

Distributed Data Storage Scheme and Efficient Way to Process Data in Wireless Sensor Network

J. Gokulraj, Dr. J. Senthilkumar, Dr. Y. Suresh

Information Technology, Sona College of Technology, Suramangalam, Salem, Tamil Nadu, India

ABSTRACT

In recent technology era data's generated are huge in number and in volume ,maintaining those huge volume of data requires lot of computation .storing all data in single repository is difficult task and scholars have proposed the advantage of storing data in distributed environment which reduces the factors of data duplication and efficient way of data processing , here we propose how data can be stored in a distributed environment with help of Elliptic curve cryptography and DES scheme to reduce the error and also to detect the error which occurs in storing data through distributed environment and propose a reliable information discovery mechanism which deliver high quality of data processing(diameter based multi-dimensional storage approach) we propose hybrid method of processing data using acquisition query processing and query dissemination.

Keywords: Distributed Data Storage, Elliptic curve cryptography, DES, query optimization and query dissemination.

I. INTRODUCTION

Wireless sensor are used in most of the application such as battlefield, surveillance, medical purpose, research area etc., Major area to be discussed while using wireless sensor are Memory , power , bandwidth and unreliable communication. Processing and storing all data using wireless sensor networks is huge task and so all the data which are required to process alone are kept in the sensor network and remaining data are stored in the wireless sensor networks which can be used for future purpose storing the data requires lot of memory space which can be allocated only through distributed wireless network, storing data in distributed environment have lot many problem to resolve such as data confidentiality , data integrity and data authentication . Wireless sensor network provides the three aspects of security and here we are discussing about storing data in distribute environment. In wireless sensor network the sensor spend most of its energy in processing the data rather than storing of information.

Distributed data storage are used in wireless sensor networks due to the factors which influence the data storage

- Nodes can fail in anytime of transmission of data
- Improved storage space
- High fault tolerance
- Improved reliability

In-Network processing can also be adopted to transfer data to avoid data loss and have better data storage but the process of In-Network processing is that the redundant nodes which are participating in the data transfer are neglected and data are processed and transferred through the neighbor nodes which generally hold the information of the adjacent nodes. It greatly reduces the time which are spend on the redundant nodes and the overhead is greatly reduced, but the drawback of using this approach is that in some case the idle nodes can be considered as redundant nodes and the path from this nodes may be deleted so which the nodes response time may vary and it depends on the algorithm used to transfer data.

II. METHODS AND MATERIAL

Here we propose method of storing data in an distribute environment which involves effective information discovery mechanism

- Network formation
- Nodes are framed in such a way to adopt diameter based multi-dimensional approach for better information discovery
- Adopt elliptic curve cryptography to provide error data communication across nodes.
- Usage of hybrid mechanism of query processing and query dissemination mechanism to gather data effectively.

Nodes are formed using self-organization structure such as node can transfer to its neighbor nodes and data can be effectively transmitted across the nodes and between its own areas of communication.

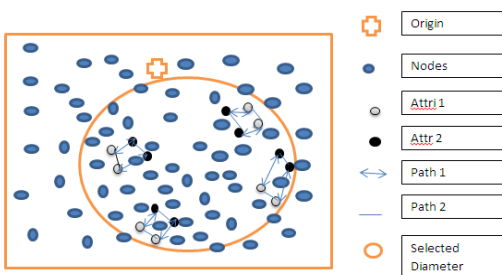


Figure 1. Network Self Organization

Wireless sensor network are highly mobile in nature each time a node shift from place to place and therefore forms a network of own choice based on the area of interest and which are able to communicate freely and one of most important features are wireless nodes are the lifetime of the battery and transmission range of the nodes both are limited we have to maintain a better information recovery mechanism so the life time of the sensor is not compromised most of the sensor are idle in the communication medium only few sensor actively participate in the transmission of data , we adopt a mechanism in such a way that the sensor which are active in most of situation are left idle in some point of time to maintain the life time of the sensor and the idle sensor which are not used for most period of time are utilized for the transmission of data using this method the nodes are equally used which in turn reduces the maximum usage of particular node giving the equal weightage of all nodes participating in the transmission of the data.

Our idea of using the idle node is that it can be used to find out the main node which acts as the repository of the information available in the network formation, the idle node can be used as transfer the information to the base station in this way the main node acts as information repository and data are transferred through idle nodes, nodes consume most of its battery power in transferring data transmissi on can be transferred across nodes to minimize the usage of battery life time.

