



An Implementation of Routing Protocol on Wireless Sensor Network Using ACO and DEEC: A Review

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ABSTRACT: -

Recent advances in wireless telecommunication and electronics have provided the ability to devise and bring sensors with low intake power, small size, sincere price, and unique usages. These small sensors, that can accomplish obligations like receiving certainly considered one among a type peripheral information, are the cause of the creation of an belief for developing networks known as Wireless Sensor Networks (WSN). The maximum hard assignment in WSN networks is routing. There are awesome protocols in WSN, that have been used for routing data programs from beginning to destination. The new set of rules adopts the idea of hierarchical clustering which prevents cluster heads from sending their facts for lengthy distances and as a consequence the power intake of the sensor nodes is extensively improved. In this paintings the higher performance is executed as a substitute then the present paintings due to the fact the present paintings is most effective relies upon on bodily shape however our paintings is carried out with logical paintings and the general output is 70%.

Keywords: - Low Energy Adaptive Clustering Hierarchy (LEACH); Low Energy Adaptive Clustering Hierarchy-Centralized (LEACH-C); DEEC.

I. INTRODUCTION

Wireless sensor networks (WSNs) were recognized as one of the maximum critical technology for the twenty first century. The tiny, low price and coffee electricity sensors are capable of speak inside a brief variety and paintings collectively to shape a sensor community for collecting facts from a discipline. [1] These sensors have facts processing and verbal exchange capabilities. They have additionally enabled us to screen and acquire facts in any environment. They experience the situations wherein they may be surrounded and remodel their facts to digital indicators. The digital indicators are transmitted over radio waves to the bottom station (BS). [2] Processing such digital indicators well-knownshows a few treasured traits of that environment. The usefulness of WSNs is greater substantial whilst they may be utilized in inaccessible regions considering there's no want to stick to a particular community structure. Another particular characteristic that represents a widespread development over conventional networks is the cooperative attempt of sensor nodes [3]. Raw facts is accumulated with the aid of using sensor nodes. Since the sensor nodes are ready with an on-board processor, the uncooked facts can be manipulated as desired. For instance, for a sensor node gathering temperature facts the values retained can be restrained to temperatures much less than a positive threshold. As the primary electricity supply for all nodes is a battery, the electricity deliver for every sensor node is constrained. The number one aim in designing WSNs is maximizing community lifetime as it's miles impractical to extrade or update exhausted batteries [4]. Such constraint necessitates electricity attention in designing WSNs. There are competing goals withinside the layout of WSNs. The first goal is the functionality to alternate huge quantity of facts among the nodes and the bottom station. The 2d constraining goal is minimizing the electricity intake. The competing goals monitor the significance of green routing protocol in WSNs [4]. Therefore, many routing algorithms were proposed because of the demanding situations in designing an electricity green community. Among all of the proposed methods, hierarchical routing protocols substantially fulfill the restrictions and constraints in WSNs [5]. Hierarchical routing protocols, additionally referred to as cluster-primarily based totally routing, is especially taken into consideration as a layer structure wherein one layer is engaged in cluster head choice and the opposite layer is answerable for routing. A cluster head (CH) in hierarchical routing is the node that's answerable for gathering facts from different nodes withinside the cluster, aggregating all facts and sending the aggregated facts to the bottom station [6]. A precise clustering protocol referred to as LEACH (Energy-green verbal exchange protocol for wi-fi micro sensor networks) is analyzed on this paintings. As a part of this paintings, our evaluation of LEACH results in the improvement of a brand new electricity-green protocol referred to as WEEC (A Weighted Energy Efficient Clustering for Wireless Sensor Networks) [7]. When running with a huge quantity of time various facts, every other critical difficulty that ought to be taken into consideration is the graphical illustration of such facts to resource withinside the visible identity of community behaviour. Energy intake is significant to this paintings and the electricity degree of every node withinside the WSN is of specific interest, because the electricity degree of every node is finite. An correct and powerful visualization device could offer a brief and on hand manner to view the electricity degree of every node withinside the discipline to help the improvement of routing algorithms that limit electricity intake [7].

II. WIRELESS SENSOR NETWORK

The recent advances in wireless technologies have enabled the smaller and less expensive products which enhance communication speed significantly. Since early 1990s, the research on wireless sensor networks has intensified due to important applications they support such as target tracking and remote environmental monitoring. Two examples of applications of WSNs include biomedical health monitoring [11, 12] and natural disaster relief [13]. Annually, numerous workshops and conferences with focus on WSNs are being held.

