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# Findings

***Keywords:*** WSNs, Data aggregation, Clustering, F-GWO, DBSCAN

Due to the integration of enormous machine type connectivity, IoT is becoming more and more common due to massive machine type communication (mMTC). One of the most important parts of any IoT device is its sensor. These tiny sensors use physical size to monitor and manage the physical and living environment's conditions, such as pressure, temperature, humidity, sound, vibration, and motion. These tiny sensor nodes collect data from the environment, process it, and then transmit it wirelessly to a base station or sink. Considering that radio transmission uses a lot of energy. As a result, in Networks of Wireless Sensors, energy usage is of utmost importance.

Recent studies have focused on creating energy-saving clustering routing algorithms that increase network durability. The recent analysis discovered that the energy of the current clustering strategy degrades quickly.

In order to extend the lifespan of WSNs, the research work "Coverage and Energy Optimization in Large Scale Wireless Sensor Network with sink mobility" proposes to create energy-efficient data aggregation protocol techniques. In this study, the energy-efficient routing algorithms DBSCAN and fuzzy-GWO are suggested and examined. Data transmission and collection can be made more energy-efficient by using density-based spatial clustering of

applications with noise (DBSCAN). The redundant data will be combined for transmission to the sink using the data aggregation protocol, which will gather the packets. By assuring even energy distribution across the nodes, the proposed protocol Energy Efficient Cluster based Data Aggregation (EECDA) will contribute to extending network lifetime.

The number of sensor nodule and the deployment area are changed to mimic various scenarios using the modified protocols in MATLAB. The proposed protocols F-GWO and EECDA are compared to the existing protocols LEACH, HEED, and MBC. Simulation is used to assess the performance of the updated protocols in terms of network longevity, packet delivery ratio, throughput, time analysis, and end-to-end latency. The simulation results demonstrated the efficiency of suggested procedures in comparison to pertinent, currently used protocols from the literature.

The Wireless Sensors of Network, which is an Ad-hoc network, is made up of a huge number of sensor nodules that are dispersed rigidly within the network. These nodes, which serve as sensors, are primarily responsible for gathering pertinent data from various environmental conditions. Instead of sending accurate data to the nodes that can be combined, these nodes use their computational power to execute quick computations close to where they are and output the anticipated and partially calculated data. These nodules, which are working as sensors, rely on restricted power supplies and power storage devices as their main sources of energy. As a result, the WSN's ability to continue operating depends heavily on how these nodules use their energy. This study presented the energy-efficient shared assembly routing protocol LEACH for a pair of dense sensor nodes placed in circular and rectangular locations to address this issue. When the network lifetime and energy consumption for the two networks are computed, it is discovered that the circular LEACH interconnected system performs better than the rectangular LEACH interconnected system.

Recently, numerous ideas have suggested employing the mobile sink method for data collection. However, it has been determined that the path construction in real-time WSN applications is an NP-hard task. This study suggested a heuristic strategy based on Steiner points to develop an effective path building approach. It also determined that the meeting would take

place at the Steiner point, which is situated close to the cluster head (RP). In order to make a circuit with the smallest possible length, the shortest path is created around this RPs.

Wireless Sensor of Network pathways are produced using DB-SCAN clustering and Steiner point-based path construction. With clustered Wireless Sensor of Networks, this technique performs best. The path-forming point is chosen. The cost-effective solutions in this study are suggested using a basic distance matrix. Thus, delay is reduced. The algorithm and example aid in this proposal's comprehension of the problem. The parameters E2ED, energy use, and longevity were run in a simulation. The outcomes indicate a 20% to 50% improvement over the current procedure.