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Enhanced Stable Election Protocol for Cluster based Routing by using Advanced Nodes in WSN

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***Abstract*—** A wireless sensor network (WSN) comprises of economic power obliged sensor nodes gathering information from the detecting territory and transmits information towards the base station synergistically. The essential objective of wireless sensor network is to improve the node life expectancy, soundness period and throughput of network. The WSN nodes are confined by energy, stockpiling limit, and processing power. So grouping is utilized to enhance lifetime and strength. Group directing protocol assumes an imperative part for development of energy and soundness of the network. In this paper a new technique Enhance Threshold Sensitive Stable Election Protocol (ETSEP) is proposed and evaluated for heterogeneous wireless sensor network. In this technique cluster head election probability dynamically changes. The ETSEP is simulated using MATLAB and found that it performs better than Stable Election Protocol (SEP), Threshold Sensitive Stable Election protocol (TSEP) and Zonal Stable Election Protocol(ZSEP) in terms of stability and network lifetime. ETSEP builds more stable routing environment as compared to SEP, TSEP and ZSEP. Simulation results shows that our protocol performs better than SEP, TSEP and ZSEP.

***Keywords*—** Clustering, Data aggregation, Stable-aware routing protocol, Heterogeneous environment, Wireless sensor network.

I. INTRODUCTION

The utilization of WSNs in various applications is expanding with the fast progressions in innovation. Energy restriction is the significant issue that should be considered. Frequently, a battery is the main wellspring of energy and the wireless sensor node expends control amid emphasess. The node will instantly kick the bucket when its battery runs out [1]. The sensor node changes its states to determine the energy issue. Normally, the three conditions of a sensor node are utilized: dynamic state, sit without moving state, and resting state [2]. In the dynamic express, the node transmits and gets information messages. The majority of the node assets are utilized amid the dynamic express that causes the energy utilization. The sit out of gear state is the point at which a node just plays out the detecting tasks without doing any information transmission or gathering [3]. The node in this state devours less energy than when it is in the dynamic state. The real reason for energy utilization in the dynamic mode is the inside tasks amid transmission process. To stop transmissions in the sit without moving mode is the essential explanation behind sparing the battery control. In the rest mode, the node kills its radio part totally to spare the node energy. Energy utilization in rest mode is not exactly in the sit without moving and dynamic state [4].

The energy of a sensor node in a wireless sensor network is exceptionally restricted and its relatively difficult to supplant the energy of sensor nodes amid network activity so we need to receive certain methods that will help in energy preservation of sensor nodes. The conceivable systems to preserve energy of sensor nodes incorporate the booking of node states between dynamic, sit out of gear and rest, utilizing energy effective directing protocol for information transmission, utilizing less transmit energy to lessen transmission run [5].

The point of this exposition is to propose another energy effective steering protocol for WSNs. The WSN comprises of an extensive number of sensor nodes. Normally the sensor nodes are set in a remote territory to satisfy the necessities of checking or reconnaissance. All the sensor nodes are battery-worked. The life of a node relies on the battery. Notwithstanding sending the node's own particular information it additionally assumes a part of a transitional node by getting and sending the other nodes' information towards the base station or sink.
Various fruitful endeavors have just been made to accomplish this objective, yet there is a need to take a shot at this region for advance changes. The thought of energy proficiency is basic for any sort of protocol.

The motivation behind this proposition is to outline a protocol to enhance the lifetime of nodes in WSNs. In this proposal the current protocol which is a heterogeneous mindful protocol called as SEP (Stable Election Protocol) is enhanced by the presentation of cutting edge nodes which will really supplant the dead nodes subsequently expanding the network lifetime and furthermore some more energy fueled sensor nodes are utilized which will give greater dependability to the network.

II. LITERATURE

Refaay et al. [6] exhibited clusterHead election framework for WSNs. They talked about their advantages and shortcomings based on some QoS factors that demonstrate the quality of the WSN network.

