

Processing Dual Data While Load Balancing using Dynamic Clustering Mechanism in Wireless Sensor Networks

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Abstract:- Large number of sensor nodes collectively form wireless sensor network, that is used to monitor the environment using static and mobile sensor nodes. Sensor node consists of sink node with a combination of sensor nodes and the final data /information will be passed to the destination node. Clustering mechanism is used to collect the data sink node and pass them to respective destination node. The existing method contains this clustering mechanism in the combination of cluster head and cluster members in the form of static network. There are several problems related to static clustering in case, the failure of certain node in static membership then it has an effect on fault-tolerance. The Proposed work exchange the static clustering mechanism into an algorithm that succeeds decrease in energy consumption that is completely on the result obtained by the prediction on moving object so that redundant data is avoided. Cluster head is denoted as CH and Cluster member is denoted as CM, when the Cluster Head is destroyed (CH), then the cluster obviously useless and the respective data information will not be passed to the destination hence data will be lost. The clusters formed dynamically as per the corresponding events that is triggered then and there and that's a merit. Then the event will be identified by the nodes that has apt power in it and that will be ready to be cluster head. Cluster head will then send request to the node that it wishes it to act as member of that cluster. This is actually not a cluster since each time they are picked from different clusters. The sensors do not statistically form a cluster; they are selected from different clusters at different times.

Keywords: Clustering mechanism - dynamic clustering, Cluster Head, cluster member.

1. INTRODUCTION

Wireless Sensor Networks capable of collecting the information by using micro-sensor nodes. WSN is made up of group of sensor nodes which is subdivided into two they are sensor node and sink node these nodes are mainly to transfer the data from one node to another and here the process of clustering is merged. There are more set of clustering technique and one of the major method used is dynamic clustering method has been worked. The existing method has a method of clustering called as static clustering. Each sensor Cluster head and Cluster member each sensor will be in static condition. Additional set of node types are Micro-sensor nodes which are not as powerful as macro sensors but the fact to be accepted is that

they provide fault tolerant and rich in quality by the deployment of huge number of sensors in a network. The process defined as the electronics of sensing and detecting the information directly from environment occupied by the sensor that transforms into electronic signal plus message. The routing protocol that decides the path in which the message has to travel through the sensors in reaching base station, influences the efficient energy of a WSN. Wireless Sensor Network which is composed of network of devices notified as sensor nodes that is employed to sense the environment and alter the data obtained. Then the obtained data is forwarded to the sink node that is by either single hops or by multiple hops. Finally they have come up with an effective solution for many such applications.

The sensor network has the main objective to cooperate with the sensor nodes. The volume of data increases with the advances in the technology that will fall under the category of Big Data.

Big data takes up the challenge in guiding the industry to improve the way in which the data is been handled irrespective of how huge it may be. Collecting huge amount of data is possible when the number of sensors becomes high and this will pull the matter into the same broad category.

The most important phase of cluster-based routing protocols is the cluster head selection (CHS) procedure that ensures uniform distribution of energy among the sensors, and consequently increasing the lifespan of a sensor network.

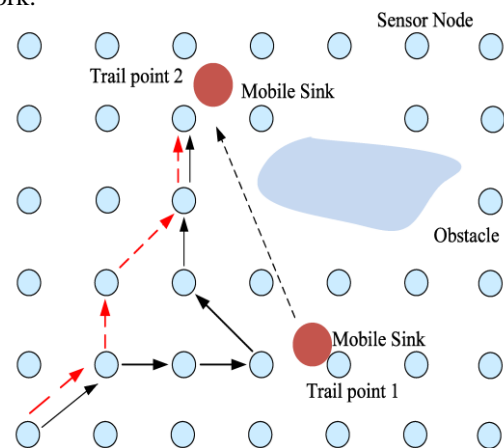


Fig. 1 architecture of Sensor network

Once the CHs are identified, they form a backbone network to periodically collect, aggregate, and forward data to the BS using the minimum energy (cost) routing. This method significantly enhances the network lifetime compared to other known methods. The major challenges include equal distribution of each cluster over the entire sensor network and the energy dissipation caused by the frequent information exchange between selected cluster head and nodes in the cluster in every setup phase of cluster formation. If CH is selected on the basis of the concept of maximum number of nodes connected, then it may happen that one or more nodes are not connected to any of the selected cluster heads, even though they are in the transmission range. Such nodes are called the isolated nodes. The proposed algorithm deals with the cluster head selection based on the unique node concept. A unique node is the one which is not connected to any other cluster heads. The current paper describes CHS using two other parameters as well, namely, number of neighboring nodes and the residual energy of the node.

