International Journal of Technical Research and Applications e-ISSN: 2320-8163,
www.ijtra.com Volume 3, Issue 1 (Jan-Feb 2015), PP. 41-43

A LITERATURE SURVEY OF IN-NETWORK AGGREGATION FOR EFFICIENT PACKET DELIVERY IN LOSSY WIRELESS SENSOR NETWORKS

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Abstract- This survey explains about the inference of wireless broadcast for lossy wireless sensor networks data aggregation. In which each sensor node sensing its physical environment and generates information finally sent those data to a special node called the sink through multi hop communications. By using the information gathered from spatially distributed sensor nodes the network system is to compute a function at the sink. Both collecting information and in-network computation at intermediate forwarding nodes can considerably increase network effectiveness through dropping the number of transmissions. On the other hand, this method also increases the single packet information capacity and makes the system vulnerable to packet loss. The proposed In network aggregation provides performance improvement of our solution over unicast architecture with retransmissions also this improvement should be depends on the transmission range as well as the reliability constraint.

Index Terms—Data aggregation, delay performance, lossy wireless networks.

I. INTRODUCTION

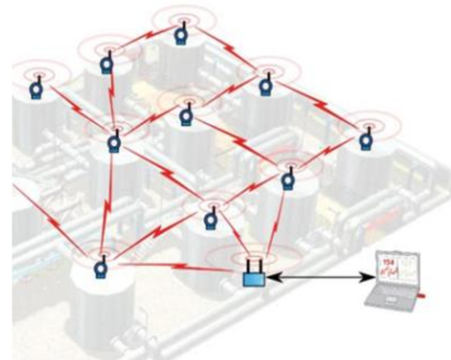
A. Network

The purpose of the Internet is to enable continues end-to-end information transfer. Information streams in such type of networks are carried across point-to-point links with intermediate nodes can simply forwarding data packets without any modification the payload of the packets.

B. Wireless Sensor Network

Wireless Sensor Networks contains a large number of sensor nodes .These nodes may having limited assets for energy, transmission power, network bandwidth, and computation power. This sensor node governs the physical environment from neighborhood nodes, and collects data from these nodes and then processes information. Sensor networks are not just data networks with sensors being the sources of data because the sensor networks are often developed and deployed for a particular application.The entire network operation is accordingly changed towards satisfying the application. In order to increase overall system efficiency, nodes will perform computations on data which is opposed to simply originating or forwarding information. WSNs (Wireless Sensor Networks in English) are spontaneous networks consist of nodes deployed in large numbers to collect and transmit data to one or more collection points, and this independently.

The sensor nodes usually have the network components of low computing power, memory and energy, access to the radio medium is the most expensive. And reduce this consumption (by reducing the number of packets flowing through the network) and prolong the lifetime of the network is an ongoing challenge for this type of network.



C. Lossy Wireless Sensor Networks

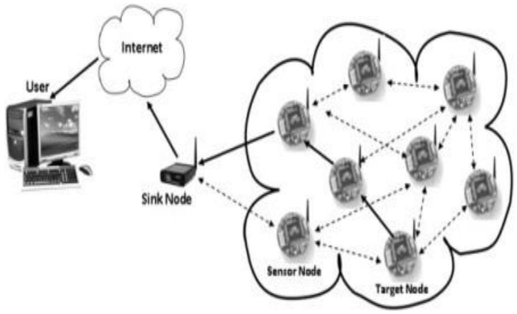
Wireless sensor networks (WSNs) must consistently transfer large amounts of data, this scheme is challenging because of the typical resource constraints of WSN devices. These may be deployed in undesirable circumstances where poor and highly variable link quality is caused by dynamic environmental factors such as heat, humidity, low-cost hardware and its concomitant failure or by obstacles and RF interference (accidental or malicious).To extract sensor data or to load new code in over-the-air reprogramming, huge data must be transmitted effectively in order to reduce wasted computation and communication. The loss-tolerance and efficiency problem are not sufficiently addressed by the state of the art.

D. Sensor Node

The main task of a sensor node in a network of wireless sensors is the detection process and transmits data. It can participate in a WSN as Sensing node or as a sink node

E. Sink

The aim of wireless sensor networks in many applications is to gather information from spatially distributed sensors and then compute a global function from that collected information at a special node called the sink node. The Multi hop communication is often used to transmit information transmitted from the source node to the sinks.



F. Data Aggregate Function

In contrast, the purpose of a sensor network is to provide users access to the information on data gathered from spatially distributed sensors. In most of the applications, users require only certain aggregate functions of this distributed data. Example of data aggregation function is the average temperature in a network of temperature sensors. This function should be computed under the end to-end information flow paradigm by communicating all the relevant data to a central collector node.

The objective of this proposed scheme is

- The delay performance of in-network computation get decreased.
- Reliability in lossy wireless networks get increased.
- The efficiency of wireless broadcast on the delay performance gets increased.
- The motivation behind the In Network Computation is to elucidate how a wireless sensor network to efficiently perform distributed computation.

II. EXISTING SYSTEM

In 1998 R. G. Gallager, worked on "Finding parity in a simple broadcast network" [1]. In this paper each Wireless Sensor Network nodes switches between a binary state "0" for inactive and "1" active stage. The proposed method constructs a distributed algorithm to find the parity of the set of states with some given reliability.

