

An Energy Efficient Techniques For RFID Protocol In Wireless Sensor Network : Review

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Abstract - The wireless sensor network is the type of network which is used to sense environmental conditions like temperature, pressure etc. The energy consumption is the major issue in wireless sensor network due to small size of sensor nodes and far deployment of the network. In this paper, RFID protocol has been discussed. Later, various energy efficient techniques has been compared.

Keywords: *Wireless sensor network, RFID, P2MP communication, Contention Period.*

I. INTRODUCTION

WSN is a network consisting of small size and less complex devices known as sensor nodes. Sensor network [1] consist of small sensor nodes which is used to send the data that are sensed by the nodes to the base station. Sensor nodes are used for sensing the area and collect the data from the network field and communicate with the help of wireless links. After the Collection of data, then it move through the multiple nodes and send the data to a sink or monitor [2]. WSN control the hundreds or thousands of sensor nodes and all the sensor nodes are able to communicate to the base station (BS) directly or indirectly. Sensor nodes are totally dependant on batteries and are difficult to change or recharge the batteries. WSNs [3] track the whole system or the environment by measuring the physical parameters like pressure, temperature and humidity etc. WSNs have limited computational power, battery power. In WSNs, less power is required for processing the data as compared to transmitting the data. WSN is an efficient and reliable communication.

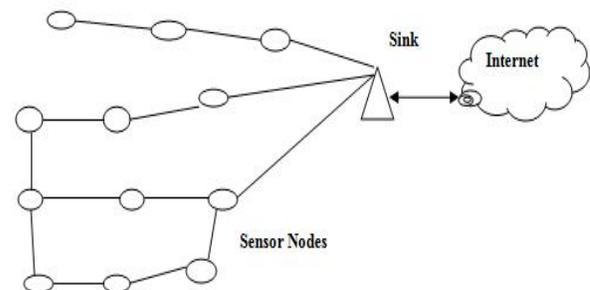


Fig.1.1 Wireless Sensor Network [4]

In WSN, it broadcast the data on the network [5] and network use more nodes and network resources. It uses more energy and bandwidth. There are efficient energy [6] aware techniques available to increase the life of the WSNs so that we can extend the network lifetime of the battery. The destruction of energy of nodes will lead to failures in WSNs .Broadcasting the information on the network will use large number of nodes and resources of the network. It also use a lot of energy and bandwidth. Sensor nodes have finite power resources and it is impossible to change the batteries. Energy efficient technique needs to be designed in such a way so that it will increase the lifetime of the WSNs[7].

1.1 Structure of sink node: Data is collected from the sensor nodes and all the collected data are transferred from the sensor node to the sink node. Sensor node is used for the collection of data and it can be a base station or access point[8]. Sink node works as a connecting link in between the preceding and the following node that plays an important role in WSNs. It can manage the sensor nodes and

communicate with the data terminal. It is responsible for sending the commands from the data terminal and receiving the data from the sensor nodes in the network.

Sink node should have high speed of processing capacity, large space for storage of data, less power consumption, and the low cost. The whole structure is divided into the four parts .

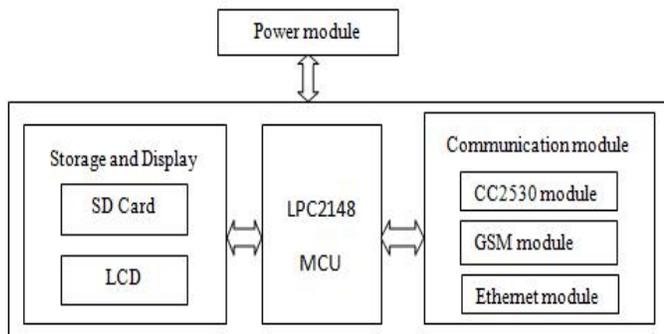


Fig. 1.2: Sensor Node architecture

Energy efficient WSNs can make when the load is equally divided to all the sensor nodes due to this all the sensor nodes will consume power equally and the network becomes operationally as possible . Network is a collection of autonomous devices that have low battery capacity information [4] that is gathered from the environment and spread the data on the wireless links.

For energy efficient WSNs these are the efforts bare applied:-

- Increase the efficiency of the network and to reduce the antique network which give the better performance of the network for this a new caching technique is used.
- Proper utilization in the network and should take the benefits of the deploying grid and proper utilization in the network
- Limited utilization of cache memory and the invalidation scheme of the cache is developed so that it removes the antique entries from it.

