A COMPARITIVE ANALYSIS OF CONSUMED NETWORK ENERGY IN WSN THROUGH CLUSTERED-GA

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Abstract:
The network of sensors consists of a large number of sensor nodes, which are intensely exposed either within or close to the phenomenon. One of the most important features in WSNs belong to a limited battery of sensor nodes. When wireless sensor nodes that operate on batteries are placed in a particular field, it is difficult to replace their batteries or provide additional power. In addition, if the sensor node consumes power fully, a portion of the network can be separated. This algorithm involves communication between groups when using the genetic algorithm. This investigation starts the preparation of the contract in the connection area and calculates the click order for all the nodes in the WSN node preparation space. When we apply RSSI (signal strength received signal) to form groups. RSSI facilitates the scope and location of wireless sensor networks (WSN), where it is increasingly necessary to look for a mathematical model that can accurately describe the relationship between the values of RSSI and distance. This technique is more specific to activate the network node that did not focus on the previous technology, as well as to enter the cluster in each node constitute the power constraints. In addition, you should be willing to modify the parameters according to the environment adjustment by yourself, so be able to minimize the error. Any genetic algorithm to be applied to activate the group leader as an optimization method to improve the performance of the group leader's election procedure. In particular, the genetic algorithm is defined as search algorithms that use the mechanics and processes of natural processes such as reproduction, gene intersection and mutation as a way to solve problems. It is not guaranteed that the results will be returned to a generation that has a higher fitness value, but when the development process is completely different, the probability of achieving the desired results is greater.

Key Words: Genetic algorithm, WSN-Wireless Sensor Network, Clustering, Clique, Fitness Function, RSSI Level, Energy Dissipation

I. INTRODUCTION

Wireless sensor networks (WSN) are the basis for a wide range of applications related to national security, surveillance, military service, medical care and environmental monitoring. An important class of WSNs are the dedicated wireless sensor networks, which are characterized by random or random deployment, in which the location of the sensor is not known in advance. This function is necessary when the individual sensor mode is not possible, such as the battlefield or disaster areas.

In general more sensors are implemented than necessary (Compared to the optimal position) to perform the proposed task, which compensates for the lack of precise positioning and improves fault tolerance. The characteristics of the sensor network include limited resources, large networks, density and dynamic topology. A major problem in sensor networks is the shortage of power, in part due to the size of the battery and weight restrictions. The mechanisms that improve the use of sensor energy have a significant impact on the longevity of the network. Energy-saving technologies can generally be classified into two categories: sensor contract programming to switch between active mode and sleep mode, and the transmit or sensor range at wireless nodes. In this work we deal with both methods. We designed a programming mechanism in which some sensors are only active, while all other sensors are in sleep mode. In addition, for each sensor in the assembly, the objective is to obtain a minimum range of sensors that meet the requirements of the application. One of the main design considerations in cluster-based wireless sensor networks is the choice of cluster leader and mass training. The size of the cluster with a large number of nodes causes members to have a small number of clusters in the network, which improves the efficiency of communication between clusters. The figure 1 below shows that the WSN clustering which has cluster head, sensor node and base station.

