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Enhancing Network Lifetime Maximization by Efficient Routing Protocol in Wireless Sensor Network

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Abstract **--Traffic patterns in wireless sensor networks (WSNs) generally follow a many-to-one model. This paper presents how to balance power consumption and maintaining the networks lifetime for sensor network. The proposed system focus the influence of multiple mobile sink nodes on power consumption and network lifetime, and mainly focus on the selection of movable sink node number moreover the selection of parking positions, as fine as their impact on performance metrics above. For the lifetime maximization of the network is improved with the help of Ant Colony Optimization algorithm at the same time as well as Short cut tree routing algorithms are used. Without referring the router table information data could be forwarded through the shortest path. And the verification process of the data could be achieved by Short cut tree routing algorithm. By using the proposed algorithm the lifetime of the network could be increased**

Keywords -- Wireless Sensor Network, Energy Conservation Scheme, Mobility, Controlled Mobility.

I. Introduction

Wireless sensor networks (WSNs) must existed proposed as observation of events and environments over a huge number of slight and guileless sensor devices to connect over short range Wireless interfaces to deliver observations over multiple hops to significant sites [1]. WSNs are measured for several critical application scenarios including battlefield opinion, region observation, circulation observation, and security applications. Sensor nodes and hence these applications, are topic to limits such as inadequate processing, storage, communication capabilities and limited power supplies.

One of the pronounced visions of wireless sensor network (WSN) research is the idea of a ubiquitous and seamless boundary between the physical and online domains. WSN research aims to soak our surroundings with small, cheap, multi-functional nodes that can intelligence, development and communicate [2]. Usually, the base station is much more powerful in terms of properties than the sensor nodes. Sensor node is a minor method that includes four basic components: a data sensing unit, a processing part, a wireless communication element and an energy unit.

The sensor node is equipped with low-power batteries suitable for its small dimensions, which bounds the aptitude of the sensor node in terms of development, storage and communication [3]. Wireless Sensor Networks (WSNs) have captured the attention of researchers completed the past period because of the various applications they maintenance and the springiness of network deployment options they provide. These advantages, along with the extraordinary developments in sensor technology, finished WSNs a viable option for many tracking and monitoring requests [1-5] even in mission-critical circumstances such as battlefield troops' deployment, and exploration and rescue operations. In such applications, sensors nodes container collaboratively display the network environment and report real-time data about the supervised phenomenon. Using device nodes with multimedia abilities such as video cameras improves the understanding of the coverage area.

II. Related Work

In Wireless Sensor Networks, motionless sinks forms the central locations where the communication to different nodes are determined. As a result of this concentration, the sensor nodes at the vicinity of the sink lose energy, leading to disentanglement of the sink from the network. The primary aim of MBS-based solutions is to move the sink in the network so that the energy expenditure is distributed consistently to all the sensor nodes.

2.1.1 Base Station Relocation

In this proposed scheme [2], the main intention is to move the MBS along the periphery of the sensing field, such that the energy utilization is equally distributed among the sensor nodes and the overall energy consumption is minimized. To put into practice this scheme, time is divided into rounds when the MBSs are motionless. At the end of every round, the location of the MBS is recomputed by means of inductive logic programming (ILP) methods reduce an objective function. The two intention functions explained in [2] states the total energy disbursement of all the sensor nodes in the set of connections and maximum energy consumption of any sensor node in the next surrounding. According to the reproduction results, the first purpose function results in more data composed in the entire network natural life, while, the second independent function shows a extended network lifetime, which is defined as the time until the primary node dies.

2.1.2 Cooperative Mobility and Routing

This proposal [3] is motivated by the not smooth energy consumption by the antenna nodes in the Wireless Sensor Networks with motionless sinks. The load complementary of the sensor nodes [3] becomes essential to share out the energy expenditure among the nodes in the network. It is exposed that the network lifespan is improved significantly by alternate motionless sinks with mobile sinks and it is further shown in [3] that the most favorable association of the sinks is to follow the trajectory where the consumption area is spherical. Finally, a heuristic explanation for joint mobility and routing is obtainable where it is states that, the MBS with change laterally a round route and the sensor nodes exchange a few words with the MBS by the as the crow flies paths to reduce the energy consumption in central parts of the network. Nodes exterior the MBS route use tracks composed of round arcs followed by as the crow flies lines directed in the direction of the route midpoint to extent the MBS. The remaining energy of the external nodes is utilized or else not used for this approach.

