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Secure Data Aggregation in Wireless Sensor Networks: A Review

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ABSTRACT : In WSN, data aggregation and data dissemination play very important role. The various areas where foremost research activities going on in the field of WSN are deployment, localization, synchronization, data aggregation, data dissemination, database querying, architecture, Network Layer, middleware, security, designing Less power consuming devices, abstractions and higher level algorithms for sensor specific issues. Data aggregation is a habitually used technique in wireless sensor networks. It is a progression of aggregating the sensor data using aggregation approach. In WSN data aggregation is an efficient way to accumulate the restricted property. The major purpose of data aggregation algorithms is to congregate and aggregate data in an energy proficient compartment so that network lifetime is enhanced. The intention of this paper is to investigate the data aggregation issues in WSN such as delay, redundancy elimination, accuracy and traffic load and mentioned various methods to solve those issues.

KEYWORDS: Data aggregation, Data dissemination WSN,

1. INTRODUCTION

Wireless Sensor Network

Wireless Sensor Networks (WSNs) can be clear as a self-configured and infrastructure-less wireless networks to supervise physical or ecological conditions, such as temperature, echo, shuddering, heaviness, movement or pollutants and to considerably pass their data through the network to a main location or sink wherever the data can be pragmatic and analyzed. A descend or base station acts like an boundary between users and the network. One can recover required in sequence from the network by injecting queries and gathering consequences from the sink. Characteristically a wireless sensor network contains hundreds of thousands of sensor nodes. The sensor nodes can converse amongst themselves using radio signals. A wireless sensor node is prepared with sensing and computing devices, radio transceivers and power components. The character nodes in a wireless sensor network (WSN) are naturally resource constrained: they have limited processing speed, storage capacity, and communication bandwidth. After the sensor nodes are deployed, they are accountable for self-organizing an suitable network communications often with multi-hop communication with them. Then the onboard sensors start collecting information of interest.

Wireless sensor devices also react to queries sent from a "control site" to execute specific commands or provide sense samples. The operational mode of the sensor nodes may be either incessant or event driven. Global Positioning System (GPS) and local positioning algorithms can be used to get hold of location and positioning information. Wireless sensor devices can be prepared with actuators to "act" upon certain situation. These networks are occasionally more specifically referred as Wireless Sensor and Actuator Networks.

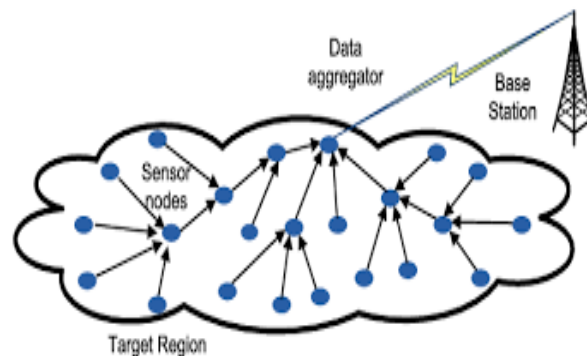
Wireless sensor networks habitually consist of a large number of low-cost sensor nodes that have stringently limited sensing, computation, and communication capabilities. Wireless Sensor Networks have in recent times emerged as a leading research topic. Wireless sensor networks also create a number of new concrete and optimization problems, such as deployment, location and tracking, are fundamental issues, in that many applications rely on them for needed. The different areas where major research behavior departure on in the field of WSN are deployment, localization, synchronization, data aggregation, dissemination, database querying, architecture, middleware, security, designing less power unbearable devices, abstractions and higher level algorithms for sensor specific issues. Data aggregation is a broadly used method in wireless sensor networks. The security issue, data development and reliability, in data aggregation transpire vital when the sensor network is deployed in a argumentative environment.

II. RELATED WORK

Background of Data Aggregation

Data aggregation is the progression of summarizing and combining sensor data in order to diminish the amount of data communication in the network. Data aggregation is the procedure of collecting and aggregating the practical data. Data aggregation is measured as one of the fundamental dispensation procedures for saving the energy. In WSN data aggregation is an effectual way to save the restricted resources. The main goal of data aggregation algorithms is to gather and aggregate data in an energy efficient manner so that network lifetime is enhanced.