II. SYSTEM DESCRIPTION

2.1 EXISTING WORK

Wireless sensor nodes are scattered to monitor the area and collect the information. The major process is based on transmitting the information from one sensor node to another sensor node. The main objective of the sensor network is based on detection of reliably and also about the accuracy by evaluating the information using observed area details.

All sensor nodes send transformation of data is based on Static Cluster Head. In sensor acknowledgement and communication process, each sensor energy level has to be tested at every route requesting time. Static CH consumes more energy to collect data from all sensor nodes. Hence the energy is drained easily.

DISADVANTAGES

- The static cluster Head has reduced network life time.
- Energy are consumed high
- Overhead is also high

2.2 PROPOSED WORK

Cluster heads CH are selected based on the probability of optimal cluster heads defined by the networks. After the selection process of cluster heads CH, the respective cluster member CM are formed and the cluster heads communicate data with base station.

The flaws occurred by Static CH can be overcome by using the Sencar methodology, Here, a cluster head selection method is based on the HEF algorithm. This method verifies that the network lifetime can be efficient and similarly the Dynamic CH reduces the traffic.

Advantages:

- packet delivery rate is increased
- Lifetime of the network are increased
- packet loss is reduced and also the delay are reduced

- energy consumption is also reduced

1.3 Flow Diagram

The flowchart defines the process which starts from the base station BS. All the sensor nodes send their own energy level status to the respective BS (base Station). This process of intimating the energy level is to maintain a database about the energy level at starts of the process compare with end of the process. Next to this collection of energy level then the base station group the data into geographical group. This group separates the higher energy level nodes and lower energy level nodes and each form each set of groups. From that group highest energy nodes are selected. Then CH cluster head are selected from that the information are passed to other cluster member. finally the send to the cluster group of information.

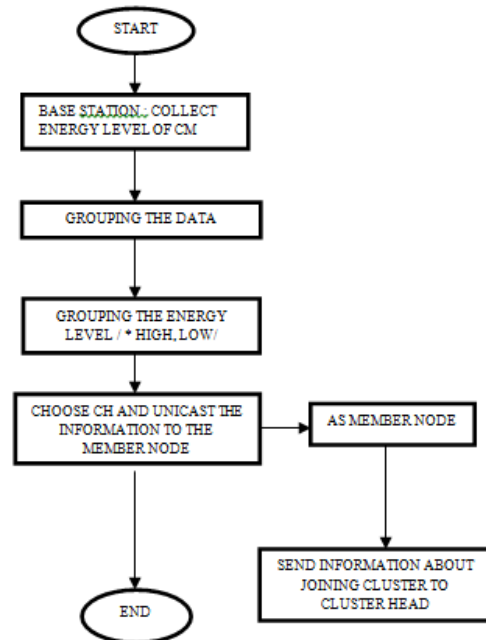


Fig.2 Flow Diagram

3. IMPLEMENTATION AND RESULT ANALYSIS

3.1 Implementation

Clusters are shaped in group and the cluster head is selected based on their energy level. After that the cluster head receives the data, it can be accumulated and the data can be transmitted to the base station. In set-up phase each sensor node pass the information about its current location to the base station. Base station collects the data from sensor nodes, and calculates the node with higher and lower energy by calculating average value of node energy. Higher energy node will be the cluster head. Then a broadcast message is pushed to other nodes. “CH advertisement” phase, CSMA MAC protocol used by CH. During the receiving phase the non CH nodes should keep the receiver on to fetch the advertisements from all CH nodes. Then each non CH node will identify itself to the native round to which it belongs to,

based on the signal strength of the advertisement followed by the request to the corresponding CH node to be a member of cluster. Then the information is transmitted back to the CH using CSMA MAC protocol.

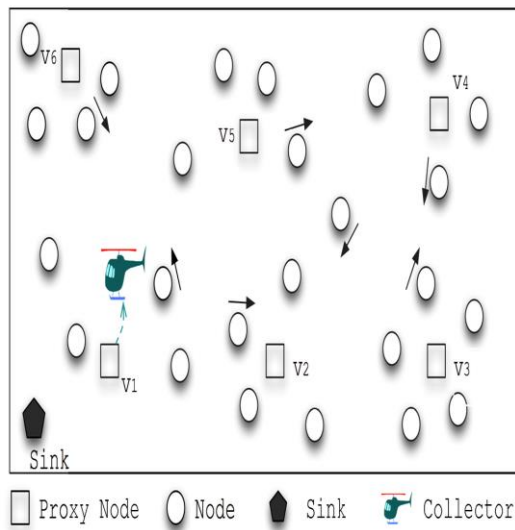


Fig. 3 architecture of network transmission

CH node after receiving the request from the nodes that wishes to be the cluster's member, it creates the TDMA schedule having the details on the exact time slice when it can be allowed to transmit.