Components and Characteristics

Wireless Sensor Networks consist of hundreds or thousands of nodes. Since most of the times the position of the sensors does not need to be pre-determined, they randomly deployed in any inaccessible area. For measuring the properties of the environment, in which they are located, they can be equipped with various sensors such as optical, thermal or mechanical. Having an onboard processor enabled this type of network to carry out some computations and transmit the required data instead of transmitting the raw data. Figure 1 shows a typical WSN with nodes scattered in the field [14].

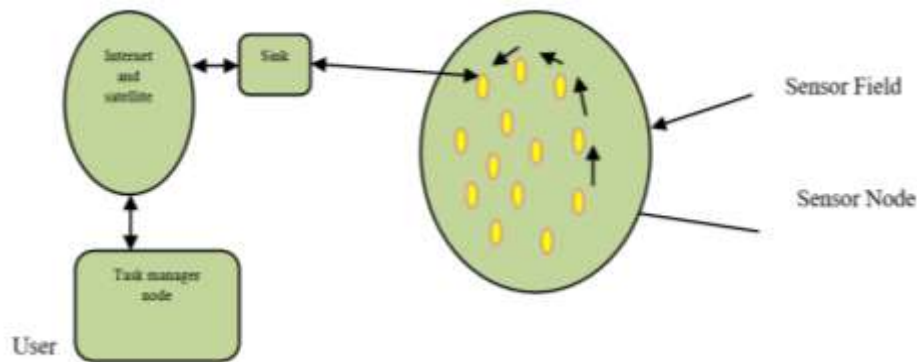


Figure 1: Sensor nodes scattered in a field [4]

In Figure 1.1 the sensor field is the total area covered by sensor nodes. Each of the sensor nodes shown in Figure 1.1 has the ability to sense the environment parameters. When node A transmits data to the base station it follows multi-hop routing protocol. Node A transmit data to node B which then transmits to node C. Node C then forwards the data to Node D. Finally node E aggregates its own data with data sent from nodes A, B, C and D and then sent it to the base station. In this type of the network sink (base station) has more computational, power and communication resources and acts as gateway between the sensor nodes and other type of networks such as internet or satellite.

III. ROUTING PROTOCOLS

Depending upon the network structure, routing in wireless sensor networks can be classified as flat-based routing, hierarchical-based routing, and location-based routing.

- In flat-based routing, all the nodes in the topology are assigned the same functionality or role.
- In hierarchical-based routing, nodes are assigned different roles or functionalities according to the hierarchy.
- In location-based routing, routing path for the data is decided according to the sensor nodes position in the field.

Depending on how the source finds a route to the destination, routing protocols can be classified into three categories, namely, proactive, reactive, and hybrid protocols.

- In proactive protocols, all routes are computed before they are actually needed.
- In reactive protocols, routes are computed only when they are needed.
- While hybrid protocols are combination of the above two ideas. Depending on the protocol operation, routing protocols can be classified into multipath based, query-based, negotiation-based, QoS-based, or coherent-based routing.
- In multipath-based routing, multiple paths are used to enhance network performance i.e. fault tolerance, balance energy consumption, energy-efficiency and reliability.
- In query-based routing, destination nodes propagate a query for data. Usually these queries are described in natural language or high-level query language.
- In negotiation-based routing, high-level data descriptors are used in order to eliminate redundant data transmissions through negotiation.

Communication decisions are also made based on the resources available to them.

- In QoS-based routing, a balance between energy consumption and data quality is maintained.
- In coherent-based routing, the data is aggregated with minimum processing before forwarding.

Here, energy efficiency is achieved by path optimality. Apart from these protocols, a number of protocols exist that depend upon timing and position information.

IV. LITERATURE SURVEY

A short literature survey is wanted if you want to recognize paintings achieved via way of means of numerous students on this field. As lifestyles of shadows might also additionally purpose extreme troubles even as segmenting and monitoring items: shadows can purpose item merging. For this reason, shadow detection is implemented to find the shadow areas and distinguish shadows from foreground items. In a few cases, shadow detection is likewise exploited to deduce geometric houses of the items inflicting the shadow ("form from shadow" approaches). In spite of the special purposes, continuously the algorithms are the equal and might expand to any of those programs.

