A Review of Sleep Wake up Scheduling in Wireless Sensor Networks

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Abstract- Here we are doing the hybrid optimization combining the ant colony optimization and genetic algorithm. The hybrid optimization is applied to the self-adaptive sleep wakeup scheduling. Here we find the different parameters that is packet drop ratio packet delay, delay, routing overhead and throughput. The hybrid optimization is analysing the transmission system using different methods. These algorithms combine two or more others algorithms that solve the same problems and produce better performance. This is generally done to combine desired features of each, so that the overall algorithm is better than the individual components. Here we are using the wireless network it is having different advantages that is WSN is a flexible network and can adapt to the changes, WSN can accommodate new devices in the network any time with ease, Wireless sensor network are used in different fields like healthcare, defense, environment monitoring which is very beneficial to human welfare.

Keywords- colony optimization, hybrid optimization, packet drop ratio, packet delay, delay, routing overhead and throughput.

I. INTRODUCTION

A wireless sensor network (WSN) consists of a large number of sensors which are densely deployed over a large area. Each sensor monitors a physical environment and communicates via wireless signals. With the advancements in hardware miniaturization and wireless communication technologies, WSNs have been used in various applications such as education, warfare, and traffic monitoring. Regardless of the applications, extending the network lifetime is a critical issue in WSNs. This is because the sensors are battery-powered and generally difficult to be recharged [1]. They are small in size and are able to collect information on its environment like temperature, pressure, humidity, water content, gas presence, or luminosity. In spite of the large amount of applications offered by WSN, sensor nodes are designed with resources constraints such as a restricted computing capacity, reduced memory size and storage, weak range of communication, low bandwidth, and a limited amount of energy. To efficiently cover areas, a single sensor is not sufficient due to its limited communication range. In order to cover a more consequent space, several sensors are deployed and connected to each other, thereby forming a Wireless Sensor Network (WSN) [2]. The first class is the disjoint cover set scheduling which prolongs the network lifetime by finding a maximum number of disjoint cover set. In these methods, all the cover sets found can satisfy the network requirements and are activated successively. When an active sensor runs out of energy, a new cover set will be activated to accomplish the monitoring task. The disjoint cover set scheduling discards the whole cover set when a sensor in the cover set runs out of energy. This will waste a lot of energy in applications where sensors have different lifetimes [3].

II. LITERATURE REVIEW

A sensor is a device which detects or measures a physical property and records, indicates, or otherwise responds to it. Memory is the faculty of the mind by which information is encoded, stored, and retrieved. Memory is vital to experiences and related to limbic systems, it is the retention of information over time for the purpose of influencing future action. If we could not remember past events, we could not learn or develop language, relationships, nor personal A wireless sensor network (WSN) is a wireless network consisting of spatially distributed autonomous devices using sensors to monitor physical or environmental conditions [1]. Sleep/wake-up scheduling is one of the fundamental problems in wireless sensor networks, since the energy of sensor nodes is limited and they are usually unrechargeable. The purpose of sleep/wake-up scheduling is to save the energy of each node by keeping nodes in sleep mode as long as possible (without sacrificing packet delivery efficiency) and thereby maximizing their lifetime [2]. In WSNs, most sensor nodes have to rely on unrechargeable power sources, e.g., batteries, to provide the necessary power. In most cases, it is difficult to charge or replace the batteries, especially in outdoor monitoring. Thus, their power management has become crucial. Energy shortage is always the bottleneck restricting the development of WSNs applications [1]. As an engineering practice, sleep scheduling or duty cycling approaches have long been used in a wide variety of devices to save energy and prolong the lifetime of equipment's, such as air-conditioning compressors, pumps and electric motors [3]. The same information is communicated to the sink node through secure wireless mesh networks. To conserve energy this information is aggregated at intermediate sensor nodes say cluster head by applying a suitable aggregation function collected data across from the whole network. The intention behind aggregation is to reduce the amount of network traffic which avails to decrease energy consumption on sensor nodes. Providing data security to aggregate data in wireless sensor networks is also called as secure data aggregation in WSN. The wireless sensor networks stages such as node placement, network coverage, clustering, data aggregation and routing by using a genetic algorithm can be optimized. And by using ant colony optimization these stages give optimized results with efficiency, accuracy, and speed. In Ant colony optimization, this ant swarm algorithm used for optimization of wireless sensor networks. And EAAR protocol is used to maximize the network lifetime and for data routing in WSN. Also, modified APTEEN gives the number of dead nodes by threshold energy drained to 50% [4].

wireless sensor network coverage: -

Wireless sensor network is composed of a large number of randomly distributed integrated small nodes of sensors, data processing units and communication modules. By means of self-organization, nodes compose the network which is a large-scale, unattended distribution system with strictly limited resources [7]. Various sensors embedded in the node measure surrounding environment parameters, collect data through the network and transmit in the network or through the upper network. Components of wireless sensor network node is shown in Figure 1.

