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Sensory Data Collection Using Rendezvous Nodes

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ABSTRACT - A large class of Wireless Sensor Networks (WSN) applications involves a set of isolated urban areas covered by sensor nodes monitoring environmental parameters. Mobile sinks mounted upon urban vehicles with fixed trajectories viz buses provide the ideal infrastructure to effectively retrieve sensory data from such isolated WSN fields. Existing approaches involve either single-hop transfer of data from SNs that lie within the MS's range or heavy involvement of Network periphery nodes in data retrieval, processing, buffering, and delivering tasks. These nodes run the risk of rapid energy exhaustion resulting in loss of network connectivity and decreased network lifetime. Our proposed System is minimizing the overall network overhead and energy expenditure associated with the multihop data retrieval process while also ensuring balanced energy consumption among SNs and prolonged network lifetime. This is achieved through building cluster structures consisted of member nodes that route their measured data to their assigned cluster head (CH). CHs perform data filtering upon raw data exploiting potential spatial-temporal data redundancy and forward the filtered information to appropriate end nodes with sufficient residual energy, located in proximity to the MS's trajectory.

KEYWORDS—WSN, Routing, Network over head, Energy consumption, Multihop, Data retrival

I. INTRODUCTION

A large class of monitoring applications involves a set of urban areas (e.g., urban parks or building blocks) that need to be monitored with respect to environmental parameters (e.g., temperature, moisture, pollution, and light intensity), surveillance, fire detection, etc. In these environments, individual monitored areas are typically covered by isolated "sensor islands," which makes data retrieval rather challenging since mobile nodes cannot move through but only approach the periphery of the network deployment region. A main reason of energy spending in WSNs relates with communicating the sensor readings from the sensor nodes (SNs) to remote sinks. These readings are typically relayed using ad hoc multihop routes in the WSN. A side effect of this approach is that the SNs located close to the sink are heavily used to relay data from all network nodes; hence, their energy is consumed faster, leading to a no uniform depletion of energy in the WSN.

1.1 Existing method

In Wireless Sensor Networks (WSN) applications involve a set of isolated urban areas (e.g., urban parks or building blocks) covered by sensor nodes (SNs) monitoring environmental parameters. Mobile sinks (MSs) mounted upon urban vehicles with fixed trajectories (e.g., buses) provide the ideal infrastructure to effectively retrieve sensory data from such isolated WSN fields. Single-hop transfer of data from SNs that lie within processing, buffering, and delivering tasks. These nodes run the risk of rapid energy exhaustion resulting in loss of network connectivity and decreased network lifetime.

1.2 Problem definition

A main reason of energy spending in WSNs relates with communicating the sensor readings from the sensor nodes (SNs) to remote sinks. These readings are typically relayed using ad hoc multihop routes in the WSN. A side effect

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of this approach is that the SNs located close to the sink are heavily used to relay data from all network nodes; hence, their energy is consumed faster, leading to a non uniform depletion of energy in the WSN. This results in network disconnections and limited network lifetime. Network lifetime can be extended if the energy spent in relaying data can be saved.

1.3 Our Proposed Approach

In our protocol aims at minimizing the overall network overhead and energy expenditure associated with the multihop data retrieval process while also ensuring balanced energy consumption among SNs and prolonged network lifetime. This is achieved through building cluster structures consisted of member nodes that route their measured data to their assigned cluster head (CH). CHs perform data filtering upon raw data exploiting potential spatial-temporal data redundancy and forward the filtered information to appropriate end nodes with sufficient residual energy, located in proximity to the MS's trajectory. Our Approach is builds a clustering structure on top of the sensor network. That way, high data aggregation ratios are possible since data from the nodes of the same cluster usually are strongly correlated and thus aggregation at each cluster head considerably reduces the data forwarded to RNs. This in turn leads to much lower energy consumption in the WSN and also much less data are buffered at RNs, reducing so the probability of buffer overflows at a RN.

II. MODULES

1. Topology formation
2. Cluster head Election
3. Rendezvous node election and Data Process
4. Cluster head re-election.
5. Security implementation.

