CORRELATED RECONSTRUCTION OF CLUSTERS IN MOBILE WSNUSING SOFT COMPUTING TECHNIQUES

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Abstract

WSN is a wireless sensor network that contains distributed self-governing devices spatially using sensors to monitor all environmental and physical conditions. Due to energy consumption among nodes, WSN has challenges with better utilization of energy and system enhancement. Cluster Algorithm is employed to prolong network lifetime and balance energy consumption. Many designers and researchers focus on architecture and algorithm that allow energy efficient operation of WSN. Therefore, we proposed an energy efficient routing using hybridization of Glowworm Swarm Optimization (GSO) and Cuckoo Search Algorithm (CSA) with fuzzy inference system. Glowworm Swarm Optimization (GSO) algorithm can efficiently capture all the maximum multimodal function. GSO algorithm was used simultaneously to find solutions of multimodal function optimization problem in various fields in the recent industry such as network, robotic, science and engineering.

Keywords: Energy consumption, Network Life time , Cuckoo Search Algorithm , Cluster Head
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1. INTRODUCTION

The WSN consists of smart sensor nodes which detects data and collects data from the confined condition and forwarding the data to the base station. The most emerging issues in Wireless sensor network communication are energy consumption and providing security for the data. The interaction of local nodes with their environment which is a population of agents motivated from the social behavior of living creatures such as Swarm Intelligence. The main objective is to increase the energy efficiency by decreasing energy consumption of the sensor nodes and to enhance the lifespan of a network, thus striking a balance in the power consumption of each node for battlefield surveillance.

The sensor nodes acts as both transmitter and receiver, it usually scattered in a sensor field where each of the sensor nodes has the capability to collect data and route data back to the sink/gateway and the user at the other end by a multi-hop infrastructure less architecture through the sink. They use their processing capabilities to carry out simple calculations and transmit only the required partially processed data. The WSN communicate with the task manager/end-user via the Internet, satellite and any type of wireless network (like Wi-Fi, mesh networks, cellular systems, WiMAX, etc.), making Internet of Things possible.

Soft computing is a group of fine ways grounded on natural selection and artificial intelligence that provides cost effective and quick result to a veritably complex problems for which logical phrasings don't live. Soft computing that aims at chancing error-free approximation which gives a robust, computationally effective and cost effective result saving the time. For future Internet of Things (IoT) applications, reducing energy consumption and prolonging the battery life of SNs have become compulsory. The power consumption of sensor nodes can be reduced by controlling the transmitted power of the wireless protocols. This control can be achieved through an accurate distance estimation between the nodes in the WSN. One method of reducing sensor node power consumption is by exploiting the location or distance between the nodes.

2. LITERATURE REVIEW

The author presented ESAC(1) which consists of detector bumps into a group of disjoint clusters. Each cluster group has a leader called cluster- head which is the knot among them with the topmost weight. Moreover,

cluster size is ranging between two thresholds Thresh Lower and Thresh Upper, which independently represent minimum and minimal number of detectors in a cluster. either, inside a cluster each class is at most two hops from its corresponding cluster- head negative to the distributed algorithm Low- Energy Adaptive Clustering scale(LEACH), which allows only single- hop clusters to be constructed.

The presented task allocation strategy is called DTAC(2), in order to reduce energy consumption among detector bumps and to balance network loads carried by it. Task allocation is enforced by both inter cluster and intra cluster allocation. The processing of tasks is achieved by the ranking sphere which classify the detector bumps into three levels.

The author presents cold-blooded GSA-ANN(3) which is more accessible than the other styles by relating distance estimation accuracy. ANN- grounded localization ways are suitable to model the complex fine relationship between the input variables (RSSI in current work) and target variables(distance). The localization that depends upon the equals and topology. thus, it can be applied to mobile WSN knot for the correct estimation of distance in both inner and out-of-door environments.

The fashion CICR(4) which solves the guarantor and pathway bumps selection through a new enhanced Lagrangian grounded with a metaheuristic successional bettered GWO(SIGWO) hunt space algorithm to find the optimal solution WSAN composed of ordinary and stationary detector bumps via portable actor bumps.