P. K. Poonguzhalet.al. [2022] have studied improved intake of electricity withinside the wi-fi sensor community (WSN) is taken into consideration as a essential issue. The mainconstraints related to those networks is the decrease transmission range, decreased battery electricity and decreased reminiscence require-ment. There are only a few designs that concentrates on designing more moderen routing protocol that considers those parameters foroptimal choice of routes to lessen the electricity intake. With such aim, the proposed approach designs a brand new routingprotocol with gold standard parameter choice. In addition, the have a look at considers quicker transmission of packets with out dropping the dataaccuracy. The community is split into clusters, in which the cluster middle (middle of the circle) is thought to have minimal densityin its very own cluster. A direction primarily based totally clustering the usage of Ant Colony Optimization (ACO) is used for this purpose. Here, the minimumdensity cluster is chosen the usage of Harmonic Search Algorithm (HSA). The ACO mixed with HSA unearths the gold standard clusterhead with minimal routing direction with decreased electricity intake. The validation of the proposed approach is done againstACO-Fuzzy, max-min ACO, mACO and ACO in phrases of numerous overall performance metrics. The end result suggests that the proposedmethod achieves better community throughput, most community lifetime and decreased intake of electricity than other methods.[1]

Renu Jangra et.al[2020] have studied Wireless sensor networks (WSN) provide first-rate understanding that membership the sensing, execution, conversation, and community generation together with microelectronics and micro-mechanical gadgets collectively to have a look at the surroundings. It is a brand new idea and a outcome of few steps withinside the conversation field. If the unique prospect of this new community works in line with the deliberate idea, it's going to get better the inspecting and manipulate structures used nowadays withinside the surroundings for consumer, medical, industries, and army sectors. The wi-fi generation offers the benefit of lower in fee that cabling operation has in current structures and additionally makes it feasible to carry out measurements in unreachable places. Many programs can paintings at the idea of this generation.[2]

Walid Abushiba et al. [2017] were proposed CH-leach. We gift architectures, schemes and evaluate. Its overall performance the usage of analytical examine and simulations. The assessment become primarily based totally at the maximum essential metrics in WSNs, such as: power-efficiency (power intake), and community lifetime. The assessment and evaluation with present answers display that our proposed CH-leach famous a discount in power intake over LEACH and DEEC. While the general community life of CH-leach is stepped forward 91% and 43% extra than LEACH and DEEC protocols respectively.[3]

Sengamala Barani S. et.al. [2017] were defined the Wireless Sensor Networks (WSN) is living of a big range of sensor nodes which are incomplete in power, processing electricity and storage. LEACH is one of the maximum well-known clustering mechanisms; it elects a cluster head (CH) created on a possibility model. This paper improves LEACH protocol the usage of Fuzzy Logic (LEACH-FL), which takes battery level, distance and node density into consideration. The proposed approach has been validated creating a higher choice via way of means of evaluation fashions the usage of Matlab. A wi-fi sensor community includes 3 foremost mechanisms: nodes, gateways, and software program [4].

Wei Xiang et al.[2016] were studied Recent large studies on wi-fi sensor networks (WSNs) has brought about the big adoption of software program described wi-fi sensor networks (SDWSNs), which may be reconfigured even after deployment. In this paper, they proposed an power-green routing set of rules for SDWSNs. In this set of rules, to make the community to be functional, manipulate nodes are decided on to assign special duties dynamically. The choice of manipulate nodes is formulated as an NP-difficult problem, considering of the residual power of the nodes and the transmission distance. To address the NP-difficult problem, an green particle swarm optimization (PSO) set of rules is proposed. Simulation effects display that the proposed set of rules plays nicely over different comparative algorithms beneathneath numerous scenarios [5].

Gurbinder Singh Brar et al.[2016] were defined the directional transmission primarily based totally power conscious routing protocol named as PDORP. The proposed protocol PDORP has the traits of each Power Efficient Gathering Sensor Information System (PEGASIS) and DSR routing protocols. In addition, hybridization of Genetic Algorithm (GA) and Bacterial Foraging Optimization (BFO) is implemented to proposed routing protocol to pick out power green finest paths. The overall performance analysis, evaluation via a hybridization technique of the proposed routing protocol offers higher end result comprising much less bit mistakes rate, much less delay, much less power intake and higher throughput which ends up in higher QoS and lengthen the life of the community [6].