Although numerous specialists handled this field, there were a considerable measure of issues to be explained and a lot of room to progress. It was an extremely engaging field for research and application.

Sharma et al.[7] exhibited a protected grouping arrangement which bolsters dynamic bunching and wipes out the likelihood of plotted part manipulability assault by malevolent nodes which is conceivable in SecDeach.

Shi et al.[8] proposed bunching protocol called CNN-LEACH based on Hamming network and a sort of advancement calculation called SMPSO-BP based on neural network Then, the CNN-LEACH grouping directing protocol coordinated with SMPSO-BP improvement calculation was connected in the WSN information combination process. The previously mentioned protocol and calculation under various situations were recreated and looked at on the NS2 stage.

Prasath and Shankar [9] proposed an energy effective Cluster head selection calculation for wireless sensor networks. By utilizing a Ridge strategy to choose best group head, RMCHS dependably picks CHs out from nodes with higher remaining energy. Reproductions result demonstrate that RMCHS did not just furnish sensible circulation of group heads with higher energy use yet in addition effectively balances the energy utilization levels of nodes and delays the network lifetime.

Agrawal and Kushwah [10] enhanced multi-bounce protocol named, Layered Clustering Routing Protocol with Overlapping Cluster Heads (LCRPOCH) was presented for limiting the energy utilization and the reenactment was finished demonstrating the execution investigation contrasted with the before EEICCP protocol.

Diwakar and Kumar [11] proposed EELBCRP (Energy-Efficient Level Based Clustering Routing Protocol), a protocol for wireless sensor networks. The network was divided into annular rings by utilizing different power levels at the base station and each ring having different sensor nodes. They considered the remaining energy of every node and separation from the BS of nodes as the guideline of bunch head election. The numerical formulae for the election of the group head were given.

III. PROPOSED WORK

In this proposed work the concept of mobile wireless sensor nodes is introduced and these mobile sensor nodes will be used to replace the existing sensor nodes which are dead. The mobile nodes will usually take the positions of the nodes that are dead and then start the sensing process in their region thereby sending the data to the base station and thus also prolongs the network lifetime. In this work also additional energy powered sensor nodes are used which are advanced, intermediate and super-advanced nodes, here the energy of intermediate node is less than advanced node, the energy of advanced node is greater than that of intermediate node and energy of super-advanced node is greater than advanced node.

Proposed Algorithm

1. Begin
2. Set Nodes in Network
3. Arrange them according to topology
4. Elect CH based on CH selection probability P
5. If En_N>Th
6. {
7. Make CH
8. Else
9. Repeat 3 and 4 steps
10. }
11. Now cluster head advertise its slots withn range R
12. Join request to CH
13. Data Aggregation started
14. If CH_En< T
15. Replace CH with SAN
16. End

IV. RESULTS

TABLE.1 SIMULATION PARAMETERS

Parameters	Values
No of Node	100 ;150;200;250
Environment Size	100 X100
Centre node Position	(50,50)
Initial Energy of node	0.5 Unit
Simulator	Matlab 2013
Operating System	Windows 7

