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Evaluation and Analysis of Active RFID Protocol in Wireless Sensor Networks

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Abstract*— Wireless Sensor Networks (WSN) is a type of self organizing and self managing network which is not made of permanently of sensor nodes of the condition of not having internet infrastructure [6]. A wireless sensor network consists of a large number of nodes spread over a specific area where we want to look after at the changes going on there. A sensor node generally consists of sensors, actuators, memory, a processor and they do have communication ability. But this gives rise to many drastic changes to deal with in the network topology such as updating the path, or the network tree etc. The main task of the sensor node in the sensor network is to remove even, perform quick local data processing and send the data to the destination. Another prominent problem in the network is limited battery lifetime. In the current paper we will discuss how to the Enhance Energy Efficient Active RFID Protocol for the Clock Synchronization using NTP Protocol on Wireless Sensor Networks and thus improve the performance of the wireless networks.

***Index Terms*—Wireless Sensor Network, RFID, NTP Protocol, MANET.**

I. INTRODUCTION

A Wireless Sensor Networks (WSN) is a type of self organizing and self managing network which is not made of permanently of sensor nodes of the condition of not having internet infrastructure [6]. A wireless sensor network consists of a large number of nodes spread over a specific area where we want to look after at the changes going on there. A sensor node generally consists of sensors, actuators, memory, a processor and they do have communication ability. All the sensor nodes are allowed to communicate through a wireless medium. The wireless medium may either of radio frequencies, infrared or any other medium of course having no wired connection. These nodes are deployed in a random fashion and they can communicate among themselves to make an ad-hoc network[8]. If the node is not able to communicate with other through direct link i.e. they are out of coverage area of each other. The data can be sending to the other node by using the nodes in between them. This property is referred as multi-hoping. All sensor nodes work cooperatively to serve the requests. Generally WSNs are not centralized one as there is peer-to-peer communication the nodes.

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So, no requirement of established infrastructure to deploy the network. WSN gives flexibility of adding nodes and removing the nodes as required. But this gives rise to many drastic changes to deal within the network topology such as updating the path, or the network tree etc. In a WSN the node that gathers the data information refers to sink. The sink maybe connected to the outside world through internet where the information can be utilized within time constraints [8].The main task of the sensor node in the sensor network to remove event , perform quick local data processing and send the data to the destination. Nodes having a lesser moving compatibility, limited energy and bandwidth. But in the direct communication WSN the sensor node directly transfer the data to the base station without any coordination [23]. But the main problem in the network is limited battery lifetime. The reason is due to size of sensor node is small and its constraints on its elements i.e. battery size, processor, data storage memory. So the energy consumption is higher issue in the wireless sensor network. In the sensor node energy consumption can be useful or wasteful [8].

II. BACKGROUND

The goal of this study is to collect the information about networking parameter, networking protocols, networking aspects, what parameter used to improve the energy of RFID Protocol.

The main objective of the thesis is given below:

- To study and evaluate the existing energy efficient Active RFID Protocol on Wireless Sensor Network and identify the vulnerabilities like packet collision.
- To analyze the packet collision and to overcome this vulnerability for enhancing the energy of Active RFID Protocol using NTP (Network Timing Protocol).
- To implement the proposed technique and compare with the exiting technique.

Wireless Sensor Network is most important area now a days and recent advances in the WSN have led to the development of various new routing protocols and algorithm under various categories. A lot of studies have been done on network performance, improvement in the energy of Active RFID Protocols .RFID Protocols try to reduce energy consumption of tags into sleep mode when the reader is not working. To start interrogative, a reader sends a special signal that wakes up its nearby tags in sleep mode. There are number of protocols used for the improvement of energy but they does not perform on the large network and the tags not working proper when t after wake up a tag remains in active mode during the whole interrogative period until it receives a sleep mode.

III. METHODOLOGY

The basic concepts of the WSN including its characteristics and design issue and routing protocol are studied to understand the improvement energy of RFID using NTP protocol, to get the improvement in the energy. To obtain the knowledge as given above, the network model with consist of number of sensor nodes has been deployed. To generate the wireless network of specific number of nodes, code is implemented using the NS2 .It supports simulations of TCP and UDP, some of MAC layer protocols, various routing and multicast protocols over both wired and wireless network etc. Depending on user's requirement the simulation are stored in trace files, which can be fed as input for analysis by different component. According to the earlier study of WSN and routing Protocols, the parameter used for tags. The tags parameter are implemented using the suitable function in NS2 .these parameter are implemented for all the protocols to get the results as per the output of the simulation on the basis of the parameter. The parameter are configured and simulated for two different scenarios with varying number of sensor nodes.