2.1 Topology Formation

Deployment of sensor nodes and neighbor node and region estimation in WSN.

2.2 Cluster head Election

Based on node deployment each node sends the CH ELECTION Packets to its neighbor for electing the Cluster Head.

2.3 Rendezvous node Election and Data Process

Rendezvous node election process should be takes place based on nodes which are nearer to the mobile sink. It will act as a intermediary between cluster head and mobile sink.

2.4Cluster head re-election

Clustering algorithm are based on residual energy, random selection etc. But the random selection may not give optimize number of cluster head and do not guarantee the efficient way of selecting cluster head. Cluster head is selected

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based on the threshold distance R. The nodes outside the No Coverage Region(NCR) are also eligible for becoming CLUSTER HEAD(CH),but all nodes that are outside the NCR are not selected as cluster head. Only nodes within the value R can be selected as CH.Initially one node is selected as a cluster head randomly which satisfy the NCR constraints.

2.5 Security implementation

For secure transmission of various types of information over networks, several cryptographic, steganographic and other techniques are used.

2.6 System Model

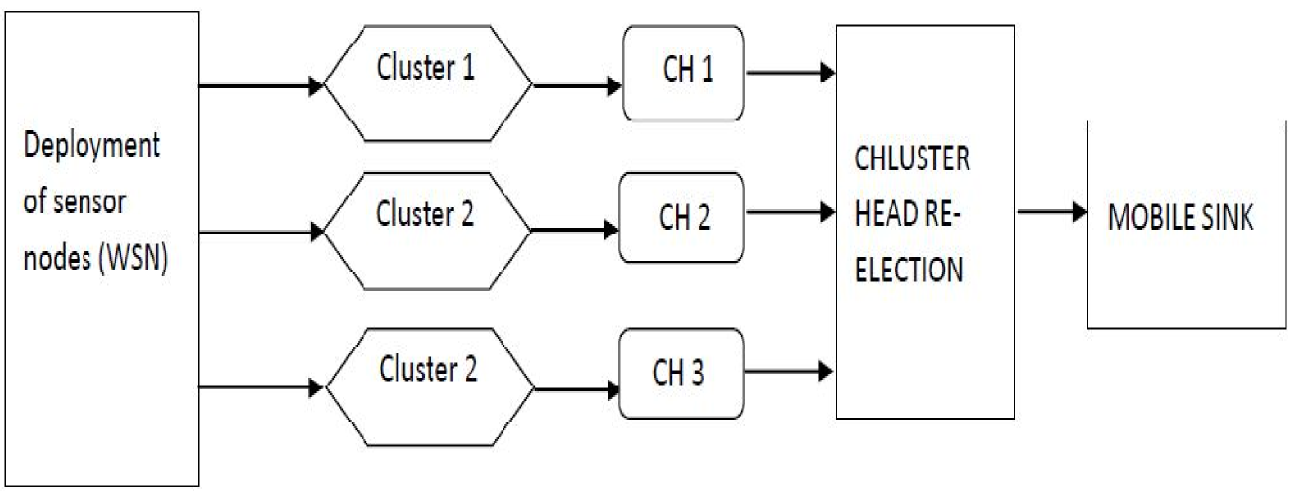

Fig 2.6 Sensor readings and Transmission

III. PROTOCOLS USED

3.1MOBI CLUSTER PROTOCOL (DYNAMIC SOURCE ROUTING)

DSR is a reactive routing protocol which is able to manage a MANET without using periodic table-update messages like table-driven routing protocols do. DSR was specifically designed for use in multi-hop wireless ad hoc networks. Ad-hoc protocol allows the network to be completely self-organizing and self-configuring which means that there is no need for an existing network infrastructure or administration. For restricting the bandwidth, the process to find a path is only executed when a path is required by a node (On-Demand-Routing).

3.2 ADVANTAGES

Reactive routing protocols have no need to periodically flood the network for updating the routing tables like table-driven routing protocols do. Intermediate nodes are able to utilize the Route Cache information efficiently to reduce the control

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overhead. The initiator only tries to find a route (path) if actually no route is known (in cache). Current and bandwidth saving because there are no hello messages needed (beacon-less).

