GEO ROUTING IN DUTY-CYCLED MOBILE SENSOR NETWORKS USING SLEEP SCHEDULING ALGORITHM

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ABSTRACT

In this paper focus on sleep scheduling for geographic routing in duty cycled WSNs with mobile sensors and proposes two geographic-distance-based connected-k neighbourhood (GCKN) sleep scheduling algorithms. The first one is the geographic-distance-based connected-k neighbourhood for first path (GCKNF) sleep scheduling algorithm. The second one is the geographic-distance-based connected-k neighbourhood for all paths (GCKNA) sleep scheduling algorithm. The main concept of this paper is Geographic routing, a promising routing scheme in wireless sensor networks (WSNs), is shifting toward duty-cycled WSNs in which Mobile sensors are sleep scheduled to reduce energy consumption.

I.INTRODUCTION

Recently, this paper focus on geographic routing, a promising routing scheme in wireless sensor networks (WSNs), is shifting toward duty-cycled WSNs in which sensors are sleep scheduled to reduce energy consumption. However, except the connected-k neighbourhood (CKN) sleep scheduling algorithm and the geographic routing oriented sleep scheduling (GSS) algorithm, nearly all research work about geographic routing in duty-cycled WSNs has focused on the geographic forwarding mechanism; further, most of the existing work has ignored the fact that sensors can be mobile. Our analysis and simulations show that when there are mobile sensors, geographic routing can achieve much shorter average lengths for the first transmission path explored in WSNs employing GCKNF sleep scheduling and all transmission paths searched in WSNs employing GCKNA sleep scheduling compared with those in WSNs employing CKN and GSS sleep scheduling. This paper addresses the sleep scheduling problem in duty- cycled WSNs with mobile nodes (referred as mobile WSNs in the following) employing geographic routing. We pro- pose two geographic-distance-based connected-*k* neighborhood (GCKN) sleep scheduling algorithms.

The first one is the geographic-distance-based connected-k neighbourhood for first path[1] (GCKNF) sleep scheduling algorithm, aiming at geographic routing utilizing only the first transmission path in duty-cycled mobile WSNs. The second one is the geographic-distance-based connected-k neighbourhood for all paths[2] (GCKNA) sleep scheduling algorithm, for geographic routing concerning all paths explored in duty-cycled mobile WSNs. By theoretical analysis and performance evaluations by simulations, we show that when there are mobile sensors, geographic routing can achieve much shorter average lengths for the first transmission paths searched in mobile WSNs employing GCKNF sleep scheduling and all transmission paths explored in mobile WSNs employing GCKNA sleep scheduling compared with those in mobile WSNs employing CKN or GSS sleep scheduling.

II.GEOGRAPHIC ROUTING

The earliest proposal for geographic routing is in which has a local minimum problem in that a node may have no closer neighbor to the destination. For this reason, face routing and its variants are proposed to use geometric rules (e.g., right hand rule) to route around voids near the local minimum in case it happens. However, these algorithms require converting the network into a planar graph or removing the problematic cross links from the network which are not very applicable in realistic conditions. Moreover, there is also a hole problem in geographic routing, in that a hole can be formed by a set of dead sensor nodes running out of energy or being damaged. To solve this problem, some research work try to identify the hole boundary nodes first and then use these boundary nodes to avoid the hole. Others try to use geometric modeling to find an optimized hole- bypassing routing path. Recently, by using a step back and mark strategy when it cannot find the next-hop node, a two-phase geographic forwarding (TPGF), which does not have the local minimum or the hole problem, is shown in. With a label- based optimization method, TPGF can optimize the routing paths by finding one with the least number of hops. However, all these works only consider WSNs with static nodes.

III. ALGORITHM USED

In our system by using a Geographic-distance-based connected-k neighborhood (GCKN) sleeps scheduling algorithms.

IV.MODULES

A. ***Network Models (CKN)***

The source and sink are always-on and both assumed to have unlimited energy supplies. The sink or a normal sensor can move to a randomly chosen position with a randomly selected speed within the WSN boundary and it will pause for a time period after it reaches the selected position, according to the random waypoint model. Normal sensors can dynamically change states between asleep and awake.

