Efficient Path Management of Non-Uniform Load Distribution in Wireless Sensor Networks

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ABSTRACT: The LEACH protocol didn't take the residual energy of nodes into account when choosing the cluster heads, which may result in the node with rather low energy is to be select as a cluster head. Thus, it will cause the cluster created by this low-energy node to be dead at an early stage, which wastes the whole network's resource. In this we introduced an energy factor when choosing a cluster head, which can avoid a node with very low-energy to be a cluster head. Meanwhile, we conducted a simulation specific to LEACH protocol and this improved algorithm in terms of network lifetime, network stability, collecting data packages and energy consumption. Simulation results show that our improved algorithm has better performance compared with LEACH protocol in these aspects.

KEYWORD: LEACH Protocol, Wireless Sensor Networks, Cluster Head, Multiple Input Multiple Outputs (MIMO).

I. INTRODUCTION

A wireless sensor network contains the sensor nodes that are used to collect the information from the surroundings and communicate via wireless transceiver. The collected information that can be delivered to the sink node.These data that can be delivered to one of the more destination node by using multi-hop communication. The sensor nodes are generally operated by the batteries and it has the possibilities to drain the battery. In this situation, it is very hard to recharge the battery of the sensor node. The sink node energy is very rich. Therefore, the sensor node energy is more precious in WSN. So the utilization of the energy is very efficient to prolong the lifetime of the network. It focused the research analysis in WSN. The multi-hop communication is generally required the distant sensor nodes from the sink node. To save the energy with relaying the massive amount of data traffic that can be burdened from the other sensor nodes [1]. A Sensor node generally constrained in terms of energy, processor, memory, low range communication and bandwidth. Limited battery power is used to work the sensor node and it is very hard to replace and recharge it. So, the sensor nodes are automatically die and it will affect the network performance.

The work of the sensor node is to gather the information from the desired node. All the nodes work ceaselessly and transmit the data as long as it has the potential. Sensor node spends the entire energy for transmitting the data, receiving the data and relaying the data into packets. In order to overcome the energy efficiency problem the routing algorithm that can be used to maximize the life span of the battery of the sensor node.

There are so many applications that can be used in Wireless Sensor Networks. Some of the applications are Patient monitoring system, Forest fire detection, Weather monitoring system and battlefield surveillance, etc. The outline of the WSN research that the sensor nodes are deployed in the research area. The sensor node has the capacity to store and transmit the data in the network. In these the concept of LEACH protocol that can be used to form the clusters.Basically,

the formation of the cluster involving the clustering algorithm. In the concept of LEACH protocol it uses the homogenous clustering scheme containing the same amount of battery power containing and the nodes form the cluster. In the next step choosing the cluster head as random manner in the concept of LEACH. The Cluster head have the responsibility to transmit data to the sink node. The concept of cluster and cluster head are used to start the transmission of the data from the source to the sink node. In the entire network there are so many number of cluster head want to transmit the data to the sink node. At the time, the problem of overlapping will occur. TDMA concept that can be introduced to solve the problem. In this situation if any one of the cluster head not send the data to the destination node means it will consider as the failure of the particular cluster head. Here, the current cluster head got failure and it can be overcome by using the alternate way to select the neighbour cluster head by using Request-Response message. The failure cluster head send the request message to all the possible neighbour cluster head. In that time if any one of the neighbour cluster head will send the response message to the failure cluster head. By using Virtual Multiple Input and Multiple Output (MIMO) concept the data that can be transmitted to the neighbour cluster head. Finally, AODV concept that can be used to discover the route and the path has to be created and it is ready to transfer the data to the destination node.

The Main Objective of this paper, a simple modification in clustering algorithm of LEACH protocol is proposed to exploit virtual Multiple Input and Multiple Output (MIMO) based user cooperation. By using this concept we overcome the problem of data loss and the failure of the network.

- To minimize the number of cluster groups.
- To minimize the network failure.
- Handle the non-uniform load distribution.

II. RELEATED WORKS

In this section a detailed description of various clustering algorithm is discussed for load distribution in the Wireless sensor networks.