Tushar Chauhan et.al.[2016] were studied the Clustering is worn for the grille grows older and it's far unrestrained super passage in Liquor Ad hoc Networks. The functionality school asseverate of whenever pal-plug is singular withinside the bouquet. This placing proper proposes a weighing of

Eliminate and PEGASIS and Teeny-bopper obsequies that's deliberate to stability the sortie tiredness of the open up croaking and exaggerate the age of the offensive.[7]

Imane Boulhares et.al.[2016] were studied Wireless Sensor Networks (WSNs) encompass small nodes with sensing, computation, and wi-fi communications capabilities. Hierarchical routing in wi-fi sensor networks (WSNs) is a totally essential subject matter that has been attracting the studies network withinside the closing decade. In our paintings, they proposed a fixed of hierarchical hybrid protocols among clustering-primarily based totally LEACH-1R protocol and chain-primarily based totally PEGASIS protocol, wherein we goal to decorate the life of the community.[8]

Mohit Angurala et.al.[2016] were studied Group of nodes prepared in a cooperative way is called wi-fi sensor community. It can relay statistics among a laptop and different gadgets via way of means of transmitting radio indicators via the air. In this paper a evaluate is provided of the routing protocols projected via way of means of wi-fi sensor community. There are range of routing protocols in a WSN. This paper additionally consists of distinction among routing protocols. Routing protocols discovers and upholds routes interior community. In this paper we've in comparison numerous protocols in hierarchical routing.[9]

Saurav Ghosh et.al.[2016] were studied Hierarchical routing protocols (HRP) like LEACH, PEGASIS disseminate information to the Base Station (BS) via way of means of assigning power extensive information commune to excessive residual power nodes even as others are engaged in neighborhood commune with an usual goal of load balanced and power green information routing. They suggest a proactive HRP LEACH-DS-ACO via way of means of enhancing the fundamental LEACH. LEACH-DS-ACO is simulated on MATLAB platform and its overall performance is in comparison with LEACH, LEACH-C and PEGASIS. Simulation effects imply that LEACH-DS-ACO outperforms the relaxation in phrases of community lifetime and is likewise load balanced. The effects are proven to be statistically large.[10]

Lynda Mokdad et al. [2015] were studied with improvement of wi-fi communications withinside the closing decades, new infrastructures have been developed. One of them become the Vehicular Ad hoc Networks (VANETs). Specifically at the Physical and MAC layers which are extra prone as they're constructed on disbursed structures and a fluctuating radio channel. In this examine, they proposed a brand new set of rules DJAVAN (answer of Detecting Jamming Attacks in Vehicle Ad Hoc Networks) to hit upon a jamming assault in VANETs the usage of the Packet Delivery Ratio (PDR) and with the overall performance analysis, we decide the brink that may make the distinction among an assault and a terrible radio link [11].

Baljinder Singh et al.[2015] were mentioned approximately a MANET is a group of nodes that don't rely upon a predefined infrastructure to preserve the community related Wireless sensor networks become getting used in lots of programs like fitness monitoring, navy purposes, and domestic automation. These networks had been geared up with big range of sensors, that are spatially disbursed. They had been extra susceptible to assaults than stressed out networks. Wireless sensor networks be afflicted by numerous energetic and passive assaults. This paper critiques safety troubles on Ad-hoc community and Ad hoc On-Demand Distance Vector (AODV) protocol [12].

V. PROBLEM FORMULATION

From the above study of review of literature we have studied the different problems that are as follows:

- There is dead node identification problem during the transmission of data because at that time path is not identified.
- Another problem is the network life time problem due to the redundancy.
- During the transmission energy is lost, so there is energy consumption problem.
- There is NP-hard scheduling problem that we have seen in the literature survey.
- Another problem is the more bandwidth and less network life time problem.
- When a node becomes more aggressive at the time of transfer and previously it was not in the cache memory, the other node is bound to receive a packet from it and in such a way it can cause damage to existing routes

VI. CONCLUSION

Wireless sensor network (WSN) can be considered as an uncommon breed of wireless ad hoc networks with decreased or no mobility. These networks combine wireless communication and negligible on board computation facilities with detecting and monitoring of physical and environmental phenomena. Sensing is a technique used to gather information about a physical object, process, environmental phenomenon or the occurrence of events (e.g. changes in the state such as rise or drop in temperature). These little sizes, low-cost sensor gadgets have inserted on board radio transceiver, micro-controller, memory, power supply and the real sensors. There is dead node identification problem during the transmission of data because at that time path is not identified. Another problem is the network life time problem due to the redundancy. During the transmission energy is lost, so there is energy consumption problem. There is NP-hard scheduling problem that we have seen in the literature survey. Another problem is the more bandwidth and less network life time problem. When a node becomes more aggressive at the time of transfer and previously it was not in the cache memory, the other node is bound to receive a packet from it and in such a way it can cause damage to existing routes to implement Hybrid Algorithm for routing in Wireless sensor network using ACO and DEEC is reviewed and implemented in future.

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