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Different techniques in wireless sensor networks: Survey

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Abstract:- Wireless sensor networks is a collection of distributed nodes which are randomly deployed in sensor area. To capture environmental parameters like temperature, pressure, humidity. Performance of the network is depend upon the congestion and traffic control mechanism. Because heavy congestion and traffic will be effect on lifespan of the network. With the help of QoS parameters like delay, throughput, energy, PDF, PLR , researcher can easily measure the performance of the network. In this paper, we have covered various techniques of wireless sensor networks, which are very useful for achieve QoS parameters of sensor networks.

Keywords :- Energy, delay, throughput, congestion control, packet drop, packet loss ratio.

Introduction:

Wireless sensor network (WSN) is a new type of wireless network that is becoming more and more popular in various civil and military applications. A wireless sensor network (WSN) is a wireless network that contains distributed independent sensor devices designed to monitor physical or environmental conditions. WSN consists of many interconnected small sensor nodes that communicate with each other and exchange information and data. These nodes receive information about the environment, such as temperature, pressure, humidity, or pollutants, and send this information to it, send the information to the wired network, or trigger an alarm or action based on the type and amount of monitoring data. Typical applications are weather and forest monitoring, combat monitoring, physical monitoring of environmental conditions, such as pressure, temperature, vibration, pollutants, or tracking the movement of people and animals in forests and borders. The transmission medium (that is, air) used for wireless

transmission, such as wireless local area network (WLAN). Standard access protocols (for example, IEEE 802.11) can be used for correct communication between nodes on the LAN. This protocol and other protocols cannot be directly applied to WSN. The main difference is that, unlike the devices participating in the local area network, the sensor has a very small power source (usually a battery) and can discharge very quickly. Therefore, a new energy-saving MAC protocol needs to be developed. ...Obviously there is a difference between traditional WIFI and WSN, because the latter has limited resources.

Components of WSNs:

A wireless sensor network (WSN) consists of several sensors called nodes and a central location called a base station.

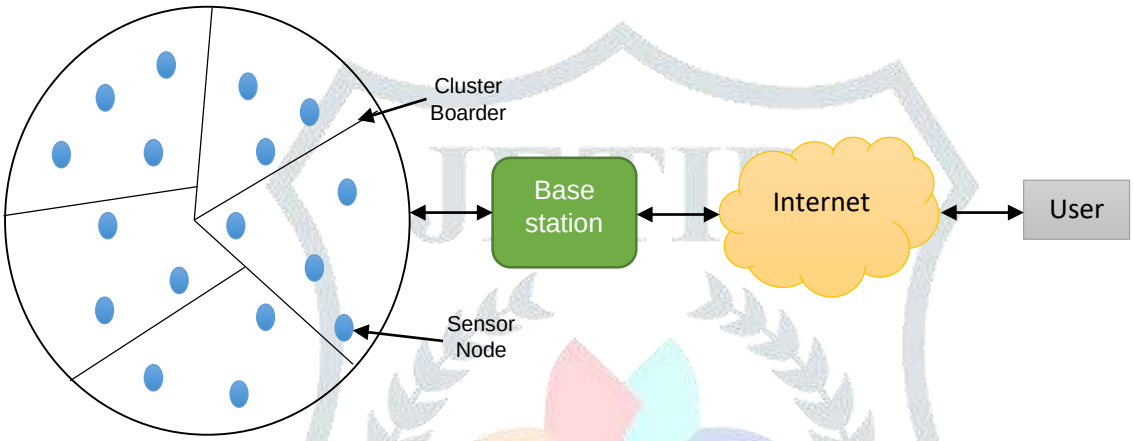

Figure1. Structure of Wireless Sensor Network

Sensor Node:

A sensor is a small electrical device that senses and processes data before sending it all to the bs. It's being used to track a variety of things, including changes in physical environmental parameters like temperature, pressure, humidity, & sound, as well as changes in human health factors like pulse and blood pressure. A sensor node should be small and compact, require very little energy, function independently, have a high-volume density, and just be able of adjusting to the environment in which it has been placed and function without the need for external monitoring.

