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Uniform Deployment of Sensor and Density Based Energy Efficient Cluster Head Protocol for WSN

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ABSTRACT: We study the effect of heterogeneity of nodes in the zone concept of clustered wireless sensor networks. The most classic heterogeneous grouping protocols consider the detection field as a whole for group training. Unlike the existing protocols creates the proposed protocol the Square fields, the zones are called and the number of the selected group heads depends on the zone size and number of nodes. The best way to the life of sensor nodes to extend the complexity in the communication costs between the sensor nodes and their group heads to reduce and optimal probability of nodes to calculate to group heads in their respective areas. To view the performance of the zone-based clustered wireless sensor network to improve, we optimize some of the factors of the networks as the number of groups that the nature of the group head is selected and the total energy consumed in the zones. To view the performance of the zone-based hierarchically grouped wireless sensor network to improve, we optimize certain factors of the network such as the number of the groups that are produced, the nature of the group head is selected and the total energy consumed in the zones. We show by simulation results that the evenly distributed energy consumption of nodes in the zones of the total energy decreased in the network will be resolved. Simulation results also cover significant increased and beneficial effect on the new zone-based heterogeneous setting that were not previously possible.

KEYWORDS: Wireless Sensor Networks, inconsistency, optimal probability, Group Heads, Square field, zone-based grouped hierarchically

I.INTRODUCTION

In this paper we propose UDDEECH-protocol, zone based stable groups head-Selection protocol increased for clustered wireless sensor networks, the energy levels of the nodes by powerful group head selection in the zones balanced. We assume that the base station is not the limited energy and that the coordinates of the base station and the dimensions of the field. We also accept that the nodes are distributed evenly and that they are not movable. The contribution of the thesis presents a new network development model, in which the network is distributed in zones. While far esters range from the base station (BS), more energy is required to transfer in the BS, high energy advanced node in the furthest zones of the base station. Between the node and the normal node will be in the zone of the next close to the BS. Grouping technology is at the place in the zones, in which the density groups in the respective zones are formed and maximum residual energy as a group node probabilistic heads can be selected. Suitable extends the energy level node in the zones the time interval before the death of the first node that is crucial for many applications in which the feedback from the sensor network must be reliable. We show by simulation that achieve this balance about robust performance in the network by repeatedly, it stability period of zones and of the higher average throughput as the flow increases, the heterogeneous Zone - forgetful protocols are grouped. We also study the sensitivity of our protocol with a variable size of zones together with the Energy of Diversity in the sensors of the network.

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The rest of the paper is organized as follows. We repeat briefly the related work in section II with short descriptions of SEECH and UDDEECH; motivations in the direction of the zone-based protocol; section III provides a description of how the optimum number of groups in zones of WSN constructed; see the protocol with exemplary specifications of the network, energy consumption restrictions in the stable period of zones and development. In the simulation of section IV are settings and results of analyzes. We close the paper in section V.

II. RELATED WORK

Sensor nodes process normally unattended in the remote geographical areas. They may be in a chemically or biologically contaminated field at the bottom of the oceans, in the large buildings in a battlefield of enemy lines. Special Wireless routing protocols are essential to the communication between the base station and the tub to handle. For high density hundreds and thousands of sensor nodes in the wireless sensor networks to hand have been grouping techniques are used. There are two broad categories grouped homogeneous and heterogeneous sensor networks namely hierarchical sensor networks. In the homogeneous networks are all nodes in terms of energy and functionality is identical. In the heterogeneous networks, two or several node types in terms of battery power and functionality. In our paper we consider homogeneous and heterogeneous nodes used in the homogeneous and heterogeneous zones respectively. In this section we present the literature review of the various published work.

