

A Survey on Data Collection in Wireless Sensor Networks

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ABSTRACT

Wireless sensor networks are the networks, which can detect, break down and afterward convey the data. The data collection at sensor nodes devours a great deal of vitality however sensor nodes are vitality requirements. The vast majority of the WSN designs comprise of stationary nodes, which are vigorously sent over a detecting zone. As of late, a few WSN models dependent on mobile elements (MEs) have been proposed. The use of Mobile elements brought about a more up to date mode to limit and give a vitality utilization in wireless sensor networks (WSN). The vast majority of them create versatility to manage the issue of data collection in WSNs. The booking of mobile elements needs to address the navigate design and furthermore the season of data collection from individual sensor nodes. Wireless Sensor Network with MEs and give a total course of action of their models, in light of the job of the MEs. Mobile component trajectory control plan to diminish the detected data collection delay against deterrents. It will lessen the data collection postponement and parity the vitality utilization in WSN.

Keywords : Data Collection, Mobile Elements, Power Management, Discovery, Data Communication, Data Forwarding, Motion Control

I. INTRODUCTION

A Wireless Sensor Network (WSN) comprises of the autonomous sensor which is spatially dispersed to screen physical or ecological conditions, for example, temperature, resound, weight and so on. The improvement of WSNs was supported by military applications. In any case, WSNs are utilized in common applications, including condition, traffic and environment checking, social insurance and home. A sensor hub comprises of battery, simple to the advanced converter, detecting gadget. Every one of the segments has their own job. Because of every one of these segments, there are a few factors that influence the structure of sensor networks, these elements incorporate blame tolerant, accessibility and

creation cost. The fundamental difficulties in the sensor networks are restricted battery power and cushion flood. An investigation and execution of the different existing strategies for data collection in sensor networks have been performed.

Execution of all the essential ME Scheduling calculations is performed to examine their attributes. At that point, meet based framework is actualized and its execution is resolved. The primary point is to investigating these calculations for detected data collection utilizing an upgraded ME-based methodology, which limits the misfortune in the framework, enhances the execution of the WSN furthermore improving the lifetime of the network. Because of every one of these limitations, we are

proposing a plan Mobile Element Trajectory Control, which will diminish the data collection postponement and parity the vitality utilization in WSN. Data collection is the key elements of WSN. In that, the detected data is gathered at all or a portion of the sensor hub and sent to the focal Base Station (BS) for further handling. The Mobile Element can go about as mechanical transporters gather data from every one of the nodes and exchanges to the BS. The issue of planning the mobile component with the end goal that none of the cushions floods is named as the Mobile Element Scheduling issue.

The point of booking calculations is that there ought to be no postponement of the detected data, down to earth arrangements will focus on limiting the data collection delay. Since, when there is an expansion in the number of sensor nodes, clearly the data collection defer will increment. To diminish the detected data collection delay against obstructions, Mobile Element Trajectory Control plans are taken care of.

II. LITERATURE SURVEY

In this paper [1] author consider the issue of recovering a dependable gauge of quality from a wireless sensor network inside a settled time window and with least vitality utilization for the sensors. The sensors are situated in the plane as per some irregular spatial process. They perform vitality gathering and pursue a sleeping/conscious cycle. A sink, at an irregular area in the plane, demands estimations from the conscious sensors so as to recover a gauge of a characteristic. The sink needs to gather an adequate number of estimations inside a settled time window. Besides, the sink plans to limit the vitality that the sensors use to transmit their estimations. They decide a shut frame articulation for the normal vitality utilization of the sensors when estimations are recovered by a Greedy calendar. They additionally give an upper bound on the most extreme expected separation over which a sensor transmits under this

Greedy timetable. Moreover, the examination figure a Markov Decision Process (MDP) to decide a sensor transmission plan with general time imperatives. They likewise build up a heuristic that plans the sensors for transmission. They think about numerically the execution of the MDP plan with the heuristic and with a disconnected, ideal calendar, where the snoozing/conscious condition of the sensors is thought to be known early. They demonstrate that the vitality utilization under the MDP plan combines to the vitality of the disconnected calendar as the span of the time window for estimation collection increments. They likewise demonstrate that the heuristic performs near the MDP plan for terms of vitality utilization.

