A Review on: Sensor Data Collection Method for Communication Traffic Reduction in Wsn

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***Abstract*— Now a day, many studies exploit mobile sinks to collect large scale data-base sensor data for environmental observations or weather forecasting. Agent (intelligent) travel in sensing areas and collect data directly from each sensor. By using this, we can reduce communication traffic further than that for the case of constructing sensor networks. However, in many methods, the mobile sink collects data from all sensors that the mobile sink can communicate with. In this project, we propose a communication traffic reduction method by agent approach for sensor data. In our proposed method, the agent broadcasts predicted sensor data to each sensor. Only sensors whose sensing data exceeds the admissible error margin from the predicted sensor data transmit their data. Therefore, the communication traffic can be reduced and at the time of implementation results demonstrated the effectiveness of our proposed method.**

Keywords—sensor data, mobile sink, communication traffic, wireless sensor network.

I. INTRODUCTION

Recently, there has been an increasing interest on sensor data collection for the weather forecasting and environmental observations and many more. To realize these applications, we have to collect sensor data from many sensors. One of the ways to collect sensor data is to construct a wireless sensor network (WSN) and the sink node by using agent approach collects sensor data. Therefore, recent studies exploit mobile sinks such as taxies or buses equipped with a sink node and as far our proposed method is concern we used an agent based approach for collecting all such data in the sensing area that sensors are deployed and collect data from each sensor directly. This sink is also act as an agent for collecting sensor data and passes this data to the base station .The communication traffic decreases compared with the traditional sensor network approach. Moreover, by using robot as a mobile sink, we can monitor dangerous area which is hard to visit. Although actual sensor value is not always the same as the predicted sensor value, many applications can accept a little error. For example, suppose the case that the agent collects temperature data from sensors for environmental observations.

The accuracy of the sensor data is 0.1 degree. In this case, we can accept the error within 0.1 degree. Admissible error margin means the error margin that the application can accept at the time of programming. That is, when the admissible error margin is 0.1 degree, the application can accept the error of ± 0.1 degree from actual sensor data value by using the agent because whatever the data which has to be collected by the agent is compared to the previous one. If it is same then no need to send it once again , since the redundant communication is eliminated, the communication traffic can be reduced. The agent sends predicted sensor value to the sensors before they transmit their observed sensor value to the mobile sink. Each sensor compares their sensor value with the predicted sensor value that receives from the mobile sink and replies only when the observed sensor value exceeds the admissible error margin from the predicted sensor value. The communication traffic can be reduced because sensors do not have to transmit all data to that each sensor.

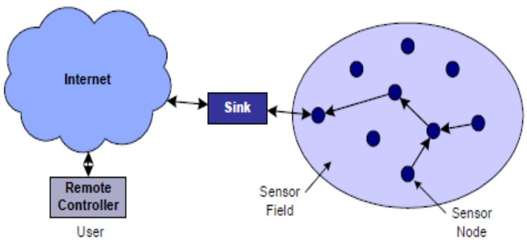

Fig1. Sensor Network Architecture.

II. PREVIOUS WORK

In [1] & [2] we have studied that he key idea in this model is to develop mobile entities present in an application scenario. They call these entities MULEs (Mobile Ubiquitous LAN Extensions) because they "bring" data from sensor to access point. For example, in a city traffic monitoring application vehicles can act as MULEs; in a habitat monitoring scenario, the role can be served by animals; in a national park monitoring scenario. MULEs are assumed to be capable of limited wireless communication and can replace data as they pass by sensors and access points as a result of their motion. Thus MULEs pick up data from sensors, buffer it and later on drop off the data at an access-point. The MULE architecture provides connectivity by adding an intermediate layer of mobile nodes to the existing relationship between sensors and access-points. This effort is only a first step in accepting the feasibility of with mobility in sensor networks. It is clear that much more work remains to be complete to fully understand the cost effectiveness of this approach.