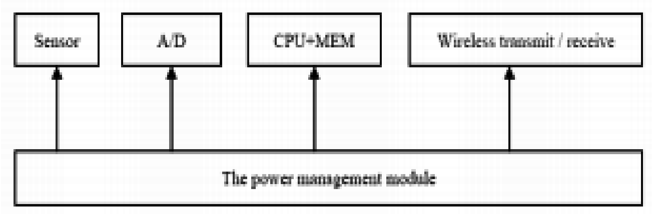

Fig.1: Components of wire1ess sensor network node

In traditional wireless sensor networks, nodes scatter randomly in the monitored area. Nodes form the network in the form of the self-organization, send the monitor data to sink node through the multiple hops relaying mode and finally transmit the data in entire area to the remote centre for the centralized processing by means of long-distance or temporarily built slot link [5]. Ad hoc Networking with Swarm Intelligence (ANSI) is a reactive algorithm which finds out path only when demanded that is, when node has data to send to other nodes it finds out the path. The Multicast for Ad hoc Network with Swarm Intelligence protocol provides multicast support for Ad hoc Networks. Within a multicast group, each member launches a forward ant in order to find an existing forwarding node where it can be used to establish connectivity to the group with lower cost. The Multicast for Ad hoc Network with hybrid Swarm Intelligence utilizes small control packets equivalent to ants in the physical world [6]. WSN is composed of several sensors which are randomly or deterministically distributed for data acquisition and to forward the data to the gateway for further analysis [1]. WSNs are used in various industrial applications; in street lighting, in smart grid, water municipals, in health care for monitoring the health condition of a patient, in green house monitoring to monitor the condition of water, soil, temperature or humidity levels, in monitoring strength of bridges, in checking the state of equipment WSNs are used to monitor and detect if there is a malfunction in industrial machinery during a normal production activity which will be able to improve on efficiency[7].Data aggregation is one of the broadly used techniques in wireless sensor networks. Wireless Sensor Networks (WSNs) are collection of sensor nodes that can sense or observe physical or ecological conditions cooperatively. WSNs countenance many challenges, mainly caused by communication failures, storage space and computational constraints and restricted power supply. Paradigms of Computational Intelligence (CI) have been effectively used in latest years to concentrate on a variety of challenges such as data aggregation and fusion, energy aware routing, task scheduling, security, optimal deployment and localization. In difficult and dynamic environments like WSNs, the computational intelligence provides adaptive mechanisms that show intellectual performance. CI brings about flexibility, autonomous activities, and strength against topology changes, communication failures and state changes [7].One effective way to prolong the network lifetime is to schedule sensors' wake-up activities. In WSNs, sensors commonly have two operation modes, i.e., active mode and sleep mode. A sensor in active mode can perform its monitoring task and therefore needs to consume a relatively large amount of energy. On the contrary, a sensor in sleep mode does not perform the sensing task and consumes little energy. Therefore, by appropriately scheduling sensors to be in low-energy sleep mode and waking them up when necessary, the network lifetime can be prolonged. In the literature, various efforts have been made on optimizing the wake-up scheduling in WSNs. These methods generally can be classified into two classes [4][5].

