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Semi Dynamic Underwater Wireless Sensor Network Based on Differential Evolution Motion Planning

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ABSTRACT: Energy capability could be a crucial read in wireless device networks to beat this downside the economical technique of bunch is employed to attain additional information transmission, long network period of time, less time consuming process, minimize energy utilization. In this paper propose multi cluster head teams, multi cluster heads via Load Balanced bunch and twin information Uploading and sencar. It is accountable to keep up the energy and information transmission from every sub node. In each cluster head collect data and energy level form sub nodes then transmit to the cluster group head. Here Multi User-Multi input multi output(MIMO) is used for multi data transmission to the sink, each nodes connected their cluster heads and sending packet to the sink via cluster heads and group heads. Sink assign Id to each node for identification purpose which node transmit data. Although the transmission of inter cluster, each cluster head group data is gathered by SenCar then transport the data to the static data sink. Sencar is that the quality of mobile nodes accustomed update the energy during which the node has low energy. If sencar has low energy then it is energized by sink is the base station controls the entire network .As the Simulation results exhibit that the proposed load balanced clustering maintains the energy state in addition as additional data-gathering to extend the network life time..

KEYWORDS: Wireless Sensor Network, Multi Cluster Head and Cluster Head Group (CHG) , Energy Capability , Sencar

I. INTRODUCTION

Wireless Sensor Networks (WSNs) have gained world-wide attention in recent years due to the advances made in wireless communication, information technologies and electronics field.
Wireless Sensor Networks (WSNs) contains a large number of sensor nodes with restricted energy. The sensing and transmitting of data involves a huge amount of energy consumption. Therefore, Clustering is considered as one of the powerful approaches for efficient utilization of energy. The heterogeneous environment contains different types of sensor nodes in term of sensing, computation, communication and power.
The mobile charging vehicles called Sencars are equipped with charging sources or devices and move along a wireless sensor network. The way the Sencar attends the energy depleted nodes, the order by which it meets the sensor nodes would have an impact on the life time and efficiency of a network. Many papers and researchers have tried attending, the recharging of nodes at certain intervals and in periodic manner. This is unpredictable, that the energy level of the node might get depleted at any point, based upon its transmission of data along the network. This paper proposes, a well-defined solution called NDN approach, which would meet the requirement of the thirsty nodes whenever it is needed.

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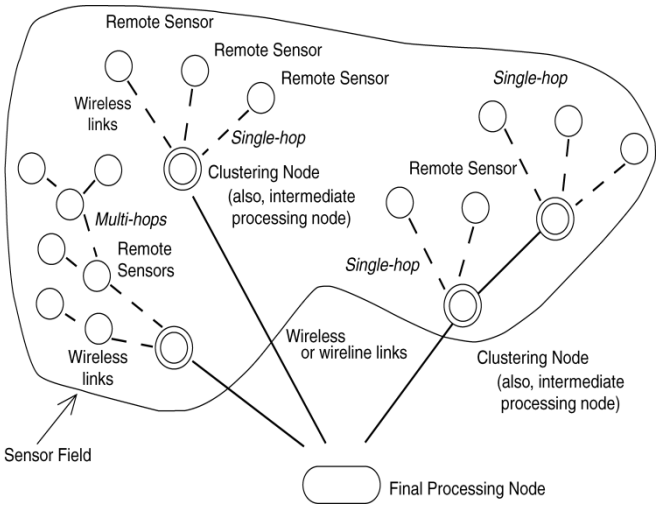

Fig 1.Overview of WSN

II. RELATED WORK

[1] ZebaIshaq, Seongjin Park AndYounghwanYoo, "A Security Framework For Cluster-Based Wireless Sensor Networks Against The Selfishness Problem," 2015

Algorithms/Techniques

Cluster Based Wireless Sensor Networks (CBWSNs)

Concept

Security also become a big problem for cluster-based wireless sensor networks, when node is cluster becomes selfish from the intension to save their limited resources, destroy cluster, new ideas of incorporating two special nodes, cluster heads(CHs),inspection node(IN),over heads CH is transmissions in order to prevent the selfishness attacks. Control selfishness attack also controls the black hole attack.

Merits:

To appoint two special nodes per cluster: inspector node and cluster head node.

