An Efficient Mobile Configuration for Data intensive in WSN's

Bejawada Naga Lakshmi [1], P. Jyothiswari [2]
Sri Venkateswara College of Engineering and Technology, Chittoor, India
1(M.Tech Student) 2(Associate Professor)

Abstract— **Data Intensive applications like micro climate monitoring, weather monitoring, climate monitoring, agriculture, audio/video Observation has increased in tremendous way in Wireless Sensor Networks (WSNs). The main problem and challenge faced in Wireless sensor networks is data transmit, where all the data to be generated inside or within the application and processed to the base station where we despite the sensor nodes which are having limited energy or power supplies. The project proposes a novel method for to use low-cost disposable mobile relays for reducing energy consumption of data intensive in wireless sensor networks. Our New frame work provides a different approach to the previous work in two major aspects. In the first section it does not require any complex planning for mobile nodes, it can be implemented on number of low cost mobile sensor platform. The second main aspect is that we integrate the reduction of energy consumption in wireless transmission and mobility usage with a inter connected optimization framework. The project presents a enhanced novel frame work called efficient distributed implementations, The algorithm uses localized synchronization with limited activities because the project do not compute un necessarily. The optimal topology gives final routing tree with a optimal optimization. Finally our algorithm simulation results shows outperforming the best of existing solutions.**

Manuscript received August, 2014. ***Bejawada Naga Lakshmi****, M.Tech., Sri Venkateswara College of Engineering and Technology, Chittoor, Andhra Pradesh, India. Email: bnammulu@gmail.com*

P. Jyothiswari,*M.tech,* ***Associate Professor,*** *Sri Venkateswara College of Engineering and Technology, Chittoor, Andhra Pradesh, India. Email: Jyosvcetcse@gmail.com*

I. INTRODUCTION

The project provides various reviews in which three different approaches are studied i.e., data mules, mobile relays and mobile base stations which uses mobility in wireless sensor networks to reduce energy usage or consumption. First discussing about a mobile base station which moves around various networks to collects data from the neighbor nodes. In order to balance the transmission of data using multiple hop we perform the load balancing transmission between neighbor nodes. In consequent work all nodes will transmit data only to the base station when it very close to them called a neighbor activity. The primary goal is to make process and compute a new framed mobility path which collects data from various visited nodes before these nodes having problem or suffer from overflows. In wireless sensor networks of several assignations of data collection algorithms were proposed, but in all the algorithms the mobile base station only visits to the selected set of neighbor nodes visited to as assignation points within a deadline and the assignation points buffer the data from sources.

In the second approach of Data mules which are very similar to the form of the data transmission to the mobile base stations. In this approach they are picked up data from various sensors and transmit to the sink. In the data mule all the nodes visits all the sources to collect data, and collect information of transports data to the distance and makes static base station activity through the network. The primary goal is to find and locate the movement path that reduces the both communication and provides consumption of energy in mobility. To reduce large delays in sensor and reduce the wait activity before data transmission the proposed research will help to reduce the delay of transmission.

In the third approach, Wireless Sensor Network Consists of

various mobile relay nodes along with data source and base station. In this approach relay nodes will not transport data instead of relay nodes move to different locations to reduce the transmission cost. The project novel work mobile relay approach is used to show the iterative mobility algorithm where each mobile relay node transports or moves to the central point of its neighbor nodes with coverage on the optimal solution using a single route path.

To reduce the cost of moving, However, the relay nodes have implemented a novel mobility algorithm. When the mobile nodes decide to move only when it is having beneficial but the position is considered at the midpoint of neighbors. To provide energy consumption and mobility of transmission we used mobile base station with data mules giving solution to OMRC problem. Our enhanced approach also rearranges each mobile relay transmission only once when immediately after exploitation. When compared with previous mobile relay schemes we believe that all possible neighbor locations are targeted to the locations for a mobile node instead of its neighbors in the midpoint,

The project contributions following operations:

(1) Project proposes and formulate the a obstruction of Optimal Mobile Relay Configuration in data-intensive WSNs. The main objective is to reduce energy consumption in dramatic activity considering the total energy consumed by all mobility relays and wireless transmissions are minimized, in this contrast the existing mobility approaches are only minimize the transmission energy consumption but the tradeoff energy consumption is exploited by mobile relays.

(2) The project observers the effectiveness of the initial configuration on the final result and also compares the different strategies with tree building and gives a optimal tree construction for static nodes with no mobility.