B. ***Duty-Cycling Mobility:***

To evaluate the performance of the proposed GCKN algorithms when applying geographic routing into duty-cycled mobile WSNs, this project is conduct extensive simulations in .Net. Here use geographic routing due to the unique desirable characters of TPGF in dealing with the local minimum or hole problem as well as the shortest and multipath transmission prosperities of TPGF. It compare the performance of the proposed GCKN algorithms with CKN and GSS, since CKN and GSS are the only other sleep scheduling algorithms focusing on geographic routing in duty-cycled WSNs,

The performance metric is the lengths of the transmission paths searched by TPGF in duty-cycled WSNs employing GCKN, CKN, and GSS. Geographic routing transmission path is widely used to estimate the transmission time, transmission delay, etc.. In addition, the network lifetime of WSNs employing GCKN, CKN, and GSS based are also observed to check whether GCKN degrades the network lifetime.

C. GCKNA and GCKNF Path

Connected-*k* neighborhood3 requirement and geographic routing requirement in their designs. Specifically, it consider the following six factors for both GCKNF and GCKNA.

1) A node should go to sleep assuming that at least *k* of its neighbors will remain awake so as to save energy as well as keep it *k*-connected.

2) The asleep or awake state of nodes should be allowed to change between edges so that all nodes can have the opportunity to sleep and avoid staying awake all the time ,thus distributing the sensing, processing, and routing tasks across the network to prolong the network lifetime.

3) Although each node decides to sleep or wake up locally, the whole network should be globally connected so that data transmissions can be performed.

4) Each node should have enough initial neighbours, in order to make it easier for the node to satisfy the connected-*k* neighborhood requirement; thus, it is more likely to be asleep after sleep scheduling. For GCKNF, which emphasizes the first transmission path of geographic routing, this project further take the following factor into account.

5) The neighbor of each node, which is closest to sink, should be awake so that geographic routing can utilize these nearest neighbor nodes to make the first transmission path as short as possible. For GCKNA, which considers all transmission paths.

6) For each node, as many as possible of its neighbor nodes that are closer to the sink should be awake so that geographic routing can make all transmission paths as short as possible. In contrast with CKN and GSS, the fourth design factor of both GCKNF and GCKNA is the extra consideration that makes it easier for each node to satisfy the connected- *k* neighbourhood requirement during sleep scheduling. In addition, the fifth design factors for both GCKNF and GCKNA to geographic routing requirement in case they encounter mobile sensor nodes or mobile sinks are ignored by the CKN and GSS schemes.

D. System Flow Diagram

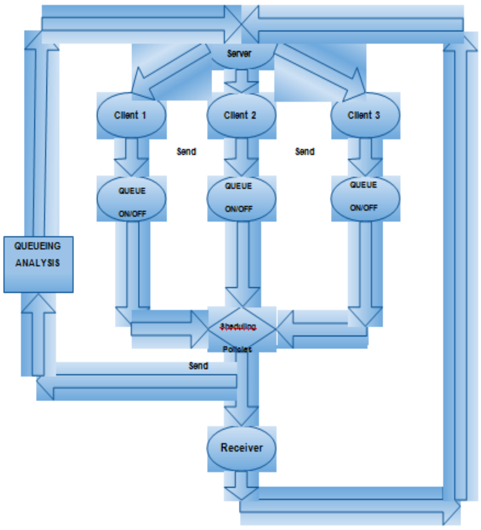

Figure1. System Flow diagram

E. Sleep Scheduling (GSS)

The basic mechanism for sleep scheduling is to select a subset of nodes to be awake in a given epoch while the remaining nodes are in the sleep state that minimizes power consumption, so that the overall energy consumption can be reduced. Existing works on sleep scheduling in WSNs mainly focus on two targets: point coverage and node coverage. For point coverage (also known as spatial coverage), the awake nodes in each epoch are chosen to cover every point of the deployed field. Existing point coverage oriented algorithms differ in their sleep scheduling goals: minimizing energy consumption, or minimizing average event detection latency. For node coverage (also called network coverage), awake nodes are selected to construct a globally connected network such that each asleep node is an immediate neighbor of at least one awake node. However, all these works generally focused on the medium access layer of static WSNs with static nodes. The only recent works addressing sleep scheduling in duty cycled WSNs employing geographic routing are the CKN scheme proposed in and the GSS method presented in.

CKN is a sleep scheduling method providing node coverage and a probabilistic point coverage, which tunes the number of awake nodes in the network by changing the value of k in CKN.GSS is based on CKN and differs from CKN only by making the potential nearest neighbor nodes to the sink to be awake .However, both CKN and GSS do not consider the scenarios in which sensor nodes can be mobile, and both CKN and GSS determine the awake or asleep state of each node based only on a random rank, which may keep awake many nodes far away from the destination and thus degrade the performance of geographic routing.