IV. ADHOC WIRELESS SENSOR NETWORK

Adhoc mode is connecting wireless clients directly without the need of access point and wireless router. It has no central controller. So it is infrastructure less mode [4]. All the devices in infrastructure less network are wirelessly communicated to each other. In infrastructure less network file server contain base station of Wi-Max which controls all access points the range of 6kms.Using Wi-Max base station and access points communicating and using Wi-Fi user and access points communicating [20].

V. TYPES OF ADHOC WIRELESS SENSOR NETWORK

5.1 MANET:

MANET is a mobile Adhoc network. It has no central controller network. It is infrastructure less in nature. Nodes are moves frequently in MANET.

5.2 Wireless Mesh Network:

Wireless mesh networks made up of gateways, mesh routers, and mesh clients. The mesh clients are may be laptops, cell phones and other wireless devices. Mesh topology is followed by this network. The traffic is forwarded by mesh routers to and from the gateways but not connect to the internet.

5.3 Wireless sensor network:

A wireless sensor network is collections of sensing device that can be wirelessly communicate. Each device is capable of talk to its peer, sense, process. It is centralized system. It is inexpensive to install and no wiring is required for data transfer. A wireless sensor having a capability of processing, communication and storage capability. To enhancement in the network a sensor node is responsible for network analysis, correlation and fusion of its collected data and from the other sensor nodes. When number of sensor nodes handle large physical environment they construct or generate a Wireless Sensor Network. Sensor nodes communicate with base station (BS) using wireless radios and it communicates with one sensor node to another sensor node .It allowing them to transfer their sensed data to analysis, visualization, remote processing and storage systems [10]. The sensor nodes having a ability in a WSN can vary widely, simple sensor nodes may control a single physical phenomenon, while more complex devices may combine many different techniques such as optical, magnetic. they are different in the sense of communication .simple sensor may only collect the information and communicate the information about the observed environment ,more powerful devices having a large energy and storage capacity may also perform extensive processing and aggregation functions. For example additional devices form the responsibility in the form of the communication with the help of backbones that can be used by other resource constrained sensor devices to reach the BS. Global Positioning System receiver, allowing them to accurate observes the position .a few systems and devices consume too much energy to be feasible for low cost and low power sensor nodes [10].

VI. TYPES OF WIRELESS SENSOR NETWORKS

6.1 Underwater WSN [2]

Underwater sensor nodes and vehicles must possess self configuration capabilities it means they must be able coordinate their operation by exchanging configuration, location and movement information and to relay control data to an onshore station. Underwater sensor is more expensive and few sensor nodes constructed as compared to the terrestrial WSN.

6.2 Underground WSN [12]

Wireless Underground Sensor Networks is a type of wireless sensor networks where sensor nodes are positioned under the ground and communication through soil. WUSN covers intelligent irrigation, environment monitoring, localization and infrastructure monitoring. When compared with Terrestrial WSN the lossy communication medium in wireless underground sensor network which is soil, air and water incurs significantly higher attenuation.

6.3 Terrestrial WSN [25]

Terrestrial WSN consist of Hundreds to thousands of inexpensive wireless nodes deployed in a given area, either in before planned manner or in ad hoc .in pre planner manner there is a grid placement but ad hoc deployment sensor nodes dropped from the plane and placed into target plane.

6.4 Mobile WSN [3]

Mobile sensors must subsequently estimate the position, which takes time and energy consumes other resource needed by sensing application. In the mobile WSN nodes can be position in grid, randomly, surrounding an object of interest or countless other arrangements. The difference between WSN and MWSN is power consumption .in the both type of network wireless communication incurs a significant energy cost and must be used efficiently .however, mobile entities require additional power for mobility and needed equipped with much larger energy reserve or have a self charging capability that enable them to plug into the power grid to recharge their batteries. Other difference in between the WSN and MWSN is network sink and key distribution.

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6.5 Multi-media WSN [1]

In the Multi-media WSN networks of wireless interconnected device that are capable to ubiquitously to remove multimedia content like audio and video streams still images and scalar sensor data from the environment. It also able to store information, process in real-time, correlate and destroy multimedia data which is generate from the different sources. Wireless multimedia sensor networks will not only improve existing sensor network application like environmental control, tracking but it also able for multimedia surveillance sensor networks, Advance health care delivery Traffic avoidance, control systems etc.

