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RESEARCH ARTICLE

Effective Decentralised Clustering and Data Compression Using Balancing the Throughput

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Abstract - Compressive sensing (CS) can reduce the number of data transmissions and balance the traffic load all the way through networks. However, the total number of transmissions for data collection by using pure CS is still large. The hybrid method of using CS was projected to decrease the number of transmissions in sensor networks. However, the preceding works use the CS method on routing trees. In this paper, I plan a clustering technique that uses hybrid CS for sensor networks. The sensor nodes are planned into clusters. Inside a cluster, nodes transmit data to cluster head (CH) with no using CS. CHs use CS to pass on data to sink. I initially propose an analytical model that studies the relationship between the size of clusters and number of transmissions in the hybrid CS method, aim at finding the best possible size of clusters that can lead to minimum number of transmissions. Then, I plan a central clustering algorithm based on the results obtained from the analytical model. Finally, I present a distributed implementation of the clustering technique. Extensive simulations prove that our method can decrease the number of transmissions significantly.

Key words: Cluster head, Compressive Sensing, Simulation

I. INTRODUCTION

MANETs have received increasing attention in recent years due to their mobility feature, dynamic topology, and ease of deployment. A mobile ad hoc network is a self-organized wireless network which consists of mobile devices, such as laptops, cell phones, and Personal Digital Assistants (PDAs), which can freely move in the network. In addition to mobility, mobile devices cooperate and forward packets for each other to extend the limited wireless transmission range of each node by multihop relaying, which is used for various applications, e.g., disaster relief, military operation, and emergency communications lifetime predictability in practice, the network lifetime bounds and feasibility test for the HEF are developed via the worst case energy consumption analysis.

1.2 PROJECT SCOPE

Among all security issues in MANETs, certificate management is a widely used mechanism which serves as a means of conveying trust in a public key infrastructure, to secure applications and network services. Wireless comprises a great number of nodes with sensing, computing, and wireless communication capabilities. When WSNs are used in safety-critical or highly-reliable applications, two timing constraints are considered: real-time constraints, and network life- time constraints. Real-time computing is the study of systems that should operate correctly under time constraints.

There are two types of real-time systems: hard real-time systems that do not allow any task to miss its deadline, and soft real-time systems that strive to satisfy deadline requirements statistically. For these systems, research advances such as Rate-Monotonic Scheduling and Earliest-Deadline First scheduling algorithms have facilitated efforts by the real-time research community to minimize the risk of harm to all involved with good success. With respect to WSNs, real-time computing has been mostly applied in the areas of sensing, data processing, aggregation, and communication with deadline constraint requirements.

1.3 INTRODUCTION ABOUT PROJECT

In many sensor network applications, such as environment monitoring systems, sensor nodes need to collect data periodically and transmit them to the data sink through multi hops. According to field experiments, data communication contributes majority of energy consumption of sensor nodes. It has become an important issue to reduce the amount of data transmissions in sensor networks. The emerging technology of compressive sensing (CS) opens new frontiers for data collection in sensor networks and target localization in sensor networks

The sensor nodes are uniformly and independently distributed in a sensor field. Such a deployment can be modeled as a Poisson point process. All sensor nodes have the same fixed transmission power and transmission rate. Each sensor node is aware of its own geographic location, which can be obtained via attached GPS or some other sensor localization techniques. The location information is used in the distributed implementation.

Compressive sensing can reduce the number of data transmissions and balance the traffic load throughout networks the total number of transmissions for data collection by using pure cs is still large. The hybrid method of using cs was proposed to reduce the number of transmissions in sensor networks.

The previous works use the cs method on routing trees I propose a clustering method that uses hybrid cs for sensor networks. the sensor nodes are organized into clusters within a cluster, nodes transmit data to cluster head without using cs. chs use cs to transmit data to sink.

I first propose an analytical model that studies the relationship between the size of clusters and number of transmissions in the hybrid cs method, aiming at finding the optimal size of clusters that can lead to minimum number of transmissions.