2.1.3 Move and Sojourn

Examination for protracted network lifetime is also discussed in [4]. The study planned a outline by seeing the location of sensor nodes then MBSs in grids. Interruptions related with MBS activities are assumed to be negligible. The strength of mind of the break times of the MBS is considered by the assistance of in linear programming (LP) methods. The LP solution makes the most of network lifetime subject to balanced energy utilization constraints. It is proved from side to side simulations that the use of MBSs maximizes network lifetime than motionless sinks and also it is observed that maximum lifetime solutions are achieved by non-uniform sojourn time distributions in the middle of grid points depending on the shape of the consumption area.

2.1.4 Statistics Mules

In its first overview [6], the MDC is denoted towards as Data Mules. In this proposal, the sensor node supplies the data till an MDC resourcefully move toward the nodes and bring together the data from the node through direct communication range. Mount up data is then reassigning to a wireless access point. The presentation of Data Mules proposal is evaluated by a Markov model built on a two-dimensional arbitrary walk mode for Mules, and the effect of shock absorber sizes, number of access position, and number of Mules on data loss rate is examined. The message transport delay is not upper-bounded as the route of MDC's in [6]is

2.1.5 Predictable Data Collection

This proposal is given in [7], where it is specified that the data after the sensors is composed by the vehicles that passes nearby. Sensors are assumed to distinguish the route of the MDCs and the sensors can calculate the time of data transfer. Underpinning on the predicted data transmission time, the sensors develop energetic at the time of data transfer, otherwise it sleeps until the time of data relocate arrives to save its energy. A wait your twist model is utilized in [7] to accurately model the data collection process. Using this queuing model, the achievement rate of power utilization and data collection are investigated and it is found that by implementing conventional MDC can save power in Wireless Sensor Networks.

III. OUR APPROACH

An energy-efficient ant-based routing algorithm (EEABR) was presented in which forward ants and backward ants are well-defined, and the ant selects a path permitting to the actual energy level of nodes and the distance traveled through the forward ant. Constructed on ACO, a dynamic and reliable routing protocol (DRRP) was proposed in which the ant picks a path giving to the energy level of the nodes and the total number of nodes visited by the ant. In an ACO routing algorithm named ASW was presented to decrease energy depletion. In this routing algorithm, the distance to the sink and the energy depletion of the route are used to choice paths by the ant. Another energy-aware ant colony algorithm (EAACA) was planned to lengthen the network lifetime.

Ant Colony Optimization

The Ant Colony Optimization algorithm is inspired after the food systematic performance of ants. Once ants are in search of their food, they guarantee the pheromone on the technique which sorts route for them. This pheromone is nobody but the liquid which disappears as period passes. So the pheromone attention on the route is nothing but suggestion of probability usage of the route [7]. In arrears to its energetic and probabilistic environment, this procedure is used for mobile ad-hoc networks where topology changes frequently. The mechanisms aimed at finding shortest path by an ant colony are exposed in Fig.3. (A) Ants in a pheromone track between shell and foodstuff. (B). An problem disturbs the trail. (C). Ants invention two paths to go round the problem. (D). A original pheromone path is designed laterally the shorter path. In this procedure innovative ways(shortest) are produced by using two fake ants, forward ant (Fant) packet and backward a(Bant) packet, which creates the pheromone path to basis node then sink node respectively.

IV. RESULTS BAND DISCUSSION

The assortment of the cluster by the nodes and the attributes for the selection of cluster head is very important and a hot topic among the researchers.

There are dissimilar factors for clustering technique. The important features that make a payment towards the arrangement of a clustering technique comprise the Network model, Clustering objectives and Clustering attributes.