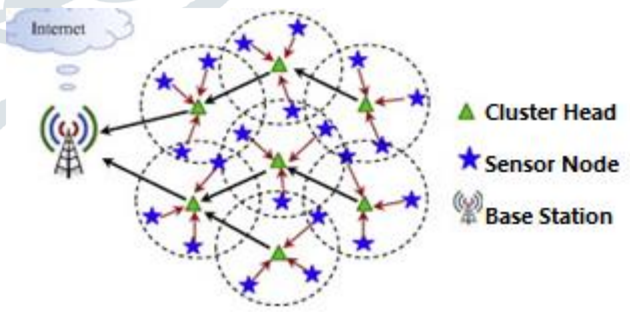

Fig 1: WSN Clustering

On the other hand, the size of the block with a small number of nodes leads to an increase in the number of clusters in the grid that require the backbone network with a large number of heads and expressions (one cluster member connects two heads) to guide the package to the communication between groups [1]. Energy efficiency in cluster protocols can be considered in two different ways: the number of problematic groups or the number of members in groups (cluster size). In the context of the cluster-based topology, the size of the block is related to the number of neighbors connected to the cluster head, which is defined as the node grade and can be called the number of nodes per block. Most current methods control mass size through acceptance or rejection policies during group formation, which can be based on the strongest receiver signal strength [2]. The method is to control the number of members in each group through the transmission power control algorithm [3]. This paper discusses the basic question about what mass size provides the minimum energy dissipation while maintaining network connectivity. The connection can be determined by the number of neighbors to the node (degree node) [4]. The node class is a local property that can be verified by each node to achieve a global network property such as connection [5]. Communication is an important feature of wireless sensor networks that allow data to be redirected or exchanged between nodes in a network. The nodes can communicate with each other to guide each other's data packets if there is a route between any pair of nodes. The connection depends on the number of nodes per unit area and the extent of its transmission. The correct configuration of the contract delivery range is an important consideration for the age of the network [6]. By increasing the transfer capacity of nodes, more nodes can be accessed through a direct link. A greater range of transport can improve communication but, on the other hand, it can generate more interference, more data collisions and greater energy consumption [7]. The reduction can reduce the transmission capacity to isolate some nodes without any connection to other nodes. Conductivity was studied by node degree in [4, 8, 9]. The degree of the node is also one of the important and appropriate metrics for measuring the wireless LAN connection [10, 11]. It has been shown that the mean node degree of a random grid is almost completely connected to the node and is located at random using a uniform distribution that is between 6 and 10 [8]. The figure 2 below shows that the cluster or non-cluster differences with very clear diagram.

