A REVIEW ON SLEEP WAKE SCHEDULING IN WIRELESS SENSOR NETWORK

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Abstract: -In this review paper we are studying sleep wake scheduling in wireless sensor network.Sleep/wake scheduling is an important thought in sensor network applications.Discovery an optimal sleep/wake scheduling approach that would lessen computation and communication directly above, be strong to node failures, and deliver high-quality data facility is extremely challenging.Wireless sensor network (WSN) has drawn growing interest in latest years with the growth of production and integration of low-power equipment. a sleep/wake schedule protocol for lessening end-to-end delay for event determined multi-hop wireless sensor networks. These networks are extensively used in military for tracking trespassers, climatic changes, health care, home safety, etc., To spread the lifetime of wireless sensor network, the strategy of Energy-Efficient scheduling algorithm is acentral factor.

Keywords: - wireless sensor network, wireless sensor network, data facility, protocol, Energy-Efficient

Introduction: -

Wireless sensor network is a network consisting of a number of nodes that monitor an environment cooperatively. Each network comprises of a sensor node with a device that contains sensor, memory and communication. The sensor senses the atmosphere and sends it to the base station or sink node [1]. A distributed wireless sensor network (WSNs) have been increasing in popularity for a wide range of applications. A WSN consist of large number of sensor nodes equipped with various sensing devices to observe different phenomenon changes in the real world [2]. Continuous monitoring systems constitute an important class of sensor network applications, where a large number of sensor nodes monitor the environment and periodically report to a single base station(s) [3]. A wireless sensor network (WSN) comprises of spatially distributed independent sensors for monitoring physical or environmental circumstances, such as temperature, sound, pressure, etc., and for passing their information to a primary place through the network [4].

For a broad range of parameters, wireless sensors and the arrangement of these tiny electronic devices into radio networks have launched the ability to monitor a physical environment remotely [5]. A sensor is a device that detects and records, indicates, or otherwise responds to a physical property or measures it. Memory is the mind's ability to encode, store, and retrieve information [6]. If we couldn't remember past events, we couldn't learn or create language, relationships, or private A wireless sensor network (WSN) is a wireless network of independent spatially distributed devices that use sensors to monitor physical or environmental circumstances [7]. A WSN scheme includes a gateway that offers wireless connectivity back into the wired globe and distributed nodes. Good understanding of energy consumption sources in WSNs is the first step towards reducing energy consumption [8].

Literature review: -

The sleeping / wake planning systems bring some sensor nodes into sleep and only use a required set of active nodes for sensing and communication to keep connectivity and coverage efficiency, when a sensor node is placed in the sleep state, it shuts down entirely, leaving only one highly low energy timer to wake up at a later moment [1]. The literature has suggested a variety of sleep / wake planning protocols. Most use a sleep / wake period interval and provide efficient energy conservation at the expense of delay and throughput [2].

Wireless Sensor Network: -

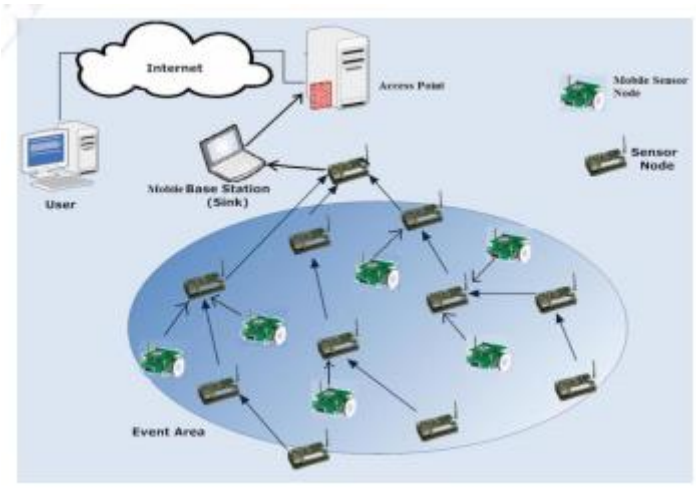
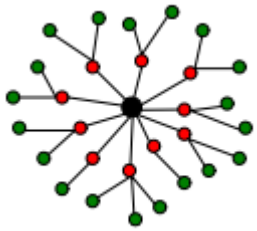


Figure 1: Wireless Sensor Network

To minimize the delay in broadcasting in WSN, it is necessary to minimize the time wasted for waiting during broadcasting. Therefore, in the wireless sensor network, there is a need to balance both energy consumption and broadcast delay. When the source nodes get the broadcast packets, the target node wakes up instantly. Wireless sensor network fundamental diagram [6]. A sensor network can be modelled as a hierarchical or flat framework, according to previous literature. Each sensor has the same position and functionality in a flat framework, while some sensors perceive and relay environmental data in a hierarchical system, while others may be control centres for data aggregation or decision making [7]. For a broad range of parameters, wireless sensors and the arrangement of these tiny electronic devices into radio networks have launched the ability to monitor a physical environment remotely [8]. Sleep planning should increase the lifespan of the network. But it can sometimes improve the delay in broadcasting. The delays in broadcasting also improve as the network scale rises. Therefore, effective techniques of delay sleep scheduling must be intended to provide low delay in broadcasting from any node in the WSN [9]. Existing sleep / wake schedules for wireless sensor networks can be synchronized where nodes synchronize to coordinate their wake-up schedules or asynchronous / random schedules that do not involve explicit synchronisation [8].

