributed. The dimensions of the sensor fields are known and coordinates with the sink. In the presence of heterogeneous nodes, when the nodes die first then the behavior of such sensor networks becomes very unstable

In [3], FEMI A. ADEROHUNMU et al :- In this paper, to handle more complex function, wireless sensor networks are equipped in-network processing. To use their constrained energy, it may require battery powered sensors in heterogeneous setting. For optimized energy consumption clustering technique is used in constrained wireless sensor

networks. A three-tier node is used to enhance SEP to prolong the effective network life-time. It achieves better performance in this respect, compared to other existing clustering algorithms in both heterogeneous and homogeneous environments

III. PROPOSED WORK

In wireless sensor environment, WSN protocol can be used widely because of its greater flexibility. In this proposed work, a protocol is to be designed that has many advantages and overcomes the disadvantages of current protocol and to implement these changes into a single protocol.

A. Problem formulation

Wireless Sensor Nodes themselves provide a limited power supply, so for efficient use of this power supply we may require that all the nodes work in harmony. By this the lifetime of the whole network turns increases. Thus further investigation should be a more flexible routing protocol which adopts mobility according to its environment. Most protocols written for a WSN only allow for fixed sensors but a WSN would most likely contain a limited number, if not consist only of mobile nodes. If a sensor is mobile, attached to a person for instance, the static network would be constantly trying to reorganize the network routing structure.

B. Objectives of Proposed Protocol

The scope and objective of this proposed research is the design and development of a WSN routing protocol that can be implemented on existing WSN infrastructures and which exhibits the following criteria:

- The protocol should be scalable and function effectively for networks of any size.
- The protocol has to minimize the computational complexity for the nodes, thus extending the lifetime of the network.
- The protocol must be as simple as possible and as independent from the hardware capabilities of the nodes as possible.
- The protocol must limit the number of required transmissions, thus extending the lifetime of the network.

IV. CONCLUSION

In this work we will take the full utilization of heterogeneous environment WSN node. Fitness node is used as a cluster head because it has higher energy among another nodes. For this SEP protocol takes the election probability as the bases for the election of the cluster head and apply the election process separately for the normal node and the advance nodes. This approach is not able to utilize the advantage of the advance nodes in the network which result in low increase in network performance parameters.

ACKNOWLEDGMENT

It's a great opportunity to express the gratitude to have a mentor and guide like Er. Mohinder Malhotra. He provide me all the necessary guidance and assists me finding solutions of various problems.

REFERENCES

- [1] Laveena Mahajan "Improving the Stable Period of WSN using Dynamic Stable Leach Election Protocol" Issues and Challenges in Intelligent Computing Techniques (ICICT), vol-11, pp: 393-400, 2014
- [2] Georgios Smaragdakis, Ibrahim Matta, Azer Bestavros," SEP: A Stable Election Protocol for clustered heterogeneous wireless sensor networks" university of otago
- [3] Femi A. Aderohunmu1 , Jeremiah D. Deng2 'An Enhanced Stable Election Protocol (SEP) for Clustered Heterogeneous WSN ' 2004
- [4] Dheeraj Ritu Mishra, 'Review Paper on Hierarchical Energy- Efficient Protocols in Wireless Sensor Networks' Volume 4, Issue 6, June 2014