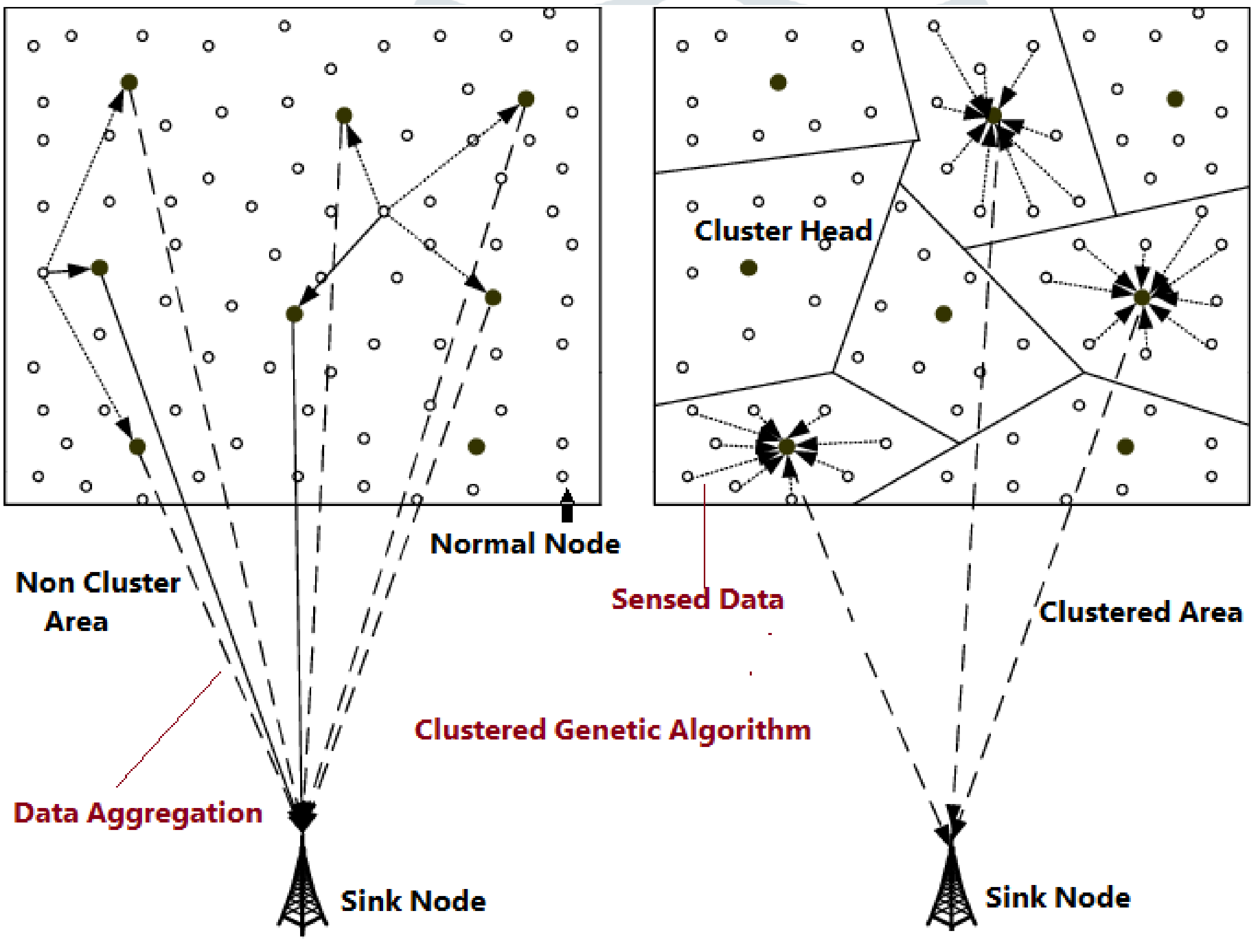

Fig 2: Clustered and non-clustered Data

1.2 INTRODUCTION TO LEACH & CBCR FOR WSN

The core idea of the C-LEACH protocol is to divide all wireless sensor networks into several groups. The group header node is randomly selected, and the chance to select each node as a group head is equal and the average power consumption for the entire network is calculated. Therefore, C-LEACH can extend the network lifecycle. C-LEACH is a periodic algorithm, providing a round-the-clock perspective. The C-LEACH protocol is implemented with many rounds. Each round contains two states: the cluster configuration state and the stable state. If the cluster is configured, it forms a block in Auto Backup mode. In a static state, move the data. The second case time is typically longer than the first case time to save the protocol load. The choice of the cluster leader depends on the decision taken. If the number is less than the threshold, the node becomes the group header for the current round. Using this threshold, each node will be a group header at some point during single / p rounds. The nodes that have been heads of block heads cannot become the second time block in **(1/p-1)** rounds. After that, each node has a **(1/p)** probability of becoming the group leader in each round. At the end of each round, each normal node is determined not the cluster leader as the nearest block head and connects that block to the data transfer. Group headers gather, compress, and send data to the base station, extending the useful life of the main contract. In this algorithm, the power consumption will be allocated almost evenly between all the nodes and the nodes that are not heads as far as possible will be turned off. C-LEACH assumes that all nodes are in the wireless transmission band of the base station, and this is not the case in many sensor applications. Only five percent of the total contract play as heads of groups in each round. C-LEACH is one of the most common clustering algorithms used in WSN to increase network life. LEACH is an adaptable protocol, self-organization and assembly. Enter the concept of tours. C-LEACH assumes that the BS station is stationary and present away from the sensors. Each sensor contract is homogeneous and has a limited power source; a fixed rate can communicate with each other. Sensors can communicate directly with base station. C-LEACH is the organization of nodes in groups to distribute energy between sensor nodes in the network. In each group there is a selected node called the head of the cluster head (CH), due to the lack of power in the sensor, the life expectancy of the network is a major concern. Especially for applications of wireless sensor networks in hostile environments. Therefore, energy efficiency guidance mechanisms and adaptive assembly plans have been developed to extend the productive life of the network.

