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CLUSTER BASED ENERGY EFFICIENT SCHEDULING ALGORITHM FOR WIRELESS SENSOR NETWORK

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***Abstract*— The existing system, The energy expenditure of the sensor nodes occurs during the wireless communication, the environment sensing and the data processing.The routing protocols in WSNs aim mainly at the attainment of power conservation. And the routing protocols developed for wired networks pursue the attainment of high Quality of Service (QoS) , they are practically improper for application in WSNs. For these reasons, many protocols have been proposed for data routing in sensor networksThe existing system used the Energy Efficient Cluster Formation Protocol (EECFP) elects the nodes with the higher energy as cluster heads and rotates them in each round to provide a balance of energy consumption and to minimize the energy spend for cluster formation**

Energy saving can be achieved in mobility enabled wireless sensor networks that visit sensor nodes and collect data from them through short range communication. The problem that has been faced in WSNs is the increased latency in data collection due to the speed at which the data have been collected. So in order to collect the data efficiently a rendezvous point (RP) is used. Here data are collected by the base station while visiting the rendezvous points. The rendezvous points collect the data which are being buffered from various source nodes which aggregate at a particular point known as RP. This work proposes an efficient rendezvous design algorithm with provable performance bounds with mobility and fixed tracking.

***Keywords*— cluster,base staion,Routing**

I. Introduction

A wireless sensor network (WSN) of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, pressure, etc. and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, also enabling control of sensor activity. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on.

The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting.

II. Related works in Rendazvous Planning Introduction

A. NETWORK FORMATION

Network formation is an aspect of network science that seeks to model how a network evolves by identifying which factors affect its structure and how these mechanisms operate. Network formation hypotheses are tested by using either a dynamic model with an increasing network size or by making an agent-based model to determine which network structure is the equilibrium in a fixed-size network.

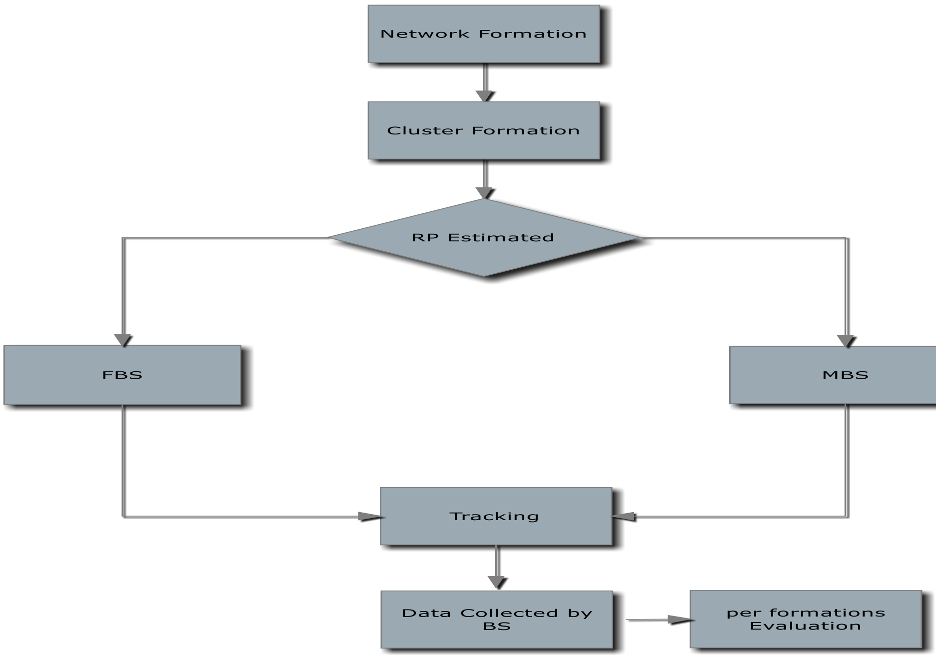

Fig. 1 Flow Diagram

Networks are formed with the given range of the sensors. Nodes are grouped automatically depends upon their radio waves Agents are formed for group registration.The simulation work has been done with The Network Simulator ns-2In the simulation nodes are randomly distributed within the network field of size 300m*300m.Using manna-sim for data genration .