II. EXISTING SYSTEM

A clustering method that uses the hybrid cs for sensor networks. The sensor nodes are organized into clusters. Within a cluster, nodes transmit data to the cluster head without using cs. A data gathering tree spanning all chs is constructed to transmit data to the sink by using the cs method. One important issue for the hybrid method is to determine how big a cluster should be.

If the cluster size is too big, the number of transmissions required to collect data from sensor nodes within a cluster to the ch will be very high. but the cluster size is too small, the number of clusters will be large and the data gathering tree for all CHs to transmit their collected data to the sink will be large, which would lead to a large number of transmissions by using the CS method.

In this regard, I first propose an analytical model that studies the relationship between the size of clusters and number of transmissions in the hybrid cs method, aiming at finding the optimal size of clusters that can lead to minimum number of transmissions. And then I centralized clustering algorithm based on the results obtained from the analytical model.

Finally I present a distributed implementation of the clustering method. Distributed method is efficient in terms of the low communication cost and effective in reducing the number of transmissions.

DRAW BACKS

By using compressive sensing technique along with centralized clustering method same cluster heads are used for getting sensor field data from the sensor nodes in the deployment field. This process leads to data loss throughout the network. So the new techniques were used to avoid the data loss during clustering.

III. PROPOSED SYSTEM

In this paper I proposed three techniques to avoid the data loss during clustering. I decentralized the clustering by using following processes. Re electing cluster head, K hop neighbour and Master and Slave techniques.

Re electing cluster head

In this process the cluster heads are re elected vice versa. Previous works are cluster heads selection and transmission from nodes to cluster heads do not change. In the centralized process cluster head selection do not change for the entire process. In this proposed system decentralised process is implemented. Re electing cluster heads process leads the process with less transmission through network.

K hop neighbour

To avoid the data loss during the transmission from cluster head to sink the k hop neighbour technique was proposed. In this technique, some cluster heads having some count limits of transmitting data from sensor nodes to cluster heads. When high amount of sensor nodes transmitting the data to reach cluster head data loss and network traffic occur. To avoid this problem K hop neighbour technique was proposed. In this technique the cluster heads with less amount of sensor nodes transmission will lead the problem occur with the cluster head with exceeding limits of sensor nodes clustering with cluster head. It will send request to the high amount of sensor nodes clustering cluster heads in the network. Then the request will be accepted by the cluster heads with high amount of sensor nodes transmitting in the network. Then the excess sensor nodes transmit the data to the new cluster head. The data loss problem was avoided in the network by using K hop neighbour technique.

Master Slave technique

In the deployment field the nodes that are can not able to transmit the data to the cluster heads are exist because of improper signal, less coverage area, network traffic in the network. The master slave technique will organise the anonymous rejected sensor nodes in the network. In those sensor nodes first was designated as master one then this master sensor node will organise the other rejected anonymous sensor nodes in the network. All other sensor nodes in the field were slaves. Then slaves transmit the data to the cluster head which was rejected first in the network was master. The new transmission of data will lead the network with highly propagated.

IV. SOFTWARE DEVELOPMENT ENVIRONMENT

4.1 Operating Environment

Constraints as Informal Text

- Constraints as Operational Restrictions
- Constraints Integrated in Existing Model Concepts
- Constraints as a Separate Concept
- Constraints Implied by the Model Structure

Constraints in Design

- Determination of the Involved functions
- Determination of the Involved Objects
- Determination of the Require Clauses

4.2 External Interface Requirements

User Interfaces

- Graphical User Interfaces not in this product.
- Users are communicated with Buttons with network animator.