Cluster Energy Hop Based Dynamic Route Selection (CEH-DRS) (15) routing way to deal with locating the best route in the network. The cluster head approach uses the node position-based discovery and dynamic routing strategies to perform identification of the cluster head.

The cluster-based approach recognizes not just the starting point of risk and identifies an arrangement of traded-off nodes which support the head node and the varied estimation strategies discovering the risk network. At long last, the proposed ways to deal with performing close recognition of right and secure path and creating effective outcomes.

3. PROPOSED METHOD

The proposed algorithm EEFL-CH(5) which is further energy effective and is more effective in maximizing the network continuance of the whole network. Energy hamstrung leads to poor performance and short network continuance of WSNs. In every round each knot calculates the chance grounded on the three fuzzy parameters. It also achieves better performance while compared to LEACH and LEACH- ERE protocols.

The proposed fuzzy sense- grounded protocol(6) that's much better than other comparing algorithms. As the knot's distance from BS increases, the energy needed in data transmission also increases, leading to the knot's rapid-fire battery drainage. The final step utilizes fuzzy sense.

The ERFN system which is Energy centric routing with fuzzy heuristic(7) outperforms in the terms of continuance, energy consumption, and SD of residual energy. To optimize the performance of the sensor network, routing centric parameters are derived fastening on anticipated energy consumption, anticipated knot degree, and anticipated forward progress towards the sink.

The FLECH(9) which improves the WSN network continuance by the fashion that combines probabilistic and metric predicated CH election ways with suitable parameters for CH election in thenon- livery WSN.

A CH is having the arrears like collecting information from the members, adding up the entered information, and communicating accrued information to central Base Station(BS) (8).

3.1 METHODOLOGY USED

Optimization is a process of modifying a system to make some features work more efficiently or chancing indispensable performance under given constraints, as possible by maximizing asked parameters and minimizing the uninvited parameters which are involved in the problem. If the computer or any Android phone is optimized also it runs briskly or to run with smaller memory conditions. Optimization can be classified in numerous ways.

CS is the algorithm successfully used to break scheduling and optimization problems and so reduces knot failure. It's used in numerous operations like speech reorganization, job scheduling, global optimization and then we're using it for battlefield surveillance.

1. Each guira lays an egg one at a time and clog it in a nest which is aimlessly chosen.

2. The stylish nests with the high quality of eggs like the power knot sustained further time will carry to the coming generations.

3. A host warbler identifies the guira egg with the probability of pa =0.1 when the number of available host nests is fixed and also the host warbler can either throw the nest down or abandon them and make a new nest.

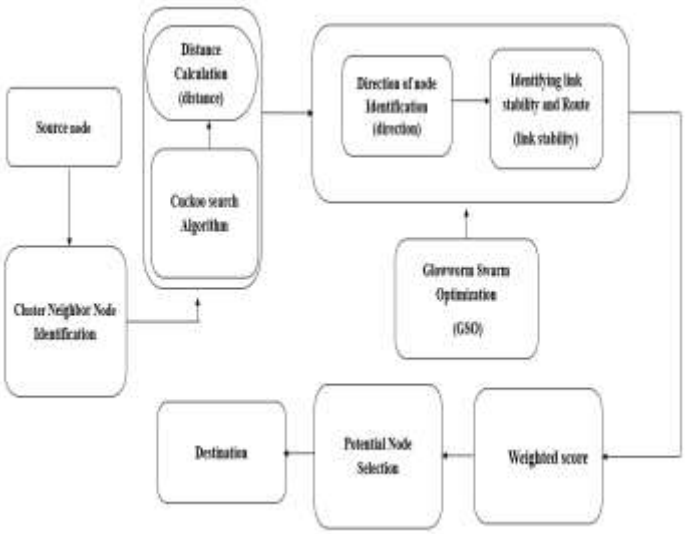

Fig.1.Block Diagram of AGDWE Algorithm

The location and distance information of all nodes can be identified with the help of receivers. It can be communicated to neighbour nodes using constant ideal messages. The neighbour node which is closer to the destination node is calculated. The closeness of the next hop is identified with the help of the mathematical model

