Data Transmission using clustering and Mobile Sink for wireless Sensor Network.

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Abstract—**in a wireless sensor networks data transmission play very important role. WSN infrastructures are based on movable terminals. In WSN, the energy of a node is limited and when a node participates as an intermediate node for data transmission of others then he lost their residual energy which is not good for his survival. So we are trying to save residual energy of a node using mobile sink and clustering help to improve network existence because in clustering we make a group of the node in which one node act as a head node will decide that which node will participate for next transmission and which will not participated. Due to mobile sink, we are trying to reduce network traffic and also improving network existence**

Keywords — Wireless Sensor Networks (WSN), Mobile Sink, Data Dissemination.

I. INTRODUCTION

Wireless technology is one of the fastest growing technologies in worldwide. WSN is helpful for rapid communication and effective data transmission. In WSN various problem occurs like security, network traffic, reliability, residual energy etc. basically our problem definition is based on residual energy because it plays a very critical role. Residual energy of a sensor node is limited in WSN, if a node continuously participates as an intermediate node during data transmission then he will lose their energy and when he wants to send their own data, he doesn't have enough energy. In our work, we are trying to save residual energy of a node using mobile sink and clustering help to improve network life cycle.

WSNs consist of frequent battery power devices. Due to huge network extent, partial power delivers, the WSN-based protocols are quite dissimilar as compare to the wireless protocol. The main procedure of WSN is to gather and process data into network nodes as well as send out the essential data to the base station for next scrutiny and processing.
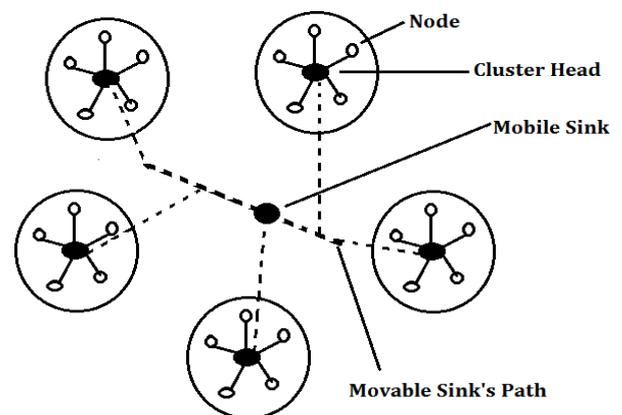

Figure 1: Cluster & Mobile Sink Based WSN.

2. RELATED WORK

Now a day's clustering is widely used in WSN, MANET & Wireless ad-hoc networks. In this technique, few nodes are creating a group in which node acting as a head node and group of nodes are known as a cluster and they all are gathering into some clusters. Only head node is exclusively responsible to communicate with the base station in a cluster.

The other nodes collect data and forward it to their head node. The head node collects all data from the followers. Collected data is to be again forward by the head to sink. This entire process takes a lesser amount of node's energy to transmit data to the head node rather than to sink node, which increases network life cycle as well as the residual energy of a node.

The sensing circuitry procedure circumstances associated with the surroundings the sensor and convert them into an electric signal. Processing such a signal reveals some property about items located and/or events incident in the region of the sensor. The sensor sends such composed data, usually via radio transmitter, to a command center either directly to data concentration center.

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The reducing in size and cost of sensors, consequential from such technological advances, has fueled attention in the probable use of the bulky set of not reusable unattended sensors. It is significance noting that the Internet is not just a single network but a collection of many interconnected networks. But wireless sensor networks are experiencing unique expansion in the modern era. Wireless sensor networks are characterized as networks they don't have any physical connections. In these networks, there is no fixed topology due.

In 2008, Dilip Kumar, Trilok C. Aseri, and R.B. Patel are introduced an energy-efficient heterogeneous cluster based scheme for WSN in which years, they studied about the impact of heterogeneity of nodes in terms of their energy in WSN. They also assume that the sensor nodes are randomly distributed and are not mobile, the coordinates of the sink and the dimensions of the sensor field are known. WSNs based on weighted election probabilities of every node to turn out to be a cluster head according to the residual energy in each node.

In 2009, Tao Liu, Feng Li proposed a new type of routing protocol for wireless sensor networks named power-efficient clustering routing protocol based on applications in WSN in which he proved the rationality that multi-hop communication can prolong the lifetime of the Wireless sensor network in narrow sense circumstances based on mathematical proofs.

In 2010, Feilong Tang, Ilsun You, Song Guo, Minyi Guo and Yonggong Ma are designed A chain-cluster based routing algorithm For WSNs in which they proposed a Chain-Cluster based Mixed routing, which makes full utilization of the advantages of LEACH and PEGASIS, and gives improved performance. It divides a Wireless Sensor Networks into a few chains and runs in two stages.