F. GCKN ALGORITHMS:

The GCKN algorithms basically depends pseudo code of GCKNF and GCKNA. Specifically, in GCKNF, each node sends probe packets to its neighbor nodes and receives the ACK packet from its neighbor nodes. That the, each node calculates whether it currently satisfies the connected-*k* neighborhood requirement or not. If it already belongs to a connected-*k* neighborhood or its transmission radius is the maximum, the node maintains its transmission radius. Otherwise, the node increases its trans- mission radius until the connected-*k* neighborhood appears. The below diagram shows initially thus the data receiver are sleep condition.

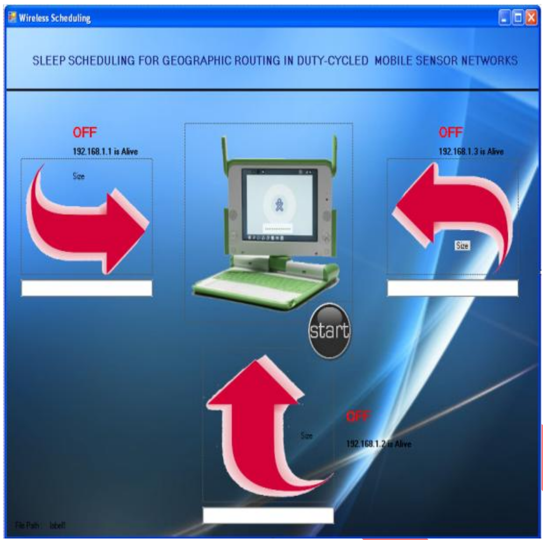

Figure2. System Diagram

THE BELOW DIAGRAM SHOWS HOW TO SEND THE FILES TO SERVER:

STEP:1 DATA RECEIVE FROM NODE 1

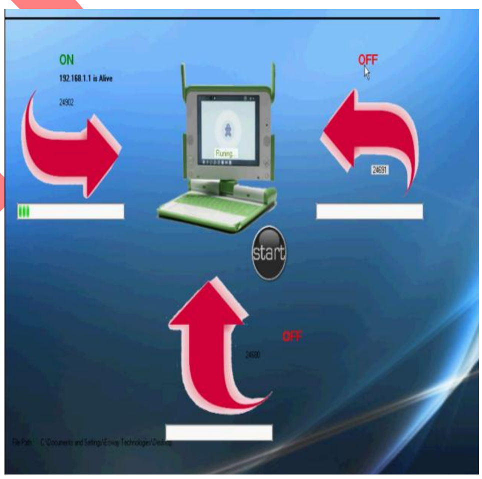

Figure 2(a): Data receiving from node1

STEPS:2 DATA RECEIVING FROM NODE 2

Figure 2(b): Data receiving from node2

STEPS 3: DATA RECEIVING FROM NODE 3

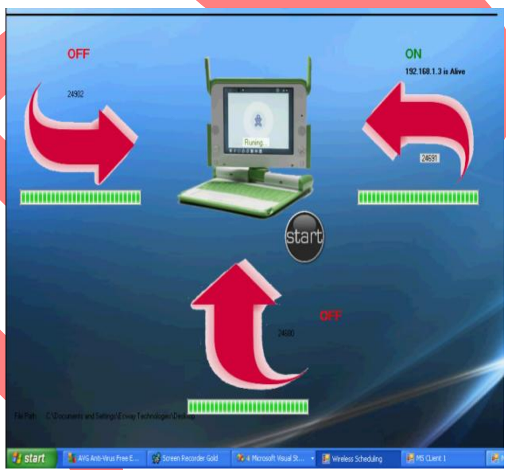

Figure 2(c): Data receiving from node3

The above snapshot (Figure 2 (a-c)) are all explain how to receive the files through client or transmitter at two way they are, The first one is the geographic-distance-based connected-k neighbourhood for first path (GCKNF) sleep scheduling algorithm. The second one is the geographic-distance-based connected-kneighbourhood for all paths (GCKNA) sleep scheduling algorithm.

V CONCLUSION

In this paper, we have explored geographic routing in duty- cycled mobile WSNs and proposed two geographic-distance- based connected-k neighborhood (GCKN) sleep scheduling algorithms for geographic routing schemes to be applied into duty-cycled mobile WSNs. The first geographic-distance-based connected-k neighborhood for first path (GCKNF) sleep scheduling algorithm minimizes the length of first transmission path explored by geographic routing in duty-cycled mobile WSNs. The second geographic-distance based connected- k neighborhood for all paths (GCKNA) sleep scheduling algorithm reduces the length of all paths searched by geo- graphic routing in duty-cycled mobile WSNs.

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