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Sink Mobility for Data Gathering and Reporting Protocol for Wireless Sensor Networks

Mrs. M.Kavitha [1], C.Mahesh Sathya [2]
Assistant Professor [1], Mphil Research scholar [2]
Department Of Computer Science,
Tiruppur Kumaran College For Women,Tirupur
Tamil Nadu, India.

ABSTRACT

In large-scale Wireless sensor networks (WSNs), coverage data sinks mobility for gathering has drawn substantial interest in recent years. Current researchers either focus on planning a mobile sink's moving trajectory in advance to achieve optimized network performance, or target at gathering a small portion of sensed data in the network. In Many application scenarios, a mobile sink cannot move freely in the deployed area. To avoid constant sink location update traffics when a sink's future locations cannot be scheduled in advance, we purpose two energy efficient data gathering protocols, Mobile sink and Mobile sink-S, for mobile-sink based data collection. The proposed protocols feature low-complexity and reduced control overheads. Two unique aspects distinguish our approach from previous ones: 1) We allow sufficient flexibility in the movement of mobile sinks to dynamically adapt to various changes.2) Without requirements of GPS devices or predefined landmarks, Mobile sink establishes a logical coordinate system for routing and forwarding data packets for diverse application.

Keywords:- WSN, Mobile Sink, Data Gathering, Sink Trail, Data Reporting Protocol.

I. INTRODUCTION

Wireless Sensor Networks (WSNs), have enable a wide spectrum of application through networks a low cost low-power sensor node e.g., habitat monitoring, precision agriculture and forest fire detection. In these applications, the sensor network will operate under few human Interventions the because of hostile environment or high management complexity for manual maintenance. Since sensor nodes have limited battery life, energy saving of paramount importance in design of sensor network protocols.

Recent research on the data collection revels that, rather than reporting data through along, multi-hop, and error prone routes use to a static sink using tree or network structure, allowing and leveraging sink mobility is more promising for energy efficient data gathering. Mobile sink such as animals or vehicles equipped with radio devices, are send into a field and communicate directly with sensor nodes, resulting in the shorter data transmission paths and reduced energy consumption.

Data gathering Mobile sink introduces new challenges to sensor network application. To better benefit from the sink mobility, many research efforts have been focused on studying or scheduling movement patterns of mobile sink to visit some special places in a deployed area, in order to minimize the data gathering time. Mobile data gathering have been proposed to achieve efficient data collection via controlled sink mobility.

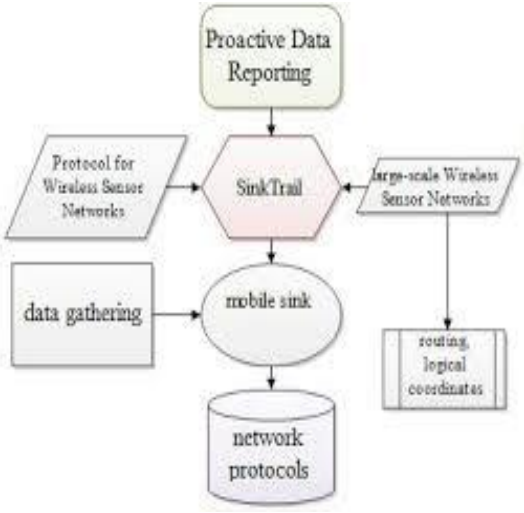

Fig 1: Mobile sink using Data reporting protocol for Wireless sensor Networks

Modules Description

- Protocol design

- Network maintains routing
- Destination identification
- Mobile sink protocol
- Patterns of a mobile sink
- Broadcasting frequency

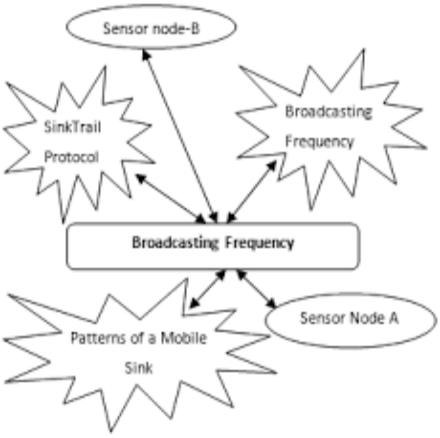

Fig 2: Modules Description

Objective of the Project

The objective of project is that when there is more than one sink in a network, each mobile sink broadcast trail message following algorithm different from one sink scenario, a sender ID field, message ID, is added to each trail message to distinguish them from different senders.

Algorithms executed on the sensor node side should be modified to accommodate multi sink scenario as well. Instead of using only one trail reference, a sensor node maintains multiple trail references that each corresponds to a different mobile sink at the same time.

Salient feature of the project

- The results and demonstrates the advantages of Mobile sink algorithms over previous approaches. The impact of several design factors of mobile sink investigated and analyzed.
- The logical coordinate of a mobile sink keeps invariant at each trail point, given the continuous update of trail references.
- We compare the overall energy consumption of Mobile sink with these protocols. Simulation results for Sink Trail-S are also presented to show further improved performance.
- Easy to implement.

II. BACK GROUND STUDY

Existing system

Exist on data collection reveals that, rather than reporting data through long, multi hop, and error prone routes to a static sink using tree or network structure, allowing and leveraging sink mobility is more promising for energy efficient data gathering.

Drawbacks:

- The protocols have been proposed to achieve efficient data collection via controlled sink mobility determent an optimal moving trajectory for a mobile sink is itself an NP-hard problem , and may not be able to adapt to constrained access areas and changing field situations.
- A Data gathering protocol using mobile sinks suggests that a mobile sink announce its location information frequency throughout the network.