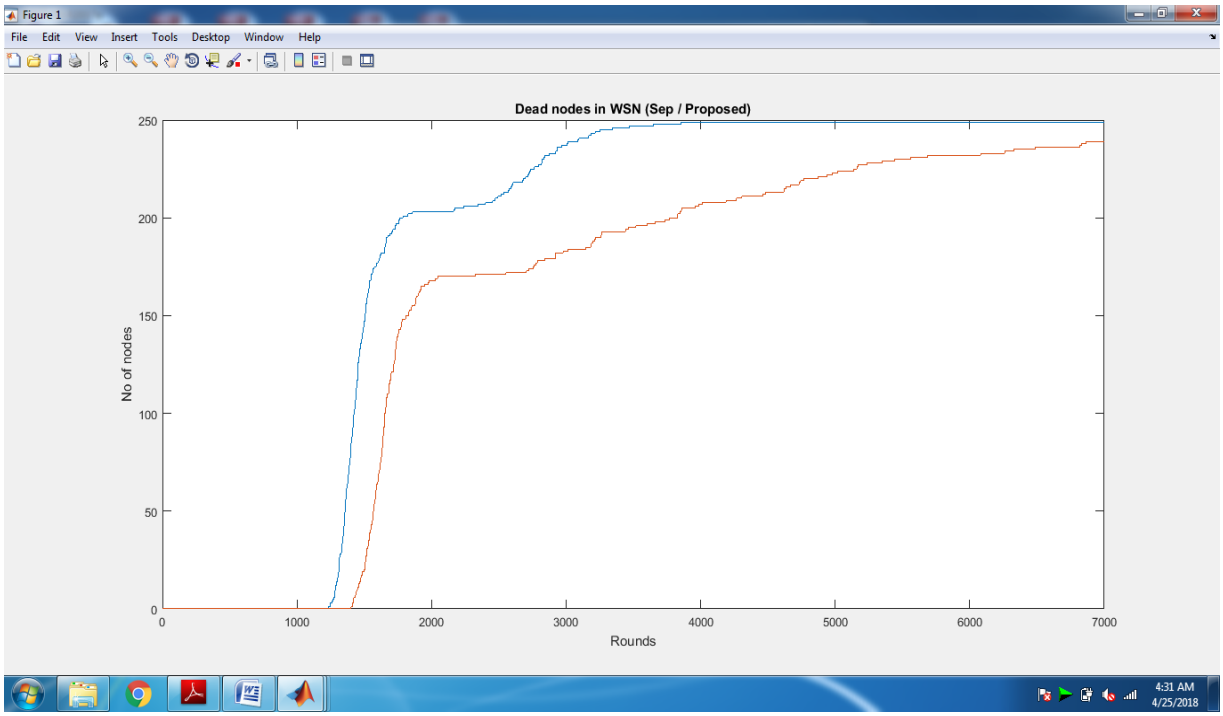

Figure 1. Dead nodes in SEP and Proposed framework

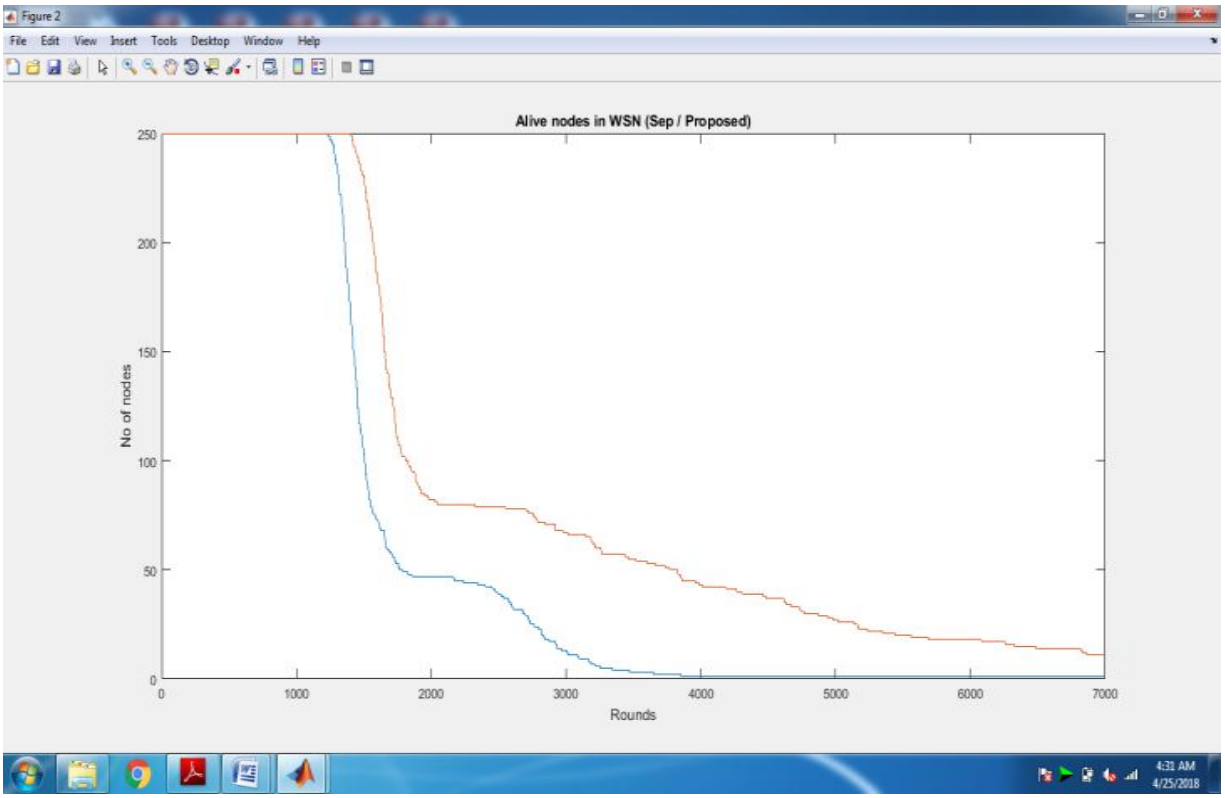

Figure 2. Alive nodes in SEP and Proposed framework

Figure 1 illustrates number of dead nodes in perspective of total number nodes. Here in proposed framework nodes are varied from 100 to 250. The red line shows proposed result while blue line shows existing SEP result. In proposed mechanism numbers of dead nodes are less as compare to existing SEP.

Figure 2 illustrates number of alive nodes in perspective of total number nodes. Here in proposed framework nodes are varied from 100 to 250. The red line shows proposed result while blue line shows existing SEP result. In proposed mechanism numbers of alive nodes are high as compare to existing SEP.

