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Improved Data Gathering System in Wireless Sensor By Using Mobile Data Aggregator

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Abstract— Energy consumption becomes a primary concern in a Wireless Sensor Network. To pursue high energy saving at sensor nodes, a mobile collector should traverse the transmission range of each sensor in the field such that each data packet can be directly transmitted to the mobile collector without any relay.

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I. INTRODUCTION

Owing to the rapid advances in wireless communications and micro electro mechanical systems technologies, the micro sensor technologies have improved in terms of size, cost, sensitivity, and variety. However, we note that the sensor nodes are still very limited in computational capacities, memory and power. Hence, the routing algorithm of the network should be designed to be energy efficient allowing for the maximal lifetime of the network. Routing algorithms can be broadly divided into two categories are namely direct routing and indirect routing using a cluster approach. In direct routing algorithms [1, 2], each sensor node directly transmits the acquired data to the base station (BS). Conversely, indirect routing algorithms [3] involve a clustering algorithm that creates multiple clusters of sensor nodes. These clusters elect a cluster header (CH) node within a cluster. Under this configuration, each sensor node transmits the acquired data to their CH node rather than the BS. The CH collected the data and transmits it to the BS.

In clustering technique, data transmission is more reliable. But in this some unnecessary energy loss will occur in intermediate cluster head while no own data transmission.

II. Related work

[1] In this paper, author proposed a new energy-efficient approach for clustering nodes in ad hoc sensor networks. Based on Hybrid Energy-Efficient Distributed clustering, that periodically selects cluster heads according to a hybrid of their residual energy and secondary parameter, such as nude proximity to its neighbors or node degree. This approach can be applied to the design of several types of sensor network protocols that require energy efficiency, scalability, prolonged network lifetime, and load balancing.

[2] In this paper, author first present how to place SNs by use of a minimal number to maximize the coverage area when the communication radius of the SN is not less than the sensing radius, which results in the application of regular topology to WSNs deployment. Mobile node rotation can extend WSN topology lifetime. It considers WSNs that are mostly static with a small number of mobile relays not practically declared for Dynamic WSNs.

[3] This paper deals with mobile data gathering, which employs one or more mobile collectors that are robots or vehicles equipped with powerful transceivers and batteries. An important issue is not addressed in this paper, i.e. latency.

[4] In this paper author presented the design and analysis of novel protocols that can dynamically configure a network to achieve guaranteed degrees of coverage and connectivity. This work differs from existing connectivity or coverage maintenance protocols in several key ways. Capability of authors protocols to provide guaranteed coverage and connectivity configurations through both geometric analysis and extensive simulations. It is not extending solution to handle more sophisticated coverage models and connectivity configuration and develop adaptive coverage reconfiguration for energy-efficient distributed detection and tracking techniques.

[5] In this paper author have developed an embedded networked sensor architecture that merges sensing and articulation with adaptive algorithms that are responsive to both variability in environmental phenomena discovered by the mobile sensors and to discrete events discovered by static sensors. They also showed relationship among sampling methods, event arrival rate, and sampling performance are presented. Sensing diversity does not introduce which is used to enhance Fidelity Driven Sampling.

III. Algorithm

Step 1: Initial setup is to design the network as less hop count transmission.

Step 2: design the pp from senor devices. "Here we are setting PP can receive the data from number of nodes"

Step3: if sensor having the data, then sensor finding the PP, which is near to that sensor.

Step 4: if sensor found any PP point node is available then transfers data to PP

Step 5: if PP has more data then it informs to control station.

Step 6: control station receives the number of control information from different PP's.

Step 7: after collecting the control message, CS makes the shortest route to collect the data from PP's.

Step 8: MC moves towards each PP's and collects the info and returns back to CS

IV. MODULES

--Analyzing the data sink details

--Setting less hop count transmission

-Problem in static forward node
-Dynamic forward node

--Select sensor as pp

-Static P
-Dynamic PP

--Find and collect data from pp's

--Handover the data o BS

Analyzing the data sink details:
Handover the data to data sink when data sink within the transmission coverage area of sensors. The sensors which are located in the range of data sink it transforms all the information to the data sink with minimum hops.