ELR=α x Number of current cuckoos eggs/ Total no.of eggs x
(Var_{hi}.Var_{low})(1)

Where α is an integer which is supposed to handle the maximum value of ELR (Egg Laying Radius)

3.2 AGDWE Algorithm

Input : Node weight, Distance and speed, Data packets
Output: Node weights,Link stability send packets

Step 1: Start
Step 2: Initialize the random population of n host nests
Step 3: Randomly select the cuckoo search (Ci) based node position
Step 4: Evaluate the node weights (Ci)
Step 5: Select a nest among node randomly
Step 6: Avoid the traffic between nodes and replace the new solution
Step 7: Evaluate the new node position based on the node weight and keep the current best
Step 8: Initialize the swarm of glow warms and calculate the node function
Step 9: Evaluating the glowwarms and find neighbor to calculate link possibility
Step 10:Update the movement of glowworms to decide sending of data
Step 11: Evaluating based on maximum iteration for route initialize
Step 12: Transmit the data to the multipath
Step 13: Stop

3.3 Flowchart

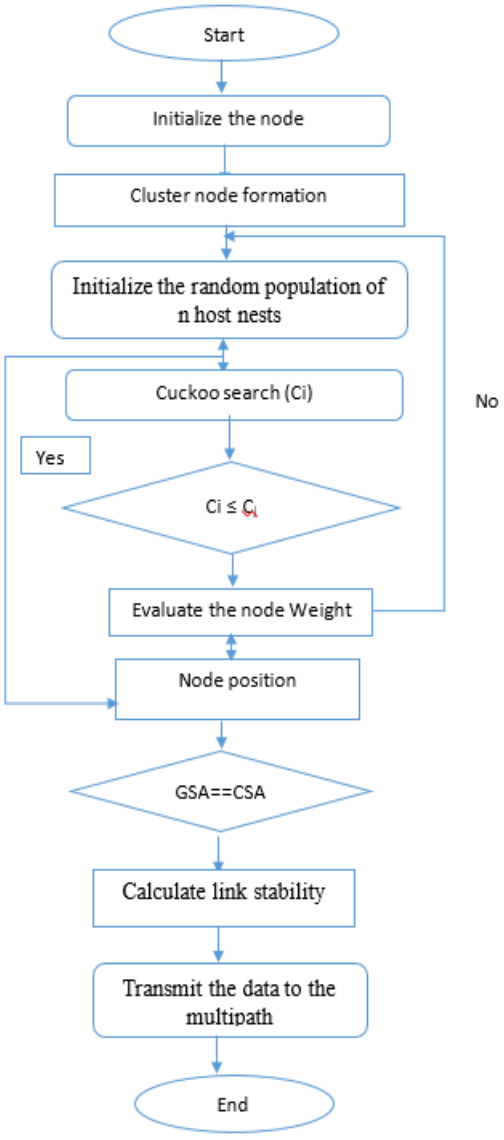

Fig.2.Flow Chart

3.4 Weighted Score Calculation

The weighted score is calculated by combining the distance, direction of motion and link stability factors of neighbor nodes. This mathematical model is used to calculate the weighted score of all nodes present within the Maximum Transmission Range (R) of source/packet carrier node to identify the next suitable hop for forwarding the packet to the intended destination.

WEIGHTED SCORE = Distance +Direction +
Link Stability (2)

4. SYSTEM REQUIREMENTS

4.1 NS2 SIMULATOR

Network Simulator(Version 2), extensively known as NS2, is simply an event- driven simulation tool that has proved useful in studying the dynamic nature of communication networks. Simulation of wired as well as wireless network functions (10) and protocols(e.g., routing algorithms, TCP, UDP) can be done using NS2.In general, NS2 provides druggies with a way of specifying similar network protocols and bluffing their corresponding actions.

4.2 Cygwin

Cygwin is the one kind of interface instrument used to interface among source and bundle and its convention. Its help all follow chart and its upheld records. It's basically

utilized for just representation purposes. Follow graph is a free instrument for separating the follow records created by ns2. Follow outline can maintain any follow plan at whatever point changed over to its own or ns2 follow plan. Follow outline runs under Windows, Linux, and UNIX and MAC OS systems.