(3) We enhance and develop two algorithms for configuration of mobile relays and refine the configuration of nodes. The first algorithm improves the structure of tree topology by adding new neighbor nodes. The project also guaranteed to find the new optimal topology. The second algorithm improves the enhancement in routing tree by rearranging the nodes without changing their structure tree topology. Our proposed and enhanced algorithms shows limited localized synchronization with efficient distribution and implementation.

(4) We conduct extensive simulations using the realistic energy activities and modes which are obtained from existing mobile and sensor platforms which are static. Our project results show that all the algorithms can reduce energy consumption better than existing solutions.

II. RELATED WORK

Analyzing the three different approaches: Mobile base stations, data mules and mobile relays. All the three approaches use mobility to reduce energy consumption in wireless sensor networks.

A. Mobile Base Station

A mobile base station is a sensor node collects the data by moving around the network from the nodes [4]. In some work, in order to balance the transmission load, all nodes are performing multiple hop transmissions to the base station.

The goal is to rotate the nodes which are close to the base station. Before the nodes suffer buffer overflows, the base station computes the mobility path to collect data from the visited nodes. Several rendezvous based data collection algorithms are proposed, where the mobile base station only visits a selected set of nodes referred to as rendezvous points within a deadline and the rendezvous points buffer the data from sources. High data traffic towards the base station is always a threat to the networks life time [5]. The battery life of the base station gets depleted very quickly due to the sensor nodes which are located near to the base station relay data for large part of the network. The proposed solution includes the mobility of the base station such that nodes located near base station changes over time. All the above approaches incur high latency due to the low to moderate speed of mobile base stations. Figure 2 shows Mobile base station.

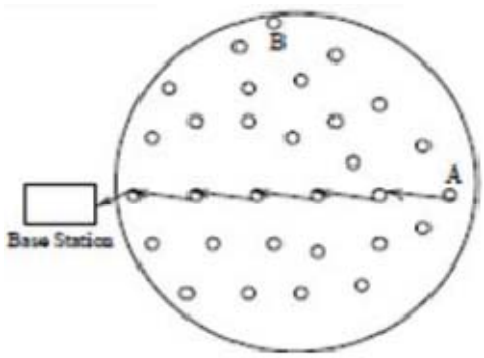

Figure 2: Mobile base station

B. Data Mules

Data mules are another form of base stations. They gather data from the sensors and carry it to the sink. The data mule collects the data by visiting all the sources and then transmits it to the static base station through the network. In order to minimize the communication and mobility energy consumption the mobility paths are determined. In paper [6] the author analyses an architecture based on mobility to address the energy efficient data collection problem in a sensor network. This approach utilizes the mobile nodes as forwarding agents. As a mobile node moves in close propinquity to sensors, data is transmitted to the mobile node for later dumps at the destination. In the MULE architecture sensors transmit data only over a short range that requires less transmission power. However, latency is increased

because a sensor has to wait for a mule before its data can be delivered. Figure 3. The three tiers of the MULE architecture. The Mule architecture has high latency and this limits its applicability to real time applications (although this can be mitigated by collapsing the MULE and access point tiers). The system requires sufficient mobility. For example, mules may not arrive at a sensor or after picking the data may not reach near an access-point to deliver it. Also, data may be lost because of radio-communication errors or mules crashing. To improve data delivery, higher-level protocols need to be incorporated in the MULE architecture. Data mules also introduce large delays like base stations since sensors have to wait for a mule to pass by before initiating their transmission.

C. Mobile Relay

In this approach, the network consists of three nodes such as mobile relay nodes along with static base station and data sources. To reduce the transmission cost relay nodes do not transport data rather it will move to different locations. We use the mobile relay approach in this work. In [7] author showed that an iterative mobility algorithm where each relay node moves to the midpoint of its neighbors converges on

the optimal solution for a single routing path This paper presents obility control scheme for improving communication performance in WSN. The objectives of the paper [7] are 1) Analyse when controlled mobility can improve fundamental networking performance metrics such as power efficiency and robustness of communications 2) Provide initial design for such networks. Mobile nodes move to midpoint of the neighbours only when movement is beneficial [8]. Unlike mobile base stations and data mules, our approach reduces the energy consumption of both mobility and transmission. Our approach also relocates each mobile relay only once immediately after deployment. The paper study the energy optimization problem that accounts for energy costs associated with both communication and physical node movement. Unlike previous mobile relay schemes the proposed solution consider all possible locations as possible target locations for a mobile node instead of just the midpoint of its neighbors.

