

Techniques of Data Collection with Mobile & Static Sinks in WSN's: A Survey

Dattatray S. Waghole, Vivek S. Deshpande

Abstract— Wireless Sensor Networks (WSNs) is a set or collection of different distributed nodes which is measure (Capture) the environmental changes like Temperature, Sound, Pressure from the environmental area. Data packets or information is sending from one location to another location i.e. Source to the Destination. Sensor nodes are capable for the information gathering and communication between other nodes from the network. In the wireless Sensor Networks hop by hop or Multi-hop data communication between the sources to the destination can be done. When the source transfer data through the different nodes to the destination. At that instance many Quality of Services (QoS) affected on the network performance like Delay, Reliability, Energy, Throughput, Scalability, jitter etc. Due to congestion or traffic in the network Average End-to-End Delay should be increased and Energy of the nodes should be waste drastically. In this survey paper propose the methods, techniques, scheme used for energy efficiency, reducing energy consumption & latency in the wireless sensor networks. Above quality of services achieves for data collection or gathering in the wireless sensor network using the static & mobile sinks. we have propose the techniques & methods of achieves reliability & energy efficiency in the networks. this paper is focus on data collection or dissemination using static & mobile sinks with effective result of quality of services.

Index Terms— Wireless Sensor Networks, Data Collection, Mobile Sinks, End-to-End Delay, Quality of Services (QoS), Energy Consumption, Packet Delivery Ratio.



1. INTRODUCTION

Wireless Sensor Networks is a set or collection of different nodes which are spread in the wireless network for capture and measure the environmental changes like heat, temperature, climate, humidity from the environmental condition. Wireless Sensor Networks is the multi-hop communication wireless networks. Sensor nodes are able to or capable to performing the process on the gathered data and after processing communication with other connected nodes in the networks. Data will be sent form the source to the destination .sink node always collect the data from other connected nodes from the network is called Data Dissemination. Many researcher uses one technique for the Data Dissemination is the Direct Diffusion (DD). [2][3] In this Technique one static Sink should be collects the data or performing the data dissemination process in the network.

But very import part is at the time of data dissemination due to the heavy traffic and congestion Av-

erage End-to-End delay should be increased and more Energy will be spent at the time of collection of packets so, network should be given poor performance in the network.

Many times due to Quality of Services (QoS) network performance should be increased or decreased.[6][7]One mechanism proposed for improve the capacity of data packets collection and reducing the energy consumption in the networks. Then for these two issues author propose new novel data collection scheme called as Maximum amount shortest path (MASP).MASP is improve the network Throughput and Energy conserve with low latency in the network. The two-phase communication protocol which is based on the Zone partition is designed to MASP scheme implementation. [1] In the paper of communication models and protocol based on the multiple static sinks in the WSNs. The author Sang-Ha Kim proposed one communication model for high data gathering or collection at the time of data dissemination with low latency using multiple mobile sinks in the network. Multiple static sinks deliver aggregated data via legacy network to the users. In the case of the mobile sink when moving around the network it collect or receives the aggregated data from which sink is nearest one. [2] The process of data dissemination in the networks is the

- Mr.Dattatray S. Waghole is currently pursuing Master Degree in Information Technology from Pune University, India, Mob No: 7387993390. Email-Id: - dattawaghole10@gmail.com.
- Mr.Vivek S. Deshpande, Dean, Research & Development, MIT college of Engineering, Pune. He is working as Associate professor in Department of IT, Pune University,India, Mob No:-9422519649.Email-Id:- vsd.deshpande@gmail.com.

process of the collection of the data from the network but here we seen more energy should be spent for this complete process. So lifespan of the network should be decreases due to loss of energy. So EBRP protocol i.e. Energy Balanced Routing protocol is developed for the data gathering with low energy, low latency in the network.

This paper focuses on the balancing energy and the increase the network lifespan. [3] Due to the congestion or the heavy traffic many time more average end-to-end Delay required for the data communication or transfer from the one node to another. Multiple nodes can be sending the data to the sink node at a time through the network so congestion will be occurred in the network. So here one protocol is develop for solve the problem of traffic and congestion avoidance in the network name as "Cosmos" i.e. Congestion Avoidance for Sensors with Mobile Sinks. [4] Mobi-Path protocol used for the predicted path in the network. [5]

2. SURVEY

As we know, Wireless Sensor Network is the Collection of Distributed nodes for capture the physical as well as Environmental changes in the network. In the network due to the path-constraint to the mobile sink with constant speed has a small communication time for collection of data from the network. But the author sajal k.Das proposed one mechanism for the collection of the data from the network in the network is MASP. MASP is the Maximum Amount Shortest Path i.e. with shortest path collect large amount of the data in the network with conserves the energy in the networks.