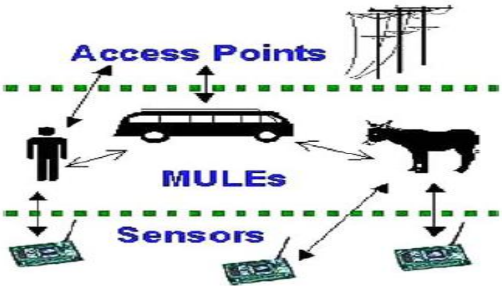

Fig2. The three tiers of the MULE architecture

In [3] paper, they have offered a routing protocol, MobiRoute, to sustain wireless sensor networks (WSNs) with a mobile sink. This can prove theoretically, that moving the sink can improve network lifetime without sacrificing data delivery latency. By inventively simulating MobiRoute with TOSSIM (in which real implementation codes are running),they have demonstrated the benefit of using a mobile sink rather than a static one. They have pretended both general networks with nodes located in point lattices and a special in-building network with nodes forming a ring. The results are very promising: a mobile sink, in most cases, improves the network lifetime with only a modestly degraded reliability in packet delivery. We are in the process of performing full-scale field tests with the in-building network. They will also improve MobiRoute based on the skill obtained from the field tests.

In [4] we have studied that the density of the network increases due to increasing number of nodes. Bearing in mind the approach of fixed round trip time for data mule, there are more nodes from which data has to be collect, in the same amount of time. This leads to loss of data due to buffer overflows at the nodes. If the second approach of stopping at each node is used, the data mule will take a longer time to complete a round. In this case, although at time of each service, the buffer of a node is empty, it may not be possible for the data mule to return to this node before its buffer fills again. Again this leads to loss of data. Another issue arises if the network is deployed over a larger area. The distance over which the data mule moves increases. The battery capability may not be sufficient for moving this length, requiring recharge on the path. These problems can be addressed by using multiple data mules. A slight solution would be dividing the area into equal parts and having one data mule in each. This solves the problem if the nodes are uniformly randomly deployed, so that each mule gets approximately same number of nodes to service. For instance, consider the area shown in Figure 3, with 4 mules. Each mule covers the similar area. Now each mule can independently run the same single mule algorithms presented in the previous section.

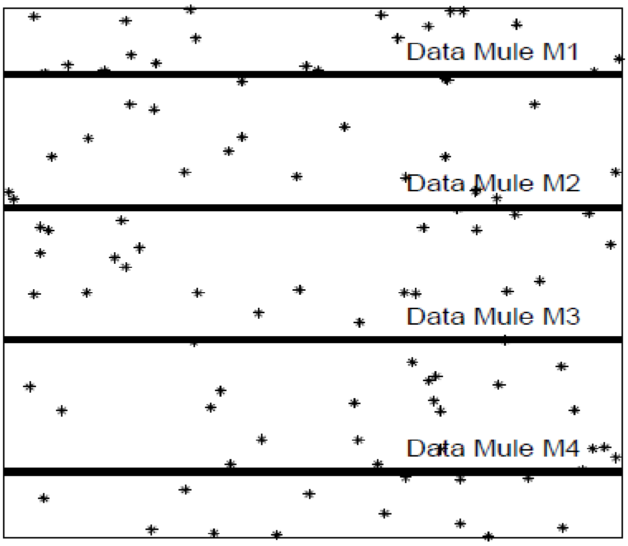

Fig3. Multiple data mules covering an area

In [5] we have studied that, the main objective of our proposed algorithm is to efficiently convey all the traffic destined for the sink and improve the network lifetime. we have investigated the impact of sink mobility on network lifetime. In a typical WSN, all the data generate in the network are routed to a static sink. Nodes near the sink tend to deplete faster in their energy which might cause holes in the network thus limiting the network lifetime. With the introduction of mobile sink, the nodes around the sink always changes, thus balancing the energy consumption in the network and improving the network lifetime. Proposed algorithm was able to balance the improvement of the network lifetime with the reliability of the network. Termite-hill is a routing algorithm for wireless sensor networks that is inspired by the termite behaviors. The principles of swarm intelligence are used to describe rules for each packet to follow which results in developing routing behavior. The algorithm finds its way for improved performance in the reduction of control traffic.