II. BACKGROUND OF THE RESEARCH

Han et al. (2017) the recent success of wireless technology has led to the emergence of large-scale industrial wireless sensor networks (IWSNs). To facilitate the optimization of integrated international networks (IWSN) and industrial applications, issues related to full network coverage and connectivity should be addressed to meet the reliability and real-time requirements. Although the general purpose of the respective target coverage algorithms has been studied extensively in sensor networks, industrial focus has given little attention to the applicability and extent of various coverage strategies. **Mishra et al. (2017)** this paper focuses on Cloud's theoretical modeling, which is the first step in this direction. They want to describe the theory in theory, which is a mandatory operating system in the sensor cloud structure. The related research work on sensor clouds is focused primarily on ideologies and challenges that are usually confronted by WNS-based applications. However, in any work, theoretical details and analysis are not included which can be used to create models to solve various problems in the use of cloud sensors. **Aziz (2016)** wireless sensor network (WSN) is a fundamental challenge due to their limited supply. Several protocols and platforms have been proposed to reduce energy consumption. Routing protocols, especially layered methods, are one of the ways to reduce energy consumption and improve network life. **Deng et al. (201 studies)** in this study, we show that the sound source localization of energy-based methods can be used successfully to detect sound sources under low-energy conditions. Localization of audio sources is widely used in battlefields, which require low power consumption and are especially necessary to extend the life of the sensor. Due to the battery limitations of Wireless Sensor Network (WSN), it is important to extend its useful life. Energy-efficient routing technology of the WSN network plays an important role in this regard. In this letter, we describe this problem and, based on their position in the heterogeneous or heterogeneous WSN network, divide the current routing protocol of the WSN network into two categories. They are also classified as fixed and mobile. **Spirazkin et al. (2016)** for decades, control of hazardous and flammable gases in industrial buildings and residential apartments has been a top priority. In the last decade, several solutions have been proposed, including solutions based on the wireless sensor network (WSN) model. As an independent control system, it is necessary to ensure the long life of gas WSN. In this work, we received several heating curves and used catalyst sensors and semiconductors used on wireless sensors to reduce their energy consumption. After analyzing the pros and cons of these documents, we recommend using a heating file based on pulse width adjustment (PWM) and multi-face heating system pills. The average current consumption of experimental results indicates that the gas sensor node is likely to be reduced to 0.76 mA and its energy consumption is 2.54 megawatts, so that the sensor can work independently for more than one year. **Henzelman et al.** The LEACH (low energy cluster hierarchy) was developed for its underlying structure and can be classified as a layered algorithm. The LEACH process consists of two steps: Setup steps and fixed step steps. Prepare to select blocks in the network and select the cluster heads in each block. **Han et al. (2017)** the recent success of wireless technology has led to the emergence of large-scale industrial wireless sensor networks (IWSNs). To facilitate the optimization of integrated international networks (IWSN) and industrial applications, issues related to full network coverage and connectivity should be addressed to meet the reliability and real-time requirements. Although the general purpose of the respective target coverage algorithms has been studied extensively in sensor networks, industrial focus has given little attention to the applicability and extent of various coverage strategies. **Mishra et al. (2017)** this paper focuses on Cloud's theoretical modeling, which is the first step in this direction. They want to describe the theory in theory, which is a mandatory operating system in the sensor cloud structure. The related research work on sensor clouds is focused primarily on ideologies and challenges that are usually confronted by WNS-based applications. However, in any work, theoretical details and analysis are not included which can be used to create models to solve various problems in the use of cloud sensors. Expanding the life of **Aziz (2016)** wireless sensor network (WSN) is a fundamental challenge due to their limited supply. Several protocols and platforms have been proposed to reduce energy consumption. Routing protocols, especially layered methods, reduce energy consumption and improve network life.

III. INTRODUCTION TO TECHNIQUES AND ALGORITHMS

A. Genetic algorithm

The genetic algorithm (AG) is a guiding research technique that mimics natural evolution. This inference is commonly used to create useful solutions to optimization problems and search engines. Genetic algorithms belong to the broadest category of evolutionary algorithms (GA), solutions to optimization problems that use techniques inspired by natural evolution to generate genetics, mutations, selection and transit. This research is looking at expanding tree data collection more efficiently in energy use. The proposed algorithm always tries to achieve an appropriate way to balance data load over the network. The algorithm that ensures the remaining energy balance between the nodes increases the productive life of the network.

B. Introduction Clustering

Clustering is an important method for prolonging the life of the network in wireless sensor networks (WSNs). This includes clustering of all nodes and grouping of sensor nodes in sensor cluster (CHs). CH collect data from the nodes of the associated cluster and send the collected data to the base station. It shows on the basis of the proposed technique that due to low energy consumption, the life span of the wireless sensor network can be increased. The clustering technique reduces the complexity of communication with the help of the help and slave node within the cluster. Now, now the master node has the full responsibility to communicate to the base station.

C. Implementation Process

To ensure that the network is working on the highest possible performance, the nodes are placed on the campus network. With the balanced power consumption of all nodes, preferred node mode protocol should provide better network throughput.