Before, different vitality effective data collection strategies have been proposed in the writing. In this paper [2] creator exhibits a subjective survey of ongoing advances in data collection systems in WSN. The audit groups every one of the considered strategies dependent on basic topology. A second dimension order of these procedures is done dependent on vitality sparing plan utilized. An examination of these procedures is accommodated subjectively assessing these methods. The survey finishes up with a talk on the constraints of the thought about procedures.

Wireless Sensor Network (WSN) gives a critical commitment in the rising fields, for example, surrounding insight and pervasive figuring. In WSN, streamlining and stack adjusting of network assets are a basic worry to give the insight to long span. Since grouping, the sensor nodes can fundamentally improve in general framework versatility and vitality proficiency this paper [3] presents a conveyed bunch head booking (DCHS) calculation to accomplish the network life span in WSN. The significant oddity of this work is that the network is separated into essential and auxiliary levels dependent on got flag quality sign of sensor nodes from the base station. The proposed DCHS underpins for two-level WSN

engineering and offers a recommendation to choose the bunch head nodes and portal nodes for both essential and auxiliary levels. The DCHS instrument fulfills a perfect appropriation of the bunch head among the sensor nodes and keeps away from the successive choice of group head, in view of Received Signal Strength Indication (RSSI) and leftover vitality dimension of the sensor nodes.

This paper [4] proposes a novel data collection technique for substantial wireless sensor networks and ubiquities applications. An ordinary data collection visit utilizing a mobile sink begins from a sensor hub close-by a base station, voyages all nodes of the wireless sensor network by visiting every hub, comes back to the base station and transfers gathered data to the base station. This technique is time wasteful and every hub spends battery power rapidly. A tale data collection strategy is proposed to build vitality effectiveness utilizing a mobile sink. The re-enactment result demonstrates that the proposed data collection strategy diminishes the vitality utilization level by drawing out the lifetime of wireless sensor networks to 15 percent contrasted and LEACH.

In this article [5] the author initially characterize WSNs with MEs and give a far-reaching scientific categorization of their structures, in light of the job of the MEs. At that point, it introduces a review of the data collection process in such a situation, and distinguish the relating issues and difficulties. Based on these issues, it additionally gives a broad study of the related writing. At last, it analyses the fundamental methodologies and arrangements, with indications to open issues and future research headings.

III. RELATED WORK

A. Clustering In WSN

Sensor center point are thickly passed on in wireless sensor network that infers physical condition

would convey on a very basic level the same as data in close to sensor center point and transmitting such kind of data is basically dull. So every one of these substances bolster using a type of accumulation of sensor centers to such a degree, to the point that social event of sensor center can be merged or pack data together and transmit simply littler data. This can reduce restricted movement in particular assembling and besides decrease overall data. This social occasion system of sensor centers in a thickly passed on enormous scale sensor center is known as clustering. The technique for brushing data and pack data having a place with a single cluster called data mix (aggregation).

Issues of clustering in wireless sensor network:-

1. What number of sensor center points should be taken in a single cluster? Assurance strategy for cluster head in an individual cluster
2. Heterogeneity in a network, it suggests customer can put some power full centers, in term of imperativeness in the network which can bear on like cluster head and fundamental center point in a cluster fill in as a cluster part figuratively speaking. Various traditions and figuring have been proposed which deal with each individual issue.