The calculated schedules will be broad casted to all the nodes in the cluster and data transmission begun, that uses minimal amount of energy. In order to save energy dissipation the radio of each CH nodes can be turned off until the allotted time arrives. But on the other side the receiver of the CH should be switched on throughout the process. Final data is sent to BS which will consume high energy due to the fact that the base station is too far from it. Over a period of time the energy of the cluster head node will be reduced since its receiving and transmitting continuously and once it falls below the average value then everything is re-clustered.

3.2 Modules Description

Network formation with Cluster

- The primary step of the process is creating the sensor nodes and sink node are created
- Nodes are placed according to the range / energy level of each neighbor sensor node .
- when the data is ready to send then the sensor nodes transfers the data, similarly it will send request message to neighbor sensor nodes.
- The node which is near to the cluster head then it will send response message.
- A batch of request and acknowledgement of a period that will be adjusted at runtime to avoid unnecessary changes.

Create Dynamic CH group communication

- A set of each sub-domain (cluster) is 'elected' as a cluster head (CH) and a respective node which forms a gateway to serves as a in-between for inter-cluster communication. Left over, sensor node are called as ordinary nodes. The boundaries are explained by the area of transmission of the cluster head in the cluster.
- Cluster doesn't mean that it should definitely have a head in it, but it will have routing information etc.,.

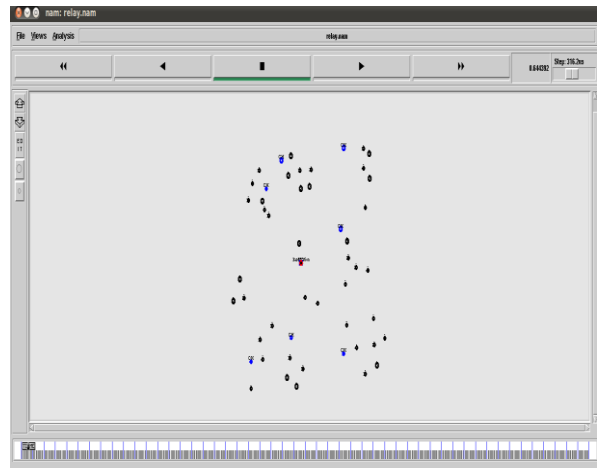


Fig.4. Network Formation

Mobile Sink data gathering from Dynamic CH's

- Points will be selected based on the subset of sensors containing the data in certain number of relay hops.
- Here, the cluster head data are temporarily stored in cache and uploaded in sink node.
- Mobile sink is allowed to move anywhere so that an optimal pathway will be decided.
- To name nodes as cluster head and find the pathway the data travels, by traversing each node in a sequence.
- When the mobile sink arrives, it polls each CH to request data uploading and then upload the data to mobile sink.
- If any message is emergency it will directly send the emergency data to base station without waiting the Mobile Sink.

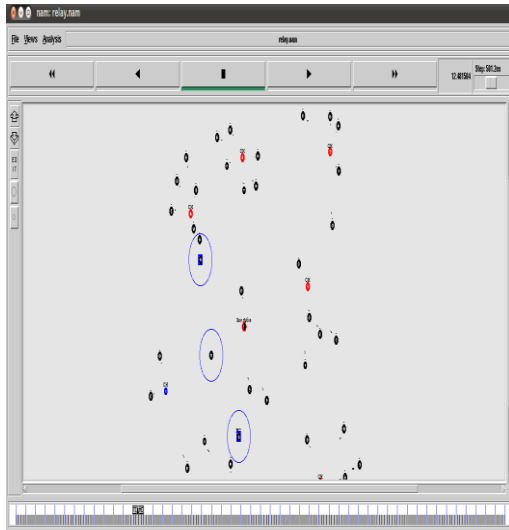


Fig.5. Data Gathering

Sending data to BS

- Single Hop mobile sink is being uploaded with data packets by cluster head.
- Static data sink that can be either inside or outside the field takes charge in collecting the data packet from cluster head and forwards it to the base station.

COMPARISON STATUS

The first comparison is about the packet delivery rate between existing and the proposed. In fig.7 explain the graphical representation. The existing method contains the static cluster head process and the existing method contain the dynamic cluster head process.