It increases the network throughput as well as consumes the energy from the network. MASP is formulated as an Integer Programming Problem (IPP) and with the help of Genetic Algorithm it solved. [1] The author Sang-Ha Kim proposed the novel communication model and novel protocol based on the multiple static sinks. Data packets sharing through the multiple static sinks the author proposed protocol increase the data delivery ration at the time of data gathering from the network and the low latency for delivery of data in the network. At the time of the data gathering process energy consumption with multiple static sinks should be improved in the network. [2] In the network due to heavy traffic congestion increases & energy loss in the data collection process. So increase the network lifespan with energy here the author Sajal K.Das proposed one protocol name as the EBRP i.e. Energy Balanced Routing Protocol for the data dissemination in the wireless Sensor Networks.. This protocol increase network lifespan, energy consumption balance, and throughput as compared to previous presented protocols. [3] to Solve the problem of traffic and congestion from the network author proposed the one useful protocol for control or avoidance of congestion and management of traffic in the network is the Cosmos i.e. Congestion Avoidance for Sensors with Mobile Sinks. [4] Author J.Luo proposes the path-constraint multi-hop sensor network where the shortest path tree method is used for the path predict in the network. This method used for the select the cluster head and user data which shows network require low energy for data collection. Author proposed Mobi-route protocol for predict the path of sensor nodes. [5] Author Cauligi Raghavendra proposes the data prediction mechanism. This paper proposed DMAC, low latency MAC protocol for tree based

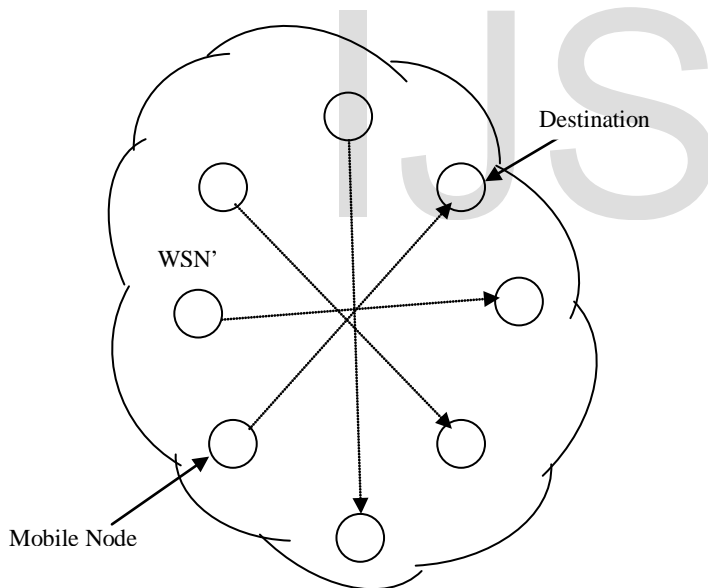


Figure1:-Data Dissemination using mobile node in WSN's

As shown in fig.1 Wireless Sensor Networks is the Collection of the different distributed nodes spread in the environmental area. Above figure shows that different distinguished node one is Mobile Node and another one is the Destination Node. The Sink Node form the network moves from different side for the collection of data or the process of the data dissemination in the networks. Given dotted arrow shows the direction of the different moving nodes in the networks.

structure for data gathering in the networks. [6] Solve the problem of latency in this paper .Author proposed Progressive optimization approach, he proposed combine-skip-substitution (CSS) Scheme to reduce the latency and tour length for the data collection process in the networks. [7] The author proposes the problem of scheduling of mobile element in the network. So there is no data loss due to buffer overflow. Author proves the problem of NP-Complete. [8] Energy and the Latency are the two important Quality of Services in the data dissemination process of the Wireless Sensor Networks. So Author proposed biased Sink Mobility with adaptive stop times as consider the energy and latency in the network for efficient data collection in the networks. [9] this paper propose the limitation of static Wireless Sensor Networks target detection the use of mobile sensor address this in this papers.[10]

3. PERFORMANCE REVIEW

Data collection in the wireless sensor networks (WSNs) using mobile sink and static sink are the two different processes. But at the time of data collection authors consider the important parameters or quality of services of WSNs. Latency, energy, congestion and packet delivery ratio, packet loss ratio are the some of the quality of services in the WSNs. [1] reducing the latency and energy consumption in the networks are the two important parameters are consider in the every paper by every authors. In all the papers which are included in the survey, mostly concentration on the performance of the Mobile sink and Static Sink. After studying the papers here conclude that latency for the data collection using static sink is more but for mobile sink it should be low latency. Using the mobile sink the packet delivery ratio & energy consumption parameters are shows the better performance & results.

