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Efficient Mobile Data Gathering in WSN based on Hora algorithm

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Abstract

The proliferation of the implementation for low-cost, low-power, multifunctional sensors has made wireless sensor networks (WSNs) a prominent data collection paradigm for extracting local measures of Data. Large amount of Data has been collected in Wireless Sensor Networks. In order to organize it, the sensors are made into clusters. A corresponding cluster head have been allocated for the communication to the other cluster members. Then finally, data is sent to the Base Station or the Data sink. In the existing systems, Data latency is find out as a major issue and also the loss of data is another issueand also that the existing systems send the data in 80 MHz spectrum range To overcome this, the proposed system uses the Task Scheduling algorithm, using this it finds out the coverage of the node and distance of the node easily, also the data have been send in 220 MHz spectrum range. Speed of the data is maintained throughout all the data transactions. Data has been maintained and controlled by the admin controller. If any data needed by the cluster members, it will report it to the cluster head. Then the corresponding cluster head, ask the information in the nearby cluster members, by that intra cluster communication is achieved. Also the existing system doesn't conserve the path of node to the Base Station. So the proposed system uses the Hole Repair Algorithm (Hora Algorithm) to find the shortest path between the corresponding data sending node to the Base Station. Also the Hora algorithm is very useful in repairing the nodes, if any of the nodes cause damaged, it will repair automatically.

Index terms: Task scheduling, Node coverage, Wireless sensor Networks, Data latency

1.Introduction

In Wireless Sensor Networks sensors are generally densely deployed and randomly scattered over a sensing field. After sensors form autonomous organizations, those sensors near the data sink typically deplete their batteries much faster than others due to more traffic. Local data aggregation reduces the collision and balances the load among sensors. The goal is to guarantee that every node is likely to collect the complete global information in a timely fashion. Due to these constraints, it is crucial to design an energy-efficient data collection scheme that consumes energy uniformly across the sensing field to achieve long network lifetime. Furthermore, as sensing data in some applications are time-sensitive, data collection may be required to be performed within a specified time frame.

2. Objectives

Cluster forming decides which cluster head should be associated within the cluster. The criteria can be described as, if a sensor with tentative status or being a cluster member, it would randomly affiliate itself with a cluster head among its candidate peers for load balance purpose. In the rare case that there is

no cluster head among the candidate peers of a sensor with tentative status, the sensor would claim itself and its current candidate peers as the cluster heads. Data has been transferred from the Sensor Layer to the Mobile Collector Layer. From this layer the data can be transferred to the Base Station by selecting the possible nodes using Hora algorithm (Hole Repair Algorithm). It finds the shortest distance to the base station and transfers the data at 220 MHz. So that the data can be send in a faster way and also its speed should be maintained. Using Task Scheduling method, we can check the corresponding node's coverage area. Also the Hora algorithm repairs each and every node, if an error is happened in the corresponding node.

3. Related Works

Literature survey is the most important step in software development process. Before developing the tool it is necessary to determine the time factor, economy n company strength. Once these things are satisfied, then next step is to determine which operating system and language can be used for developing the tool. Authors K. Xu, H. Hassanein, G. Takahara, and Q. Wang[1] exposed the concept of sensor networks which has been made viable by the convergence of micro electro-mechanical systems technology, wireless communications and digital electronics. It have enabled the development of low-cost, low-power, multifunctional sensor nodes, that are small in size and communicate over shorter distances. These are widely used in the military applications and sensor network applications. The drawback in this paper was it doesn't describe the protocol execution in terms of consecutive real time intervals and also its operating speed is very low. The authors O.Gnawali, R. Fonseca, K. Jamieson, D. Moss, and P. Levis[2] exposed the data path validation. Data traffic quickly discovers and fixes routing inconsistencies. It increases reliability, efficiency and robustness of the data. But the communication link may be failure at any time. The authors I. F. Akyildiz, W. Su, Y.Sankarasubramaniamand E. Cayirci[3] exposed the development of low-cost, low-power, multifunctional sensor nodes that are small in size and communicates in shorter distances.But the same problem has been occurred as in the previous paper, the node link can be failure at any time. Cheng-Fu Chou, Yung-Chun (Justin)Wan, William C. Cheng, LeanaGolubchik, Samir Khuller[4] imposed that moving a large amount of data from several source hosts to a destination host over a wide-area network. But the cost of message sending is very high. Miao Zhao, Yuanyuan Yang, and Cong Wang[5] exposed a concept that it can be worked for large data fields spread in a Wireless Sensor Networks but the multiple input, multiple output causes latency.

4. Proposed System

We proposed this work deals with efficient algorithms for assigning identifiers (IDs) to the nodes of a network in such a way that the IDs are anonymous using a distributed computation with central authority. A Central authority has been generated to maintain data. The nodes have the limited storage capacity. To avoid replication of data, copy of the data has been maintained in the central authority. If any data has been requested to the cluster head, the corresponding cluster asks data to the nearby cluster. So that the intra cluster aggregation has been obtained. If the data not presented in the nearby cluster, then the request is forwarded to the central authority. The central authority sends the respected data to the nodes. These all activities has been maintained under the Admin. Latency has been avoided by the transfer of data at 220 MHz. Using Hole Repair Algorithm (Hora Algorithm) data can be transferred to the corresponding base station in a shortest way. Also if any nodes get damaged, it can be easily rectified and maintained using the Hora Algorithm.