IV. SIMULATION RESULTS IN GRAPH

From the experimental graph emerging after simulation, this simulation is mainly based on proposed parameters, as described earlier in Table 1. When applying the proposed genetic algorithm, this technique gives results of different types of ratios as shown below. The figure below the basic layout constructed in MATLAB-2013. It has one executable button to perform the generic algorithm process in WSN.

Table1: Simulation Consideration

Parameters	Values
No of nodes	100
Coverage Area	100m*100m
Threshold Energy	20e-3
Transmission Range	25
Packet Size	24 Bits

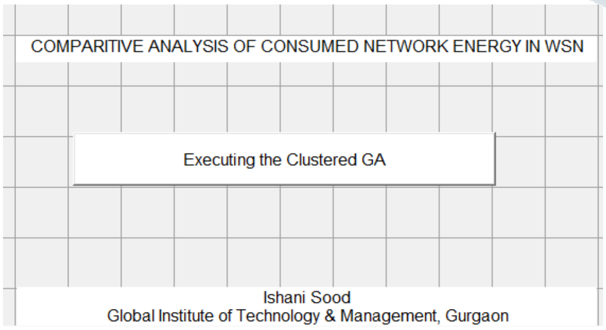

Fig 3: Basic layout constructed through MATLAB

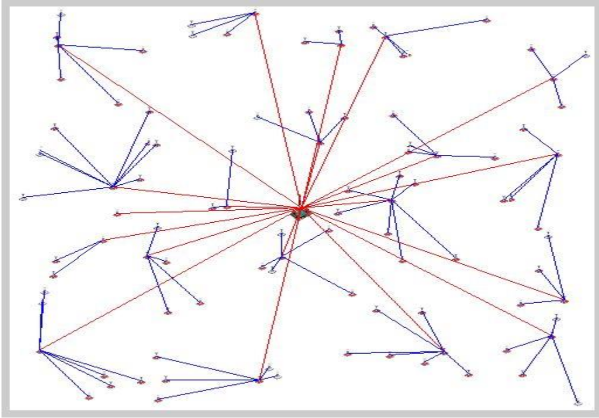

Fig 4: Clustering shows during the Simulation

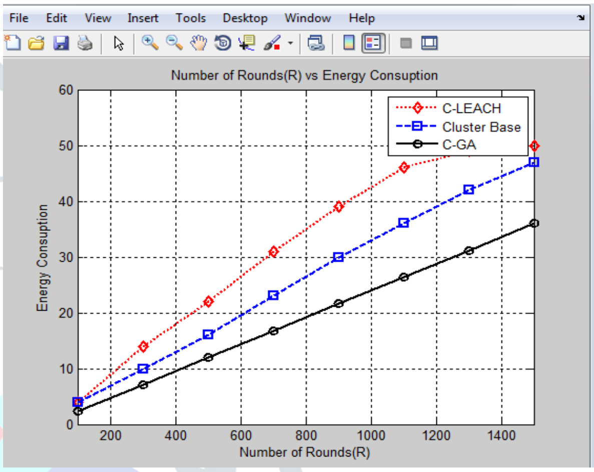

Fig 4: Energy Consumed vs. Number of Round.

Above fig 4 shows the no. of energy consumed increases with the implement of no. of rounds. The relation Between Energy consumed vs. Number of Round is linear. After this, there is a comparable result for C-LEACH, cluster base and C-GA (Cluster-Genetic. The proposed work, which is in black line, clearly indicates less energy consumed with CBCR and LEACH. It will also provide the facility of WSN to increase the life of the network. As the connection round increases, the dead node in the C-LEACH and cluster base is before the proposed action. Finally, the same situation shows a high incidence of the dead node.

V. RESULTS AND DISCUSSIONS

This research appears after the implementation of genetic algorithms, and low energy Consumed in the network appears after the increase in the number of rounds. The proposed work network uses a genetic algorithm to improve the power Consumed value of lifelong sensor networks (dead node), which seeks to find the maximum number of cluster nodes and their locations based on reducing the power consumption of the sensor nodes. The results of the MATLAB-2013 simulation showed that the proposed work is to reduce energy Consumed and fewer dead nodes. Further it outperforms previous protocols in terms of energy Consumption rate, network age and stability period in both homogeneous and heterogeneous cases. In addition, it can compare this with E-SEP, DEED, Adv.-LEACH and ADV-TEEN.

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