For the utilization of all the efforts in multiple sink environments that will provide the continuous information to mobile sinks without any delay.

1.2 RFID Protocol:

RFID (Radio Frequency Identification) is a contact-free automatic identification skill that is based on

radio frequency. There are usually two types of RFID [9] according to the power source: active RFID and passive RFID.

A. Active RFID

Active RFID system uses an internal battery to constantly power the tag and its RF message circuitry. It allows extremely low-level signals to be received by the tag. The tag can produce high-level signals back to the reader, driven from its inner power cause.

B. Passive RFID

Passive RFID depends on RF energy transferred from the reader to the tag to power the tag. Passive RFID either reflects energy from the reader or absorbs and provisionally stores a very little amount of energy from the reader's signal to produce its own fast response .

Active RFID [10] has less advantage than passive RFID in terms of its tag, cost, size and battery management but more advantages in terms of sensing rate and sensing distance. RFID is engaged to store the physical information and sensed the data for a long duration to enhance the quality of the system.

The active RFID tag uses the radio module to provide the stored physical information to the reader. It provides point-to-multipoint (P2MP) communication structure where the reader controls the tags [9]. To minimize the energy consumption of the tag, the reader reins the energy that the radio module consumes by making the tag works in the active and sleep periods. The reader transmits a collection command to multiple tags which are going to deliver the ID to the reader with contention. The active period is divided into two periods first one is the tag identification period and other is the data collection period. The ID period is called contention period [10]. A reader can be transmitting a command to multiple tags which also deliver ID to the reader via contention. In the data collection period, the reader collects the data on the tags that are sensed from the tag ID collection period using their IDs, via the point-to-point (P2P) method. During the process, sleep command turns off the radio module of the tag from which the data have been collected. This process proceeds until all the tags within its communication range are collected.

II. REVIEW OF LITERATURE

In this paper efficient energy clustering algorithm is introduced for the sensor networks it is based on the LEACH [11] protocol. Leach is an energy conserving routing protocol. LEACH arranges the nodes in the

network into small clusters. Each cluster contain a cluster head. Rest of the nodes are used to sense the data. After sensing the data it will broadcast the data to the CH. CH is used to combine the data that is received from all the nodes after that it send it to the BS. The cluster head consumes more energy. All the nodes consumes less energy base station is placed away from all the sensor nodes. LEACH protocol use the Time division multiple access based Medium Access Channel protocol it is used to support the balance of consumption of energy. This protocol adds some features of LEACH to overcome the consumption of the resource of network in each round.

In this paper Aggregation [2] of data is used to collect the data from the different nodes and data is collected by the CH in each cluster and after collecting the data by cluster head it combine the data and send the information to the Bs. Data aggregation is used to remove the redundancy. Most of the energy is used for transmitting and receiving the data. Efficient data aggregations provide the conservation of energy and it can also remove the redundancy from the data after that provide the useful data only. Data that is send from the source node to the sink through the neighbor nodes in a multi node fashion to reduce the transmission power and the reception power and when the data is directly sending to the base station or sink then it will consume less energy. In this paper, it shows that these techniques used not only for the reduction of the power consumption but also prolongs the lifetime of a network.

In this paper a technique is defied which is based on clusters in WSNs. In this paper, a new energy efficient technique is used. With the help of this technique it will help to reduce or to solve the problem of the energy hole and coverage [12] hole problem. In this technique we can control these types of problems by introducing the density controlled uniform distribution of nodes and fixing the possible number of the CH in each round. One problem occur

in the clustering technique is the creation of energy holes. If we randomly distribute the nodes then the cluster heads are overloaded and create the energy holes. In the multi-hop data forwarding technique, all the nodes that is near to the BS consume large amount of energy. These area of nodes are also known as hotspots. The energy consumes quickly in the hotspot areas in the network. New technique is introduced in this paper. In Density controlled Divide and Rule, nodes are scattered in the network and distributed randomly in different segments of network, to control the density. In this way we can avoid the coverage hole problem by using the Divide and Rule technique.

In this paper the communication distance is also reduce. In the first phase, the base station [4] divides the network into different regions. Nodes in the inner region can directly send the data to the sink. In every region one cluster head is selected in each round. Nodes of the outer region send the data to the cluster heads of the outer region and then they will send the data to the CHs of inner region and base station will receive all the data that is transmitted.