Demerits:

There is no analyze the behavior of nodes to successfully identify the intruders in the form of selfishness attack

[2] Chuan Zhu1, Shuai Wu1, Guangjie Han1, (Member, Ieee), Lei Shu2, (Member, Ieee),AndHongyi Wu3, (Member, Ieee)," A Tree-Cluster-Based Data-Gathering Algorithmfor Industrial Wsns With A Mobile Sink," Volume 3, 2015

Algorithms/Techniques

Tree-cluster-based data-gathering algorithm (TCBDGA)

Concept

Most of the data-gathering strategies for WSNs cannot avoid the hotspot problem in local (or) whole deployment area, so we introduce tech like true –cluster based data-gathering algorithm, this algorithm balance the load of the whole networks, reduces the energy consumption, avoid the hotspot problem prolong the network life time.

Merits:

Short and a mobile sink starts the data collection tour periodically.

Demerits:

Possible for heterogeneous sensory data

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[3] ChaojieXu, Zhongling Liu, Jun Xia, Hui Yu," An Adaptive Distributed Re-Clustering Scheme For Mobile Wireless Sensor Networks," 2015

Algorithms/Techniques

A novel adaptive distributed re-clustering Technique is used.

Concept

Nodes estimate their current locations; predict the most possible location of next time. Boundary node of a cluster periodically obtains location information of the nodes in the optimal cluster according to the components & separation of clusters. The outperformance of the proposed schema on packet delivery ratios comparing with existing schemes.

Merits:

The predicted locations are used to avoid the ping-pong effect.

Demerits:

Re Clustering is not accurate

[4] Zilong Jin, Student Member, Ieee, Dae-Young Kim, Jinsung Cho, Member, Ieee, And Ben Lee, Member, Ieee," An Analysis On Optimal Cluster Ratio In Cluster-Based Wireless Sensor Networks," Vol. 15, No. 11, November 2015

Algorithms/Techniques

Optimal Cluster Ratio

Concept

Optimal cluster ratio from the perspective of network life time is mathematically analystics.Network life time is extended by jointly optimizing the network transmission count & link reliability.CR deliver based on the proposed analytical model enhances the energy efficiency & effectively increases the network life times.

Merits:

To increase the Energy Efficiently and Node Life Time

Demerits:

Not Applicable for data aggregation scheme and specific application environments.

[6] HamidrezaTavakoli, JelenaMi_Si_C, Senior Member, Ieee,Vojislav B. Mi_Si_C, Senior Member, Ieee, And MajidNaderi," Energy-Efficient Cluster-Head Rotation In Beacon-Enabled Ieee 802.15.4 Networks," Vol. 26, No. 12, December 2015

Algorithms/Techniques

Cluster-head rotation protocol with virtually zero overhead

Concept

Clustering protocol called fan-shaped clusters. (FSC) to partition a large-scale networking into fan-shaped clusters. This paper proposed, different energy saving methods, such as efficient cluster head relay selection, locality of re-clustering.

Merits:

Dead time is eliminated and clustering overhead is minimized.

Demerits:

Changes needed to accommodate sensors with heterogeneous traffic and different power sources

[7] Vipin Pal, Student Member, Ieee, Girdhari Singh, And R. P. Yadav," Balanced Cluster Size Solution To Extend Lifetime Of Wireless Sensor Networks," Vol. 2, No. 5, October 2015

Algorithms/Techniques

Concept

Clustering protocol called fan-shaped clusters. (FSC) to partition a large-scale networking into fan-shaped clusters. This paper proposed, different energy saving methods, such as efficient cluster head relay selection, locality of re-clustering.

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Merits:
It has balanced clusters and better cluster quality.
Demerits:
Possible only on heterogeneous sensor node

[8] J.-S. Lee And W.-L. Cheng, "Fuzzy-Logic-Based Clustering Approach For Wireless Sensor Networks Using Energy Predication," Ieee Sensors J.,Vol. 12, No. 9, Pp. 2891–2897, Sep. 2012.
Algorithms/Techniques
A fuzzy-logic-based clustering Technique is used.
Concept
Based on analysis of energy consumption for data transceiver, single-hop forwarding scheme is proved to consume less energy than multi hop forwarding scheme within the communication range of the source sensor or a current forwarder, using free space energy consumption model. This approach is proposed to address the problem and it provides balanced clusters by considering thresholds for cluster formation.