The green line denotes the existing method. and the packet delivery rate is low when compared with the proposed dynamic cluster head process denoted in red line. The packet delivery rate increased the packet size delivery ration to 95

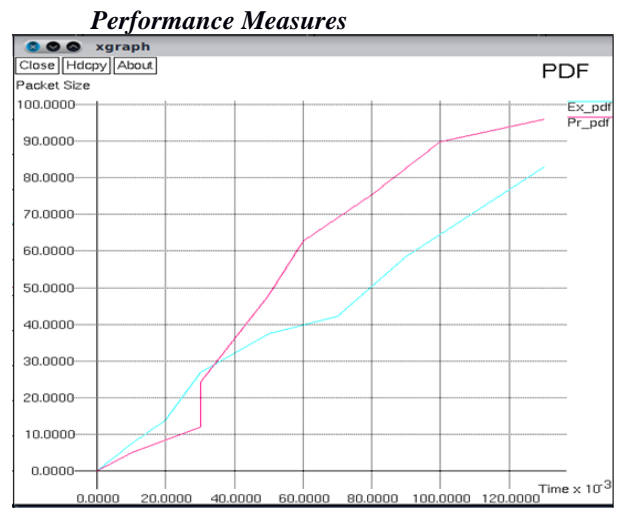


Fig.7. Packet Delivery Ratio

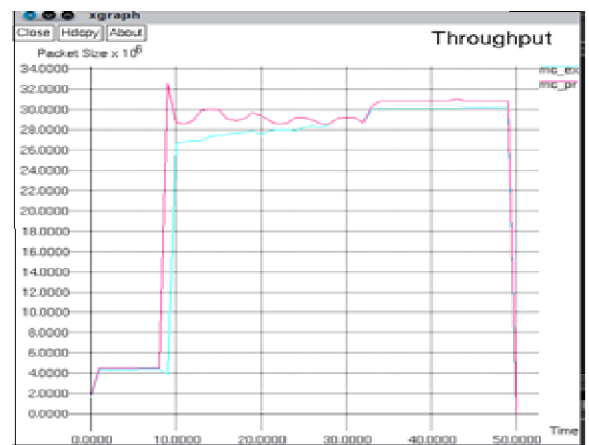


Fig 8 Throughput

The second comparison shown in fig.8 is about the throughput between existing and the proposed. Using the dynamic cluster head process the throughput rate is reducing in proposed condition. Similarly, in fig 9 when comparing the energy level with the dynamic and static cluster method. The dynamic stud first in comparison. The existing method contains the static cluster head process and the existing methods contain the dynamic cluster head process.

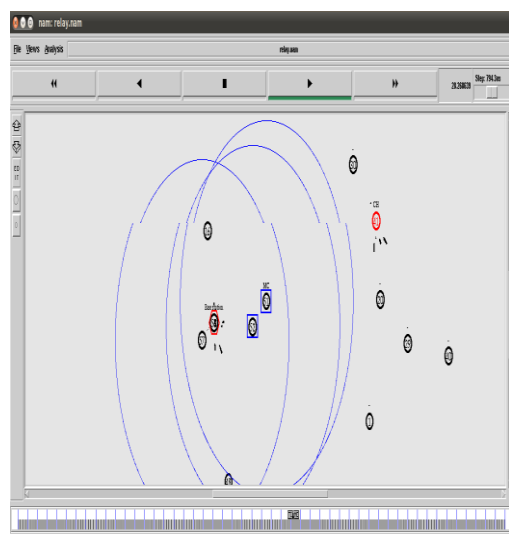


Fig. 6 Handover of data

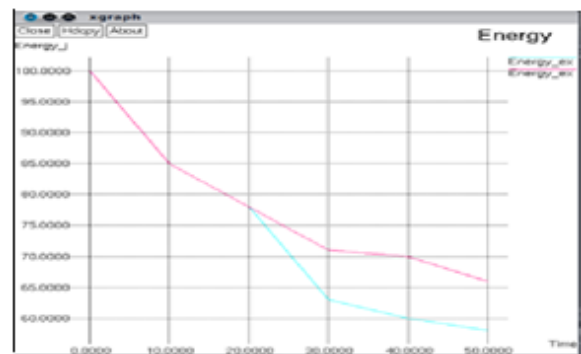


Fig. 9 Energy

4. CONCLUSION

Topology management has been considered as equally supported by the clustering technique mainly to reduce energy consumption as well as data aggregation in the networks. A clustering that is dynamic is being discussed here where clusters are refreshed repeatedly on particular time frame and the cluster head will be selected as per that scenario. To reduce the energy consumption of sensor nodes, it forwards the data to CH. This is extensively improving the network lifetime, traffic, trade off with the channel access and end-to-end delays. Finally the Mobile Sink moving from Base station gathers data from CH and hand over the data to the Base Station without any delay.

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