Problem description in wireless sensor network: -



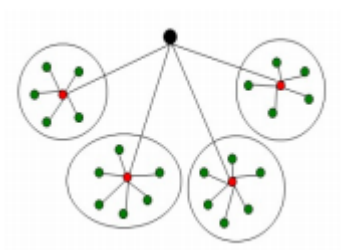


Figure 1: Flat structure **figure 3: Hierarchical structure**

Using this approach, sensors can be managed locally by a special node commonly referred to as the cluster head in a cluster-based structure, the node is chosen to manage the cluster and is responsible for communication between the cluster members and the base station, which delivers management and maintenance responsibility from the base station to the cluster heads[1].

sleep scheduling methods:

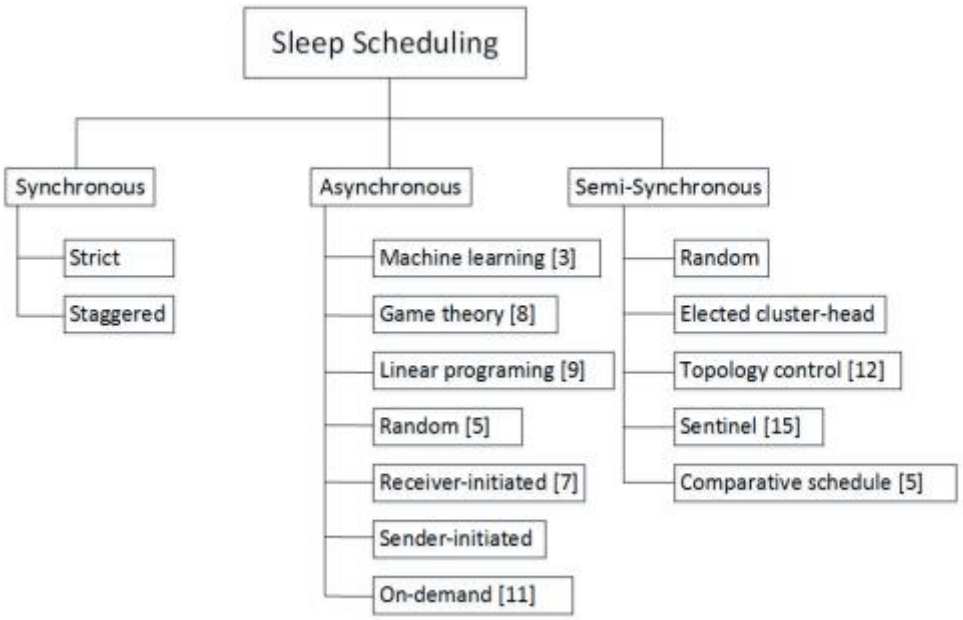


Figure 4: sleep scheduling methods

Wireless sensor network is a network of spatially distributed sensor nodes fitted with sensing, computation, energy and communication modules to track a particular phenomenon such as environmental information or object tracking [4]. The average duty cycle measures a node's ratio of moment to complete moment. Existing duty cycling MAC protocols with energy efficiency can be classified into two kinds: synchronous and asynchronous [5]. Synchronization-based sleep / wake planning schemes are often used for ongoing surveillance systems due to regular traffic patterns. Fine-grained synchronization between the sender and the receiver is needed to allow them to wake up simultaneously to interact [6]. In the context of wireless sensor networks, time synchronization was researched. Clock discrepancy between sensor nodes is primarily owing to two impacts: offset phase and skew clock. Phase offset is the clock discrepancy at a specified time between nodes [9]. The entire method operates on a regular basis. In this case, the entire routing structure can be disturbed if the period is large and any node goes down in the middle of this period. The fundamental concept is to sleep the radio during idle moments and wake it up right before transmitting / receiving the message. Existing sleep / wake scheduling systems for wireless sensor networks may be based on synchronization, where nodes synchronize to coordinate their wake-up schedules, or asynchronous / random schedules that do not require specific synchronization [10]. Sleep scheduling is a commonly used system in wireless sensor networks (WSNs) that can save energy wastage from idle listening by decreasing energy consumption. In sleep scheduling, transmitter nodes should wait until the receiver nodes are in active condition and willing to receive the signal. Sleep planning improves the lifetime of the network, but it may trigger delay in transmission [4]. This strategy is the first to use the Thus, it is possible to avoid the trade-off between energy saving and the delay in the shipment of packets caused by duty cycling. Duty cycling method to the best of our understanding. This strategy can decrease energy consumption as well as delay in the shipment of packets [5].