III. Neighbour Estimation

Proposed to achieve trade-off of energy consumption and time delay. Sensors send their measurement to a subset of sensors called relay points (RPs) by multi-hop communication.a sink moves around in the network and retrieves data from encountered RPs. RPs are static, data dissemination to RPs is equivalent to data dissemination to static sinks.Multihop ,a wireless network adopting multihop wireless technology without deployment of wired backhaul links.Tree based topology, one end of the path is the base station Broadband Multimedia Wireless Research Lab,Dedicated carrier owned infrastructure.Benefit of multi-hop technology are Rapid deployment with lower-cost backhaul, Easy to provide coverage in hard-to-wire areas, Under the right circumstances, it may, Extend coverage due to multi-hop forwarding Broadband Multimedia Wireless Research Lab. Extend coverage due to multi-hop forwarding , Enhance throughput due to shorter hops , Extend battery life due
to lower power transmission

IV. Cluster head Selection

A distance based Cluster head selection algorithm is used for improving the sensor network life time. This protocol achieves a good performance in terms of lifetime by balancing the energy load among all the nodes. This clustering technique help to prolong the life of wireless sensor network, especially in hostile environment where battery replacement of individual sensor nodes is not possible after their deployment in the given target area. Therefore, this technique is used to distribute the role of the cluster head (CH) among the wireless sensor nodes in the same cluster is vital to increase the lifetime of the network. This algorithm uses a distance based method for providing the cluster head selection. Clustering techniques also provide good load balancing, and in-network data aggregation.

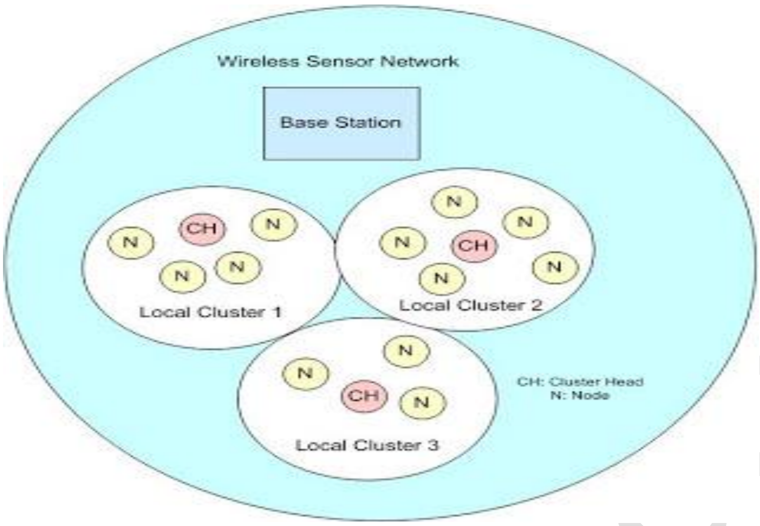

Fig. 2 Cluster Head Selection

V. DISTANCE BASED CLUSTER HEAD SELECTION ALGORITHM

A Distance Based Cluster head selection algorithm is proposed for improving the sensor network life time. This protocol achieves a good performance in terms of lifetime by balancing the energy load among all the nodes. This clustering technique help to prolong the life of wireless sensor network, especially in hostile environment where battery replacement of individual sensor nodes is not possible after their deployment in the given target area. Therefore, the proposed technique to distribute the role of the cluster head (CH) among the wireless sensor nodes in the same cluster is vital to increase the lifetime of the network. This algorithm uses a distance based method for providing the cluster head selection. Clustering techniques also provide good load balancing, and in-network data aggregation.

A. SELECTIONOF CLUSTERINGTECHNIQUES

Due to the communication devices on sensor nodes have limited battery capacity and transmission range, wireless sensor networks (WSNs) are considered to be energy constrained. In this paper, we propose a novel clustering algorithm called limiting member node clustering (LmC) algorithm to limit the number of member nodes for each cluster head by using a threshold value. The proposed clustering approach selects a cluster head based on a new cost function which considers the residual battery level, energy consumption and distance to the base station. In our experiments, we considered the transmission range of the base station in WSNs to improve the clustering performance. From experimental results, the proposed algorithm can efficiently achieve high number of successfully delivered packets as well as the longest network lifetime while give the shortest delay time and low energy consumption when compared with different existing algorithms.