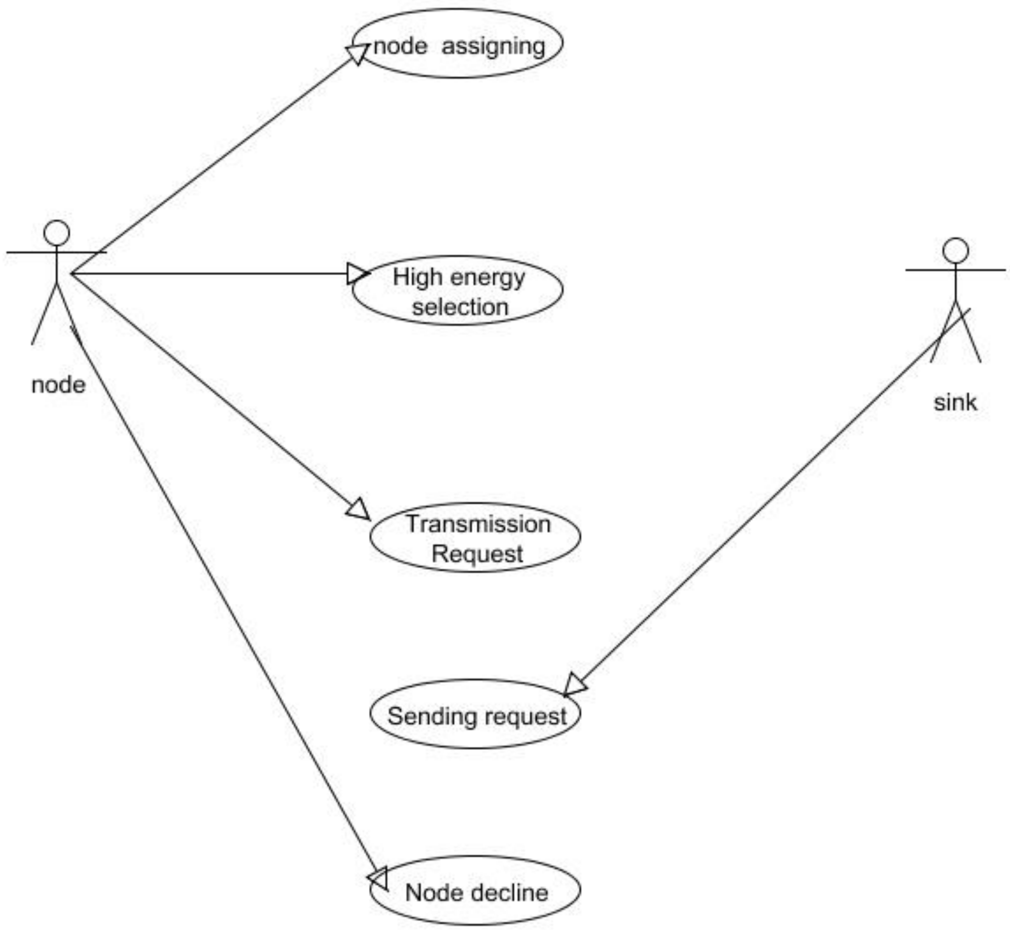
Hardware Interfaces

Linux and unix environment of system and basic need of system feature like random access memory etc