In 2012, M. Aslam, N. Javaid, A. Rahim, U. Nazir, A. Bibi, and Z. A. Khan Survey of Extended LEACH-Based Clustering Routing Protocols for WSNs in which they present few energy efficient hierarchal routing protocols, developed from conventional LEACH routing protocol. They also compared the features and performance issues of every hierarchal routing protocol.

In 2013, R.U.Anitha and Dr. P. Kamalakkannan are proposed an improved algorithm for Low Energy Adaptive Clustering Hierarchy protocol which is improved Cluster Based Routing Protocol for Mobile Nodes in WSN. Their proposed algorithm gives improved performance i.e. advanced packet delivery ratio, throughput, energy utilization, and delay.

In our proposed methodology we make a cluster having five nodes together in which all nodes are capable to received data from the movable sink but for data packet sending one

head node is responsible to take the decision that which node of the group will be participating for data sending, we have also monitoring residual energy of each node which help to maintain the network life cycle.

Low Energy Adaptive Clustering Hierarchy is a cluster-based routing protocol in which a cluster head collects data from sensor nodes belongs to the cluster and sends the data to the mobile sink node. To make all sensor nodes in this network consume their node energy equally and extend the lifetime of the network, this algorithm randomly changes the cluster head, which in turn uses more energy than any other node belonging to the cluster, every time period.

During the data transmission, the other nodes who participated in transmitting and act like an intermediate node between the sender node and receiver node they continuously lost they residual energy and when they want to send their data packet they don't have that amount of energy to send their data packets into the network. Energy consumption is the most challenges for sensor node because they don't have a large amount of energy to participate in the network to transmit data to an intermediate node. This is one of the major drawbacks of wireless sensor networks.

Due to this, we will try to implement cluster which maintains residual energy of each node and also using the mobile sink for data transmission which reduced the sensor node involvement for data transmission.
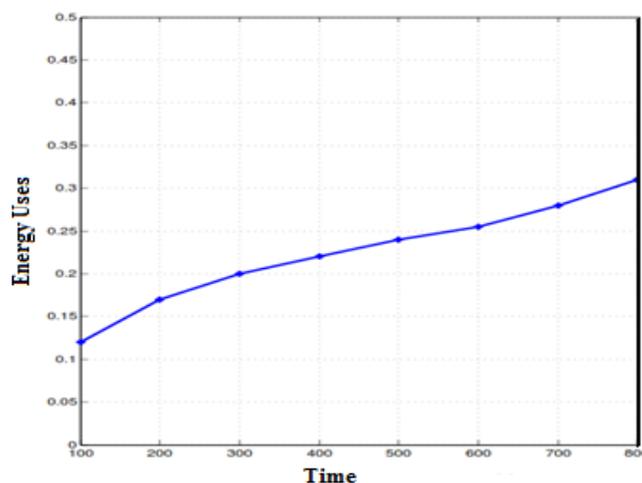
3. DYNAMIC MOVEMENT OF SINK NODE

$M_1 = P_1 (A_1, B_1)$
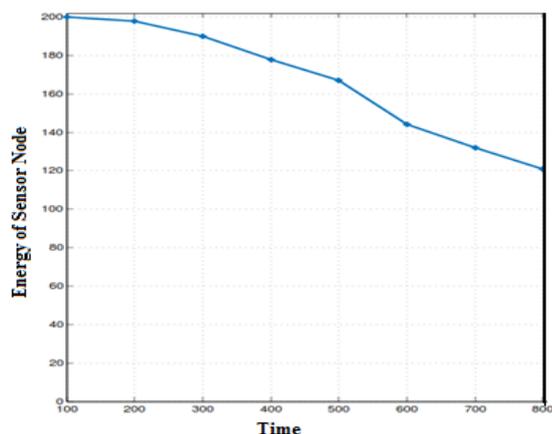Assume that at time T_1 sink node is at $P_1 (A_1, B_1)$ and then we calculate the next movement:
$B_m = By_{m-1} + \alpha\, h(A_{m-1}, B_{m-1})$
$A_m = A_{m-1} + \alpha$
Where h is fixed values and (A_1, B_1) are the previous position of sink node and (A_m, B_m) is current position. We also assume that the energy of mobile sink is sufficient for data collection and transmission.

Graph: Energy Vs Time

Remaining Energy of Sensor Nodes at Time (T)

4. CONCLUSION AND FURTHER DEVELOPMENT

In Present scenario, the wireless technology is widely used for fast communication of the end user. We discuss wireless sensor nodes uses and how to save residual energy of sensor nodes in wireless networks. We have also discussed the clustering and mobile sink which helps to improve network performance as well as network lifetime.

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