In this paper [2] Low-Energy Adaptive Clustering Hierarchy algorithm is used to select the cluster head with low energy this leads to failure of network. Energy can be added through the sensor it can doubling the lifetime of the network but finding the optimal solution is not possible in [3].

A hybrid energy efficient distributed clustering algorithm (HEED) is proposed in [4] can be used for load balancing. HEED complexity generates a high overhead at each clustering round.

Author in [5] DEEC the cluster head can be selected with the ratio between the energy of each node. Assistance of the routing protocol is required to know the total energy of network.

Author in [6] LEACH protocol is involved in the distributed cluster to form a big volume of nodes. Reducing multiple clusters is the important. Large number of parameter sets can be run in seconds by MH-TRACE. Proper adjustment of the parameters can be done according to network condition in [7].

Author in [8] proposed that MH-TRACE, time was organized into super frames. Transferring control packets and transmission of data from nodes each cluster form a frame. Each node generates its own listening cluster and receives the packets. Exact relationship between the two problems is established. Distributed dynamic channel allocation as a special case of relaxed mutual exclusion. Deadlock resolution arise in distributed channel allocation scheme[9].

Integrated Cellular and Ad Hoc Relaying Systems(iCAR) [10] is based on cellular and modern ad hoc relaying technologies. It provides control for heterogeneous networks. Balance less in the traffic creates the problem. It leads to failure of data packet transmission.

A new energy-efficient approach [11] was proposed based on Hybrid Energy-Efficient Distributed clustering that periodically selects cluster heads. Clustering process does not depend on the network topology and network size.

III. EXISTING SYSTEM

Existing System focus towards the non-uniform load distribution in wireless sensor network. It deals with the LEACH protocol. In the LEACH protocol the CH is selected among the nodes in the cluster for every round. So the CH is different for each round. In the LEACH protocol the CH can be selected randomly.

The base nodes in the cluster send data packets to the CH and the CH send those data packets to the sink. There is a possible to select the CH with low energy in the LEACH protocol during the selection of CH. If the CH is selected with low energy it's spoils the whole network.

Existing system main disadvantage is that it is not suitable for large area network. In this system packet loss will occur. It damages the network if the CH is selected with low energy, so lifetime of the network gets spoiled. Accuracy is low.

IV. PROPOSED SYSTEM

Wireless sensor networks are emerged as a new technology in different applications to get information from environment in recent years. One of the most important challenges in this type of networks is energy shortage of sensors. Whereas energy restriction, it should be mentioned a fundamental solution to providence energy consumption. The most suitable solution is clustering. In this paper the clustering approach is done by cluster head, in which the cluster heads are selected from sensor nodes and then the nodes become member of nearest cluster head. Furthermore, other parameters are used in clustering process control. The number of cluster member parameter in order to balance the number of members in each cluster and also cluster heads distance to create harmony in cluster density.We proposed a novel multi head criteria algorithm to search optimal and nearby cluster head. When cluster head have some problem our proposed algorithm search for a neighbor cluster head and all the members of cluster will send the data to the selected neighbor head.The main advantages of the proposed system are the networks are applicable for large region. Data aggregation based on the cluster head and it is directly communicate to the cluster head.