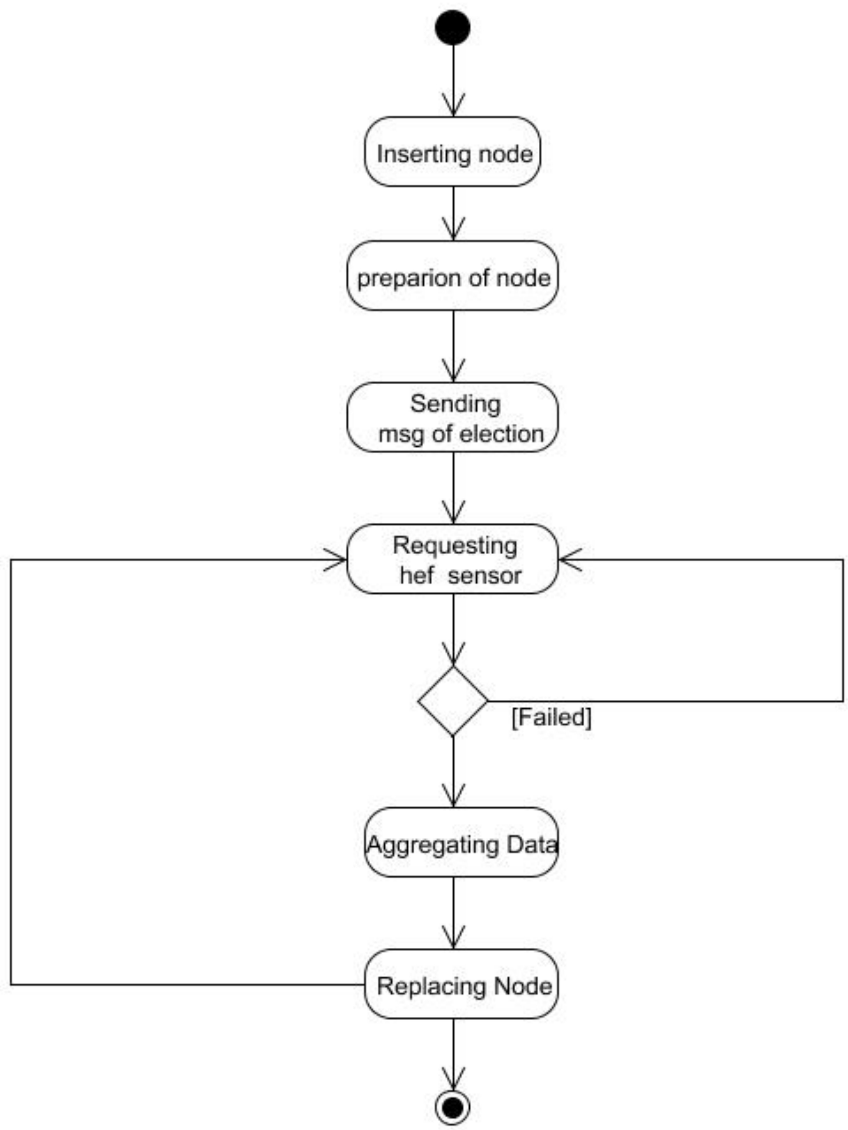
Software Interfaces

- This software is interacted with the TCP/IP protocol.
- This product is interacted with the and linux.
- This product is interacted with the gcc,python
- This product is interacted with TCL

4.3 Activity Diagram



4.4 Use Case Diagram



V. SYSTEM IMPLEMENTATION

5.1 Product Perspective

In our Existing system Lower ID heuristics method uses the static node ID scheme to choose the node with the minimum node ID as a cluster head. In an election process by secret ballot votes to identify a node that receives the majority vote of those seated in a cluster as a new cluster head. In a geographically-based approach to select a node as a cluster head. This geographically-oriented approach forces the cluster head to stay close to its virtual-cluster-center. In CIPRA, each node decides whether or not to elect itself as a cluster head by dividing the product value of its own unique ID, and the current round number by the modulus of for every round. LEACH works well to enhance network Lifetime statistically.

5.2 Product Features

The HEF algorithm scheduleability analysis of the WSN cluster head selection algorithm in hard network lifetime environments. The core idea of the HEF clustering algorithm is to choose the highest-ranking energy residue sensor as a cluster head. HEF is designed to select the cluster head based on the energy residue of each sensor to create a network-centric energy view. HEF is a centralized cluster selection algorithm; but it also can be implemented in a distributed fashion with the synchronization approach. Each round comprises the following three phases: CHS Phase, CFM Phase, and DCM Phase.

5.3 Analysis Network Topology

Each node sends messages to allow other nodes to detect it. Once a node detects messages from another node (neighbour), it maintains a contact record to store information about the neighbour. Using multicast socket all nodes are used to detect the neighbour nodes. This Model fits many application that gather data from environment as user specified rates.

5.4 Cluster Head Selection

Selects cluster heads according to the energy remaining for each sensor node, and then the message is sent to the cluster head of each cluster. The cluster head of each group broadcasts the message inviting the neighbour sensor nodes to join its group. After receiving the message at this round, the regular sensors send the “join” message to its corresponding cluster head to commit to associate with the group. Each cluster head acknowledges the commitment, and sends TDMA schedule to its cluster members. Each sensor sends its energy information to its cluster head at the end of this clock cycle. Upon collecting cluster members’ information at a given period, the cluster head send the report to base station.