VII. CHARACTERISTICS OF WSN

WSN consist of large number of nodes having a low cost , low power consumption and small size etc. it may be classified into following :-

- **Small node size:** Sensor nodes are generally deployed of an opponent environment in a large numbers, reducing node size can easy deploy the nodes. it will also reduce the power consumption .
- **Low node cost:** Sensor nodes are generally deployed in harsh environment in large Numbers and cannot be used again; reducing cost of sensor nodes is important and will conclude into the cost reduction of large network.
- **Scalability:** In the sensor network sensor nodes are in the sequence of tens, hundred, thousands, network protocol designed for sensor networks should be scalable to different network sizes.
- **Reliability:** Protocol design for sensor networks must provide error control and correction mechanisms to ensure reliability data delivery over error prone and time varying wireless channels.
- **Self–configurability:** in sensor networks, once constructed, sensor nodes should be able to self organize into communication network and configure again and again the links in the event of topology changes and node failures.
- **Lower Power consumption:** Sensor nodes are fully powered by battery .it is very difficult to recharge or charge again and again .it is very difficult to reduce the power consumption of sensor nodes so that the lifetime of sensor nodes.
- **Adaptability:** In the sensor network sensor nodes may fail or join or add up new nodes or move which would conclusion in changes in the node density and network topology.
- **Security:** A sensor network should introduce operative security mechanisms to prevent the data information in the network or a sensor node from unauthorized access or malicious attack.
- **Channel utilization:** Sensor networks have a limited number of resources, bandwidth Communication protocol which is designed for sensor networks should effective make to use of bandwidth to improve the channel utilization.

VIII. ENERGY CONSUMPTION AND DESIGN & ROUTING ISSUE

Wasteful energy consumption issue:-

- ✓ Idle listing to the media.
- ✓ Retransmitting due to the packet collisions.
- ✓ Overhearing
- ✓ Generating/handling control packets

Useful energy consumption issue:-

- ✓ Transmitting /receiving data
- ✓ Processing query request
- ✓ Forward queries/data to neighboring nodes

In the wireless sensor networks the main problem is limited battery life used by sensor nodes. The size of the sensor nodes is small so constraints are there like battery size, processors, storage for data; the seal are small as sensor nodes. So the main focus on optimizing energy consumption in wireless sensor networks. In WSN a lot of sensed data and routing information has to be sent which often some time constraints have so that the information can be utilized be for any mishap occurs, e.g. industrial monitoring, machinery monitoring, etc. In WSN the energy power consumption is much higher in data communication than internal processing. So energy conservation in WSN is needs to be addressed. Wireless Sensor Networks are pro net o node failure due to power loss. In order to provide reliable service through the network, the network should be self adjusting and must have adaptable properties as required from time to time. A bottle neck node may encounter failure due to limited battery life. In such case the network protocol should be intelligent enough to handle such failures and keeps the network operational [5].

- **Limited energy capacity:** Sensor nodes having limited energy capacity. Energy is a big factor for the network design in harsh environment .when the energy is reaches a particular threshold, the sensor nodes may be fail or any another error and the function of the sensor node may not be working proper.
- **Massive and random node deployment:** Sensor nodes deployment in WSN is application dependent and random which finally affects the performance of the routing Protocol. Sensor nodes transmitting communication randomly in the specific area.
- **Sensor locations**: in the wireless sensor network it is very difficult to position the Sensor nodes .all most existing protocol assumes that the sensors are either a tool with GPS receiver to learn about their locations.
- **Data Aggregation :** sensor nodes having a significant role to generate the wasteful data packets from the multiple nodes can be combine so that the number of transmission is reduce .data aggregation technique has been used to take the energy efficiency.
- **Scalability:** Sensor nodes may not compulsory for the same capabilities in the sense of processing ,sensing and particularly communication .communication links between sensors may not be symmetric that is a pair of sensors may not be have communication in both directions.
- **Limited Hardware resources:** sensor nodes having a limited computational functionalities and limited processing and storage capacities.

IX. SENSOR NETWORK ARCHITECTURE

In sensor network architecture, we can possibly deployed in extremely large number of sensor nodes or devices.

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Sensor network consist of a sensor field, where the sensor nodes are deployed that is physical environment, which is shown in figure 2.1. Sensor nodes should have a low cost. A low-cost device can thus be expected to have fairly limited computational and communication capabilities, considering the fact that sensing capabilities are also to be included in the device. Sensor nodes are deployed in many applications, where human intervention is not easy to maintain the sensor node. These type of sensor nodes where human intervention is not possible there sensor nodes are operate on limited battery power. These batteries are not easily replaced. Sensor nodes have a limited power, so they have to be designed in such a way, that sensor nodes use the power in efficient way. Sensor nodes automatically shut down when not in use.