The parameter energy efficiency in the network can be improved using the sink mobility along constrained path. Randomly deployed sensor nodes have a low time for data collection time due to the path constraints. So there is a challenge for improve the data collection & reducing energy consumption. So in this paper present the one technique known as Maximum Amount Shortest Path protocol (MASP).this technique increases the packet delivery ratio, improve network throughput & reduce the energy consumption in the networks. For implement & design MASP technique this protocol is based on the 'Zone Partition'. To solve the MASP scheme authors develop the distributed approximation algorithm.[1]An advantage of this

paper is it improves energy efficiency in the networks & reducing the energy consumption. Authors solve the drawback of data delivery problem in large scale WSNs with Mobile sinks. This moves along fixed paths with constant speed. Results of this paper shows that MASP scheme & proposed algorithms' better perform than the Shortest Path Tress (SPT) as well as Static sink scenario. In the case of Throughput & energy efficiency. MASP scheme balance the energy consumption. [1] Authors Develops the two algorithms.1)Zone partitioning based solution & 2)A Distributed Solution (MASP-D). In this paper [2] authors develop the communication model. In the Previous paper authors achieves or improves the energy efficiency using the mobile sink. But as compared to previous paper authors propose the one protocol based on the two static sinks for supporting Mobile users to achieves the better results in the WSNs. In the application of the Sensor nodes.

Table 1:-Performance Review Table for Different parameter.

Parameter	Single static sink	Multiple static sink	Mobile sink
Reliability	High	High	Medium
Energy Consumption	High	High	Low
Latency	Low	Low	Medium
Throughput	High	High	Medium
Network Lifespan	High	High	Medium
Congestion	Low	At crossing Point of traffic	High

There are two types of the users 1) traditional remote users & 2) Mobile Users. In this paper carefully supports the both users. In this scenario the multiple static sinks connect with the legacy networks. A sensor area divides into number of multiple sinks. Data sharing with the legacy networks. The multiple static sinks provide the more throughputs through the distributed data collection in the networks. Low latency for data delivery through the short hop data collection. Through the legacy networks, the multiple static sink send the collected data to the remote users. In the concept of two static sinks supports Mobile users. When the mobile users moves through the network. Then mobile users collect or receive the aggregated data from nearest static sink. As compare to existing models with the simulation results. This proposed model is more able in terms of delay, data delivery

ratio, reliability of data and energy efficiency. One of the most arrival drawbacks in the static & mobile user's communication models is disconnection problem. In this scenario we call the user as a remote user. The protocol which collects the aggregated data from nearest static mobile sinks. It consists of three phases. Network initialization: which contain the allocation of multiple static sinks to support the mobility in the WSNs.

The network dividing of multiple static sinks. Data gathering of Mobile users: it contains queuing of mobile users & data collection, data sharing & disseminating of the sinks. User mobility Supports like local & global mobility management. As compared to previous paper [1] it provides the high data delivery ratio through distributed data collection. Advantage is these papers solve the hotspot problem of existing models in the previous papers. Reducing the energy consumption and solve the problem of previous paper of network lifetime. [1][2] as compare to previous existing models this model gives better performance for the delay, energy consumption & network lifetime in the networks. [2] The above papers focus on the energy efficiency, delay, packet delivery ratio. Reducing energy consumption in the networks. [1][2] But in this paper authors focuses on the energy balancing, so they propose the novel protocol for energy balancing in the network. This protocol is EBRP Energy Balancing Routing Protocol. This protocol developed particularly for the data collection in the sensor networks. Previous existing routing protocols forward the packets along the minimum energy path to the destination node to only for minimize the energy consumption. But it caused an unbalanced distribution of residual energy of nodes & eventually results in network partition. These drawbacks solve the authors using the concept of potential in physics. Using this protocol researcher achieves the energy balance, networks lifetime, coverage ratio & throughputs as compared to previous commonly used energy efficient routing protocols and algorithms. [2][3]. They present the three important cause of imbalance in energy distribution. 1) Topology 2) Application 3) Routing. Deployment optimization, topology control, mobile sink, data aggregation & energy balanced routing are the five possible solutions for the energy balancing. [3]