5.5 Virtual transactions

Evaluate the impact of the Virtual transmissions approach presented. I measured the performance of HEF when the number of parents is varied from one to three. The results are obtained from based on the above topology.

5.6 System Features

This method selects the set of highest-ranking energy residue sensors for cluster heads at round where denotes the required cluster numbers at round. Some researchers have claimed that HEF is an efficient cluster selection algorithm that prolongs network lifetime based on simulations. However, their measurements and simulation results are stochastic processes. A theoretical proof to demonstrate the optimality of HEF under certain conditions is provided in this paper.

HEF is designed to select the cluster head based on the energy residue of each sensor to create a network-centric energy view. Intuitively, HEF is a centralized cluster selection algorithm; but it also can be implemented in a distributed fashion with the synchronization approach. depicts the information flow of the centralized HEF system. Each round comprises the following three phases: CHS Phase, CFM Phase, and DCM Phase. The interactions and detailed operations between components are discussed as follows.

1) This selects cluster heads according to the energy remaining for each sensor node, and then the "setup" message (indicating cluster members, and the cluster head ID for each participated group) is sent to the cluster head of each cluster.

2) The cluster head of each group broadcasts the "setup" message inviting the neighbour sensor nodes to join its group.

3) After receiving the "setup" message at this round, the regular sensors send the "join" message to its corresponding cluster head to commit to associate with the group.

4) Each cluster head acknowledges the commitment, and sends TDMA schedule to its cluster members.

5) All sensors perform its sensing and processing and communication tasks cooperatively at this clock cycle (round). Each sensor sends its energy information to its cluster head at the end of this clock cycle.

6) Upon collecting cluster members' information at a given period, the cluster head sends the summative report to the base station.

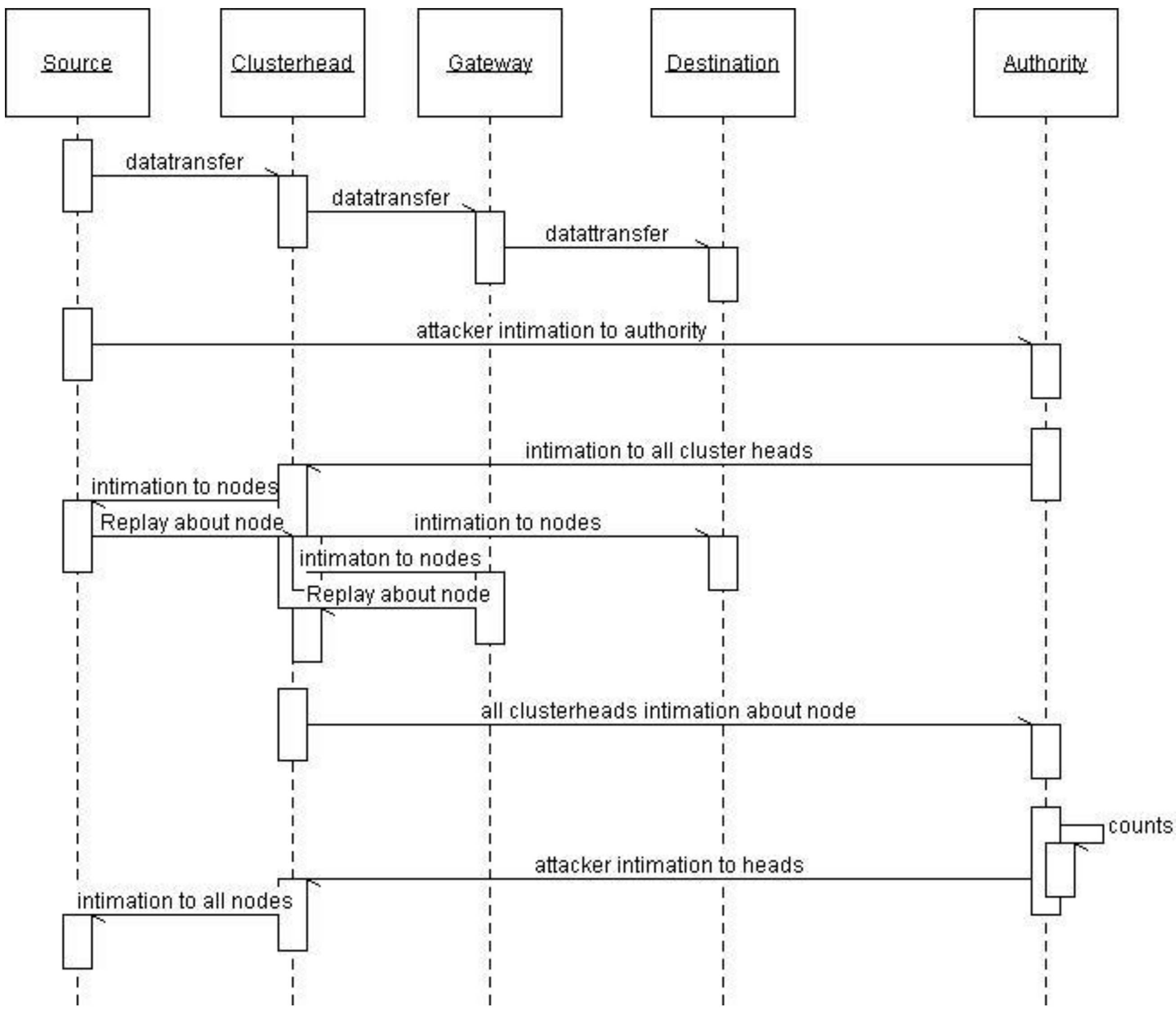
5.7 Analysis Optimal Cluster Size:

