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Energy Saving Scheme of Wireless Sensor Network with Mobile Sink

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ABSTRACT: Wireless sensor networks with mobile sink are expected to increase the flexibility for collecting information in large-scale sensing and detecting environments. Energy saving becomes one of the most important features of the sensor nodes to extend their lifetime in such networks. A novel tree-based power saving scheme is proposed in this paper to reduce the energy consumption in wireless sensor networks with mobile sink. We give a dynamic sorting algorithm to create a tree-cluster routing structure for the sensor nodes. The important goal of this scheme is to reduce the data transmission distances of the sensor nodes by employing the tree structure and multi-hop concepts. Based on the location of mobile sink, the distances between the sensor nodes, and the residual energy of each sensor node, the proposed scheme makes an efficient decision for creating the routing structure. The energy consumption is reduced and the lifetime is extended for the sensor nodes by balancing the network load. Simulation results demonstrate the superior performance of our proposed scheme and its ability to increase the appropriate performance in the energy consumption, network lifetime, throughput, and transmission overhead. Additionally think suitable delay time and multiple of retransmission messages can be achieved for the wireless sensor networks with mobile sink.

KEYWORDS: Distance, Energy consumption, Lifetime, Mobile sink, Wireless sensor networks.

I.INTRODUCTION

Recently, there has been a rapid growth in wireless communication technique. Inexpensive and low power wireless micro sensors are designed, deployed and widely used in wireless and mobile environment [1],[3],[4],[5],[7]. Wireless Sensor Networks (WSNs) are a collection of devices referred to as nodes which sense the environment around them and transmit this data via wireless communication to a sink. It is a network of large number of sensor nodes deployed over a geographical area for monitoring physical phenomena like temperature, humidity, vibrations, seismic events, and so on, where each node is equipped with limited on-board processing, storage and radio capabilities. All sensor nodes are used for detecting an event and routing the data in wireless networking. These sensor nodes are small in size that includes three basic components: a sensing subsystem for data acquisition from the physical surrounding environment, a processing subsystem for local data processing and storage, and a wireless communication subsystem for data transmission and are deployed in sensing area to monitor specific targets and collect the data. Then the sensor nodes send the data to base station (BS) by using wireless transmission techniques. WSN is used in various applications like health care system, battlefield surveillance system, environment monitoring system, human behavior monitoring, agriculture monitoring and so on. Energy saving is one of the important features for sensing the nodes to increased their lifetime in WSN.A sensor node consumes mostly its energy in transmitting and receiving data from source to destination. And the main power supply of the sensor node is battery. In most application scenarios users are usually difficult to reach a location of sensor nodes. Due to large number of replacement of batteries might be impossible. Sensor node used its battery may make sensing area uncovered because of finite battery energy. Therefore, energy conservation becomes critical concern in WSN. To provide nodes with a long period of autonomy, new and efficient energy scheme and corresponding algorithm must be designed and developed that aims to optimize energy usage are needed, so as to extend the lifetime of nodes and the lifespan of the network as a whole [8][13]. To maintain high scalability and better data aggregation, sensor nodes are often grouped into disjoint, non-overlapping subsets called clusters. The cluster-based technique is one of the approaches which incorporate efficient utilization of limited resources of sensor nodes to reduce energy usage in wireless sensor networks also it provides network scalability, resource sharing and efficient use of constrained resources that gives network topology stability and energy saving attributes. Clustering schemes offer reduced communication overheads, and efficient resource allocations thus decreasing the overall energy consumption reducing the interferences among sensor nodes. The main focus of this article is to study and survey of energy efficient protocols to reduce the data transmission distance of sensor nodes in wireless sensor networks.

II.REVIEW OF LITERATURE

Many routing protocols have been proposed for UWSNs in view of the unexampled characteristics of UWSNs. In this article we demonstrate a nitty gritty overview of submerged steering conventions. Each directing convention is painstakingly broke down, and its focal points, drawbacks, and execution issues are highlighted. Likewise, we analyze the conventions as far as vitality effectiveness, way inertness, multi-way ability, unwavering quality, dynamic power, gap bypassing, so on.[1]

They propose Ring Routing, a novel various leveled steering convention for remote sensor systems with a portable sink. The convention forces three parts on sensor hubs: ring hub, customary hub, and grapple hub. Ring hubs shape a ring structure which is a shut circle of single-hub width.[2]

The operation of the proposed convention is separated into rounds, where each round starts with a set-up stage, when the sink discovers its area and areas of CHs, trailed by a relentless state stage, when the detected information exchanged to CHs and gathered in edges; then these casings exchanged to the sink. [3]

This paper considers the uncontrolled sink versatility situations and in the accompanying lines, we quickly depict the related works in this setting including their technique and the relative qualities and shortcomings. [4]

Our proposed strategies outflank the Static Priority strategy and the Least Slack Time First approach by vast edges. These outcomes recommend that our strategies still offer great execution notwithstanding when channel reliabilities are poor.[5]