B. Data Aggregation

In common wireless sensor networks, sensor centers are by and large resource constrained and battery-compelled. Remembering the true objective to save resources and essentialness, data must be gathered to swear off overwhelming measures of action in the network. There has been expansive work on data aggregation plans in sensor networks, The purpose of data aggregation is that takes out overabundance data transmission and enhances the lifetime of imperativeness in wireless sensor network. Data aggregation is the system of one or a couple of sensors by then assembles the acknowledgment result from other sensor. The accumulated data must be set up by sensor to reduce transmission stack before they

are transmitted to the base station or sink. The wireless sensor network has involved three sorts of centers. Clear standard sensor center points, aggregator center point and querier. Ordinary sensor center points sense data package from the earth and send to the aggregator center points basically these aggregator centers assemble data from different sensor centers of the network, adds up to the data allocate a some aggregation work like aggregate, typical, count, max min and a short time later sends sums result to upper aggregator center point or the querier center point who deliver the inquiry.

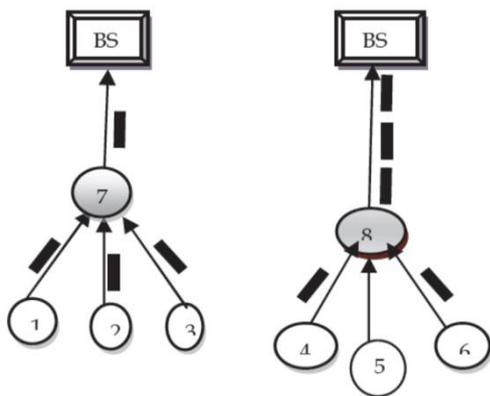


Figure 1. Data aggregation model and Non data aggregation appear

It can be the base station or now and again an external customer who has approval to connect with the network. Data transmission between sensor center points, aggregators and the querier eats up some portion of imperativeness in wireless sensor network. Figure 2 contain two models one is data aggregation model and second is non-data aggregation show in which sensor center points 1, 2, 3, 4, 5, 6 are general center points that social affair data package and declaring them back to the upper center points where sensor center points 7,8 are aggregators that perform identifying and totalling meanwhile. In this aggregation show 4 data distribute inside the network and only a solitary data package is transmitted to the base station (sink). Additionally, other non-data aggregation show in like manner 4 data allocate inside the network and all data packs are sent to the base station(sink), suggests we can express that with the

help of data aggregation process we decrease the amount of data package transmission. Also, besides save essentialness of the sensor center point in the wireless sensor network. With the help of data aggregation we redesign the lifetime of wireless sensor network. Sink have a data allocate imperativeness gainful path with minimum data inertness. So data inaction is basic in various employments of wireless sensor network, for instance, condition watching, prosperity, checking, where the freshness of data is in like manner a basic factor. It is essential to make essentialness capable data-aggregation estimations so network lifetime is overhauled. There are a couple of parts which choose the imperativeness adequacy of a sensor network, for instance, network designing, the data aggregation instrument, and the principal guiding tradition. Wireless sensor network has passed on treatment of sensor center point data. Data aggregation is the system. It delineates the planning procedure that is associated on the data got by a sensor center point and what's more data is to be controlled in the entire network. In which reduce imperativeness usage of the sensor center points and moreover diminish the amount of transmissions or length of the data distribute.

Elena Fosolo et al in [6] depict "In network aggregation is the particular strategy of social occasion and coordinating data through a multi hop network. Treatment of data allocate the help of midway sensor centers. The objective of this approach is extending the life time of the network and moreover reduces resource use. There are two kind of approach for in network aggregation. With assess diminishment and without measure reducing .In network aggregation with evaluate diminish. It is the method in which join and compacting the data got by a sensor center point from its neighbours remembering the true objective to diminish the length of data package to be sent towards the base station. Case, in some circumstance a center gets two data packs which have a compared data. In this condition it is inconsequential to send

the two data packages. By then we apply a limit like MAX, AVG, and MIN and again send single data package to base station.