Low-energy adaptive grouping hierarchy (LEECH) [20] is a group-based protocol that the energy consumption of evenly among the sensor nodes distributed by group heads under probability Rotation chooses. But there is energy drainage on group-member of the additional functionalities later, such as data collection and processing were drawn. The network must be frequently re-grouped if failure occurs on the group members. Far away are the nodes of the tub also against the drainage of the higher energy costs due to the communication vulnerable and they tend to die quickly. As a result, energy is not evenly between the nodes to maintain the energy imbalance creates. Distributed energy-saving gruppi render algorithm (DEEC) selects the group heads on the knowledge of the relationship between the residual energy of the node with the average energy of the entire network [21] are based. Additional energy will be moved to the knowledge between the nodes to share. Stochastic DEEC (SDEEC) was as an extension of the DEEC [22] proposed. Two-level inconsistency is considered and energy is preserved by the node does not sleep-CH Power. The disadvantage of this Protocol is during the sleep state, the members of non-CH do not take into account the network operations.
SEECH is an energy-saving break end hierarchical protocol that uses a hierarchychal group. In SEECH distribution area in three regions as well as all node after the accident in given regions. After that we calculate level node (degrees average distance between each node according to region). If the probability of the provisional group head and the relay header is less than, select a random value on the basis of the degree of the node (Node with larger degrees are more suitable for group head and relay head), as a temporary group head and relay header. If the probability of the provisional group head and the relay header is greater than that calculated random value as the result of all of the nodes (result is as product of the distances of all nodes of your respective group head and from the relay header is defined) and the node that the minimum result, as the actual group head and relay header is selected. SEECH is an energy-saving break end hierarchical protocol that uses a hierarchychal group. In SEECH distribution area in three regions as well as all node after the accident in given regions. After that we calculate level node (degrees average distance between each node according to region). If the probability of the provisional group head and the relay header is less than, select a random value on the basis of the degree of the node (Node with larger degrees are more suitable for group head and relay head), as a temporary group head and relay header. If the probability of the provisional group head and the relay header is greater than that calculated random value as the result of all of the nodes (result is as product of the distances of all nodes of your respective group head and from the relay header is defined) and the node that the minimum result, as the actual group head and relay header is selected.

III. UDDEECH PROTOCOL MODEL

We take a simple model in figure 1 for the radio hardware-energy dissipation is shown in which the transmitter power scattered to the radio electronics and the power amplifier to run and the recipient energy scattered to the radio

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electronics to run. For the experiments conducted here only the channel model of free space will be used. So a distance *d* to consume the radio energy:

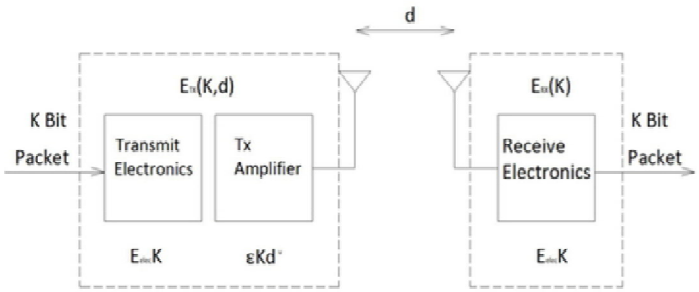

Fig.1 Radio Energy Dissipation Model

We assume that the base station, BS static and in the middle of the field is found. A protocol is hierarchical grouping together for all of the zones in which the nodes in groups and in local base station self-organize or group heads, CH are selected. To select the appropriate time between the node and the modern node in the respective zones as group heads with a certain probability and transfer their status to other nodes in their respective areas. Each sensor nodes determines your group head, the communication on the minimum energy for CH is based. The group head choice is based on the choice of probabilities randomised loaded in accordance with the residual energy of the node in the group in their respective areas. The group header to create a schedule for communication for the nodes in its group, as soon as all of the groups will be organised. The members of the group of questions the data and resources your CH. In order to reduce the power, not by the group heads scattered, the radio components at any time except during its transmission time off. Once, when all data are available on the CH, collects the data and sends it to the OS. To further reduce power dissipation and power to increase life time, CH local data fusion to reduce the quantity of data, compress the groups are sent to the base station.

IV. PURPOSED ALGORITHM

Phase I - setup phase: network is virtually in 4 zones separately. Each node generates a random probability on the product to calculate the introduction of order and the threshold value. New node control the energy of all nodes. The node, the maximum energy in the previous round, select as marginal (Relay node) and check the minimum distance from the BS. After that the energy of the new node in the previous round will not be the same torelay node is and minimum distance from BS off, select as ZH (Zone head).

In the steady-state phase: after the completion of the zone selection procedure, each member sends its data and residual energy to the ZH. The ZH retains residual energy information of all Member nodes and sends them further to marginal.

