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A SURVEY ON EFFICIENT DATA COLLECTION IN WIRELESS SENSOR NETWORKS

R. Yogeswari[1], V.Subathra[2]

PG Scholar, Dept. of CSE, Vivekanandha College of Engineering for Women, Namakkal, India[1]

Assistant Professor, Dept. of CSE, Vivekanandha College of Engineering for Women, Namakkal, India[2]

ABSTRACT: Wireless sensor networks (WSNs) have wide variety of applications and provide to many future. One of the most important applications is Sensor data collection. The sensor network collects the environment data from all sensor nodes periodically. In this paper used as the Time Division Multiple Access (TDMA) concept. The TDMA concept is used to efficiently collecting sensor data for any traffic patterns. There by reducing the latency of data collections. Our proposed schedule improves the energy efficiency and time efficiency of sensor data collection. In this method is used as the Traffic Patterns Oblivious algorithm (TPO). To develop a mathematical models to analysis the performance of the proposed schedule.

Keywords: WSN, TIGRA, convergecast scheduling, Approximate Data Collection, Fair Data Collection Scheme, Delay-Aware.

I. INTRODUCTION

Wireless Sensor networks (WSNs) have wide variety of applications and provide to many future. WSN defined as the spatially distributed autonomous sensors to monitor physical or environmental conditions. Energy efficiency and time efficiency are two major considerations for sensor data collection in wireless sensor networks. TDMA schedule to conserve energy at sensor nodes and reduce the latency of data collection as much as possible for any traffic pattern. Time is divided into slots and the duration of a time slot allows a sensor node to transmit one packet.

II. LITERATURE SURVEY

A. TIGRA: Timely Sensor Data Collection Using Distributed Graph Coloring:

The nature of many sensor applications as well as continuously changing sensor data often imposes real-time requirements on wireless sensor network protocols. Our objective is to design a protocol for sensor applications that require periodic collection of raw data reports from the entire network in a timely manner. Latency in packet delivery is caused by the low transmission rates of the sensor devices, packet loss and corruption due to the link and node failures, packet collisions, and network congestion.

Technique

a) Traditional graph coloring algorithm

There are used in two steps used in this algorithm. First, interference constraints must be satisfied while maximizing spatial channel reuse. Second, multihop communication creates unique precedence constraints. Third, to be minimized during both the transmission scheduling stage and the data collection stage. The traditional graph coloring algorithm is used to node being able to send a message to and receive a response from all its neighbours during each communication round.

Advantages

- TIGRA eliminates packet collisions is one of the advantage.
- It also reduces the network congestion in the networks.

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Disadvantages

- Each node generates a fixed amount of data to transport to the base station.
- These schedules are either inapplicable to or inefficient in dealing with dynamic traffic patterns.

B. Distributed MinimalTime Convergecast Scheduling for Small or Sparse Data Sources:

There are the two situation used in this paper: First is the length of the packets generated by nodes is much smaller than the maximum length of a data frame that can be transmitted in one time slot. Second is every node in the network has data to transmit and for those that have, may have lots of data that require more than one packet. Nature of convergecast leads to high probability of collision and data loss in the network. The paper is used as the CSMA MAC layers. Particularly when one adopts contention-based MAC protocols like CSMA for its simplicity and low overhead.

Technique

a) *Distributed convergecast scheduling algorithm*

The algorithm is significantly decreases the number of time slots required for converge-cast in linear and mesh networks. The proposed algorithm is applicable even when nodes have multiple packets to be sent to the base station.

Advantage

- The advantage of the scheduling is produces optimal or near optimal time for data collection and guarantees to be collision-free.

Disadvantages

- It has the high cost of initialization.
- Adaptive to permanent node failures during converge cast.

C. Adaptive Approximate Data Collection for Wireless Sensor Networks:

Our data collection approach ADC (Approximate Data Collection) is to divide a sensor network into clusters, discover local data correlations on each cluster head, and perform global approximate data collection on the sink node according to model parameters uploaded by cluster heads. Prove rated error-bounds of data collection using this model. Approximate data collection is a long-term data collection in WSNs with constrained bandwidth.