IV. CLUSTERING

Clustering has proven to be an effective approach for organizing the network in the above context. Besides achieving energy efficiency, clustering also reduces channel contention and packet collisions, resulting in improved network throughput under high load. The clustering algorithm in constructs a multisided cluster structure, where the size of each cluster decreases as the distance of its cluster head from the base station increases.

4.1 RNs Picking

RNs guarantee connectivity of sensor islands with MSs, In practical deployments, the number of designated RNs introduces an interesting trade-off:

- A large number of RNs implies that the latter will compete for the wireless channel contention as soon as the mobile robot appears in range, there by
  Resulting in low data throughput and frequent outages.

- A small number of RNs implies that each RN is associated with a large group of sensors. Hence, Rns will be heavily used during data relays, their energy will be consumed fast and they will be likely to experience buffer overflows.

4.2 CHs addition to RNs

CHs located far from the MS trajectories do not have any RNs within transmission range. An important condition for building intercluster overlay graphs is that Chs with no attached RNs, attach themselves to a CH u with nonempty Ru set so as to address their clusters' data to you. The description of the intercluster overlay graph building procedure can be found in Appendix C, available in the online supplemental material.

4.3 Data gathering and forwarding to Rns

The steady phase of MobiCluster protocol starts with the periodic recording of environmental data from sensor nodes with a Tr period. The data accumulated at individual source nodes are sent to local CHs (intracluster communication) with a Tc period (typically, Tc is a multiple of Tr).

4.4 Liaison between Rns and mobile sinks

The delivery of data buffered to RNs to MSs. Data delivery occurs along an intermittently available link; hence, a key requirement is to determine when the connectivity between an RN and the MS is available. Communication should start when the connection is available and stop when the connection no longer exists, so that the RN does not continue to transmit data when the MS is no longer receiving it

V. SIMULATION RESULTS

A number of rendezvous-based approaches have been proposed which either assume a fixed MS trajectory or determine that trajectory according to some energy-related optimization criteria. As MobiCluster as-sume that MS moves

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on a fixed trajectory, a fair comparison of this protocol with other proposals should only consider the efficiency of routing structures for transferring data from SNs to RNs. In the simulation tests, we compare our method with the solutions proposed in [24] and [20] which also assume fixed MS trajectory.[2] In these tests, MobiCluster and the protocols in [20] and [24] have been extensively evaluated with respect to several performance parameters.

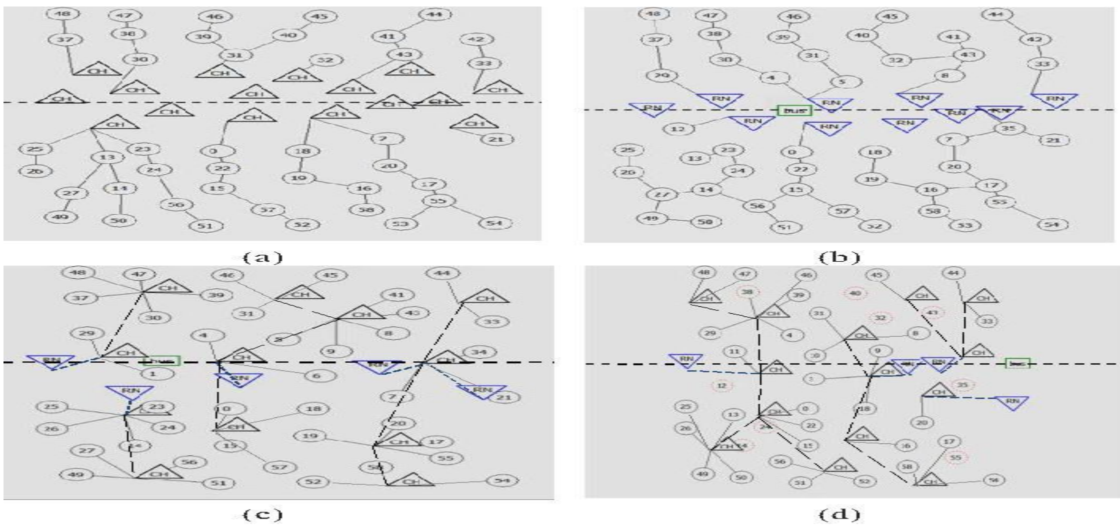
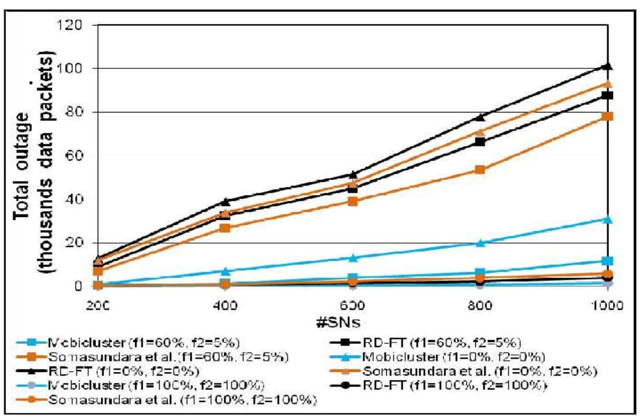