Phase II – Post setup phase: the Relay node sends BS maximum residual energy value of the node that its our group, if the last frame of round completes. BS find the maximum residual energy of the network and send this value to all ZH-nodes in the network. Further ZH-node will send the maximum value to all network nodes. Exclusive node defense of the value of the maximum residual energy for the following competition and the current round is completed.

Algorithm: Energy Of The Node, Distance From Base Station , Distance From Each Node ,Dead Node , Alive Node , Number Of Nodes , Round From Simulation .

1. Deploy nodes
2. Divide the zone in 4 equal parts

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3. For(zone=1 ;zone=4;zone +1)
4. For(N_Zone=0;N_Zone=node/4;Node++)
5. Deploy node in zone randomly ;
6. nodes with Enegry (E);
7. For (round : round =r_max : round+1)
8. For(Zone =1 :Zone= 4:Zone +1)
9. If (energy of node less then or equal to zero)
10. $N_{dead\_Zone\_i} = N_{dead\_Zone\_i} + 1$
11. $N_{alive\text{-}Zone\_i} = (N_{alive\_Zone\_i} - 1)$
12. $E_{avg\_Zone\_i} = (\sum_{n=0}^{N\_alive} energyofnodes) / N_{Alive\_Zone\_i}$
13. for(nodes=0:Nodes=N_{alive}:)
14. **If** (Energy Of The Randomly Selected Node i^{th} > Randomly Selected Node j^{th})
15. Cluster head = Nc
16. **If**(Density Of Selected Node iK^{th} < Randomly Selected Node nk^{th})
17. Relay Node =Nr
18. For(Zone =1 :Zone= 4: Zone +1)
19. Node to nearest node to cluster head till all nodes complete chain to Cluster head ;
20. Cluster head to Relay node each zone to Base Station
21. Cluster head send packet to base station Zone 1 = number of nodes *packer of each node+1 ;
22. Average Energy = Eavg Zone 1 + Eavg Zone 2+ Eavg Zone 3 + Eavg Zone 4;
23. Total nodes alive each round = $N_{alive\text{-}Zone\_1} + N_{alive\text{-}Zone\_2} + N_{alive\text{-}Zone\_3} + N_{alive\text{-}Zone\_4}$

V. SIMULATION AND RESULTS

Case I: Node 100 , Area 100 x 100

In this case we deploy 100 nodes are non-uniformly in SEECH(Fig.2) and then they are deploy uniformly in UDDEECH (Fig.3) in the 100X100 m area.

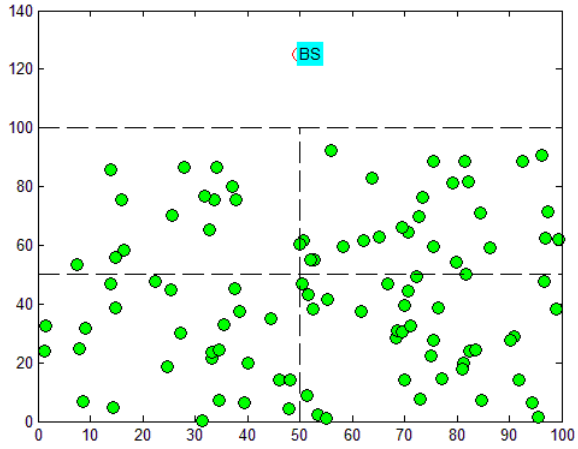

Fig. 2Non-Uniform deployment of nodes SEECH

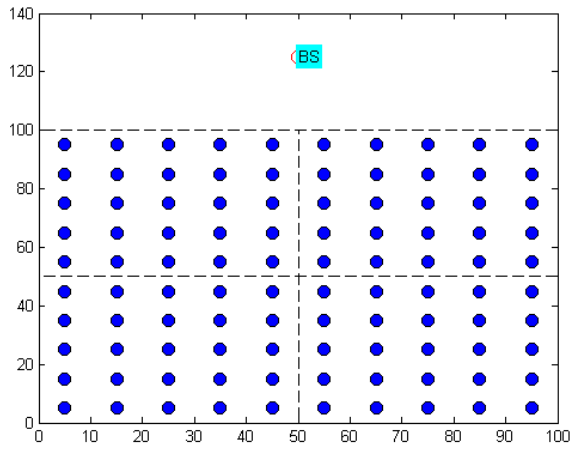

Fig. 3 Uniform Deployment of nodes UDDEECH

In Fig.2 Uniform deployment it is studied that the nodes are at equal distance and nodes are at equal coverage of the nodes and hence here is less loose of energy due equal transmission from nodes to Base station is less than non-uniform deployment (Fig. 3) here also the density of nodes area also uniform .

