PERCEIVING PROVENANCE FORGERY AND CONTAINER PLUMMET ATTACKS IN WIRELESS SENSOR NETWORKS WITH FROLICSOME SECURITY

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ABSTRACT: WSN is widespread in distinct kinds of application scenarios. It embrace a set of sensor nodes organize above a geographical area to monitor a range of phenomenon. WSN develop into increasingly constructive in variety critical applications, such as environmental scrutinize, smart offices, battlefield surveillance moreover transportation traffic monitoring. The sensor nodes be minuscule, limited in power. Sensor category contrast according to the application of WSN. Whatever exist the application, the possessions such as power, memory and band width are limited. In addition, nearly all of the sensors nodes are pitch away in environment. Therefore it is very important to believe energy efficiency so as to enlarge the verve time of the WSN. This paper contemporary energy competent mobile relaying in data rigorous wireless sensor networks. The hypothesis of mobile relay is that the mobilenodes transform their position so as to diminish the total energy obsessive by both wireless transmission with locomotion. The conformist methods, conversely do not procure into account energy level, and as a consequence they do not forever put off the network lifetime.
Keywords: Data intensive, Energy, Relay, Routing tree, WSN

I. INTRODUCTION

Smart environments determination the next evolutionary enlargement phase in building, utilities, shipboard, military, industrial, and home, shopping mall and transportation systems mechanization. Sensory data is spawn from multiple sensors of dissimilar modalities in distributed positions. This data can be make use of to create smarter ecosystem. But to accomplish these challenges choice be massive like distinguish the relevant quantities, collecting the data, monitoring and performing decision-making, evaluating the information, assessing, formulating meaningful user information, A WSN (WSN) consists of a group of sensors that are interrelated by a communication network. The feelers are actually embedded devices that are included with a physical environment and competent of processing the signals, acquiring signals, communicating and performing effortless computation missions. although this new class of networks has the prospective to facilitate wide range of applications, it also cause serious disputes like patronize network topology amend, memory and power furnish, limited computational,. Sensors are further prone to fiasco. With all these controlanprofessional and valuable method to pull out data from the network is challenging assignment.

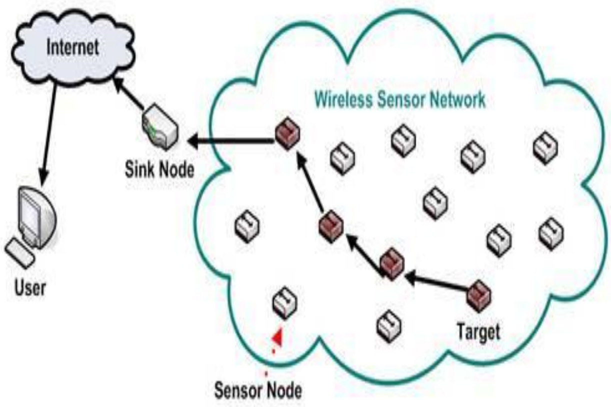

Fig. 1: Different Applications of Wireless Sensor Networks

Mobile relays do not hold the unruffled data at sensors instead they move to various locations and brazen the data between source to the base stations. In this slant we can significantly diminish the delay taking place in communication process among the nodes and each mobile node presenta relocationmerely once unlike previous approaches performs repetitive relocations. There are plentiful low-cost mobile sensor prototypes such as Robomote [1], FIRA [2] and Khepera [3] arecurrently available. Their manufacturing cost of stagnant sensors had been contrast with mobile sensors. As a result, they can be massively position in a network and worn in a disposable manner. As the manufacturing cost of sensor nodes is very less, therfore mobile sensor platforms are monitorized by batteries and capable of less mobility. thinking about these constraints, our slant only involve one relocation to the selected positions after exploitation.