In [6] they enable a user to issue a query to be swamped to the network to build data forwarding and aggregation plans. Such flooding-based systems can be made more energy efficient by exploiting the spatial correlation in sensor data. Clusters base prediction model while CAG forms clusters using real-time sensor values in sensor data while CAG takes advantage of spatial correlation to form clusters. CAG exploits semantic transmit in order to reduce the communication overhead by leveraging spatial correlation, the characteristic of the data distribution. CAG achieves efficient in-network storage and processing by allowing a unified mechanism between query routing (networking) and query processing (application). Instead of gathering and compressing all the data (lossless algorithm), CAG generates synopsis by filtering out insignificant elements in data streams to reduce response time, storage, computation, and communication costs.

III. PROPOSED WORK

We propose a communication traffic reduction method by delivering a predicted sensor data. In our proposed method, we assume that the mobile sink which act as a agent goes around a fixed route in the sensing area. The mobile sink stops and uploads collected data to the base station when it returns to the base station. Our proposed method divides the sensing area into some areas.

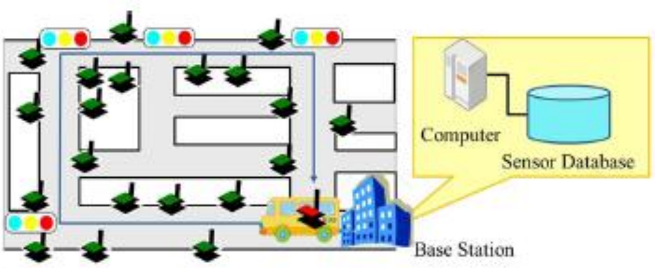

Fig4. A sensing system using a mobile sink.

The mobile sink sends predicted sensor value to the sensors before they transmit their observed sensor value to the mobile sink. Each sensor compares their sensor value with the predicted sensor value that receives from the mobile sink and replies only when the observed sensor value exceeds the admissible error margin from the predicted sensor value. The communication traffic can be reduced because sensors do not have to transmit all data that each sensor has to be given.

In this paper, we proposed a sensor data collection method with a mobile sink (i.e Agent) for communication traffic reduction by delivering predicted sensor value. In our proposed DPV method, the mobile sink delivers coefficients of predicted sensor value planes calculated from stored sensor data. When sensors receive these coefficients, the sensor computes predicted sensor value by using their position information and time. After that, only sensors whose sensing data exceeds the admissible error margin from the predicted sensor value transmit their data. From experimental results, we confirmed that the DPV method reduces the communication traffic compared with comparative approach.

The main purpose of this paper is to use efficient energy, and by using agent base approach we are collection data from the sink which is act as a cluster head of the sensor network. In the previous paper data is collected by sink but this sink node is act as a dummy sink node, but in our algorithm data is collected by the sink i.e. agent. Agent is an intelligent agent so whatever data can come together is by removing the false positive. The agent has to collect all sensors data and send to the base station. In next round it can compare the previous data and according to that DPV method can utilize. Our experimental result can given a three major parameter i.e. a) Energy efficiency b) Delay c) Throughput. By comparing with and without using algorithm and this can be done on the Linux platform under NS-2 stimulation.

IV. CONCLUSION

We have proposed and described a sensor data collection method with a mobile sink for communication traffic reduction by delivering predicted sensor value and the data is collected by the agent. In our proposed DPV method [7], the mobile sink delivers coefficients of predicted sensor value planes calculated from stored sensor data. When sensors receive these coefficients, the sensor computes predicted sensor value. The agent has to collect all the sensor data and send it to the base station with the help of admissible error margin that had to be set at the time of programming. And finally the result shows the graph related to the energy efficiency, delay and throughput.

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