III. PROPROSED WORK

We use low-cost disposable mobile relays to reduce the total energy consumption of dataintensive WSNs. Different from mobile base station or data mules, mobile relays do not transport data; instead, they move to different locations and then remain stationary to forward data along the paths from the sources to the base station. Thus, the communication delays can be significantly reduced compared with using mobile sinks or data mules. Moreover, each mobile node performs a single relocation unlike other approaches which require repeated relocations. Figure 4 shows Proposed Network.

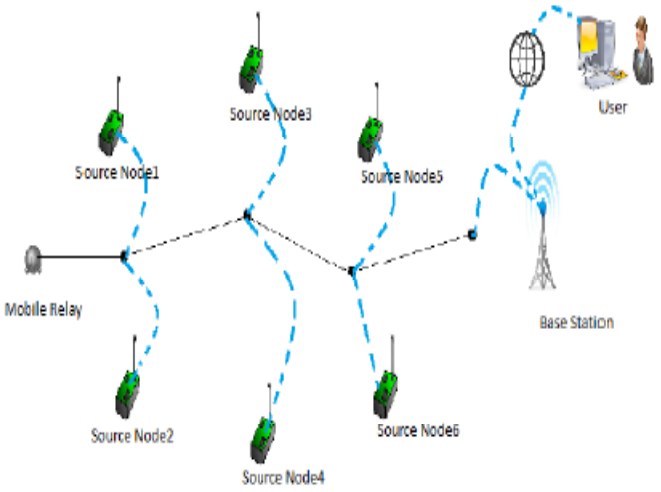

Figure4: Proposed Network

The network consists of mobile relay nodes along with static base station and data sources. Relay nodes do not transport data; instead, they move to different locations to decrease the transmission costs. We use the mobile relay approach in this work. Goldenberg et al. [13] showed that an iterative mobility algorithm where each relay node moves to the midpoint of its neighbors converges on the optimal solution for a single routing path. However, they do not account for

the cost of moving the relay nodes. In mobile nodes decide to move only when moving is beneficial, but the only position considered is the midpoint of neighbors. The sink is the point of contact for users of the sensor network. Each time the sink receives a question from a user, it first translates the question into multiple queries and then disseminates the queries to the corresponding mobile relay, which process the queries based on their data and return the query results to the sink. The sink unifies the query results from multiple storage nodes into the final answer and sends it back to the user. The source nodes in our problem formulation serve as storage points which cache the data gathered by other nodes and periodically transmit to the sink, in response to user queries. Such a network architecture is consistent with the design of storagecentric sensor networks [38]. Our problem formulation also considers the initial positions of nodes and the amount of data that needs to be transmitted from each storage node to the sink. we consider the subproblem of finding the optimal positions of relay nodes for a routing tree given that the topology is fixed. We assume the topology is a directed tree in which the leaves are sources and the root is the sink. We also assume that separate messages cannot be compressed or merged; that is, if two distinct messages of lengths m1 and m2 use the same link (si, sj) on the path from a source to a sink, the total number of bits that must traverse link (si, sj) is m1 +

m2.

IV ALGORITHM

procedure OPTIMALPOSITIONS(U^0)
converged ← false;
j ← 0;
repeat
anymove ← false;
j ← j + 1;
▷ *Start an even iteration followed by an odd iteration*
for idx = 2 to 3 **do**
for i = idx to n by 2 **do**
(u_i^j ,moved) ← LOCALPOS(o_i, $S(s_i)$, s_i^d);
anymove ← anymove OR moved
end for
end for
converged ← NOT anymove
until converged
end procedure

V. CONCLUSION

The main objective of this paper is energy conservation which is holistic in that the total energy consumed by both mobility of relays and wireless transmissions is minimized, which is in contrast to existing mobility approaches that only minimize the transmission energy consumption. The tradeoff in energy consumption between mobility and transmission is exploited by configuring the positions of mobile relays. We develop two algorithms that iteratively refine the

configuration of mobile relays. The first improves the tree topology by adding new nodes. It is not guaranteed to find the optimal topology. The second improves the routing tree by relocating nodes without changing the tree topology. It converges to the optimal node positions for the given topology. Our algorithms have efficient distributed implementations that require only limited, localized synchronization.

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