Setting Less Hop Count Transmission:
Multi-hop routing, packets have to experience multiple relays before reaching the data sink. Minimizing energy consumption on the forwarding path does not necessarily prolong network lifetime as some popular sensors on the path. So to avoid the problem in multi-hop routing we are setting the less hop count transmission.

-Static forward node:

--When the node forwarding the data continuously, then that node will loss more energy. It may causes node failure

-Dynamic forward node:

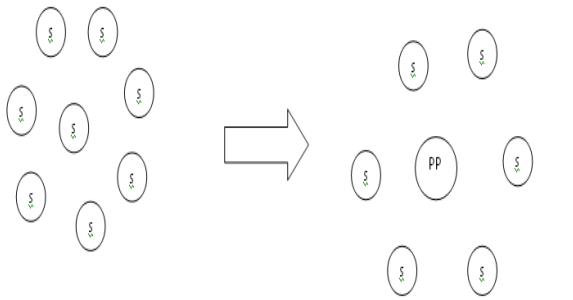
--If the forward node is dynamically changed with less hop count node then energy loss of node should be very less.

So, in the first path the hop count is 3 where as the Hop County for the second path is 2, therefore for data transmission the preferable path is second path.

Select Sensor As PP:
-A subset of sensors will be selected as the polling points, each aggregating the local data from its affiliated sensors within a certain number of relay hops.

-These PPs will temporarily cache the data and upload them to the mobile collector when it arrives.

-The PPs can simply be a subset of sensors in the network or some other special devices, such as storage nodes with larger memory and more battery power.



a) Group of sensors a)Group of sensors with a polling point

From a group of sensors one sensor will be elected as a polling point, which receives and send the information to the sensors.

Find and Collect Data from Pp's:
-Since the mobile collector has the freedom to move to any location in the sensing field, it provides an opportunity to plan an optimal tour for it.

-Our basic idea is to find a set of special nodes referred to as PPs in the network and determine the tour of the mobile collector by visiting each PP in a specific sequence.

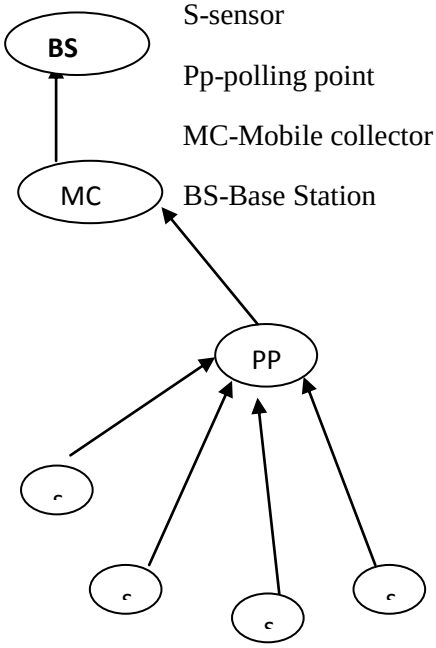
-When the mobile collector arrives, it polls each PP to request data uploading. And then upload the data to Mc

The Polling points collect the information from all the sensors and that aggregated information is collected by the Mobile collector.

Handover the Data to BS
-A PP uploads data packets to the mobile collector in a single hop.

-The mobile collector starts its tour from the static data sink, which is located either inside or outside the sensing field, collects data packets at the PPs and then returns the data to the data sink.