Fig. 5 Topologies derived from the three protocols: (a) [24], (b) [20],(c) MobiCluster, (d) adaptation of MobiClustertopology at runtime (change of CH and RN nodes)



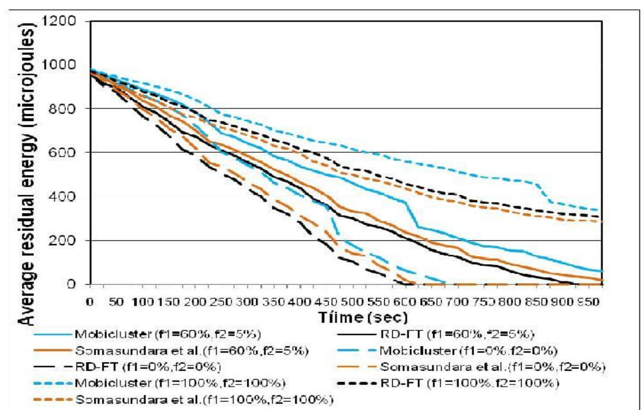


Fig. 7 Total outage.

Fig. 8 Average residual energy (#SNs = 1,000).

Fig. 7 illustrates the overall number of outages. In the basic scenario, the RD-FT protocol performs worse mainly due to the fact that SNs are not fairly distributed to the available RNs (see Fig. 3b) and thus relatively few RNs handle a considerable amount of sensory data. This is further exacerbated in no aggregation case whereas in full aggregation scenario RD-FT is slightly better than [24] since in that case the data each RN handles are much fewer and thus the problems above do not arise. Also, contrary to RD-FT, the protocol in [24] tends to employ a large number of RNs competing for the same wireless channel and hence leading to increased packet collisions (see Fig. 3a). MobiCluster exhibits the best performance in all scenarios because of the more sophisticated selection of RNs; RNs have sufficient time to deliver their data and suffer low number of collisions since they are well separated spatially.Mobicluster is better than the other two protocols in all aggregation scenarios (Fig. 5) in terms of network lifetime, i.e., the time of the first SN's energy depletion. In the basic scenario, MobiCluster involves RNs only for delivering pre-processed data to the sink in contrast to [24], where RNs receive much data and are also enrolled in data processing and delivering data to the MS. Again, the problem is more severe in RD-FT due to its aforementioned tendency of gathering SNs around few RNs

VI. CONCLUSION

The MobiCluster protocol that proposes the use of urban buses to carry MSs that retrieve information from isolated parts of WSNs. MobiCluster mainly aims at maximizing connectivity, data throughput, and enabling balanced energy expenditure among Sns.The connectivity objective is addressed by employing MSs to collect data from isolated urban sensor islands and also through prolonging the lifetime of selected peripheral RNs which lie within the range of passing MSs and used to cache and deliver sensory data derived from remote source nodes. Increased data throughput is ensured by regulating the number of RNs for allowing sufficient time to deliver their buffered data and preventing data losses. Unlike other approaches, MobiCluster moves the processing and data transmission burden away from the vital periphery nodes (RNs) and enables balanced energy consumption across the WSN through building cluster structures that exploit the high redundancy of data collected from neighbor nodes and minimize intercluster data overhead.