Traffic management is important parameter of the sensor networks. [4] In previous discussion of papers we seen the energy efficiency is important factor of networks. But as compare to previous papers reliability of the data is important parameter proposed in this paper. Effect of sink

mobility on the traffic load in the sensor networks authors study in this paper. Within the network for collecting the load for each node within the region. Authors proposed novel load collection technique. They propose the CoSMos i.e. Congestion avoidance for sensor s with mobile sink. the CoSMos-G (CoSMos Greedy) technique avoid the congestion in the networks. For load collection authors propose the two algorithms like 1) CoSMos-Proportional (CoSMos-P) inspired by the multi-users diversity. To address the local versus global network utilization. 2) (CoSMos-T) CoSMos-Threshold. These two algorithms attempt to optimize each case via joint congestion & reliability aware rate allocation. [1][3][4] Authors propose [5] the multihop networks with the path-constrained mobile sink. where the shortest path tree (SPT) method is used to choose the cluster head (CH) & route data result in the low energy efficiency for data collection routing protocol called Mobi-Route. In paper [4] focuses on the traffic load but as compare to this paper investigate the approach that makes use of a mobile sink for balancing the traffic load & improving network lifetime. [4][5]. for maximizing the network lifetime in this paper present the approach of the balancing the data flow at each link in the network. They focus on the sensor nodes are fixed & limited energy reserves. [5] In the paper [2][9] author proposed static & mobile scenario focus on network data collection with low latency. But in this paper [6] authors focus on the network lifetime using the dual-sink. Mobile scheme take the different scenario for lifetime improvement of the network. This paper solves the drawback of the extra high energy loss. To solve this problem authors propose the dual-biased scheme for energy efficiency & distributed protocol for the data collection in the network. Dual-sink is a combination of the static & mobile sink. After simulation result shows that dual-sink improve the network life-time. But the network with only one mobile sink performs no better than the single static sink network. [6]

As per title of paper [7] authors focus on minimize the latency for data collection in the network with mobile element. In the previous paper [1] authors focus on the data collection but target on achieving energy efficiency. As compare to this paper authors focus on the latency for data collection. An author achieves the different parameters like reducing & balancing energy consumption in WSNs. but there is a one drawback, data collection latency is higher. In this paper propose Combine-Skip-Substitution (CSS) scheme. These schemes solve the problem of data collection latency in the network. The goal of this paper is find the

shortest tour to collect data from all the nodes in minimum latency. The CSS scheme is proposed for the reduce the tour length as well as data collection latency in mobile elements. [7] Mobile elements are designedly built into system to improve the lifetime of the network. Working of mobile element is visit the nodes for the collecting the data from the network before the buffers are full. Drawback or problems of buffer overflow solve the using mobile element scheduling in this paper. In this paper authors investigate the some scheduling problems that occur in the network. author formulate the problem of node failures. [8] This paper [9] solves the problem of the latency in the network. The adaptive stop time lead to significantly reduced latency. In this paper propose the data-fusion - based detection model that enables static & mobile sensors to effectively in target detection. This paper simulation shows that small numbers of mobile sensors significantly promote the detection performance of the network. This paper addresses the limitation of static WSNs for target detection. [10]

4. CONCLUSION AND FUTURE WORK

In the Process of data dissemination researchers collect the data from the network using Single, Multiple static & mobile Sinks. So more energy consumed and requires low latency for the data dissemination process. So many researchers use Mobile Sink nodes in the network for the data dissemination process. If the Mobile sinks will be moves from different direction in the network for Data Dissemination process like Left to Right, Top to Bottom and more different directions, then Average End-to-End Delay for Data Dissemination process will be decreased and Packet Delivery Ratio also Increased in the Network. More Energy will be required for the process but Average Throughput of the network definitely drastically increased. Using the different algorithms & protocols for authors achieves the energy efficiency & reducing energy consumption problem. In future work we study the more energy efficient techniques for data dissemination & collection in the networks. Study more algorithms & protocols for

the improve & increases the network lifespan, packet delivery ratio, packet loss ratio & more quality of services of the networks.

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