[9] Y. Liu N. Xiong Y. Zhao A.V. Vasilakos J. Gao1 Y. Jia," Multi-Layer Clustering Routing Algorithm For Wireless Vehicular Sensor Networks," 2010,
Algorithms/Techniques
Effective clustering algorithm.
Concept
An extension to the energy predication has been proposed to prolong. The lifetime of WSN by evenly distributed the work load.

[10] DucChinh Hoang, Rasjesh Kumar, Sanjib Kumar Panda," Realisation Of A Cluster-Based Protocol Using Fuzzy C-Means Algorithm For Wireless Sensor Networks," 2013.
Algorithms/Techniques
The fuzzy C-means (FCM) clustering algorithm.
Concept
The protocol considers the dual factor of nodes remaining energy and distance between vehicular node and the center station comprehensively.Rounting protocol better balance energy consumption in the network, effectively solve sensor networks for many-to-one data transmission mode; effectively extended the network life time.

[11] Jenq-ShiouLeu, Member, Ieee, Tung-Hung Chiang, Min-Chieh Yu, And Kuan-Wu Su," Energy Efficient Clustering Scheme For Prolonging The Lifetime Of Wireless Sensor Network With Isolated Nodes," Vol. 19, No. 2, February 2015
Algorithms/Techniques
Regional Energy Aware Clustering with Isolated Nodes (REAC-IN)

Concept
The network life time has been proven to be extended when compared with a protocol, MlEACH that is a modified version of the well-known cluster-based protocol LEACH, text-bed for different optimization algorithm to achieve the best efficiency in WSNs.

III. PROPOSED ALGORITHM

Relay routing is a simple and effective approach to routing messages to the data sink in a multi-hop fashion. It is a coordinated transfer schedule by choosing alternate routes to avoid congestions. The construction of a maximum-lifetime data gathering tree by designing an algorithm that starts from an arbitrary tree and iteratively reduces the load on bottleneck nodes.The deployments of relay nodes to elongate network lifetime.Evaluated collection tree protocol (CTP). CTP computes wireless routes adaptive to wireless link status and satisfies reliability, robustness, efficiency and

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hardware independence requirements. However, when some nodes on the critical paths are subject to energy depletion, data collection performance will be deteriorated.

Disadvantages of the Existing System

- Node selection is randomly, that does not take into account energy consumption .The nodes with low remnant energy have the same priority to be a cluster head as the node with high remnant energy. Therefore, those nodes with less remaining energy may be chosen as the cluster heads which will result that these nodes may die first.
- The cluster heads communicate with the base station in single-hop mode which makes DE cannot be used in large-scale wireless sensor networks for the limit effective communication range of the sensor nodes DE cannot support moment of nodes.

MODULES

1. Node Construction
2. Cluster Head Formation
3. Data Transmission ThroughSencar

MODULES DESCRIPTION

1. Node Construction

In this Project concept, first we have to construct a base station which consists of 'n' number of Nodes. So that nodes can request data from other nodes in the network. We can assume that the nodes are moving across the base station. All nodes in the cluster head connect through the base station. Base station is used to store all the Nodes information like Node Id and other information. Also base station will monitor all the Nodes Communication for security purpose.

2. Cluster Head Formation

In this module, base station assigns energy for each node and it selects the cluster head and group cluster head based on node distance. Then the cluster head selects sub nodes based on coverage area. Although cluster head1 selects the cluster head2 similarly cluster head are selected and it forms the group. Once we created node group in the cluster head, any of the node in cluster head can send the data to reach the base station via group cluster head.

3.Data Transmission Through Sencar

Source node in cluster head sends data to base station via group cluster head and SenCar node. In that process, sensor nodes send data to its cluster head. Then the cluster head sends the collection of data to its group cluster head. We coordinate the mobility of SenCar to fully enjoy the benefits of dual data uploading, which ultimately leads to a data collection tour with both short moving trajectory and short data uploading time. Finally SenCar node collects the data from group cluster head and gives that collection of data to base station.

IV. SIMULATION RESULTS

The simulation is run on the environment of Ns2.28. The first category is the enhanced relay routing in which data are relayed among sensors. Besides relaying, some other factors, such as load balance, schedule pattern and data redundancy, are also considered. The second category organizes sensors into clusters and allows cluster heads to take the responsibility for forwarding data to the data sink.