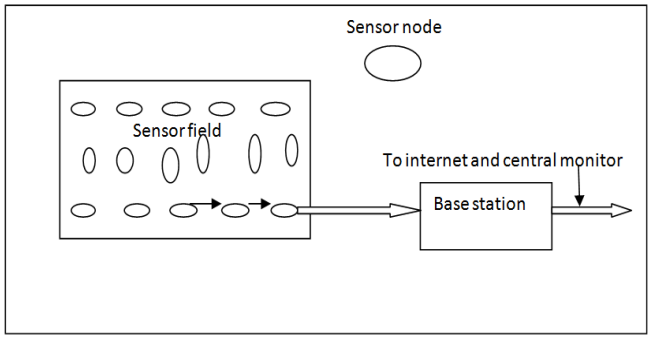

Fig 1: Sensor Network Architecture

For more specific applications like physical intrusion detection, sensor nodes have more advanced capabilities which are not in other nodes that are used in simple fields. Thus, sensor devices may range from millimeter-sized devices fabricated on custom silicon to more general purpose cell-phone-sized devices with advanced capabilities. Figure 2.1 shows simple sensor network architecture, in this sensor nodes are deployed with limited capabilities in a sensor field. The sensor nodes are communication to a powerful base station. Base station links sensor nodes with internet and a central manager for processing the sensed data which is given by sensor nodes. All the sensor nodes will not able to communication direct to base station, so sensor nodes go through from several nodes, which are connected to each other. May be sensor nodes are not in range of base station, due to limited communication range and so on. Base station or gateway may have other storage and processing capabilities that are useful for other applications. The base station is more powerful in sensor network. It has basically two types of interfaces:

- One that can connect to a mote-class device or a super mote-class device
- Connect to a large network like cell phone network, wired LAN or WLAN.

X. Structure and Application of WSN

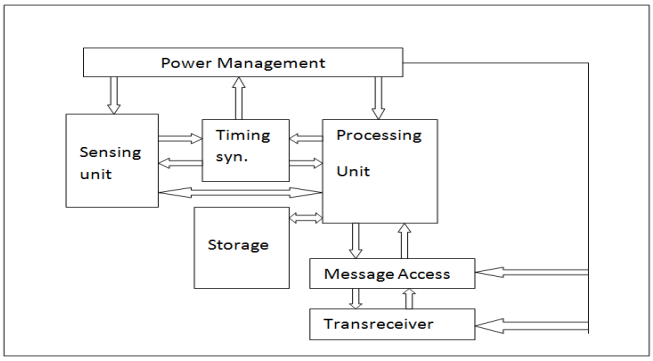

Fig 2: Systematic of sensor node

Wireless sensor network were generally used in military applications, from large scale sound observation systems for very large surveillance to small networks of not looked ground sensors for ground target detection.

- **Environmental Monitoring:** Monitor the environment parameter or condition. for example air or water quality monitoring, hazard monitoring, disaster monitoring
- **Military applications:** Military command, control communicate and intelligence system Battlefield monitoring, object protection, intelligent guiding, remote sensing.
- **Health care application:** Track new and experience technology and patients for health care purpose for example. Medical monitoring behavior monitoring.
- **Industrial process control:** Control the new construct process and control the conditions. for example monitoring and control the production process.

XI. Clustering, It's Parameters & Routing Algorithm

For saving the energy of sensor nodes one of the clustering approach is used.via the improved network organization all the sensor nodes in the sensor network can be divided into small groups or pieces is called clusters. Every cluster having a cluster head and another node is the member of cluster. Clustering conclusion in two tier structure in which cluster heads from the higher tier while member nodes from the lower tier. The clustering include grouping nodes into the clusters and choosing cluster heads periodically such that members of a clusters can exchange the information through cluster heads and these cluster heads send combined data received from its members to a base station . Because the cluster head mostly transfer data over larger or longer distances, they lost more energy as compared to the member nodes. this clustering technique is used to minimize the energy consumption .by using clustering ,it reduce the packet collision and channel assertion it to improve the network throughput under high pressure .clustering increase the network lifetime of sensor networks. Lifetime is the primary factor to formulate the performance of sensor networks .the clustering approaches cannot directly apply to wireless sensor networks, because these networks have unique deployment and operational characteristics.

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Wireless sensor networks are constructed in ad hoc manner they have a larger number of nodes. in ad hoc networks nodes does not know of their locations .hence, distributed clustering protocols that depend only neighborhood information are used WSN. We know that in the wireless sensor network the nodes performed on battery power which has limited energy. due to the some unexpected failure of node, reclustering is necessary as the cluster needs like remaining energy and node degree,it's called dynamic clustering .for the static parameters are needs like distance between nodes and the nodes are not confident for more reliable .the clustering technique is used to save the energy of battery .when using clustering in sensor network, the workload on the cluster head is thus larger than for non cluster heads. The cluster heads are changed in the sensor network during the lifetime to distribute the work load and energy consumption.

- **In Homogeneous sensor networks:** To gain more flexibility and fast execution convergence of the number of nodes in wireless sensor network in homogeneous sensor networks had done by distributed cluster head election and formation process of cluster. There are also few approaches using centralized or hybrid techniques where one or more than one coordinator nodes that means the base station is responsible to divide the whole network offline and control the cluster membership. They are naturally not suitable for practical general purpose large scale WSN application.
- **In Heterogeneous sensor networks:** There are two types of sensors, sensors which having, hardware and processing capability in this situation every sensor can become a cluster head a higher processing capabilities and complicated hardware .this type of sensors is used to generate some arrangement of backbone inside the wireless sensor network being set before the cluster head nodes and also serve as data collectors and processing centers for data collection by other sensor node. Common sensors, with lower ability, used to actually sense the desired attributes in the field. In homogeneous networks, all nodes have same characteristics. However the clusters head role can be periodically rotated among the nodes in order achieve better load balancing and more uniform energy consumption.