In this paper, we propose a sink moving plan to manage the sink when and where to move to. Some numerical execution examinations are given to show that the proposed sink moving plan can drag out the system lifetime of a WSN.[6]

In this paper, we call this problem the delay-aware energy efficient path (DEETP). We show that the DEETP is an NP hard problem and propose a heuristic method, which is called weighted rendezvous planning (WRP),to determine the tour of a mobile sink node.[7]

III.SYSTEM OVERVIEW

An effective tree-based power sparing plan is proposed to decrease the information transmission separations of the sensor hubs so that a noteworthy change on the vitality sparing and organize lifetime can be accomplished in remote sensor systems with portable sink. In the proposed conspire; a tree-group directing structure for the sensor hubs is made by receiving the dynamic sorting calculation and utilizing the multi-jump ideas. In view of the area of portable sink, the separations between the sensor hubs, and the remaining vitality of every sensor hub, the proposed plot settles on a productive choice for making the steering structure. The vitality utilization is decreased and the lifetime is reached out for the sensor hubs by adjusting the system load. And also we are doing in this share sink node contribution for the efficient energy preserving.

Advantages of Proposed System:

Suitable routing structure for the sensor hubs is an imperative element in the issues of vitality utilization. Our proposed system is to abbreviate the information transmission separations of the sensor hubs. This is a key factor to reduce the energy consumption in WSNs with mobile sink.

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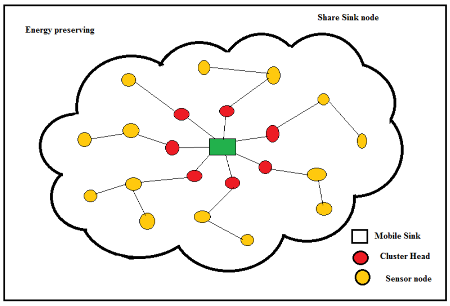

Fig 1.Proposed System Architecture

IV.SYSTEM ANALYSIS

In this section, we explore the temporal and spatial evolution of energy hole based on our analytical result. The traffic load and energy consumption of the sensor nodes and the network lifetime can be determined, where the end condition is that the sink can't receive any data in a data period, which consists of two cases. One is all nodes die due to energy exhaustion. The other is some nodes still have remaining energy, but the sink is isolated from the outer nodes after the formation of the energy hole. Accordingly, even if the network still has remaining energy, the network becomes useless and is also considered as disabled. We can easily judge the algorithm is terminated in which case by checking if there are sensor nodes with remaining energy in the network. If it is the second case, the formation of energy hole should be analyzed temporally and spatially. According to our analytic model, at least one sensor node will die after each network stage. Since the location of the dead nodes can be determined by Algorithm 1, we can check if the dead sensor nodes form a continuous dead ring with the width d and $d \geq r$ after every network stage. The network might be partitioned by the continuous dead ring, which is precisely the energy hole of the network. Demonstrate show to decide the emerging time and boundary of the energy hole.