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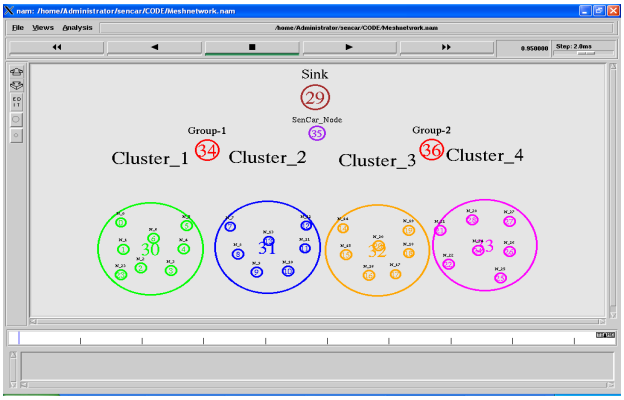

Figure 4.Node Construction

Figure 4shows the nodes are deployed in an area for sensing data. Here sink assigned the node id with energy level assumed to the SenCar Object node.

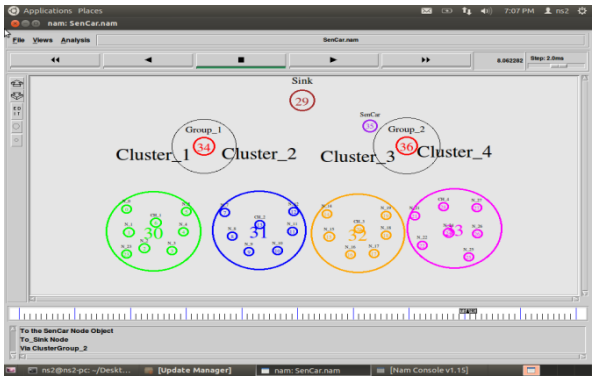

Figure 5 Selection of Cluster Head Group

Figure 5 shows the selection of cluster head group.Here four region of cluster region formed and each two cluster head is connected to the one group head.

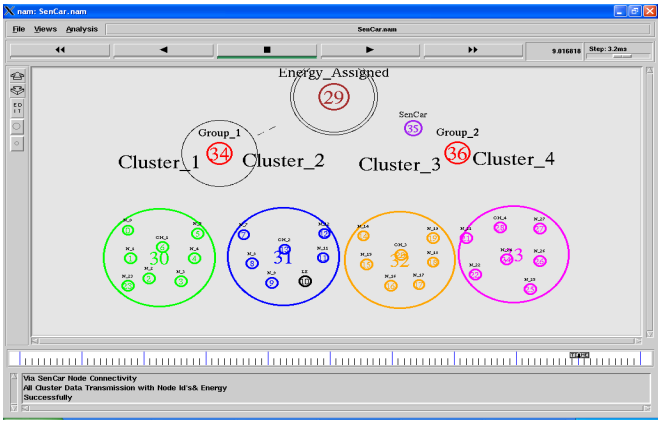

Figure 6 Energy Transmission

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Figure 6 shows the black color node in the second cluster head not having enough energy for data transmission. Sink assigned the initial energy directly to their group header and each group header sent those information to their specific cluster region.
Figure 7 shows the energy assigned successfully for that node. So, if have any less energy available then it will recycle from the monitoring sink