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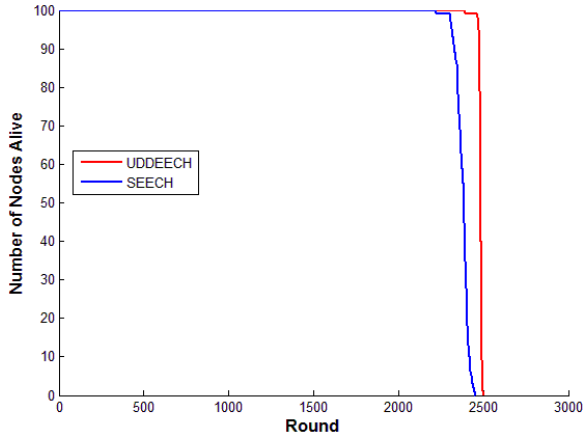

Fig. 4Nodes 100 Number of nodes Alive per Round in SEECH vs UDDEECH

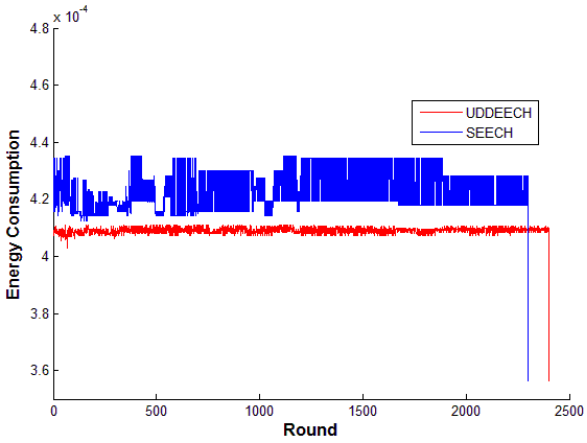

Fig. 5Nodes 100 Energy Consumed per round in SEECH Vs UDDEECH

In Fig.3 and Fig.4 graph, it is observe that all the of nodes dead around 2431 but in case of its more then 2501 .so from their is it studied that it is also from simulation clear that the death of nodes occur not in long period but in very small periods .so UDDEECH have more life time then SEECH .

Case II: Node – 200, Area -100 x 100

In this case we deploy 200 nodes are non-uniformly in SEECH (Fig.6) and then they are deploy uniformly in UDDEECH(Fig.7) the 100 X100 m area.

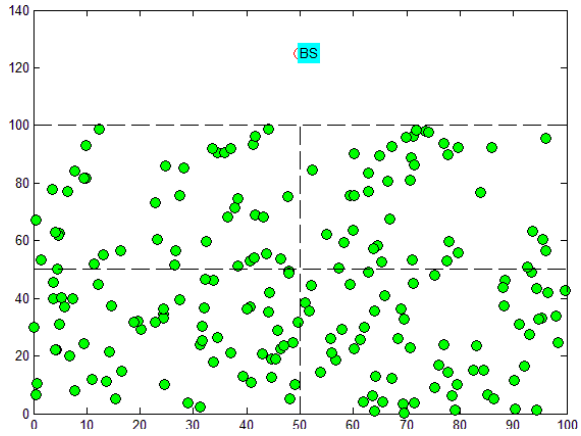

Fig. 6: Non uniform Deployment SEECH

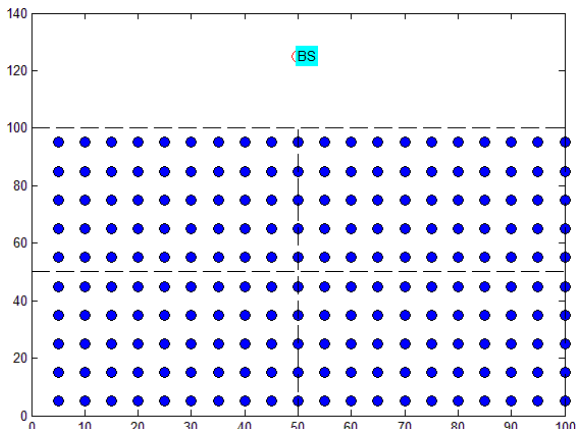

Fig.7: Uniform Deployments in UDDEECH

In Fig.6 Non uniform deployment it is studied that the nodes are not at equal distance and few nodes are very near to the nodes which result in unequal coverage of the nodes and hence here is loose of energy due unequal transmission from nodes to Base station.