V. SYSTEM ARCHITECTURE
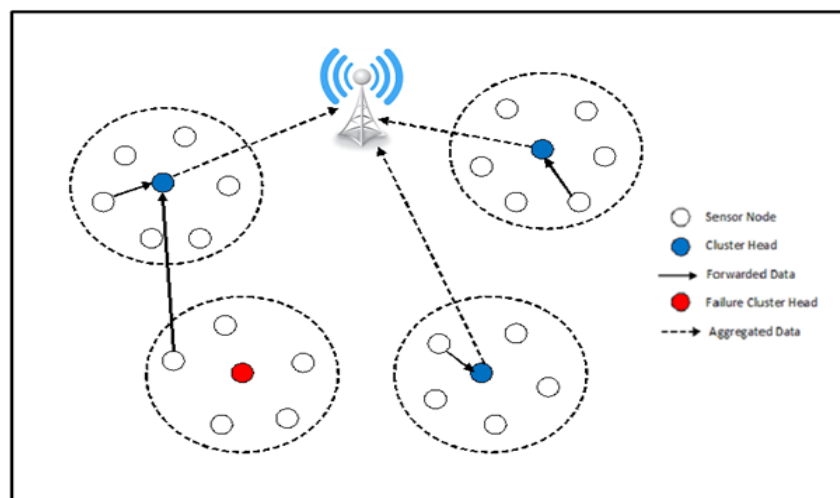
In the LEACH concept that have the clustering algorithm in the homogeneous clustering schemes. Then the clusters are formed it want to select the cluster head while we already discussed about the LEACH it have the same battery (energy) level so it select the cluster head in a random manner. Itstart the process of transferring the data to the sink node. In the network there are so many CH are there they are trying to send the data to the sink node.At that time they have the possibility to occur the overlapping on the data in the network.So, we use the concept of TDMA by using   this data transfer it will prevent the intra-cluster collision.

If the transaction have a successful data transmission then the system is in the correct order else CH be fails. Then it has to select the neighbor CH to transmit the data.So, that we include the concept called MIMO it can accept the multiple input and multiple output by using this we can transfer the data to the neighbor CH.In these it wants to find the route to send the data to the sink node. So, we use the protocol called AODV. By using our demand the route can be established and the efficient path that can be find and the data that can be send to the sink node.By, using this method the loss of data and the network failure can be recovered.

VI. SIMULATION RESULTS

Packet delivery ratio
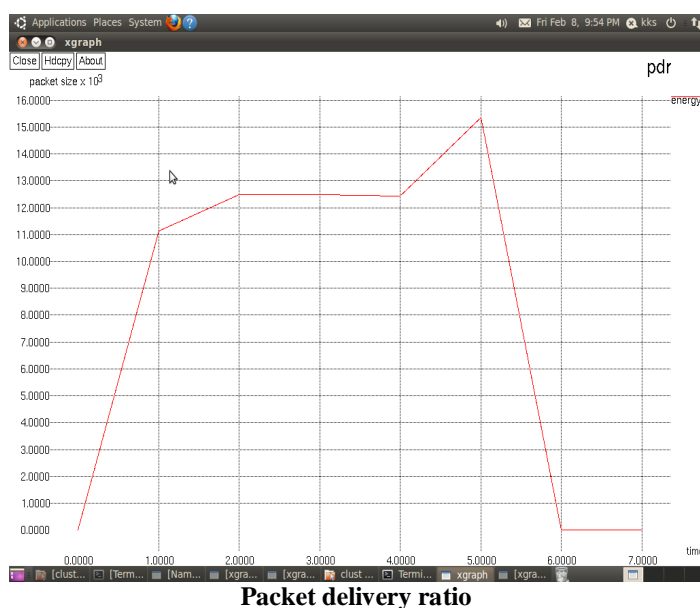
This graph is like a wave graph. In this graph the x-axis denotes the time and the y-axis denotes the size of the packet. By this, in what time the data packets can be send to the sink and the size of the data packets can be known. By viewing this we can easily understand the transferring of the data packets to the sink. The red line in the graph denotes the energy of the nodes. By this the energy of the node can be known whether it is high or low. The line is in up position means the energy of the node is high and the line is in down position means the energy of the node is low.

VII. CONCLUSION

In this overall observation the proposed system is developed to reach the data in to the sink.Here, they revised many references that have different clustering techniques and algorithm is used to make increase the network lifetime.In proposed system if energy level or battery level is low to the CH. Base node will automatically transferred data to neighbor CH .This cooperation is called as a MIMO. Our proposed system increases the network life time and the nodes lifetime in alternate way. By the proposed system, the data can be transfer without any loss and the data can reach the desired destination. The virtual Multiple Input and Multiple Output (MIMO) is applicable for long range communication.

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BIOGRAPHY

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