VII. FUTURE ENHANCEMENT

In future work is Re elect the Cluster head, through this collect the sensory data, and security implementation in between the data transmission.

REFERENCES

[1] E. Hamida and G. Chelius, "Strategies for Data Dissemination to Mobile Sinks in Wireless Sensor Networks," IEEE Wireless Comm., vol. 15, no. 6, pp. 31-37, Dec. 2008.

[2] S. Olariu and I. Stojmenovic, "Design Guidelines for Maximizing Lifetime and Avoiding Energy Holes in Sensor Networks with Uniform Distribution and Uniform Reporting," Proc. IEEE INFOCOM, 2006.

[3] X. Li, A. Nayak, and I. Stojmenovic, "Sink Mobility in Wireless Sensor Networks," Wireless Sensor and Actuator Networks, A. Nayak, I. Stojmenovic, eds., Wiley, 2010.

[4] B. Mamalis, D. Gavalas, C. Konstantopoulos, and G. Pantziou, "Clustering in Wireless Sensor Networks," RFID and Sensor Networks: Architectures, Protocols, Security and Integrations, Y. Zhang, L.T. Yang, J. Chen, eds., pp. 324-353, CRC Press, 2009.

[5] G. Chen, C. Li, M. Ye, and J. Wu., "An Unequal Cluster-Based Routing Protocol in Wireless Sensor Networks," Wireless Networks,\ vol. 15, pp. 193-207, 2007.

[6] S. Soro and W.B. Heinzelman, "Prolonging the Lifetime of Wireless Sensor Networks via Unequal Clustering," Proc. 19th\ IEEE Int'l Parallel and Distributed Processing Symp., 2005.

[7] J. Luo and J-P. Hubaux, "Joint Mobility and Routing for Lifetime Elongation in Wireless Sensor Networks," Proc. IEEE INFOCOM, 2005.

[8] M. Demirbas, O. Soysal, and A. Tosun, "Data Salmon: A Greedy Mobile Basestation Protocol for Efficient Data Collection in Wireless Sensor Networks," Proc. Int'l Conf. Distributed Computing in Sensor Systems (DCOSS '07), pp. 267-280, 2007.

[9] Z. Vincze, D. Vass, R. Vida, A. Vidacs, and A. Telcs, "Adaptive Sink Mobility in Event-Driven Densely Deployed Wireless Sensor\ Networks," Ad Hoc and Sensor Wireless Networks, vol. 3, nos. 2/3, pp. 255-284, 2007.

[10] L. Friedmann and L. Boukhatem, "Efficient Multi-Sink Relocation in Wireless Sensor Network, Networking and Services," Proc. Third Int'l Conf. Networking and Services (ICNS '07), pp. 90-90, June 2007.

[11] S. Basagni, A. Carosi, E. Melachrinoudis, C. Petrioli, and Z.M. Wang, "Controlled Sink Mobility for Prolonging Wireless Sensor\ Networks Lifetime," ACM Wireless Networks, vol. 14, no. 6, pp. 831-858, 2008.

[12] R. Sugihara and R. Gupta, "Optimal Speed Control of Mobile\ Node for Data Collection in Sensor Networks," IEEE Trans. Mobile Computing, vol. 9, no. 1, pp. 127-139, Jan. 2010.

[13] A. Somasundara, A. Ramanoorthy, and M. Srivastana, "Mobile Element Scheduling with Dynamic Deadlines," IEEE Trans. Mobile Computing, vol. 6, no. 4, pp. 395-410, Apr. 2007.

[14] R. Shah, S. Roy, S. Jain, and W. Brunette, "Data MULEs: Modeling and Analysis of a Three-Tier Architecture for Sparse Sensor\ Networks," Ad Hoc Networks