Proposed system

The proposed Sink trail protocol extended to multi sink scenario can be readily with small modifications. When there is more than one sink in a network, each mobile sink broadcasts trail messages following algorithm 1. Different from one sink scenario, a sender ID field, message ID, is added to each trail message to distinguish them from different senders.

Advantages:

- The results and demonstrates the advantages of sink trail algorithms over previous approaches.
- One advantages of sink trail is that the logical coordinate of a mobile sink keeps invariant at each trail point, given the continuous update of trail references.
- Incorporating sink location tracking, we compare the overall energy consumption of sink trail with these protocols. Simulation results for Sink trail-s are also presented to show further improved performance.

III. SINK MOBILITY FUNDAMENTAL DESIGN CONCEPT

There are several software design concept that evolved over the past three decades. Depending upon the interest of the programmer involved in a project the design process varies. The above all provides a developer with a foundation from which more sophisticated design methods can be applied, because there is a lot of differences in a program that is working and getting it right. It depends upon the

- Abstraction
- Refinement
- Modularity

Sink -Trail Design Process

A project consists of various designs like input design, output design, code design, and database design. These contain the details about the various type of designs used by the programmer.

Input Design

Input design is a process of converting a user-oriented description of inputs to a computer-based program-oriented specification.

Objective during the input design is as follows

- Collection of data its source
- Conversion of data into computer acceptable from
- Verification of converted data
- Checking data for its accuracy
- Warning message for wrong entries

The Different types of input data handled by the system are

- External
- Internal
- The Home page

Output Design

The output design defines the output required and the format in which it is to be produced.

The Objectives of the output design are as follows

- Design output to serve the indented purpose.
- Design output to fit user.
- Deliver the appropriate quantity of output.
- Provide output on time.

Code Design

The process of code is to facilitate the identification and retrieval of item of information. Characteristics were also considered while designing the code

- Uniqueness
- Versatility
- Stability
- Simplicity
- Consciousness

Database Design

This is a very important design in every phase. Because all the data that we're giving as input is stored in database directly. So the design that must be made must be very efficient and it must be very secure one for very confidential data.

IV METHODOLOGY

Implementation is last stage of the project, when the theoretical design is turned into a working system. At this stage the main workload, the greatest upheaval and major. Impact on existing practices shift to user department. If the implementation stage is not carefully, planned and controlled it can cause chaos. Thus it cannot be considered to be the more crucial stage in achieving a successful new stage and in giving the user confidence that the system will work and be effective.

The implementation stage involves careful planning, investigation of the current system and its constraints on implementation, design of methods to achieve the change our procedure and evaluation of change over methods.

System Testing

System testing and implementation is actually a series of different tests whose primary objective is to fully exercise the computed-based system. Each test is having its own purpose, and all work should verify that all system elements have been properly integrated and perform allocated functions. This

help us to rectify a problem if occurs in our project. This help us to do various testing depending upon the project such as security testing, validation testing, integration testing, unit testing etc...

The Testing Steps

By verifying the system one can verify the proper function of the system. The primary purpose is to fully exercise the computer based system. The types of some tests are 6 steps

- White Box Testing
- Black Box Testing
- Comparison Testing
- Security Testing
- Unit Testing
- Validation Testing

Quality Assurance

- Generic risks
- Security techniques and policies

Generic risks

Risk depends upon the nature of the project and it affects the particular entity. It is a type that is removed from critical path activities. Depending on the nature of risk there are several types. Some activities are very difficult when compared to others and we've to estimate the entire cost or the time span of the project to predict with a similar degree of accuracy.

Security techniques and policies

The system security problem can be divided into four related issues: security, integrity, privacy and confidentiality. They determine file structure, data structure and access procedures.

Privacy defines the rights of the users or organizations to determine what information they are willing to share with or accept from others. The term confidentiality is a special status given to sensitive information in a database to minimize the possible invasion of privacy.

Operational Documentation

Documentation means of communication; it establishes design and performance criteria for phases of the project. Documentation is descriptive information that portrays the use and/or operation of the system.

V. EXPERIMENTAL RESULTS & SYSTEM MAINTENANCE

The most commonly used implementation methods are pilot and parallel.

Pilot

Processing the current data by one user at a time called the pilot running process.

Parallel

Processing the current data by more than one user at a time simultaneously is said to be parallel running.

User Training

User Training is designed to prepare the user for testing & converting the system. There are several ways to train the user. They are

- User Manual
- Help Screens
- Training Demonstration.

System Maintenance

The maintenance of an existing software in a concern increase over year. The maintenance is very important because all the effort we had done will be maintained correctly then only the system will be good performance for ever and it has some certain characteristics. They are:

- Certain activities are required to maintain the phase
- Costs associated with that phase
- Problems that are frequently encountered when software maintenance is undertaken.

Maintenance is essentially needed because of the reason; it is web based application software. Our software is designed to improve future maintainability and reliability.

VI. CONCLUSION

We presented the sink trail and its improved version, Sink trail-s protocol, two low-complexity, data reporting protocols for energy-efficient data gathering. Sink trail uses logical coordinates to infer distance, and establishes data reporting routes by greedily selecting the shortest path to the destination reference. It process desired features of geographical routing without requiring GPS devices or extra landmarks installed. Sink trail is capable of adapting to various sensor field and different moving patterns of mobile sink. The result demonstrate that sink trail finds short data reporting routes and effectively reduces energy consumption. The Sink trail protocol can be further integrated with the Green Seeker system to enable large-scale multi hop sensing on demand and automate spray systems for optimal fertilizer and irrigation management.

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