-Finally MC Handover the data to data sink, such as BS



S-sensor

Pp-polling point

MC-Mobile collector

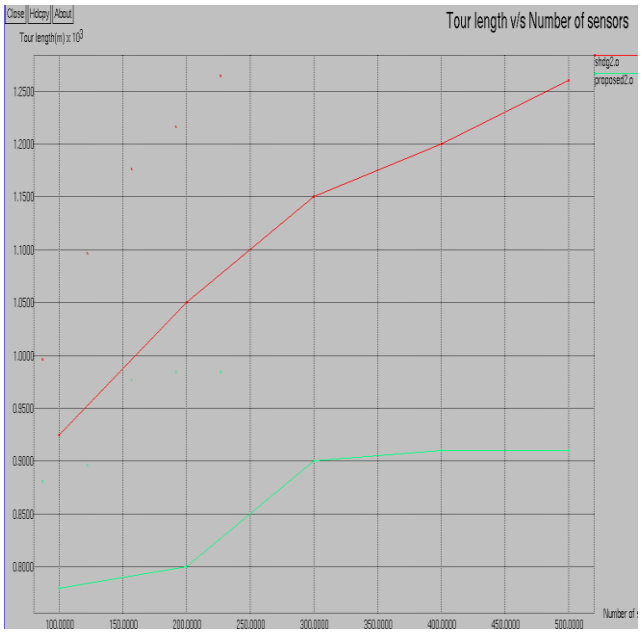
BS-Base Station

The Mobile collectors move through all the polling points and collect the information and send it to Base Station

V. Result

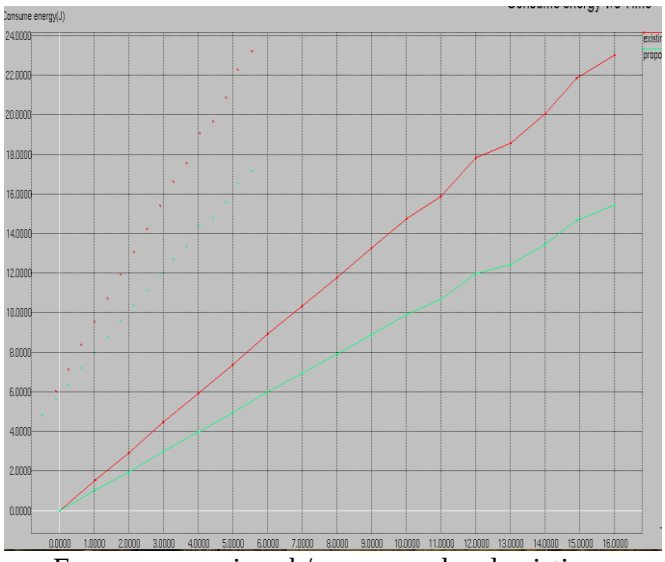
We did our research analysis in WSN by using NS2. In Ns2 we can show two type of output, one is Nam window and another one is Xgraph.

In this paper, we showed our model testing output. From this model result, we can conclude our proposed method is better than previous one.



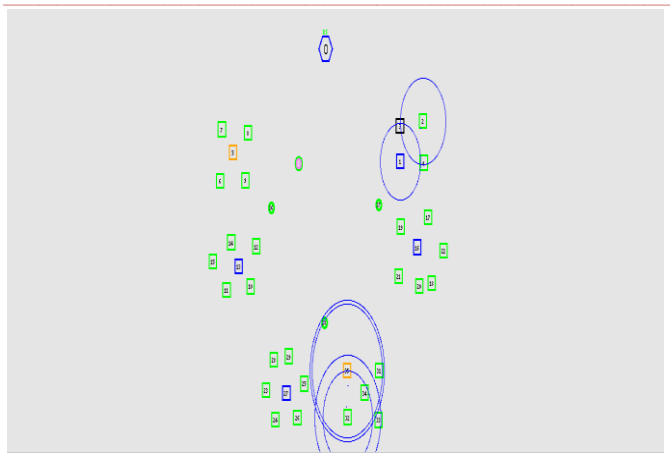
Tour length of proposed system and existing

From above graph, we got the result as we can avoid unnessary travalling time



Energy comparison b/w proposed and existing

From this model result, we improved energy level and we reduced the energy consumption



Nam window result mobile collector travelling

From Nam window result we can see the process of our proposed model (data transmission, mobile collector movement)

VI. Conclusion

In this paper, we studied mobile data collection in wireless sensor networks by researching the tradeoff between the relay hop count of sensors for local data aggregation and the travel length of the mobile data aggregator. We proposed a polling-based scheme and formulated it into the problem, then presented two efficient algorithms to give practically good results. Extensive simulations have been carried out to validate the efficiency of the system.

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