With help of this approach we diminish the amount of bit transmitted in the network and moreover save an extensive measure of essentialness. In network aggregation without measure diminishing is described amid the time spent data packs got by different neighbours in to a single data distribute without setting up the estimation of data. This methodology moreover diminishes imperativeness use or augmentation life time of the network.

a. Advantage and Disadvantage of Data Aggregation in WSN

Preferred standpoint: With the assistance of data aggregation process we can improve the power and precision of data, which is acquired by whole network, certain excess, exists in the data gathered from sensor hubs subsequently data combination handling is expected to lessen the repetitive data. Another preferred standpoint is those diminishes the activity load and monitor vitality of the sensors.

Disservice: The cluster head implies data aggregator hubs send meld these data to the base station. this cluster head or aggregator hub might be assaulted by noxious assailant. In the event that a cluster head is traded off, at that point the base station (sink) can't be guarantee the accuracy of the total data that has been send to it. Another downside is existing systems are a few duplicates of the total outcome might be sent to the base station (sink) by uncompromised hubs. It increments the power expended at these hubs.

b. Performance measure of Data Aggregation

There are critical execution measures of data combination calculation. These exhibitions are exceptionally subject to the coveted application.

- **Vitality Efficiency:** By the data-aggregation plot, we can build the usefulness of the wireless sensor network. In which each sensor hubs ought to have spent a similar measure of vitality in each

datum assembling round. A data aggregation conspire is vitality proficient in the event that it augments the usefulness of the network. Network lifetime, data exactness, and inertness are a portion of the critical execution measures of data-aggregation calculations. The meanings of these measures are exceptionally subject to the coveted application.

- **Network lifetime:** The network lifetime is characterizing the quantity of data combination rounds. Till the predefined level of the aggregate hubs passes on and the rate rely upon the application. If we discuss some application, simultaneously working of the all the sensor hubs is vital thus the lifetime of the network is number of rounds until the main hubs which enhances the vitality proficiency of hubs and improve the lifetime of entire network.
- **Idleness:** Latency is assess data of time defer encounters by system, implies data send by sensor hubs and got by base station (sink). basically postpone associated with data transmission, steering and data aggregation.
- **Correspondence overhead:** It assesses the correspondence unpredictability of the network combination calculation.
- **Data precision:** It is an assess of proportion of aggregate number of perusing got at the base station (sink) to the aggregate number of created. There are diverse writes data aggregation conventions like network engineering based data aggregation conventions, network-stream based data aggregation conventions and nature of administration (QOS)- mindful data-aggregation conventions intended to ensure QOS measurements. Here network design based conventions are depicted in detail.

c. Impact of Data Aggregation in WSN

In this section we talk about the two principle factors that influence the execution of data aggregation strategies in wireless sensor network, such as vitality sparing and delay. Data aggregation is the procedure,

in which collecting the data bundle originating from the distinctive sources; the quantity of transmission is decreased. With the assistance of this procedure we can spare the vitality in the network. Deferral is the inactivity associated with aggregation data from nearer sources may need to kept down at transitional hubs keeping in mind the end goal to join them with data from source that are more remote away. Fundamentally aggregation technique based on the position of the sources in the network, number of sources and the network topology. On the off chance that it analyses the variables, we think about the two models of the source arrangement. The occasion sweep (ER) model and arbitrary source demonstrate [15]. The demonstrating says us that where the source are clustered close to each other or found haphazardly, noteworthy vitality picks up are conceivable with data aggregation. These increases are most noteworthy when the quantity of sources is vast, and when the sources are found generally near each other and a long way from base station. The displaying through, additionally appears to the recommend that aggregation inertness could be non-immaterial.

IV.CONCLUSION

We conclude that our paper has reviewed a number of data collection technique and all these techniques provide the decrease in data collection but these were not still so a lot of efficient. The Mobile Element Trajectory control scheme used to reduce the data collection delay and also balance the energy consumption. The Data collection delay will be reduced precisely. So, if we use Mobile Element Trajectory control scheme, we can avoid data collection delay and also balance the energy consumption in a wireless sensor network.

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