Before clustering formation, the clustering algorithms fulfill all conditions for clustering which are necessary for clustering in wireless sensor networks. There are some parameters which are important for whole clustering processor in WSNs, it give more detail about clustering formation. These clustering parameters are:

- **Number of clusters:** In most recent probabilistic and randomized clustering algorithms the cluster head election and formation process lead naturally to variable number of clusters [18]. In some techniques, cluster heads are predefined and number of the cluster are also preset.
- **Intercluster communication:** one-hop communication is used in initial clustering techniques, where the cluster head and sensor nodes are communicating direct. For communication between the sensor nodes and cluster head multi-hop intracluster communication is required in this large number of sensor nodes and communication range is limited.
- **Nodes and cluster head mobility:** If we assume that sensor nodes and cluster head are stationary, we are normally led to stable clusters with facilitated intra cluster and inter cluster network mgmt. If the cluster heads and the sensor nodes to be mobile, in this case the cluster head and other members of that cluster are moveable. All change their positions dynamically, changes will occur in the clusters; probably need to be continuously maintained of that clusters.
- **Nodes types and roles:** In heterogeneous environment the cluster head has more capabilities than other nodes like more communication resources and computations.
- **Nodes and cluster head mobility:** If we assume that sensor nodes and cluster head are stationary, we are normally led to stable clusters with facilitated intercluster and intercluster network mgmt. If the cluster heads and the sensor nodes to be mobile, in this case the cluster head and other members of that cluster are moveable. They all change their positions dynamically, dynamic changes will occur in the clusters; probably need to be continuously maintained.
- **Nodes types and roles:** In heterogeneous environment the cluster head has more capabilities than other nodes like more communication resources and computations. In homogeneous env. all the nodes have the same capabilities as cluster head.
- **Cluster-head selection:** In heterogeneous environments the leader nodes of the cluster is reassigned. Reassigned nodes become the cluster head. In homogeneous environments the CHs are picked from the deployed set of nodes either in a probabilistic or completely random way or based on other more specific criteria (residual energy, connectivity)[8].
- **Algorithm complexity**: The primary design goal is the fast termination of the executed protocol in most recent algorithms. The time complexity or convergence rate of most cluster formation procedures proposed nowadays is constant or just dependent on the number of CHs or the number of hops [8]. In some earlier protocols, however, the complexity time has been allowed to depend on the total number of sensors in the network, focusing in other criteria first [8].
- **Multiple levels:** In several clustering approaches the concept of a multi-level cluster hierarchy is introduced to achieve even better energy distribution and total energy consumption instead of using only one cluster level [8]. Especially when we have very large networks and inter-CH communication efficiency is of high importance so improvements are offered by multi-level clusters are under study.
- **Overlapping:** The sensor nodes are overlapped with in different clusters due to some reasons, both for better routing efficiency and for faster cluster formation protocol execution. It is also a high importance clustering parameter. Most of the known protocols, however, still try to have minimum overlap only or do not support overlapping at all [22].

Routing in WSNs is different from the routing in static sensor networks. They having no particular structure, wireless links are unreliable, sensor nodes does not work proper and routing protocols have to meet strict energy saving requirements .for WSN different routing algorithms were developed. Routing protocol is divided into four types:

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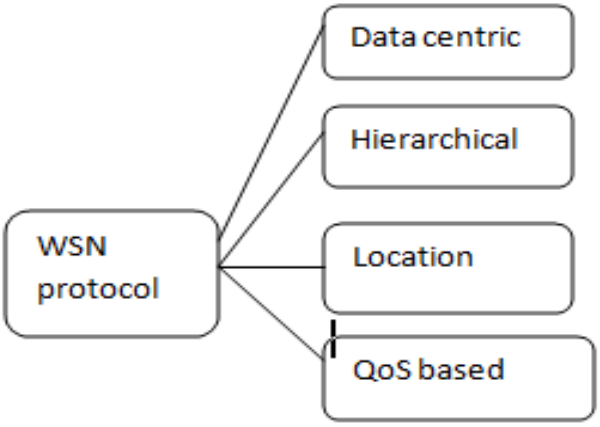


Fig 3: Routing Protocols [27]

1) Data Centric Protocols [27]In address centric protocols, each source sensor that having a particular data respond by transferring its data to the sink independently of all other sensors .when the sink node receive the data from the source node in between nodes which lies in the source and sink can perform some type of combination on the data initialing from multiple source sensors and transfer the aggregated data toward the sink node. This process can save the energy due to low transmission needed to send the data from the source to the sink node.