VI. RENDEZVOUSPINT CALCULATION

This module describes about how to calculate the RP for the purpose of tracking. By placing the RPs on an approximate Steiner Minimum Tree of source nodes allows the data to be efficiently aggregated to RPs and shortening the data collection tour of base station. The RP point can be assumed to be the shortest node in the cluster from the base station. The source nodes will send the data to the RP and the RP can accumulate all the data sends by the source nodes in its data cache. This uses the N-to-one aggregation model in which a node can aggregate multiple data packets it received into one packet before relaying it.

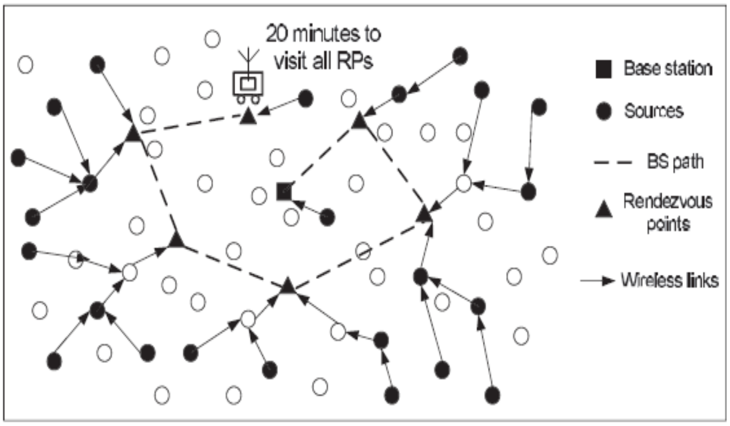

Fig.3 Redezous Point Calculation

A. *MOBILITY BS TRACKING*

This method analyzes the rendezvous design problem when the BS can freely move in the network deployment region along any track. To find a BS tour no longer than L and a set of routing trees that are rooted on the tour and connect all sources, such that the total Euclidean length of the tree is minimized. It develops the tracking by the shortest distance of the RP from the BS. When the first track has been drawn from the BS to any one of the shortest RP, the RP will check for the next shortest RP in the network.

Algorithm. *RN_CANDIDACY*

initialize $n_b = 0, v.T_{first} = 0, v.T_{last} = 0$
Wait until a BEACON is received
record BEACON receipt time t_1 and signal strength s_1
$v.T_{first} = t_1, v.T_{last} = t_1, \quad n_b = 1, n_{b,r} = 1$
start 'Connection Dropped Timer'
while 'Connection Dropped Timer' has not expired
  wait until next BEACON is received or 'Connection Dropped Timer' is expired
  if a BEACON i is received
    record BEACON receipt time t_i and signal strength s_i
    $n_b = n_b + |\frac{t_i - t_{i-1}}{T_{beacon}}|$
    $n_{b,r} = n_{b,r} + 1$
    $v.T_{last} = t_i$
    reset 'Connection Dropped Timer'
  end if
end while
$v.Comp_{val} = a_1.\frac{E_{residual}}{E_{\max}} + a_2.n_b + a_3.\frac{\sum_{i=1}^{n_b} s_i}{n_b}$
Send
$RN\_Cand\_Msg(v.Node\_ID, v.Comp_{val}, v.T_{first}, v.T_{last})$

VII. PERFORMANCE EVALUATION

This Module evaluates the performance of rendezvous design algorithms. The simulations are based on a geometric network model in which the shortest point from the base station in the network region can be chosen as an RP.The performance metric is the total Euclidean length of routing trees that connect sources to the RPs. Such a geometric network model allows us to validate the design of MT and FT and the tightness of derived performance bounds.

VIII. Packet for Forwarding

Assigned Cluster heads collect the recorded information from the sensor nodes and perform filtering upon raw data and forward the filtered information to the appropriate "Ingress Node". The latency in data collection due to low speed of Mobile element can be addressed by using subset of nodes as ingress nodes that buffer and aggregate data from other nodes and transfer to the ME when it arrives, achieving a balance between energy saving and data collection delay.