The following are the main components of a sensor node:

Controller:

The sensor node's controller is responsible for performing the sensor node's activities, processing the data obtained, and managing the functionality of the sensor node's other components. A controller is a low-cost device with the ability to link to other devices, programming capabilities, and low power consumption.

Transceiver device:

A transceiver device is just a single system that performs both transmitter and receiver functions. The transceiver's device states are transmit & gather information; when it is not in one of these states, this will be inactive or sleep. They could also close completely the transceiver instead of leaving it in idle state

even when it's not transmitting and receiving since some transceiver's devices have an energy consumption although in sleep mode, similar to the energy consumption in receive mode. Whenever it switches from sleep state to transmit mode, a significant quantity of power is used.

Actuators or sensors:

Sensors are hardware devices that sense changes in the physical state of the environment, such as temperature or pressure.

They generated a constant analogue signal, which was converted to digital by an analog-to-digital converter and then sent to the devices for further processing.

Memory:

In a sensor node, there are two types of memory: users' storage & programmer storage. Users' memory is used to store application-related / private information, while programme memory is being used to configure the sensor.

power supply:

The sensor node uses energy to sense, deliver, and receive information, as well as process data. Batteries or capacitors are used to store power.

Base Station:

The base station is connected to many wireless sensor networks. A microprocessor, antenna, radio board, and USB interface board are all included. Base station is pre-programmed with such as low-power mesh networking software enabling communications among wireless sensor network. Because all sensor nodes send their information to the base station, it's critical to set up a base station in a wireless sensor network. This information is also evaluated at the base station for analysis & decision-making. Conservation of energy & reliability challenges are addressed throughout base station deployment in sensors coverage area of sensor nodes. Base stations are typically believed to be static, although in some circumstances, they are believed to be mobile in order to collect data via sensor.

Literature Survey:

Clustering has been used as a common topology management method in WSN. Although clustering was originally considered as a way to improve power consumption, clustering can solve various network problems such as load balancing, QoS, security, and mobility management. In this article, we will study the goal of clustering technology in WSN to study the current direction of clustering technology more than 20 years after the introduction of the first major clustering technology. We will also study the various network functions that the cluster can support, such as: B. Heterogeneity and mobility. Examined 210 clustering methods to perform statistical analysis on clustering targets and network features. As expected, the results show that the most important goal when using cluster technology is energy consumption, but they can also be used to help achieve more than 17 other goals. In addition, the results show that most existing clustering methods cannot support heterogeneous and mobile network infrastructures. Since

many applications require support for such network functions, more effort is needed to eliminate heterogeneity and mobility through clusters. In addition, the results show that although clustering techniques aim to reduce power consumption and improve load balancing, they can solve a wider range of problems, prompting scientists to use clustering to solve other network problems.[1]

In the article, the author suggests that there are two drains, their energy is uncertain, and they move counter clockwise. By supporting multiple receivers, they reduce the number of hops between the channel and the receiver acting as a gateway, thereby improving network efficiency. The author proposes a clustering technique that can help multiple mobile station receivers to collect data based on queries. They increase the "success rate", which shows the relationship between the number of data packets successfully received by the BS and the total number of data packets generated. In this article, we will take a closer look at the existing WSN joint methods, their goals, and the network properties that support these methods. After perfecting more than 500 grouping methods, we have identified about 215 of the most important grouping methods. These methods have also been analysed, classified, and classified according to grouping goals and network attributes (such as mobility and heterogeneity). The video based on the selected indicators provides very useful information about the development of clustering technology in WSN.[2]

Wireless sensor networks that can be distributed in a wide geographical area are used in many areas. In this case, a way to better manage these WSNs is needed. WSN restrictions. Existing work will be discussed in detail. A short paper on the selected cluster protocol LEACH and LEACH-C is introduced. We also provide simulation results and analysis These protocols: As a conclusion of the observation of the results, it can be mentioned that when the local coordination of nodes has a higher priority than other factors (for example, the security for the required number of clusters in a cluster that does not involve OS) At times, LEACH is more preferable. and many more; When it is desired to use a centralized deterministic method to cover the entire network, and to provide a longer network life and the required number of clusters, LEACH-C and LEACH-C can be selected.[3]