Advantages

- All the node gather information from a single node can be accomplished by more communication.

In 2003 J. Zhao, R. Govindan, and D. Estrin, worked on, "Computing aggregates for monitoring wireless sensor networks" [2]. This scheme computes a global function with a certain fault tolerance, in the distributed setting. This paper mainly deals with divisible functions. This function should cover the main body of interest for wireless applications.

Advantages

- Communication complexity is Efficient.

In 2005 N. Khude, A. Kumar, and A. Karnik, worked on "Time and energy complexity of distributed computation in wireless sensor networks" [3]. This paper calculate a scaling laws for the time and energy complexity of the distributed function computation over random wireless networks based on the assumption of centralized contention-free scheduling of packet transmissions.

A**dvantages**

- Captures the correct scaling.

In 2005 A. Giridhar and P. R. Kumar, worked on "Computing and communicating functions over sensor networks," [4]. This paper performs computation of MAX factor in a structure-free random multi hop wireless network. If the nodes does not know their relative or absolute locations they can use the Aloha MAC protocol which is a constant factor required by the best coordinated protocol.

Advantages

- A minimum hop distance from the sink is used.

In 2005 J.-Y. Chen, G. Pandurangan, and D.Xu , worked on "Robust computation of aggregates in wireless sensor networks: Distributed randomized algorithms and analysis," [5]. A he numbers of low-power wireless devices contained in a Wireless sensor networks. The unattended nature of WSN needs a monitoring infrastructure which indicates system failures and resource reduction. This paper briefly describes architecture for sensor network monitoring and continuously computes aggregates like sum, average, count of network properties (loss rates, energy levels, packet counts).

Advantages

- Enables energy efficient computation.

In 2006 A. Giridhar and P. R. Kumar, worked on "Toward a theory of in-network computation in wireless sensor networks" [6].this paper proposes a theory of in-network computation, which aims to clarify how a wireless sensor network should efficiently perform distributed Computation.

Advantages

- Computation at nodes is reliable.

In 2007 L. Ying, R. Srikant, and G. Dullerud, worked on "Distributed symmetric function computation in noisy wireless sensor networks" [7] , This paper explains a wireless sensor network with n sensors where each sensor having a recorded bit either "zero(0)" or "one(1)". In order to compute a symmetric function of the bits the network has a special node called fusion center.This function calculates the number of sensors that have a state "1." The sensors transmit information to the fusion center in a multi-hop fashion to enable the function computation.

Advantages

- Minimize the total transmission energy used by the network when computing this function.

A. PROBLEM STATEMENT

- Performing distributed computations at intermediate nodes is a major challenge[8].
- The information contained in a single packet is highly intensified after several in-network computations so a packet loss will occur so the computation result can significantly reduced so

higher level of protection is required for each packet transmission[7].

- A packet can be protected by error correcting code (EEC) or can be restored by retransmitting the lost packet. In either case a additional delay is unavoidable [9].
- In efficient solution in large sensor networks severely constraints energy, memory or bandwidth [2] [5].
- Lot of networking issues will created because nodes not only originate and forward data, but may also have to perform operations on data received from different sources at different times[6].
- Transmission rate is mostly used rather than a transmission probability [4].
- Communication may prone to errors [1].

III. PROPOSED SYSTEM

In this paper, we focus on the delay performance of in-network aggregation in lossy wireless network. In Distributed network aggregation can improve the communication efficiency of the system. The global function can be calculated by an intermediate node.

A sensor node can collect information from a subset of sensors and aggregate it by performing computations with partial information. Compared to previous end-to-end information delivery paradigms, in which intermediate nodes simply relay the received information without change, distributed in-network computation can result in significant performance improvements in energy use, memory treatment, bandwidth and delay.

Advantages

- Scaling law result clarifies the relationship between delay performance, reliability and transmission range.
- Aggregate functions with relatively simple structure such as symmetric functions are somewhat easier to handle.
- The proposed hybrid scheme that combines the unicast and multicast architecture.
- Aggregation with broadcast outperforms aggregation with unicast especially in severely lossy network environments.
- Computing the global function in a timely and reliable manner, limiting the amount of additional delay.
- Support for aggregate queries in sensor networks

Table 1:-Comparative Study on Existing vs. Proposed System

SNO	METHOD	EXISTING	PROPOSED
1	**Technique**	Network Aggregation[2010]	InNetwork Aggregation
2	**Reliability**	Low[2009]	High
3	**Transmission**	Either unicast or multicast[2007]	Hybrid(Both Unicast and Multicast)
4	**Delay**	High[2011]	Low
5	**Information Delivery Type**	End to End manner[2006]	distributed in-network computation manner

IV. CONCLUSION

In this paper, we use wireless broadcast as a means of protecting the aggregate information for a class of generalized maximum functions. Exploiting the diversity of wireless medium, broadcasting spreads information spatially, and the properties of the function enable distributed in-network computation with the spread information. We show that aggregation with broadcast can improve delay performance while satisfying the same level of reliability. The gain can be presented as a function of reliability constraint and transmission range.

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