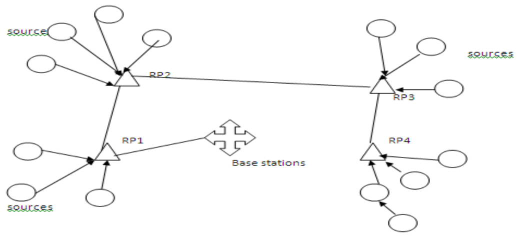

Fig. 4 Packet send to source to base station

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes. The data traces are collected from a real deployed WSN. The distributed spatial data correlation detection and spatial redundancy destruction is achieved by dividing a WSN into several clusters.ADC achieves low communication cost by fair certain stable state and strong sensual used to sensors.

IX. Analysis

The objective of a heuristic is to produce a solution in a reasonable time frame that is good enough for solving the problem at hand. This solution may not be the best of all the actual solutions to this problem, or it may simply approximate the exact solution. But it is still valuable because finding it does not require a prohibitively long time. Let us focus on the performance of the hybrid model with the greedy model. We have evaluated the performance using ns2.We have analyzed transmission overhead, packet delivery ratio and forwarding delay, Path length.In analysis the work identifies data resemblances among the sensor nodes by matching their local guesstimate models rather than their original data. The simulation outputs show that our approach can greatly reduce the volume of messages in wireless communications