Techniques

a) *Greedy heuristic algorithm* to find an approximate solution.
b) *Monitoring algorithm* to adaptively adjust the composition of node subsets according to changes of sensor.

Advantages

- It can be reduces communication cost of data collection with guaranteed error bounds.
- Packet delivery ratio can be greatly increased by reducing the data traffic within a sensor network.

Disadvantages

- Packet losses due to the limited bandwidth of sensor nodes.
- Communication traffic and potentially results in network congestions.

D. Fair Data Collection Scheme in Wireless Sensor Networks

This Fair Data Collection Scheme is used to solve the slow congestion detection and rate convergence problems. A new solution is adjusts the rate of sending data of a node by monitoring the channel utilization rate. The probability selection method is used in ISWF to achieve the fairness of channel bandwidth utilization. There are three fair data collection scheme are used.

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Techniques

a) *Congestion detection* To detect congestion in time, a new detection method that combines queue length with traffic changes of node.
b) *Rate control* to reducing the rate of the congested node generating data. Improve the rate of the congested node sending data.
c) *Fairness realization* To the achieves the fairness by the means of probability selection . Probability selection means that a node sends the locally collected data or the forwarded data to its parent node by different probability.

Advantages

- Congestion will reduce the throughput of WSN.
- Reducing the rate of the congested node.

Disadvantage

- Increase the delay of the data transmission.

E. A Delay-Aware Network Structure in wireless sensor networks with Data Collection Process

Wireless sensor networks (WSNs) utilize large numbers of wireless sensor nodes to perform close-range sensing data. It uses the many to one network structure. the number of DCPs completed in a given period of time is important for reconstructing an accurate data.

Technique

a) Multistage network formation algorithm

In the multistage network formation algorithm is based on the dynamic programming. To construct the proposed network structure while keeping communication distances among sensor nodes at low values.

Advantages

- Reduce energy consumption of the whole network.
- Improvements on data collection rates.

Disadvantage

- Without increasing data collection durations.

F. Adaptive Data Collection Strategies For Lifetime-Constrains

Communication is a primary source of energy consumption in wireless sensor networks.
This paper is data collection strategies in life time constrained in wireless sensor network. Our objective is to maximize the accuracy of data collection. It is used to optimal update strategy and develops adaptive update strategy for both individual and aggregate data collection. Many sensor networks are deployed to operate for a designated time period called network lifetime. The lifetime-constrained data collection problem in sensor networks.

Technique

a) *Offline algorithm* is developed to compute the optimal data update strategy. An algorithm to allocate the numbers of updates.

Advantage

- Increase the network life time.

Disadvantages

- The data update rate decreases.
- Doesn't chances of adjustment.

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G. Energy-Efficient Wake-Up Scheduling for Data Collection and Aggregation

The time-slot assignment problem is to avoid interference. TDMA-based wake-up scheduling can provide both energy-efficient and conflict free channel access. TDMA-based scheduling algorithms that minimize the number of time slots or the message delay are proved NP-complete. Approximate algorithms have been therefore proposed, including both link scheduling and broadcast scheduling.

Technique

a) TDMA MAC layer protocol

The sensor nodes with the consecutive time slots at different radio state while reducing the number of state transitions. To prove that the energy consumption by our scheduling algorithm for homogeneous network.

Advantage

- Reduce energy consumption.

III. CONCLUSION AND FUTURE WORK

In this paper provides the data collection in wireless sensor network. The sensor network collects environment data from all sensor nodes periodically. We have used graph coloring algorithm, distributed cover cast, greedy, monitoring algorithm and multistage network formation algorithm in this paper. To overcome the existing drawbacks I have used fault tolerant scheduling algorithm. Mainly this algorithm is used for efficiently data collection with dynamic traffic patterns.

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