wireless sensor network: -

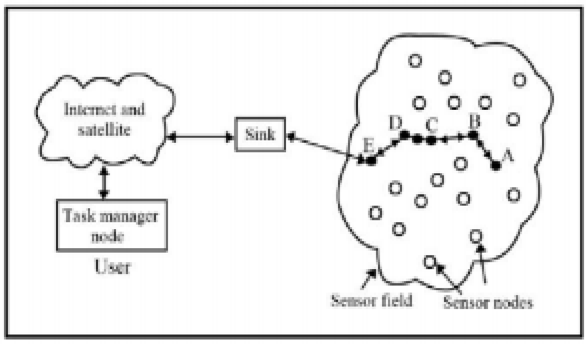

Fig.2: Architecture of wireless sensor network

In the large-scale deployed sensor network area coverage, by using high density and high redundancy of sensor nodes, the network lifetime can also be prolonged when the coverage quality is ensured. Divide all sensor nodes in the network into several mutually disjoint sets of sensor nodes with each set completely covering the target area [10]. At any time, there is only one set in working status, and others in the dormant state with low power consumption. The alternative work among different nodes can effectively prolong network lifetime. Obviously, in terms of the sensor network using such way of work, the more mutually disjoint collections are found, the longer the network lifetime will be [10]. In WSNs, routing protocols can be classified according to the manner in which information is acquired and maintained and the manner in which this information is used to compute paths based on the acquired information. In WSNs devices are resource constrained and they have a low processing speed, a low storage capacity, a limited communication bandwidth and nodes are also to limited battery powered. Increase the life time of network can be accomplished by employing energy efficient routing protocols. The performance of routing protocols depends on the architecture and design of network. However, the operation of the protocol can affect the energy spent for the transmission of data [5].The recent advances in Wireless Sensor Network (WSN) have gained world-wide attention because of its minimized size, low cost and untethered nature. These sensor nodes have sensing unit to collect the data from physical environment, processing unit to process the data and communicating component to communicate sensory data to base station over wireless medium. WSN placement is very specific to applications such as environment monitoring, habitat monitoring, military applications, health monitoring, object tracking and smart grids. In most of these applications numerous sensors nodes are remotely deployed and they are set to operate autonomously [8].One effective way to prolong the network lifetime is to schedule sensors' wake-up activities. In WSNs, sensors commonly have two operation modes, i.e., active mode and sleep mode. A sensor in active mode can perform its monitoring task and therefore needs to consume a relatively large amount of energy. On the contrary, a sensor in sleep mode does not perform the sensing task and consumes little energy [4][5]. Therefore, by appropriately scheduling sensors to be in low-energy sleep mode and waking them up when necessary, the network lifetime can be prolonged. In the literature, various efforts have been made on optimizing the wake-up scheduling in WSNs. These methods generally can be classified into two classes [10].

Structure of WSN: -

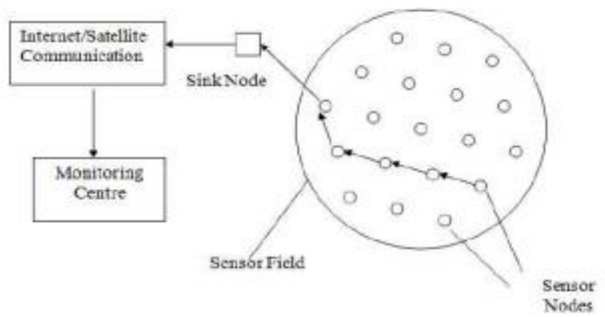

Fig.3: Basic Structure of WSN

WSN (Wireless Sensor Network) is the most standard services employed in commercial and industrial applications, because of its technical development in a processor, communication, and low-power usage of embedded computing devices. The WSN is built with nodes that are used to observe the surroundings like temperature, humidity, pressure, position, vibration, sound etc. These nodes can be used in various real-time applications to perform various tasks like smart detecting, a discovery of neighbour node, data processing and storage, data collection, target tracking, monitor and controlling, synchronization, node localization, and effective routing between the base station and nodes [5].

III. CONCLUSION

Here we are comparing the ant colony optimization and genetic algorithm. And these hybrid optimization Appling in self-adaptive sleep wake up scheduling. We are finding the packet drop, packet delay ratio, delay and routing overhead using MATLAB. Here we can see the packet delivery ratio and through put is high in Self-adaptive sleep wake with hybrid genetic algorithm and ACO and the parameters delay packet drop routing overhead these are high in SA sleep wake up. Here we are getting these parameters value by comparing the Self-adaptive sleep wake with hybrid genetic algorithm and ACO and SA sleep wake up. Here we can see the different graph diagram of these parameters that we can easily understanding the variations Self-adaptive sleep wake with hybrid genetic algorithm and ACO and SA sleep wake up in different time period.

IV. REFERENCES

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