2) Hierarchical Protocols [27] in existing research many researchers have formulate hierarchical clustering in WSN from different perspectives. Clustering is energy efficient protocol that can be used by the sensors to sense the data from source to sink.

3) Location based Protocols [27] Sensor nodes are pointed by means their positions. Positions information for sensor nodes is needed for the sensor networks by most of the routing protocols to calculate the distance between two particular nodes so that energy reduction can be estimated.

4) QoS based Protocols [27] to minimizing energy consumption, it is also important to involve considering quality of service (QoS) requirements in terms of delay, reliability and fault tolerance in routing in WSNs. QoS based routing protocols that help find a balance between energy consumption and QoS requirements.

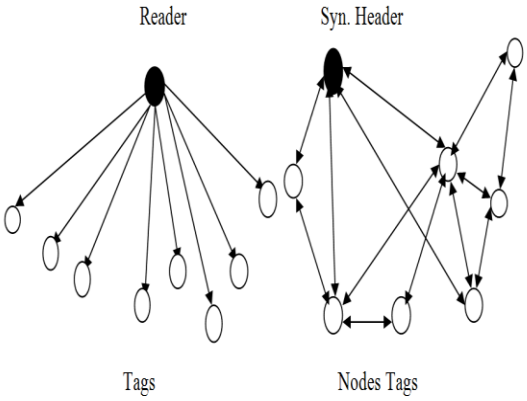
XII. RADIO FREQUENCY IDENTIFICATION

RFID is self organized technology which is based on the radio frequency. RFID is a technique for storing and retrieving data through radio frequency compatibility integrated circuit. All most cases the RFID system consist of reader and tags cases, an RFID system consists of readers and tags that construct their energy for data transfer from the reader's electromagnetic field. During the normal operation RFID system, reader first interrogates the tag within the range. The interrogation from the reader activates the RF compatible within the tags to generate enough power for necessary operation and data transmission. Using the energy the tags sent acknowledgement back to the reader upon obtaining the responses transmitted by the tags, the reader retrieves the information of all related tags from the backend server (or database). During the tag response a reader recognize tags through communication over the global wireless channel. When number of tags located within the reader's reading in the range respond to the reader simultaneously, their signal may collide each other .this technique disturb reader's tag recognition procedure and higher communication overhead and waste more bandwidth and increase the delay during tag identification procedure. When multiple tags located Hence, an efficient tag-to-reader signal collision arbitration mechanism is essential for fast tag identification in RFID systems [18].

RFID is divided into two categories [16]:-

1) Active RFID 2) Passive RFID

Active RFID will be performing the availability of tag-to-tag communication. Active RFID is less advantage than passive due to its tags size, cost, battery management but less advantage in the form of sensing rate, stability and sensing distance. Active RFID save the energy of tag operate on the tag ID period and data collection period. The active RFID tag uses the radio module to deliver the stored physical information to the reader. RFID provides the point-to-multipoint (P2MP) Communication structure where the reader controls the tags. To reduce the energy consumption of the tag, the reader controls the energy that the radio module consumes by making the tag operate in the active and sleep periods. The reader transmits a collection command to multiple tags, which deliver the ID to the reader via contention. 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. The tag in the active period passive operate according to the command of the reader, and consume the energy by keeping the Rx state while not receive the reader command .but in this case the problem is occur the tag does not know the communication time in advance .this problem is called overhearing problem. The tags waste lot of energy for overhearing.



a) Reader Central Structure (No tag to tag communication) b)Peer to Peer Structure(Tag to Tag)

Fig 4: Communication structure a) active RFID b) WSN [16]

1 States for the Tag identification:-

- Sleep
- Active
- Waiting

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2.12.2 Parameters used for the tag platform:-

- Transmission power
- Receiving power
- Sleeping power
- Time to the collection command in the synchronization period
- Time to the response frame in listing period
- Time to slot in listing period
- Time to the read command in access period
- Time to the data transmission in access period
- Time to the sleep command in access period

XIII. LITERATURE ASSOCIATED

The energy enhanced protocols deals with a particular device to transfer the data one cluster to another without using any static infrastructure. Wireless sensor networks devices became aware of each other presence. Various research papers reviewed based on the energy enhancement:

Chae-Seok Lee, Dong-Hyun Kim and Jong-Deok Kim [16] Presented that the Reservation Aloha for No Overhearing that is used to inform the tag of its effective communication for eliminate overhearing problem .large of energy is reduced due to overhearing is many times larger than consumed effective communication .overhearing is a state of tag in which it waste energy for maintaining active Rx state while no frame is destined to it. To eliminate this problem author purpose algorithm (RANO).A tag has information about the time and duration of communication advance because it maintain active mode for kept the sleep mode due to other transmission period. RANO use the reservation packet to address the problem .the reservation information is transfer in the bit map format to include this information packet consist of success bit map and error bit map .success bit map for reservation and error bit map for recovery of error. RANO Protocol saves the 60 times energy than another protocol.