II. RELATED WORK

We review three different approaches, mobile base stations, data mules, and mobile relays, that use mobility to reduce energy consumption in wireless sensor networks. A mobile base station moves around the network and collects data from the nodes. In somework, all nodes are always performing multiple hoptransmissions to the base station, and the goal is torotate which nodes are close to the base station inorder to balance the transmission load [4], [5], [6]. Inother work, nodes only transmit to the base stationwhen it is close to them (or a neighbor). The goal isto compute a mobility path to collect data from visited nodes before those nodes suffer buffer overflows [7], [8], [14], [15]. In [8], [19],

[20],several rendezvous-based data collection algorithms are proposed, where the mobile base station onlyvisits a selected set of nodes referred to as rendezvous points within a deadline and the rendezvous points buffer the data from sources. These approaches incur high latencies due to the low to moderate speed, e.g., 0.1-1 m/s [14], [16], of mobile base stations. Data mules are similar to the second form of mobile base stations [9], [10], [11]. They pick up data from the sensors and transport it to the sink. In [21],the data mule visits all the sources to collect data, transports data over some distance, and then transmit it to the static base station through the network. The goal is to find a movement path that minimizes both communication and mobility energy consumption. Similar to mobile base stations, data mules introducelarge delays since sensors have to wait for a mule topass by before starting their transmission.In the third approach, the network consistsof mobile relay nodes along with static base stationand data sources. Relay nodes do not transport data;instead, they move to different locations to decreasethe transmission costs. We use the mobile relayapproach in this work. Goldenberg et al. [13] showedthat an iterative mobility algorithm where each relaynode moves to the midpoint of its neighbours converges on the optimal solution for a single routing path. However, they do not account for the cost of moving the relay nodes. In [22], mobile nodes decide to move only when moving is beneficial, but the only position considered is the midpoint of neighbors.Unlike mobile base station and low-costdisposable mobile relay, our doze mobile relaytechnique considers the energy consumption of bothactive and sleeping mode. Our approach alsoforwards the data from source node to base station bymobile relay, while the relaying is beneficial. Unlikea previous mobile relay schemes [13],[22] and [35], itforward data from source node to the base station,when the reasonable variation in the data.Mobility has been extensively studied insensor network and robotics applications whichconsider only mobility costs but not communicationcosts. For example, in [23], the authors proposeapproximation algorithms to minimize maximum andtotal movement of the mobile nodes such that thenetwork becomes connected. In [24], the authorspropose an optimal algorithm to bridge the gapbetween two static nodes by moving nearby mobilenodes along the line connecting the static pointswhile also minimizing the total/maximum distancemoved. In [25], [26], the authors propose algorithmsto find motion paths for robots to explore the area andperform a certain task while taking into considerationthe energy available at each robot. These problemsignore communication costs which add an increasedcomplexity to OMRC, and consequently their resultsare not applicable.

III. LITERATURE SURVEY

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.

1. 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.

2. 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.

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.

3. 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 neighbours converges on the optimal solution for a single routing path This paper presents mobility 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 neighbours.

IV. PROBLEM STATEMENT

1. ENERGY CONSUMPTION MODEL

During the transferring of the data, computation and mobility the energy is consumed by sensor nodes but the large amount battery depletion takes place due to data transfer and mobility.Even in the idle listening state Radios consumes more energy, but by using sleep scheduling protocols the idle listening time of radios is considerably reduced [9]. In this work, we mainly concentrate on decreasing the total power consumption due to data transmissions and movement. Such a holistic objective of energy conservation is motivated by the fact that mobile relays act the same as static forwarding nodes after movement. We consider wheeled sensor nodes with differential drives such as Khepera, Robomote and FIRA for mobility. This type of node usually has two wheels, each controlled by independent engines. For this kind of node we adopt the distance proportional energy consumption model [10]. The energy EM (d) consumed by moving a distance d is modelled as: EM (d) = kd The factor k value depends on the speed of the node. In general, there is an optimal speed at which k is small. The variants of energy consumed with respect to mote speed are discussed by author in [10]. When the node is running at optimal speed, k = 2. We evaluate the experimental results got by two radios CC2420 [11] and CC1000 [12] that are most commonly used on existing sensor networks platform to model the energy consumed by transmissions. The authors of [13], for CC2420 studied the transmission power level required for transmitting packets reliably (e.g., over 95% packet reception ratio) over different distances. Let ET (d) be the energy consumed to transmit reliably over distance d. It can be modelled as ET (d) = m (a + bd2) Where m is the number of bits transmitted a and b are constants depending on the environment. We now discuss the instantiation of the above model for both CC2420 and CC1000 radio platforms. We obtain a = 0.6 × 10−7J/bit and b = 4 × 10−10Jm−2/bit from the measurements on CC2420 in [14], for received signal strength of -80 dbm (which corresponds to a packet reception ratio higher than 95%) in an outdoor environment. This model is constant with the hypothetical analysis discussed in [15]. We also consider the energy needed by CC1000 to output the same levels. We get lower consumption parameters: a = 0.3 × 10−7J/bit and b = 2 × 10−10Jm−2/bit. We note that although the mobility parameter k is approximately 1010 times larger than the transmission parameter b, the relays move only once whereas large amounts of data are transmitted. For larger data chunk sizes, the savings in energy transmission costs compensates for the energy expended to move the nodes resulting in a decrease in total energy consumed.