This document uses the NS2 tool to compare the two main cluster protocols, namely LEACH and LEACH-C (centralized) for various selected scenarios, and analyses the simulation results using selected performance indicators, and compares the results between the two the waiting time and network lifetime were carried out. In addition, there is work comparing LEACH and LEACH-C, but it is only very brief. With this in mind, the motivation of this work is to provide a detailed comparison of LEACH and LEACH-C for parameters such as delay and network lifetime.[4]

Literature Survey Table :-

Paper No	Technique used	Advantages	Disadvantages	Quality of service achieved
1	Energy Efficient Routing Protocol for Wireless Sensor Networks using A-star Algorithm	The average residual energy of the nodes in the EERP is greater than that of methods A and F. Creating more redundant packets in the A and F method reduces the remaining average power. Low power consumption leads to an increase in the number of active nodes. Low power consumption of nodes for packet transmission.	The sink is located in the centre of the zone, not in the upper corner of the zone. Because of the many-to-one traffic pattern, the lack of power management will lead to rapid loss and destruction of energy resources of nodes near the receiver; This is called the power hole problem. The number of transmitted packets is small.	Increasing the network lifetime.
2	Energy Efficient Hierarchical Clustering Algorithm	Power consumption decreases as the number of levels in the hierarchy increases. We used a numerically calculated set of optimal probabilities to become a group leader at each level of the group's hierarchy.	In the network with the lowest density, the sensors are located over a larger area. More power than other sensors because they must receive information from all sensors in their group.	Minimize the energy consumption in the network.

		The clustering algorithm can be run periodically to balance the load instead of periodically running the algorithm.	This algorithm is suitable for networks with a large number of nodes.	
3	Delay Aware Routing Protocol	The delivery speed of parcels is gradually increasing over time. The average pole-to-pole delay decreases with increasing time.	As the number of nodes increases, more packets fail to meet the deadline.	Under progress.
4	Cluster Head Selection in Wireless Sensor Networks under Fuzzy Environment (Fuzzy TOPSIS technique)	Residual power, distance from the nodes to the base station and the number of neighbouring nodes are taken into account to optimize the number of clusters / cluster heads. Fuzzy TOPSIS provides significant energy savings and extended network life compared to DHAC.	The amount of information is also reduced as fewer nodes remain in the physical area. The number of active nodes begins to decrease cyclically, the number of clusters also decreases, and a decrease in the number of live nodes ultimately leads to a decrease in the number of clusters.	Cluster Formation and Data Transfer
5	mobility aware energy efficient clustering for MANET based on a bio-inspired approach	The inter-layer system is well optimized, and the internal routing is served by parameters such as stability variance in channel selection and PSO-based clustering.	Mobility and the ability to choose the most suitable nodes to work as channels coordinating the work of their cluster members over a long period of time.	Selection of CHs to cluster formation, improved the overall network lifetime.

6	Transport Protocols for Wireless Sensor Networks: State-of-the-Art	Wireless sensor networks have a transport layer to manage congestion and ensure reliable messaging from sensor nodes to the receiver. Limited power, memory, and computational requirements for sensor nodes.	Traditional transport protocols such as TCP / IP do not provide a sufficiently efficient alternative without significant modifications.	Reliable data transmission
7	Periodic detection method for selective forwarding attacks based on the DBSCAN algorithm under unreliable channels.	Detect malicious hosts efficiently with selective forwarding attacks. Malicious hosts can effectively improve network performance to correct their behaviour. Malicious hosts are detected, they are isolated and cannot continue to attack the network. The associated costs and benefits for routing and forwarding packets.	Instability and unreliability of wireless links can cause detection to fail. The randomness of the link quality and the possibility of node failure will add a lot of ambiguity to the detection results.	Detection of malicious node and improve network throughput.

Conclusion:-

Wireless sensor network is set of distributed nodes, which are randomly deployed for data collection. In wireless sensor networks, techniques like sleep-active, scheduling, clustering and sectoring are used for quality of services achievement. In this paper we have covered many techniques of wireless sensor networks, which are useful for improve performance of the networks and increase lifespan of the network. QoS parameters like energy, delay, throughput, PDR and PLR are depend upon the techniques used for implementation. Some authors are achieved energy, delay, throughput and PDR. In future work, we will implement cluster and sector based protocols for achieving QoS of wireless sensor networks.

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