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In Fig.7 uniform deployment it is studied that the nodes are at equal distance and nodes are at equal coverage of the nodes and hence here is less loose of energy due equal transmission from nodes to Base station is less than non-uniform deployment .here also the density of nodes area also uniform .

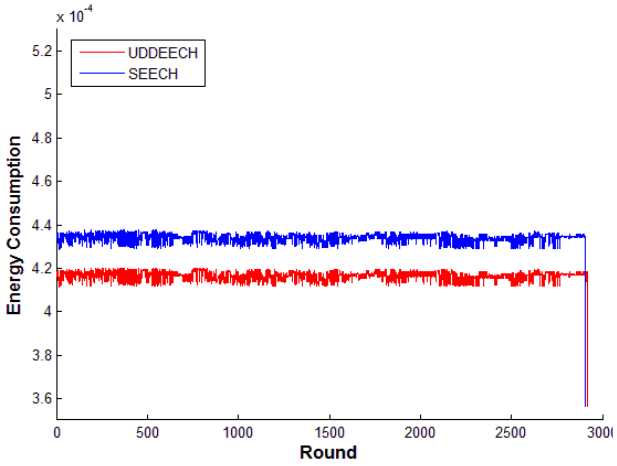

Fig. 8: Energy consumption SEECH vs UDDEECH

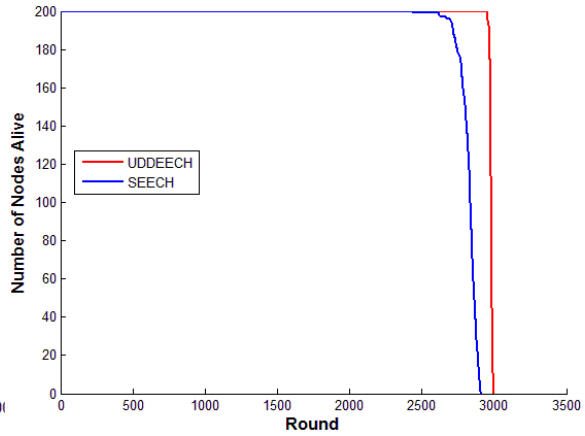

Fig. 9: Alive node per round SEECH vs UDDEECH

In Fig.8 it is observe after simulation result the uniform deployment is shown and in the Fig. 9 graph is between alive nodes per round between SEECH and UDDEECH from simulation result.it is observe that all the of nodes dead around 2930 but in case of its more then 3001 .so from their is it studied that it is also from simulation clear that the death of nodes occur not in long period but in very small periods .so UDDEECH have more life time then SEECH .

TABLE I

CASE	DEAD NODE	PROTOCOL	ROUND NUMBER
Case 1 100 Nodes	1st Dead Node (1)	SEECH	2200
		UDDEECH	2425
	Last Dead Node (100)	SEECH	2431
		UDDEECH	2501
Case 2 200 Nodes	1st Dead Node (1)	SEECH	2353
		UDDEECH	2856
	Last Dead Node (200)	SEECH	2930
		UDDEECH	3001

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VI. CONCLUSION

In the intensity-conscious distributed sensor monitoring of intelligent space and the extreme environmental and in the data group is relevant to to save energy. In WSNs are the key design issues in the research of routing protocols use of energy and power life time. A major challenge is to high stability time period for the supply area to preserve. In this paper as a zone has three-based the intensity performance layers protocol hierarchy (UDDEECH) during the member node group, where the network nodes move forward, group and the categorized relay header is proposed. UDDEECH suggested that a simple communication protocol of the low overhead approach for periodic information accumulated applications in harsh and remote offices, the network life time more than extend SEECH protocols in which network longevity three scenario studied. The simulation results showed that UDDEECH protocol, the network of life better than SEECH. The results also showed that the actions UDDEECH for networks of the large scale were used, a relevant question for room and degree of use. Simulation results showed that for UDDEECH protocol, the network life time better than SEECH-protocol.

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