2. AN EXAMPLE

We now demonstrate the key idea of our approach using a simple example. Imagine that we have three nodes s1, s2, s3 located at positions x1, x2, x3, respectively (Fig. 2), in which s2 is a mobile relay node. The aim is to reduce the total energy consumption due to both mobility and transmissions. Suppose the node s1 needs to transmit a stored data chunk to sink s3 through relay node s2. This can achieved by one the way is to have s1 transmit the data from x1 to node s2 at position x2 and node s2 forwards it to sink s3 at position x3, without s2's movement. Another approach is in which it takes advantage of s2's mobility as suggested in [16], node s2 move to the midpoint of the segment x1x3. This approach will reduce the transmission energy by reducing the distances separating the nodes. Still, moving relay node s2 also consumes energy. We assume the following parameters for the energy models: k = 2, a = 0.6 × 10−7, b = 4 × 10−10. In this example, for a given data chunk mi, the optimal solution is to move s2 to xi2 (a position that we can compute precisely). This will reduce the total energy utilization due to both transmission and mobility. For small chunk of data, s2 moves very little if at all. As the size of the data increases, relay node s2 moves closer to the midpoint. In this example, it is beneficial to move when the message size exceeds 4 MB.

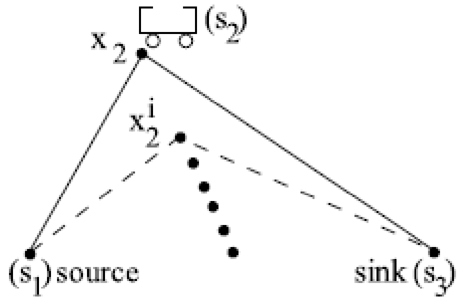

Fig. 2: Reduction in Energy Consumption due to Mobile Relay. As the Data Chunk Size Increases the Optimal Position Converges to the Midpoint of S1 S3.

3. PROBLEM FORMULATION

In our definitions, we assume that all movements are completed before any transmissions begin. We also assume there are no obstacles that affect mobility or transmissions. In this case, the distance moved by a mobile relay is no more than the distance between its starting position and its corresponding position in the evenly spaced configuration which often leads to a short delay in mobile relay relocation. Furthermore, we assume that all mobile nodes know their locations either by GPS units mounted on them or a localization service in the network. We focus on the case where all nodes are in a 2-dimensional plane R2, but the results apply to R3 and other metric spaces.

Our problem can be described as follows. Given a network containing one or more static source nodes that store data gathered by other nodes, a number of mobile relay nodes and a static sink, we want to find a directed routing tree from the sources to the sink as well as the optimal positions of the mobile nodes in the tree in order to minimize the total energy consumed by transmitting data from the source(s) to the sink and the energy consumed by relocating the mobile relays. 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. 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. The formal definition of the problem is given below. Definition 1: (Optimal Mobile Relay Configuration): Input Instance: S, a list of n nodes (s1,...,, sn) in the network; O, a list of n locations (o1, . . . , on) where oi is the initial position of node si for $1 \leq i \geq n$; S sources, a subset of S representing the source nodes; r, a node in S, representing the single sink; M sources = {Mi | si∈Ssources}, a set of data chunk sizes for all sources in Ssources; We define mi, which we compute later, to be the weight of node si which is equal to the total number of bits to be transmitted by node si. We define a configuration <E,U> as a pair of two sets: E, a set of directed arcs (si, sj) that represent the directed tree in which all sources are leaves and the sink is the root and U, a list of locations (u1, . . . , un) where ui is the transmission position for node si for $1 \leq i \leq n$. The cost of a configuration <E, U> is given by:

V. PROPOSED WORK

In the proposed work, we use low-cost disposable mobile relays to reduce the total energy consumption of data intensive 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 thesources to the base station. Thus, the communication delays can be significantly reduced compared with usingmobile sinks or data mules.