In this paper the first hierarchical cluster based routing protocol is described that is LEACH. It is used to partitions the nodes into clusters. It is responsible for the creation and manipulation of a TDMA[13] schedule and send the aggregated data from all the nodes to the BS where these data is needed using CDMA. Remaining nodes are the cluster members. There are two phases in leach protocol first is the set up phase and second is the steady state phase. In Steady State Phase the data transmission begins, all the nodes send its own data during the allocated slot of TDMA to the CH. In case of the set up phase each node decides independent of the other nodes that will become a CH or not. There is no need to form the clusters every time and there is no need to form new cluster head in the cluster. When the nodes rotate in the cluster then we will have the same access point i.e cluster head.

III. RELATED WORK

Author	Year	Description	Advantages	Disadvantages
Mousam Dagar¹ and Shilpa Mahajan	2013	Aggregation [2] of data is used to collect the data from the different nodes and data is collected by the CH in each cluster and after collecting the data by cluster head it combine the data and send the information to the Bs. Data aggregation is used to remove the redundancy. Most of the energy is used for transmitting and receiving the data.	Data that is send from the source node to the sink through the neighbor nodes in a multi node fashion is to reduce the transmission power and the reception power and when the data is directly sending to the base station or sink then it will consume less energy.	The data which is transmitted from source to destination will reduce energy consumption in the network. As described sink is placed in the middle due to which throughput of the network is less.
Ahmad, K. Latif et al	2013	In this paper, a new energy efficient technique is used to reduce or to solve the problem of the energy hole and coverage [12] hole problem. This technique can control these types of problems by introducing the density controlled uniform distribution of nodes and fixing the possible number of the CH in each round.	In the multi-hop data forwarding technique, all the nodes that is near to the BS takes large amount of energy. These area of nodes are also known as hotspots. The energy consumes quickly in the hotspot areas in the network New technique is introduced in this paper.	Nodes will select their cluster head on the basis of minimum distance and received signal strength. In DDR, entire network field is divided into small segments. Division of the network field in such a way so that the communication distance between node and CH, and between CH and BS is reduced.
Nagaveni.B.Sangolgi et al	2013	The First hierarchical cluster based routing protocol is the LEACH. It is used to partitions the nodes into clusters. It is responsible for the creation and manipulation of a TDMA [13] schedule and send the aggregated data from all the nodes to the BS where these data is needed using CDMA.	There is no need to form the clusters every time and there is no need to form new cluster head in the cluster. When the nodes rotate in the cluster then we will have the same access point i.e cluster head .	The main disadvantage of this paper is energy consumption. Due to use of central controller in the network energy consumption of the network increase at steady rate .
Anku, Hardeep Singh	2014	Divide and Rule[14] scheme is used to reduce the consumption of battery in the network. DR scheme has two clustering types first is the static cluster and second is the dynamic cluster and cluster head selection is based on the minimum distance. In the DR technique create the concentric square and the rectangular clusters which split the network into small clusters, It helps to reduces the transmission distance for the inter cluster and intra cluster network and it divides the network into three equal distance	In the existing techniques suppose we had the corner nodes which wants to communicate to the sink with the help of the intermediate nodes. First of all it will send the request to its cluster head of nearest cluster head and then the cluster head sends the data to neighbor cluster. Sensor nodes that are deployed near the sink are the main nodes and they participate for communicate with the sink and the intermediate nodes.	The energy hole problem is solved in the proposed technique. The proposed technique is based on extra deployment of the relay nodes which increase costing of the network.

		squares.		
Archana Kumari	2014	The Communication distance is also reduced. In the first phase, the base station [4] divides the network into different regions. Nodes in the inner region can directly send the data to the sink. In every region one cluster head is selected in each round. Nodes of the outer region send the data to the cluster heads of the outer region and then they will send the data to the CHs of inner region and base station will receive all the data that is transmitted 20 by the nodes.	The proposed technique will reduce the network performance in terms of energy consumption as energy hole problem is solved and lifetime of the network increased.	The proposed technique will reduce energy consumption of the network but increase network cost due to extra node deployment.

IV. CONCLUSION

In this we have discussed wireless sensor network and its architecture. In this we have reviewed various energy efficient techniques also to reduce energy consumption. It is concluded that Time diffusion of RFID is the best energy efficient technique.

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