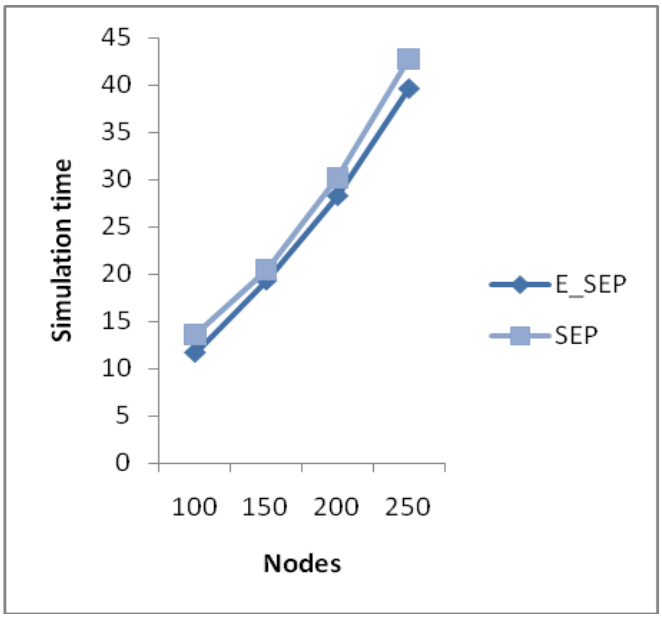

Figure 3. SEP V/S E_SEP

Figure 3 depicts total time taken to execute SEP and ESEP protocol. Here during simulation nodes are varied from 100 to 250. In proposed scheme executing time is low as compare to existing protocol.

V. CONCLUSION

In the existing protocol the death of nodes starts much earlier than the proposed protocol, the results show that the proposed protocol is better than the existing protocol in terms of first node dead. Also the overall lifetime of the network in proposed protocol is better than the existing protocol. Thus there is a significant improvement in the performance of the network with proposed protocol in terms of increase in number of rounds that leads to enhancement of the network lifetime.

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