Norah Tuah et.al. [15] Discussed a new technique Three level heterogeneous energy protocol (TLHE) .which is used to elaborate the results from the simulation. The technique proposed by author is used for energy efficient routing protocol for hetrogenious WSN and compare the HlEACH, EEHC and EECDA .author conclude them which resulted in significant increase in network. The TLHE Protocol for hetrogenious sensor network having ability of periodic order. In which each order is split into three different phases is called as the cluster head selection, cluster formation and data communication phase .A percentage of energy was added to some nodes to create the energy heterogeneity in the network.

LI Jian-qi et.al. [6] Proposed improved clustering routing algorithm which priority to energy efficiency. First generate cluster head by random competition in the nodes which have advantage in energy next determine the internal structure of clusters by calculating dynamically tightness coefficient of each cluster, after that, optimize transmission path between cluster heads through improved multi-objective particle swarm algorithm. Improved algorithm combine the advantage of EUUC algorithm and PEGASIS algorithm .in this paper the improved algorithm is more suitable for large scale WSN and increase the overall performance. The improved protocol improves cluster election and then most effective communication mode improves in between the clusters. The choose cluster head require to calculate the dispersion coefficient and decide communication architecture according to the dispersion coefficient. Stable data transmit overall the network. Clustering factor is calculated in each round. When the clustering factor is greater than the set threshold value .the network clustering is started again. The algorithm reduces the competition but it will take too much load and reduce the overall network energy consumption among the balanced nodes and the time is same to improve the data done instantly.

Yu Wang and Shuxiang Guo. [14] Focused on the energy efficient and delay tolerant cooperative transmission algorithm which show simulations validate that energy efficient and delay-tolerant cooperative transmission algorithm (EDTCT) outperforms the store-wait forward way no matter in E2E sleep latency and E2E energy consumption. In particular scheme is adaptive to dense network and it works efficiently in low-duty-cycled WSN. To minimize sleep latency combined with the transmission energy optimization .to address this delay issue range extension feature of cooperative communication is include for avoid waiting sleep node. The EDTCT algorithm compares two procedures: transmission modes determination procedure and relay selection procedure. The former one operated on the node required for task with the sleep latency issue according to different four architecture while the latter one is responsible for picking up an energy efficient relay in order to save energy in cooperative transmission.

Degan Zhang et.al. [17] Proposed a method forward aware factor (FAF-EBRM).This method is used for the next hop node selected according to the forward energy density and link weight .The FAF-EBRM compared with LEACH and EEUC. The proposed method balance the energy reduction, function lifetime and provide good quality of service. It reduces the probability of successive node breakdown and enhances the synchronization of WSN. Furthermore, a spontaneous construction again and again mechanism for local topology is designed LEACH and EEUC, which balances the energy consumption, extend the function lifetime and guarantees high QoS of WSN. it also include the distributions of node degree, strength and edge weight follow power law and represent tail .so the topology has strong and fault tolerance and enhances the synchronization of WSN .

Nicolas Gouvy et.al. [13] developed PAMAL (PATH MERGING ALGORITHM) new geographies routing algorithm for mobile node .The proposed first routing protocol which is located and uses paths crossing to adapt the topology to reduce the network traffic in this way while still Optimizing energy efficiency. The protocol makes the intersection to move away from the destination, getting closer to the sources, allowing higher data aggregation and energy saving. PAMAL making the different routes merge in a localized way. Which save the energy having lesser number of nodes. Intersection node is that node when the node is detected i.e. the node having receiving packets from different sources for same direction. The proposed algorithm could easily be enhanced to n sources. It improves the network life time 37% than exiting.

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Peyman Neamatollah and **Mahmoud Naghibzadeh** [22] Points out the hybrid clustering approach a cluster head reduce of its energy, it indirectly informs all other nodes and clustering is used to beginning of the upcoming round. Clustering is performed on demand. To elaborate the efficiency of proposal the distributed clustering protocol HEED (Hybrid Energy Efficient Distributed) hybrid clustering algorithm is used as baseline example. The clustering approach having a cluster head which consume energy before it specify. It indirectly informs all other nodes so; clustering will done in the initialing of the upcoming round. Through simulation results, it shows that HCA is approximately 30% more efficient in terms of network lifetime than the other protocol.