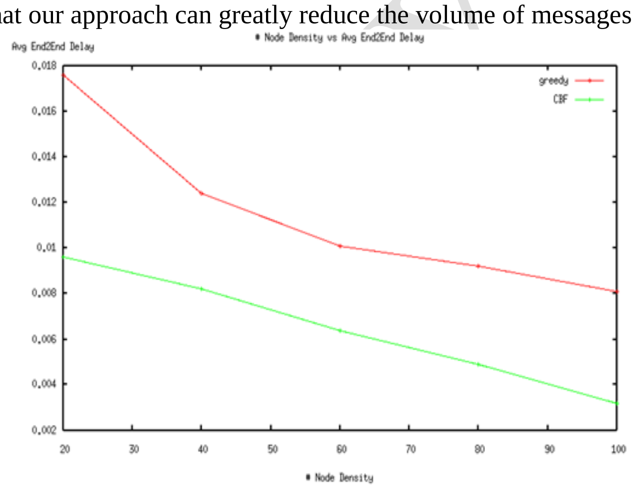

Fig. 5 Node Density

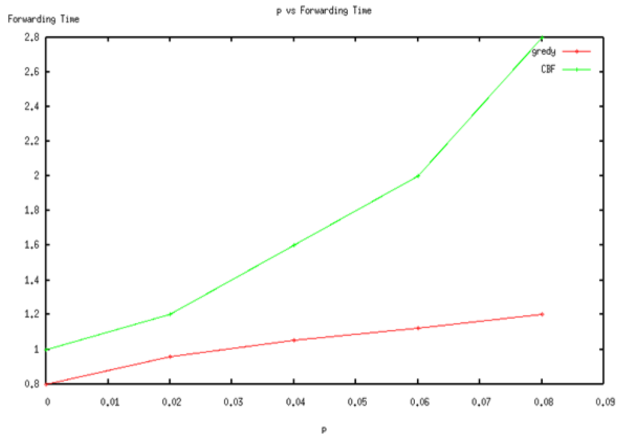

Fig. 6 Packet Forwarding Time

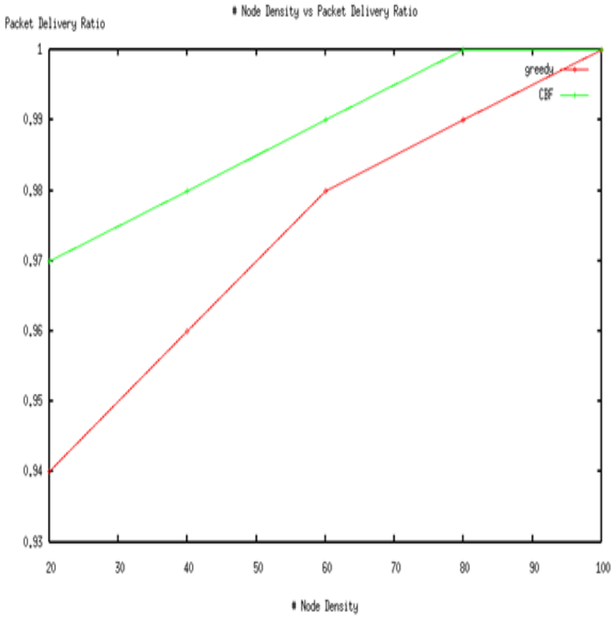

Fig. 7 Packet Delivery Ratio

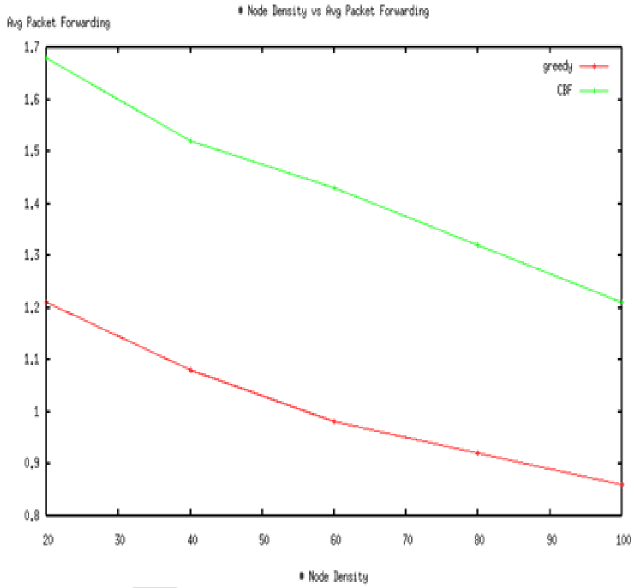

Fig. 8 Average Packet Forwarding

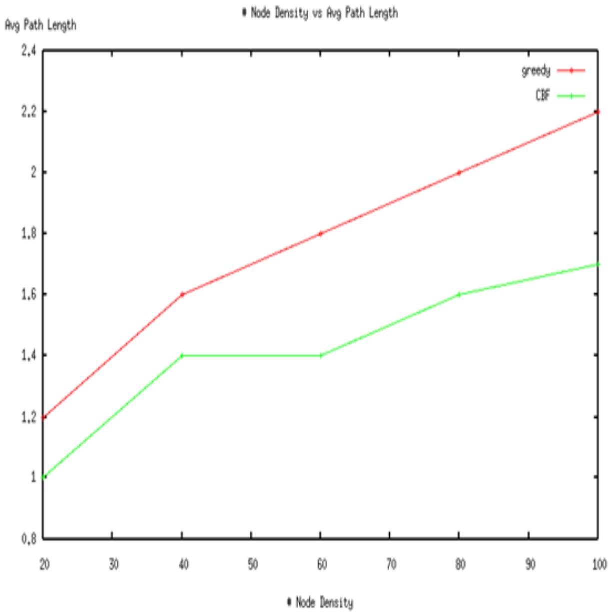

Fig.9 Average Path Length

X. CONCLUSION

In the relay-based data compilation access RPs are static, once preferred they do not change. However due to message relay overhead, uneven energy reduction will appear around RPs as the network evolves, offsetting the efficiency of the algorithm for network lifetime elongation. Our work identifies data resemblances among the sensor nodes by matching their local guesstimate models rather than their original data. The simulation outputs show that our approach can greatly reduce the volume of messages in wireless communications.

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A greedy heuristic algorithm to get an approximate solution. A monitoring method to adjust the configuration of node subsets confer to the changes of sensor readings. The data traces are collected from a real deployed WSN.The distributed spatial data correlation detection and spatial redundancy destruction is achieved by dividing a WSN into several clusters.ADC achieves low communication cost by fair certain stable state and strong sensual used to sensors.

Our work detects data similarities among the sensor nodes by comparing their local estimation models rather than their original data. The simulation results show that our approach can greatly reduce the amount of messages in wireless communications.The spatial, temporal parallel within WSNs used in novel evaluation model to approximate all sensor readings. In this scheme prove rated error bounds of data assemblage using this model.The result show that our approach can greatly reduce the volume of messages in wireless communications.

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