Sleep Scheduling in WSN:

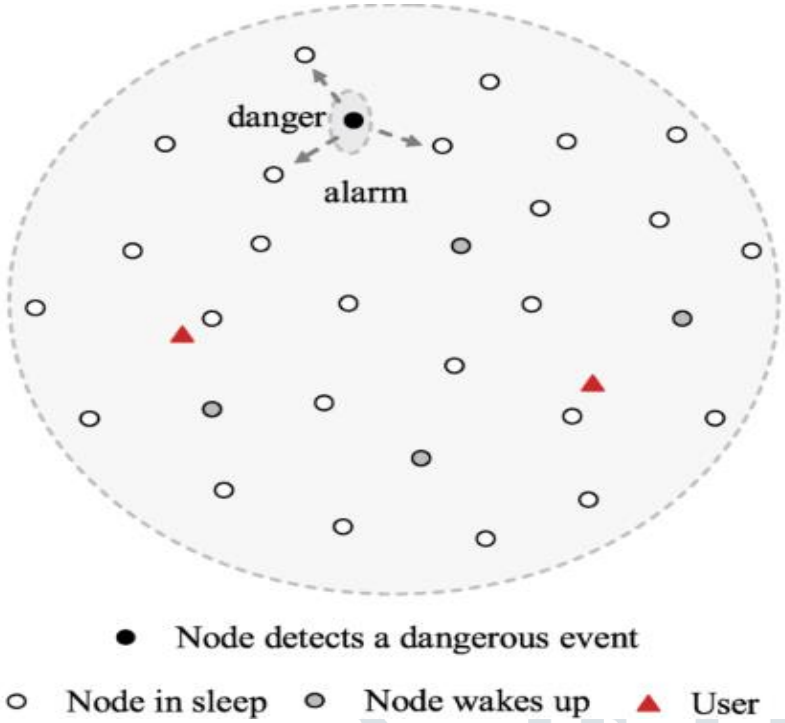


Figure 6: Sleep Scheduling In WSN

Usually, WSNs can consist of hundreds or thousands of sensor nodes, each capable of sensing their environment, carrying out easy computations, and interacting with their neighbours. The sensor nodes with restricted electricity provided from the built-in battery will gradually die due to the sensing conduct on a bigger geographic area and sending their measurements (raw data) to the sink. The energy saving of sensor nodes is apparently essential to prolong the entire network's lifetime.

Balanced-energy Sleep Scheduling: -

The sleeping methods are commonly used for battery-powered sensor energy conservation. The rotation of active and inactive sensor modes in the cluster, some of which provide redundant data, is one way in which sensors can be managed efficiently to extend the life of the network. Some scientists suggest placing redundant sensor nodes in the network and enabling the additional sensors to sleep in order to extend the life of the network. Due to the low price of individual sensors, this is feasible. When the sensor node is in a sleeping state, it shuts down entirely, leaving only one incredibly small energy timer to be on at a subsequent moment to wake up. In the task allocation issues for wireless networked embedded systems with homogeneous components, the energy expenses of both computation and communication operations were regarded. However, it is crucial to determine which sensor nodes should be placed in the sleep state [3].

sleep and listen schedule for network nodes:-

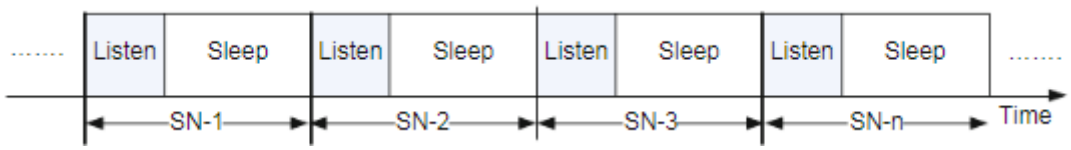


Figure 7: Generic periodic sleep and listen schedule for network nodes

A sensor node, also known as a mote, is a node in a sensor network that can process, collect sensory data, and communicate with other linked nodes in the network. A mote is a node, but not always a mote is a node. The literature has suggested a variety of sleep / wake planning protocols. Most use a sleep / wake period interval and provide efficient energy conservation at the expense of delay and throughput [6]. For example, in order to transmit data, a source node must know the neighbouring node's sleep / wake-up schedule and must wait for the neighbour to enter the active state. The same thing will be repeated until the information reaches the final destination leading to unprecedented delays.

Conclusion: -

The greatest problem in wireless sensor networks is the lifetime of the network that this sleep scheduling algorithm solves. The Delay effective sleep schedule effectively decreases energy consumption and network delay from the entire algorithm. Additional study is also crucial to correct some of this algorithm's drawbacks.The variable activedurations

are assigned to the nodes based on node distance from the sink node, node topological importance,and occurrence of event in its vicinity.

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