Kai Bu, Bin Xiao, Qingjun Xiao, Shigang Chen [5] Discussed about the series of protocol toward efficient misplace tag protocol solution in large RFID system. The proposed protocol remove misplaced tags based on reader position rather than tag position .it has guarantee the efficiency and scalability to system scale grow due to smaller number of reader rather than tags. in this consider the application to employ more and more populating active tags. In this paper analyze the best performance of purposed protocol to demonstrate their efficiency. The T-MTP detects misplaced tags based on reader vectors instead of tag vectors. T-MTP continuously increased time efficiency as well as energy efficiency than a basic solution requires tag wise positioning. Considering employ more and more popular active tags with self equipped batteries. Purpose ET-MTP.ET-MTP address the MTP problem through requiring replied from only partial tags in favor of energy saving .The proposed protocols performs the state of the art in both time efficiency and energy efficiency having guarantee scalability in large RFID systems. Potential .the result shows show significantly increase the time efficiency and the energy efficiency by over 70% on average when compared with the state of art.

Diwakaran S [20] Developed an anycast packet-forwarding approach to reduce the event reporting delay and to maintain the network lifetime of the wireless sensor networks for the a synchronization sleep wake scheduling .in this paper the author study two optimized problems first when the wake up rate of sensor node is given, then develop efficient distributed algorithm to reduce the expected event reporting delay from sensor to sink node. Second, the lifetime-maximization problem to optimally control the sleep–wake scheduling policy and the anycast policy in order to maximize the network lifetime subject to an upper limit on the expected end-to-end delay.

Shah.T, N.Javaid, Qureshi.T.N [21] Developed the energy efficient intelligent routing protocol for WSN .The proposed technique the author evaluate and enhance certain issue network lifetime ,network stability and cluster head selection process useful the topics of characteristically pairing among sensor nodes energy utilization is optimized. Presented efficient routing scheme for WSN. the main focus was to improve cluster head selection process .the designed protocol ,CH are selected on the base of remaining energy .in EESAA nodes switches between active nodes and sleep nodes to reduce the energy consumption. The proposed strategy shows, lifetime and stability period of network .The proposed routing protocol compared with existing routing protocol like SEP,LEACH and DEEC.

DENG Huifang, WANG Tingting [11] focused the data fusion routing algorithm and time synchronization algorithm for wireless sensor networks. Proposed a new data fusion routing algorithm low energy consumption cluster based routing algorithm(LECCBRA).conclusion shows lot of energy is saved and the balance in the energy consumption between clusters can be achieved with LECCBRA .The network lifetime is expanded. In the second step the proposed a timing synchronization algorithm clustering based time synchronization (CBTS).which is useful for LECCBRA. Second step shows the total energy is improved and the accuracy can be improved. LECCBRA use the LEACH-C cluster head selection algorithm to divide the network for controlling the number and location of cluster head. The result shows the cluster heads are equally distributed in the network area and the number of cluster head is neither too big nor small. Other round not using LEACH-C algorithm, the remaining energy and being closer to the centred of mass is selected to the next cluster head cluster inter connection must be balanced nodes having no need to report the base station .

CHEN Yu-Ping, WU Quincy [9] Point out a new clock synchronizing systems which observe network time synchronizing protocol having low power Wi-Fi devices .in this paper the author addressed two issues in WSN .first is power reduction of wireless sensor. Then compared ZigBee with Low power Wi-Fi on the power reduction .results shows the measurement the low power reduction of ZigBee and Low Power Wi-Fi a digital oscilloscope was used to help to compare the power reduction in start up and stand by status. The second issue is clock synchronization because time accuracy is a large issue for disaster prevention every node is synchronized by the clock. In this paper when compared with the exiting Wi-Fi the power reduction of low power Wi-Fi is consumed approximately 40% .The average power reduction of low power Wi-Fi with startup status is lower than the ZigBee ,but the peak current at start up is higher than ZigBee.

Vinay Kumar et.al. [27] Discussed the Wireless Sensor Networks to maximize the network lifetime of the sensor node, for data transfer the path is selected in such a way in which the energy consumption is minimized in the path. To support high scalability and better data aggregation sensor nodes are often grouped into clusters. Cluster create hierarchical wireless sensor network, the sensor nodes utilization their limited resources in efficient way and thus enhance network lifetime. They presented taxonomy of energy efficient clustering algorithm in WSNs. and also presented timeline and description of LEACH and its descendant in WSNs.

Raj Deni Ebin [20] Presented the cluster head Gateway Switch Routing Protocol (CGSR) uses a hierarchical network topology. In this way they organize all nodes into cluster and all the nodes should trust on a cluster head which is elected by any selection algorithm. The discussed algorithm enable to optimize power consumption during the selection of cluster head in wireless sensor network that is LEACH and LEACH with deterministic.

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There are several factors which play an important role in selection of cluster head like power efficient, threshold based, density, load balancing, scalability and distance. Algorithms based on load balancing reduce communication cost to a great extent. An energy efficient algorithm for cluster head selection in wsn, Consumed energy as a factor for cluster head. They analyzed of these algorithms and gave birth to a new algorithm called EDR LEACH.

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