VI. OPTIMAL POSITION ALGORITHM

In this section, we consider the problem 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. The algorithm [4] converges to the optimal solution for the given tree given the topology is fixed. procedureOPTIMALPOSITIONS(Uo)

converged ← false;
j ← 0;
repeatanymove ← false;
j ← j + 1; ⊳ Start an even iteration followed by an odd iteration for idx = 2 to 3 do
fori = idx to n by 2 do
(uji ,moved) ← LOCALPOS(oi, S(si), sdi);
anymove ← anymove OR moved
end for
end for
converged ← NOT any move
untilconverged end procedure

VII. SIMULATION RESULT

As in data-rigorous wireless sensor networks power management is challenging task so, mobile relay node is used to minimize the consumption of energy mobile relay node is used. The task of relay node is to forward the data which is gathered by sensor node to sink. The simulation is carried out for the three pairs of static sensor node. Relay node computes the optimal position by comparing the size of the data at the sensor nodes rather than considering mid-point between two sensor nodes as optimal position. Relay node moves nearer to sensor node which has large size of data and forwards the data to the sink.

The below fig. shows the energy optimization chart for three pairs of sensor nodes.The size of data in terms of KB at each node. Chart shows the energy consumed to transfer the data in the mid positions and optimal positions.

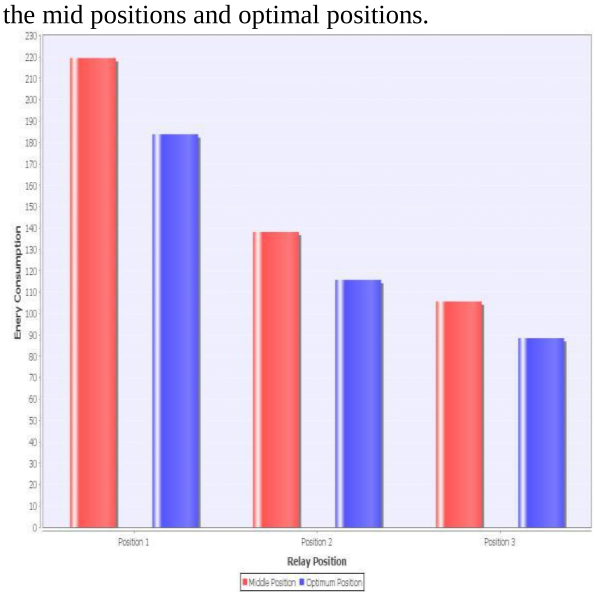

Fig. : Energy optimization chart

VIII. CONCLUSION

In this paper, we proposed a holistic approach to minimize the total energy consumed by both mobility of relays and wireless transmissions. Most previous work ignored the energy consumed by moving mobile relays. When we model both sources of energy consumption, the optimal position of a node that receives data from one or multiple neighbors and transmits it to a single parent is not the midpoint of its neighbors; instead, it converges to this position as the amount of data transmitted goes to infinity. Ideally, we start with the optimal initial routing tree in a static environment where no nodes can move. However, our approach can work with less optimal initial configurations including one generated using only local information such as greedy geographic routing. Our approach improves the initial configuration using two iterative schemes. The first inserts new nodes into the tree. The second computes the optimal positions of relay nodes in the tree given a fixed topology. This algorithm is appropriate for a variety of data-intensive wireless sensor networks. It allows some nodes to move while others do not because any local improvement for a given mobile relay is a global improvement. This allows us to potentially extend our approach to handle additional constraints on individual nodes such as low energy levels or mobility restrictions due to application requirements. Our approach can be implemented in a centralized or distributed fashion. Our simulations show it substantially reduces the energy consumption by up to 45 percent.

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