Sensors every so often sense the data from the nearby environment, process it and transmit it to the base station or sink. The incidence of reporting the data and the number of sensors which report the data depends on the exacting application. Data gathering involves methodically collecting the sensed data from numerous sensors and transmit the data to the base station for further dispensation. Other than the data generated from sensors is often superfluous and also the amount of data generated may be very huge for the base station to process it. Consequently we need a method for combining the sensed data into high quality in order and this is accomplished through Data Aggregation. Data Aggregation is defined as the process of aggregating the data from manifold sensors to eliminate redundant transmission and estimating the desired answer about the sensed environment, then providing fused information to the base station.



The data aggregation is a method used to solve the implosion and partly cover problems in data centric routing. Data impending from multiple sensor nodes are aggregated as if they are about the same characteristic of the observable fact when they reach the identical routing node on the way back to the sink. Data aggregation is a extensively used technique in wireless sensor networks. The security issues, data confidentiality and integrity, in data aggregation become vital when the sensor network is deployed in a hostile environment. Data aggregation is a process of aggregating the sensor data using aggregation approaches

Major research focus in data aggregation is geared towards conserving energy. Other research issues contain improving security in data transmission and aggregation, handling tradeoffs in data aggregation i.e. tradeoffs between different objectives such as energy consumption, latency and data accuracy, improving quality of service of the data aggregation protocols in terms of bandwidth and end to end wait.

Data aggregation in Wireless sensor Network refers to make use of the sensed data from the sensors to the doorway node. Data aggregation performing a important role in Wireless sensor Networks since the aggregation schemes followed here involve in reducing the amount of power consumed throughout data transmission between the sensor nodes. Within the data aggregation of WSN, 2 security requirements, confidentiality and integrity, ought to be consummated. Specially, the primary security issue is data confidentiality that protects the sensitive transmitted data from passive attacks, such as eavesdropping. Data confidentiality is particularly very important in a aggressive environment, where the wireless channel is at risk of eavesdropping. While there are many methods provided by cryptography, the hard encryption and decryption operations, like modular multiplications of large numbers in public key primarily based cryptosystems, will assign the sensor's power quickly. The additional security issue is data integrity that prevents the compromised source nodes or aggregator nodes from by far altering the final aggregation value. Sensor nodes are easy to be compromise because they not have expensive tampering-resistant hardware, and

even that tampering-resistant hardware may not frequently be dependable. A compromised node will alter, counterfeit or discard messages.

III. METHODOLOGY

Security Issues in Data Aggregation

Data gathering is the main objective of sensor nodes. The incidence of reporting the data and the number of sensors which statement the data depends on the exacting application. Data gathering involves systematically collecting the sensed data from manifold sensors and transmitting the data to the base station for additional processing. although the data generated from sensors is often superfluous and also the amount of data generated may be very huge for the base station to process it. Hence we need a method for combining the sensed data into high quality information and this is talented through Data Aggregation. Data Aggregation is defined as the process of aggregating the data from manifold sensors to do away with redundant transmission and estimating the desired answer about the sensed environment, then providing fused information to the base station. Some design issues in data aggregation are.

- 1) Sensor networks are intrinsically unreliable and certain information may be engaged or expensive to obtain; like the number of nodes present in the network and the number of nodes that are responding and also it is hard to obtain complete and up-to date information of the adjacent sensor nodes to gather information.
- 2) Making some of the nodes to transmit the data directly to the base station or to have less transmission of data to the base station to condense energy.
- 3) Abolish transmission of redundant data using meta- data discussions as in SPIN protocol.
- 4) Improving clustering techniques for data aggregation to preserve energy of the sensors.
- 5) Civilizing in-Network aggregation techniques to improve energy efficiency. In-Network aggregation means sending partially aggregated values rather than raw values, thus reducing power consumption

IV. CONCLUSION

In this paper an exhaustive review of sensor networks and secure data aggregation conception in wireless sensor networks is provided. Wireless sensor networks are energy constrained network. Since the majority of the energy devoted for transmitting and in receipt of data, the process of data aggregation becomes an important issue and optimization is needed. Behind secure data aggregation to present the incentive, first, the issues in wireless sensor networks are available and affiliation between data aggregation and security necessities are explained.

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