There are many sensor nodes uniformly and independently distributed in a rectangle sensor field. a deployment can be modeled as a Poisson point process and all sensor nodes have the same fixed transmission power and transmission rate. each sensor node is aware of its own geographic location, which can be obtained attached gps or some other sensor localization techniques The location information is used in the distributed implementation and sensor nodes are organized into clusters and each cluster has a cluster head, represented by the solid. sensor nodes in each cluster transmit their original data to the CH without using cs.thus in each round, the CH aggregates its own projection and the projections received from its children CHs in the same round and forwards it to the sink following the backbone tree. When the sink receives all M rounds of projections from CHs, the original data for all sensor nodes can be recovered. there are two levels of transmissions in our clustering method using the hybrid CS: intracluster transmissions that do not use the cs technique and intercluster transmissions that use the cs technique. The data size in intercluster transmissions is the same as the data in intracluster transmissions.

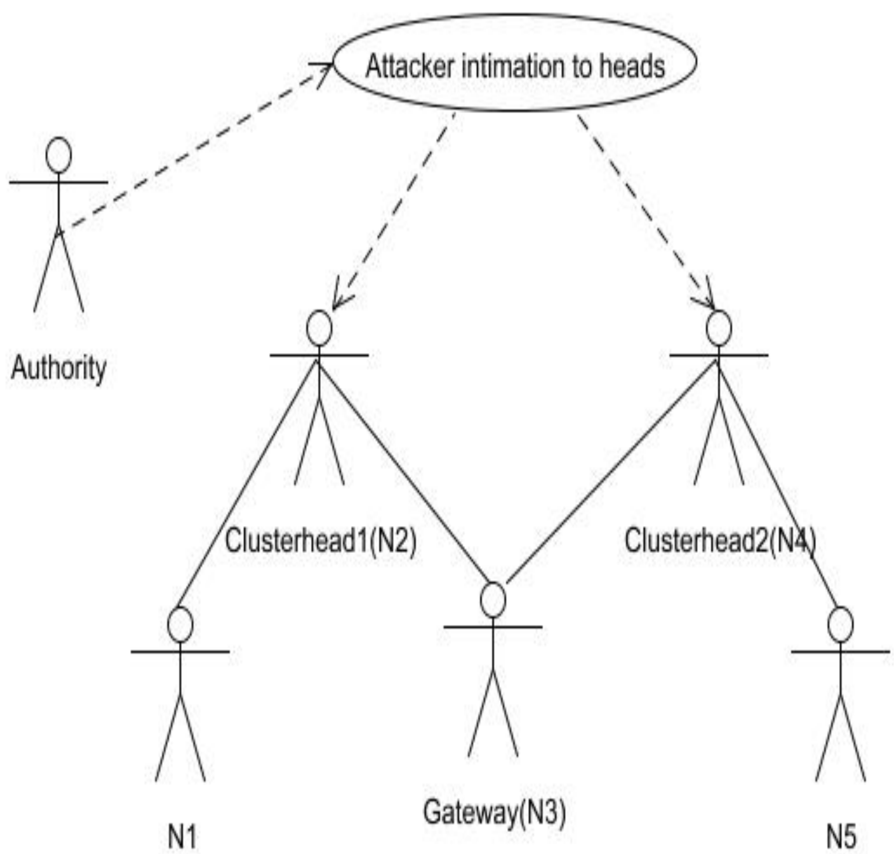
5.8 Sensor Node Clustering

CH is elected; the CH broadcasts an advertisement message to other sensor nodes in the sensor field, to invite the sensor nodes to join its cluster. An advertisement message carries the information: the identifier and location of the CH, and the number of hop that the message has traveled. The hop count is initialized to be 0. When a sensor node receives an advertisement message, if the hop count of message is smaller than that recorded from the same CH, it updates the information in its record including the node of previous hop and the number of hop to the CH, and further broadcasts the message to its neighbor nodes; otherwise the message is discarded. The maximal hop count for the advertisement message is set to so that all nodes can receive the advertisement messages from at least one CH .