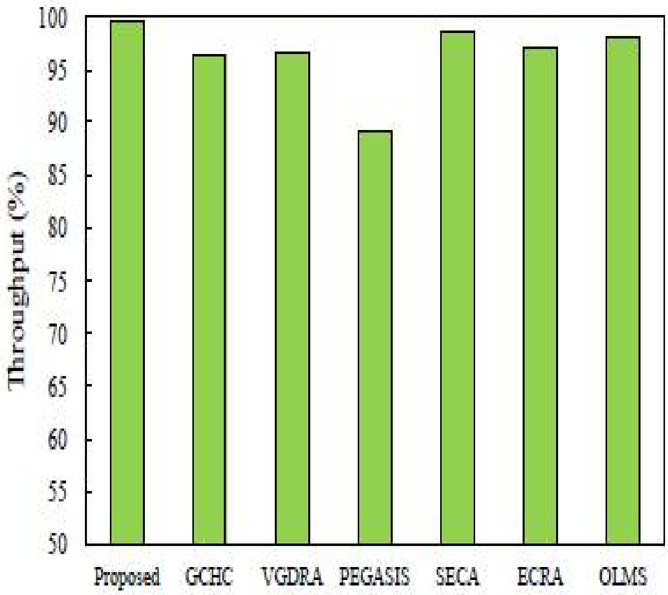

Fig 2.Throuhput

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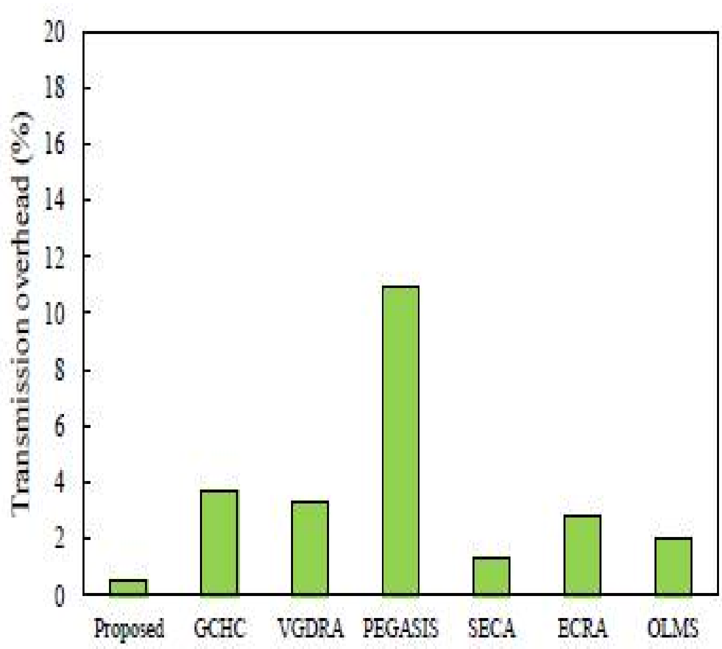

Fig 3.Transmission Overhead

V.RESULTS

In fig.4 and 5 some sensor node, mobile sink and cluster head are available. Blue color indicate sensor node, red color indicate mobile sink. Sensor node collects the information and pass through the mobile sink. As communication increases then battery capacity of sensor node is reduce and as a result dead node are created.

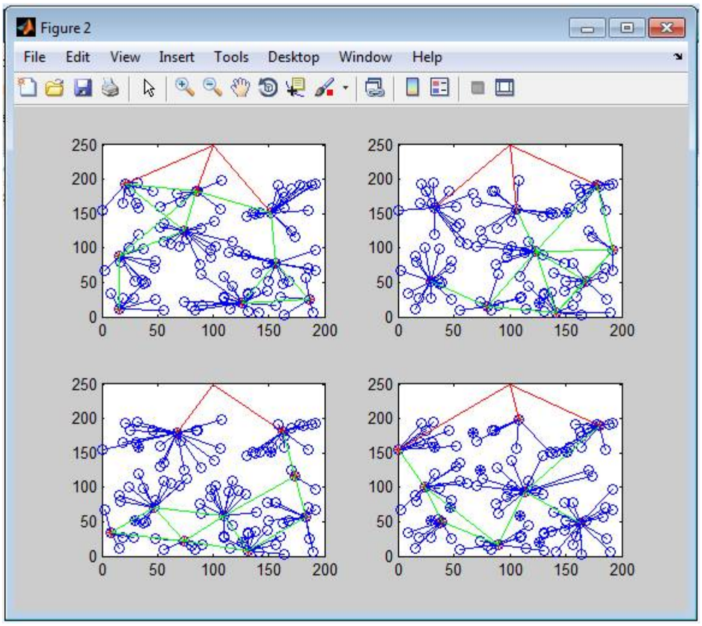

Fig 4.Simulation Setup 1

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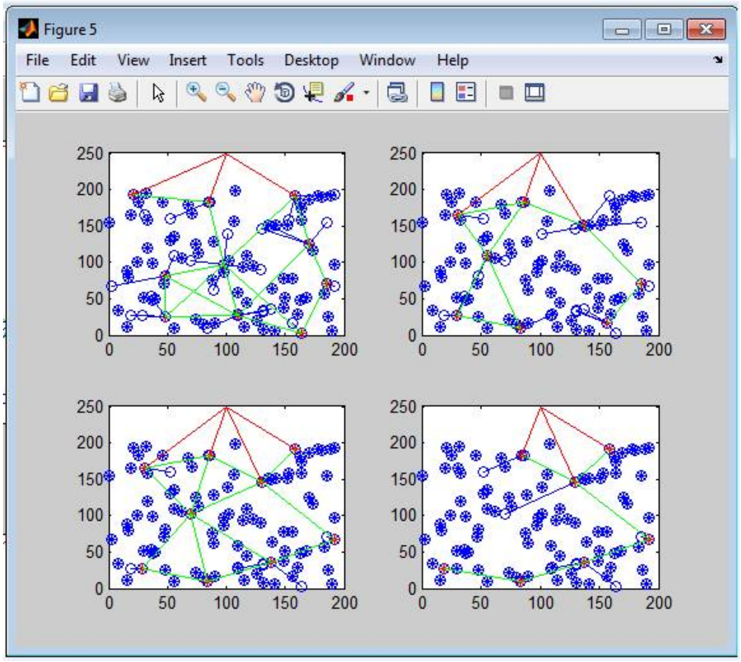

Fig 5.Simulation Setup 2

VI.CONCLUSION

In this paper, an efficient tree-based power saving scheme is proposed to reduce the data transmission distances of the sensor nodes so that a significant. The important goal of this scheme is to reduce the data transmission distances of the sensor nodes by employing the tree structure and multi-hop concepts. Based on the location of mobile sink, the distances between the sensor nodes, and the residual energy of each sensor node, the proposed scheme makes an efficient decision for creating the routing structure. The energy consumption is reduced and the lifetime is extended for the sensor nodes by balancing the network load. The simulation of the system shows that the consumption of energy is reduced the system is efficient.

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