Diameter based multi-dimensional storage approach are adopted to store and retrieve information in an effective manner , initially nodes are located using self-organization approach and next ensure nodes are available in the edges of the diameter , consider an area were an (n) is the maximum diameter of the nodes located area , we identify the location of the nodes in such a way that it is equally distributed across(n/4) area based on the size of maximum n the distributed area can be increased by 4,8 etc., the nodes are located in the edges of the diameter and now each edge will have a network of smaller region were data can be transferred across them here the location of each smaller network is identified an main node which acts as an information repository(IR) are identified and the way data can be exchanged inside the network and the idle nodes are marked and each network are framed in such a fashion of IR and idle nodes.

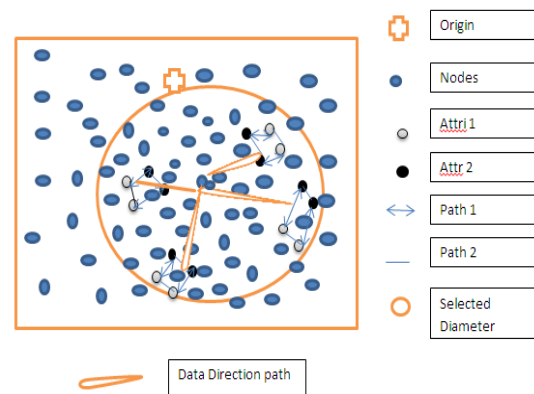


Figure 2. Diameter based multi-dimensional storage approach

Each node wants to communicate with the neighbor nodes for the data to be transferred across the network, as we have adopted diameter based storage mechanism each node neighbor will be available next to the adjacent to smaller network which are formed in the edges of the diameter of the transmission region in the order of execution here we try to make a path in the

transmission of data inside the diameter of the transmission, path is marked in such a way that each network can communicate easily across the network and the data need not to carry forward for longer period of time since reducing the data transmission across the network greatly influence the lifetime of the sensor and also the risk of the data being lost in between and error rate is reduced

Error Detection

In wireless sensor network there are numerous data which are being generated which are high in volume and velocity, the data may be a numeric data or text file, the data generated encounter numerous error most of which are human error and system error, here we focus on the system error which occurred while data and being generated and transmitted.

Human generated error are data reading error and capturing data from wrong nodes which in turn duplicated the value, here our focus is on the error which are done by the system such as data communication error such as when data are transmitted from source node to receiver node the data travels through shortest path to maintain optimum routing cost error occurs when a system transmits the data to unknown intermediate node which results in destination unreachable error and some other kind of system error out of bound error, where a system can take a reading of 100 but the system is forced to take a reading of above 100 in this case its neither a system or human error, the guidelines for a sensor should be properly followed to avoid this kind of error.

III. RESULTS AND DISCUSSION

Data Base Approach

The literature survey on the data base approach for effectively storing and retrieving information are Acquisitional Query Processing (AQP) and Query Dissemination (QD). In AQP approach the objective is that the node which are participating in the data communication or data transfer are limited for query processing so the life time of sensor are greatly saved and the nodes participating are limited so the error are minimized and the optimized results are obtained with greater accuracy

QD approach suggests that the query is interested on data rather than the number of nodes participating in the data communication, here the focus is on the exact data what the user is interested are being extracted which does not see the what number of nodes are participating in the data extraction, this approach used ANY type query here the interest is towards getting the needed data in the selected group of storage nodes each nodes maintain its own neighbor nodes with its reachability and availability and each nodes selects its most nearest node to get the required data and other type of query is ALL type query which is the main source node it contains all information such as required data that the user are intended from the particular node, since this node has all the necessary details it is easy to retrieve the data.

Here we try to propose a hybrid approach for retrieving information from the database such as AQP and QD, using of reduced number of nodes which are participating in data transfers are limited and reducing the number of participants in data gathering phase which results in minimizing the battery utilization of the nodes and also the number of participating nodes in effective transmission of data are being constantly monitored to provide the expected results to provide greater data efficiency with limited nodes participation and focus only on the data for the purpose and not towards the nodes participation for the data generation.

IV. CONCLUSION

In this paper various approaches concerning distributed data storage are discussed using elliptic curve cryptography and DES scheme have greatly reduced the error rate in which data are transferred in distributed environment and also information discovery mechanism are discussed such as perimeter based multi-dimensional storage approach through which data are retrieved using minimum distance between the nodes and also the methods for processing the information is also discussed to retrieve information effectively and get the results using hybrid method of storing and retrieving information for better response time with highly optimized battery utilized life time.

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