Sequence Diagram:



Activity Diagram



VI. CONCLUSION

A cluster data are collected to the cluster heads by shortest path routing at the cluster head data are compressed to the projections using the CS technique. The projections are forwarded to the sink following a backbone tree. I first proposed an analytical model that studies the relationship between the size of clusters and number of transmissions in the hybrid CS method, to find the optimal size of clusters that can lead to minimum number of transmissions. Then, I proposed a centralized clustering algorithm based on the results obtained from the analytical model. Re electing cluster ,K hop neighbour and Master slave technique are used to reduce the data loss during clustering. Finally I decentralized the clustering. In this paper I proposed three techniques to avoid the data loss during clustering. I decentralized the clustering by using following processes. Re electing cluster head, K hop neighbour and Master and Slave techniques

REFERENCES

[1] G. Shen, J. Liu, D. Wang, J. Wang, and S. Jin, "Multi-Hop Relay for Next-Generation Wireless Access Networks," Bell Labs Technical J., vol. 13, no. 4, pp. 175-193, 2009.

[2] C. Chou, D. Wei, C. Kuo, and K. Naik, "An Efficient Anonymous Communication Protocol for Peer-to-Peer Applications Over Mobile Ad-Hoc Networks," IEEE J. Selected Areas in Comm., vol. 25, no. 1, pp. 192-203, Jan. 2007.

[3] H. Gharavi, "Multichannel Mobile Ad Hoc Links for Multimedia Communications," Proc. IEEE, vol. 96, no. 1, pp. 77-96, Jan. 2008.

[4] S. Marti, T. Giuli, K. Lai, and M. Baker, "Mitigating Routing Misbehavior in Mobile Ad Hoc Networks," Proc. MobiCom '00, pp. 255-265, Aug. 2000.

[5] G. Marias, P. Georgiadis, D. Flitzanis, and K. Mandalas, "Cooperation Enforcement Schemes for MANETs: A Survey," Wiley's J. Wireless Comm. and Mobile Computing, vol. 6, no. 3, pp. 319-332, 2006.

[6] Y. Zhang and Y. Fang, "A Secure Authentication and Billing Architecture for Wireless Mesh Networks," ACM Wireless Networks, vol. 13, no. 5, pp. 663-678, Oct. 2007.