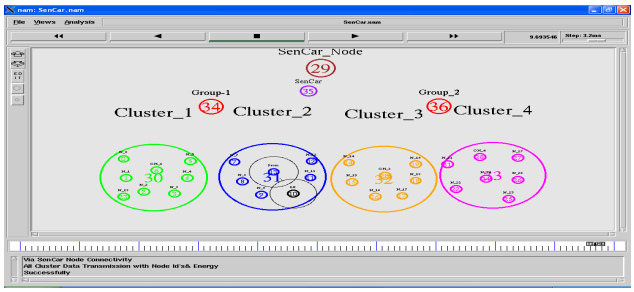

Figure 7 Re-Transmit Energy Via Cluster Head

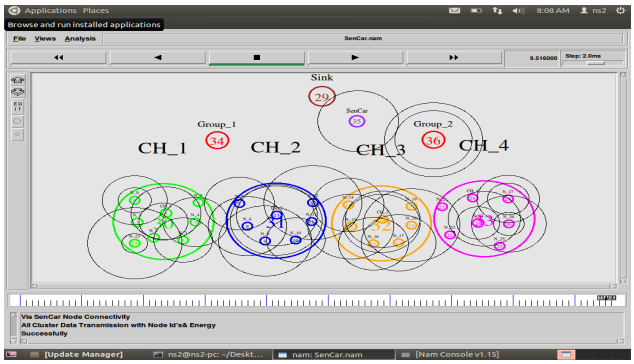

Figure 8 MIMO

Figure 8 shows that MIMO is used to send the multiple data to the sink. Here cluster heads are connected to their neighbor nodes within the particular region. Hence each nodes connected their cluster heads and sending packet to the sink via cluster heads and group heads**.**

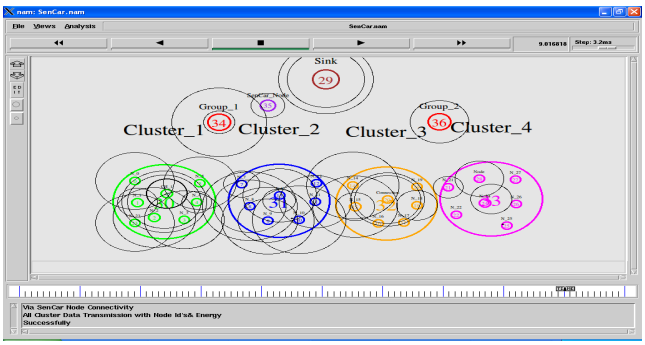

Figure 9 Data Transmission ThroughSencar

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Figure 9 shows the group head received packet with energy level from the cluster head then it transfers to the SenCar object node. Group head monitoring each two cluster heads details information and updated to the Sink node from here itself.

PERFORMANCE METRICS

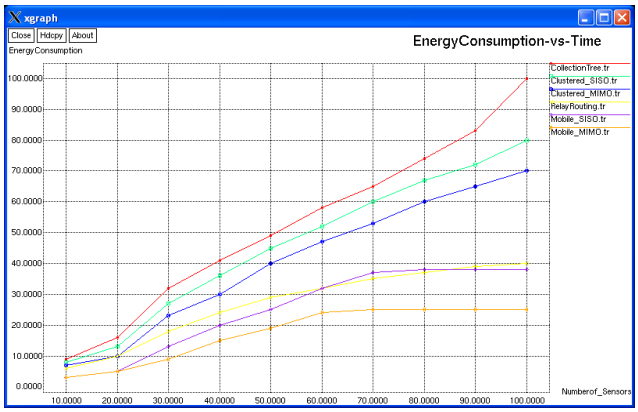

Figure 10 Maximum Energy Consumption

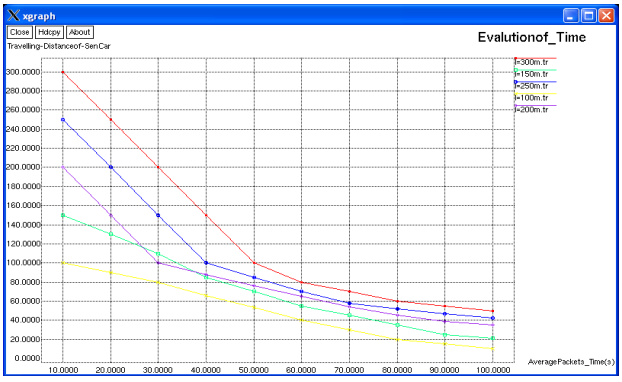

Figure 11 Evaluation of Time

V. CONCLUSION AND FUTURE WORK

In this paper, we have proposed the Load Balanced Clustering-Dual Data Uploading framework for mobile data collection in a WSN. It consists of sensor layer, cluster head layer and SenCar layer. It employs distributed load balanced clustering for sensor self-organization, adopts collaborative inter-cluster communication for energy-efficient transmissions among Cluster Head Groups, uses dual data uploading for fast data collection, and optimizes SenCar's mobility to fully enjoy the benefits of MU-MIMO. Our performance study demonstrates the effectiveness of the proposed framework. The results show that LBC-DDU can greatly reduce energy consumptions by alleviating routing burdens on nodes and balancing workload among cluster heads.

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