5. Module Descriptions

- Data Transferring and Reporting
- Data Activity Controller
- Fast Transmission
- Scheduling Management

5.1 Data Transferring and Reporting

To create a new encoded packet, each storage node asks information to the cluster head. The receiver answers to the caller sending its information that will used by the caller to encode a new packet. Nodes run on batteries which have limited energy supply. In order to stay and communicate for longer periods it is desirable that a routing protocol be energy efficient. Routing protocols should be bandwidth efficient by expending a minimal overhead for computing routes so that much of the remaining bandwidth is available for the actual data communication. The routing protocols should also support for the reliable data delivery even though the links between the nodes are dynamically changing. A Hybrid of hierarchical routing, broadcast routing and multicast routing has been used in the proposed work. So that the data can be transferred using this protocols from the sensors to the cluster heads.

5. 2 Data Activity Controller

The proposed scheme enables the energy spectrum trading, and allows to enhance their quality by utilizing the licensed bandwidth. It enhances both the energy efficient and spectral efficiency of the networks. Nash bargaining formulation is used to obtain the Pareto-optimal solution so that the data loss has been prevented. Also the framework will be useful for supporting various mobile applications based on distributed cooperative packet delivery. Data Activity Controller controls all the activities happening in the Wireless Sensor Networks. If any data has been asked by the cluster head, it would be transferred to the data activity controller, DAC stores more information, if it is available then it sends the information otherwise it searches for the information available in another cluster heads or in the cluster members. Acknowledgement also created for the data that has been send to the corresponding node.

5.3 Fast Transmission

The system finds the possible nodes that allow transmission of data without any drop age and latency. The data is then transmitted across the preferred polling points so that it reaches the destination (data sink) in a faster way. The data has been transmitted at 220 MHz speed in spectrum range. The base station acknowledges the other node after transmission. Data accumulator is a node that finds out the data angle. In this module receiver node receives the data from the Primary user or Secondary user through the mobile core network via Primary Base station or Secondary Base station. When comparing with the Primary Base station the data receive through Secondary Base station achieves at least 50% power consumption savings. The corresponding data is also viewed through this receiver module.

5. 4 Scheduling Management

Task scheduling is used to find the node coverage. Polling points have been found by using the Hole Repair algorithm (Hora algorithm). It generates condition activity that allows data transmission among the nodes. It lets node to node transfer very easier. The HORA algorithm creates the grade value, routing table, neighbor nodes, and payload value for each sensor node using the grade diffusion. The sensor nodes transfer the event data to the sink node according to the HPCM algorithm when events appear. Then the wireless sensor network can continue to work as long as the operators are willing to replace sensors.

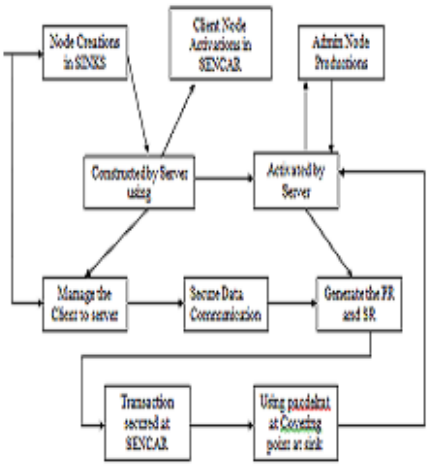

Fig 1 : Architecture Diagram

6. System Design

Design is multi-step process that focuses on data structure software architecture, procedural details, (algorithms etc.) and interface between modules. The design process also translates the requirements into the presentation of software that can be accessed for quality before coding begins.

Computer software design changes continuously as new methods; better analysis and broader understanding evolved. Software Design is at relatively early stage in its revolution. Therefore, Software Design methodology lacks the depth, flexibility and quantitative nature that are normally associated with more classical engineering disciplines. However techniques for software designs do exist, criteria for design qualities are available and design notation can be applied.

Input design

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

The objectives in the input design:

- To produce a cost-effective method of input.
- To achieve a highest possible level of accuracy.
- To ensure that input is acceptable to and understood by the user staff.

Input stages:

Several activities have to be carried out as a part of the overall input process. They include

- Data Recording – Collection of data at its source.
- Data Description – Transfer of data to an input form
- Data Conversion – Conversion of the input data to a computer acceptable medium.
- Data Verification – Checking the conversion
- Data Control – Checking the accuracy and controlling the flow of data to the computer.
- Data Transmission – Transmission or transferring the data to the computer.
- Data Validation – Checking the input data by program when it enters the computer system.
- Data Correction – Correction the errors that are found at any early stages.

Output design

Output design generally refers to the results and information that are generated by the system for many end-users; output is the main reason for developing the system and the basis on which they evaluate the usefulness of the application. in any system, the output design determines the input to be given to the application.

The output design is an ongoing activity almost from the beginning of the project, and follows the principles of form design. Effects and well define an output design improves the relationship of system and the user, thus facilitating decision-making. A major form of output is a hard copy from the printer, however soft copies are available.

The Types of output used in the system are: -

Internal outputs: Whose destination is within the organization and is the user's main interface with the computer.

Interactive outputs: - Which involves the user in communicating directly with the computer.

External outputs: – Whose destination is outside the organization and which require special attention since they project the image of the organization.

7. Performance Evaluation

The performance of the proposed system has been achieved by 50% more efficiency when comparing with the previous works.

8. Conclusion and Future Work

Inwireless sensor networks Mobile Data Gathering has been a major issue. There is no proper management for that data, and it needs more memory for the data storage and management. Even though there will an admin controller, there is lack of proper management. As it all happening in the Wireless Sensor Networks, due to this overload of memory, the nodes near the sensors deplete their energy very fast. And also the transferring of the data from the corresponding node to the data sink, causes drop age of data and latency.

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