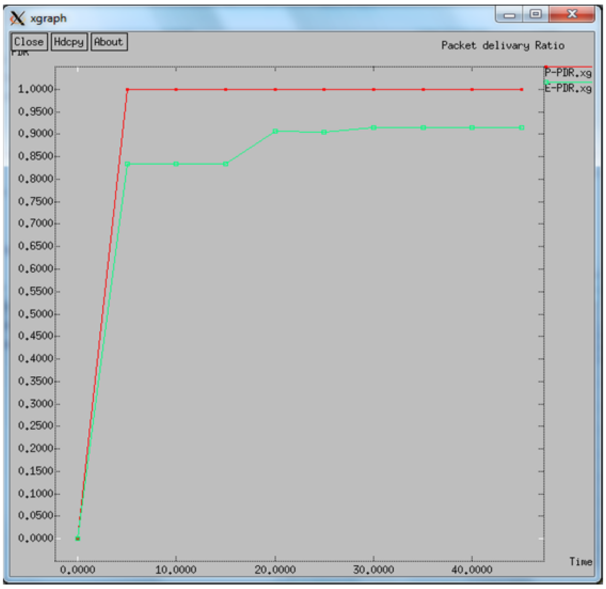

Fig 1. Packet Delivery ratio

Fig 1 shows that the packet delivery ratio from the given network with the sensor nodes. Ant colony optimization ACO due to its distributed nature becomes alternate to GA, in order to conclude the most favorable route it requirements that the base station already has the essential information. For fusion process neural networks are well suited for the reason that neural networks can be taught and vigorously adapt to the changing scenarios Reinforcement learning is fully disseminated and it can adapt quickly to network topology change or any node breakdown. It has been used professionally for finding the optimal path for aggregation. GAF based disseminated approach using sleep state control numbers and subjective standard operators to carry out power efficient flooding-based aggregation has also been proposed and the system outperforms the previous results. In wireless sensor networks many situations demand cumulative data at a middle node e.g. monitoring events.

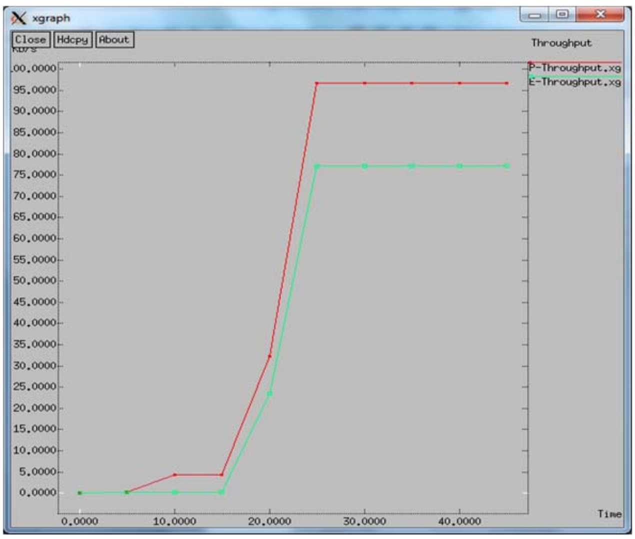

Fig. 2 Throughput of the WSN

Fig 2 shows that the throughput of the network by using ant colony optimization. For instance, if a barrier blocks part of the trajectory and holds-up the movable sink from moving on, the main idea of our explanation is to make a cross-over. Once the mobile sink discovers the chunk ahead, it will soon scan from left to right and choose a direction with no barricade. A mobile sink moves on with beforehand stated method, though in every surrounding the selected direction be supposed to with the priority of moving back to the original trajectory. In the intervening time, the position of the mobile sink should be rationalized to every sensor node.

V. Conclusion

In this article, the problem of network longevity maximization is investigated in WSNs, and an optimal distance based transmission strategy is proposed on the basis of ACO. Some proactive measures have been taken in this transmission strategy, in which an optimal transmission distance acquirement mechanism is designed for both high energy efficiency and good energy balancing, and another optimal transmission-distance acquirement scheme is provided to achieve energy depletion minimization for nodes with maximal energy consumption throughout the network. Furthermore, simulations are used to validate the effectiveness and superiority of our findings.

VI. Future Enhancement

Future research of this work can be done in two directions. Firstly, it is assumed that all nodes are uniformly deployed within a specific area. It can be extended to networks with non uniform node deployment. Secondly, by consider that all nodes in the same corona have the same data distribution ratio. However, for sparse networks, improving our transmission strategy by allowing different nodes have different data distribution ratios is an interesting task.

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