5. PERFORMANCE ANALYSIS

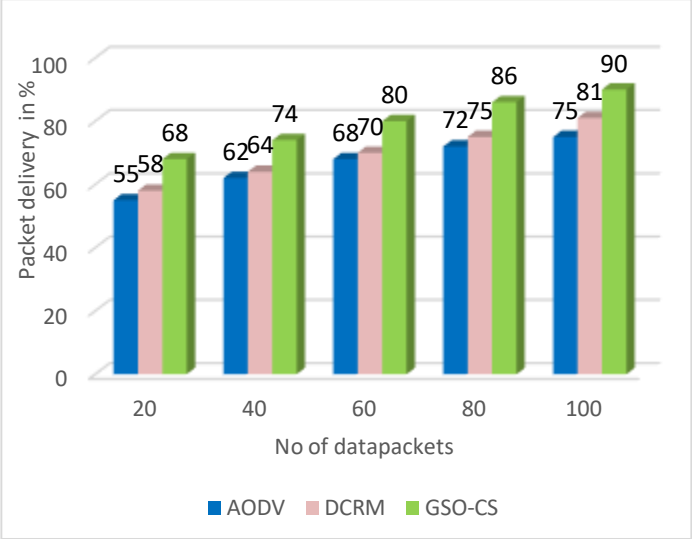

Fig.3.Packet Delivery Ratio Performance

Fig 3 defines examination of packet delivery ratio performance. The packet delivery ratio can be obtained from the total number of data packets arrived at destinations divided by the total data packets sent from sources. In other words, Packet delivery ratio is the ratio of number of packets received at the destination to the number of packets sent from the source.

The proposed Apex based Guira Delve Wandering Escalation algorithm**(**AGDWA) which is a combination of GSO-CS achieves the performance of 88% against the existing algorithms Ad hoc On-demand Distance Vector (11) packet delivery ratio performance of 72% and Dynamic Cloudlet-assisted Routing Mechanism (DCRM) packet delivery ratio performance of 75%. Which is shown in the table 1.

Table.1. Examination of Packet Delivery Ratio Performance

No of nodes	AODV (%)	DCRM (%)	AGDWA (GSO-CS) (%)
20	55	58	68
40	62	64	74
60	68	70	80
80	72	75	86
100	75	81	90

It defines the examination of packet delivery ratio performance. The proposed algorithm provides the best results compared to existing methods. It gives better efficiency in transmitting the packets when the nodes increase from to higher points. The node that carries the packets from source to destination will be higher in the ratio by using this algorithm with the main focus on the distance and direction.

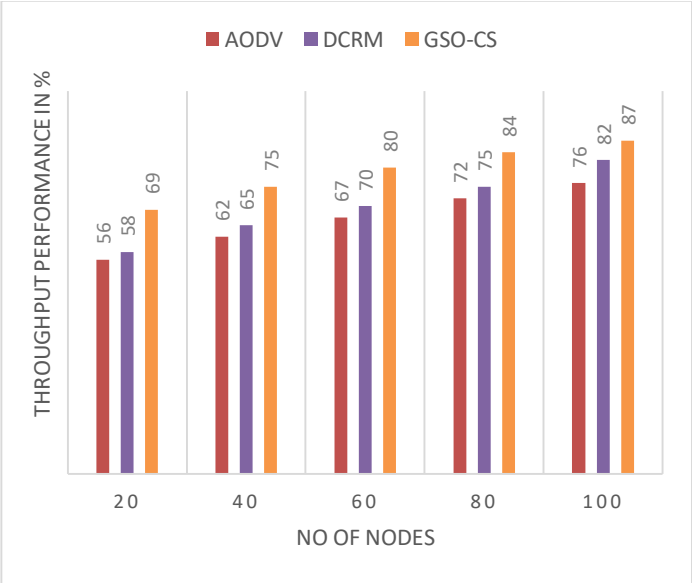

Fig.4.Throughput Performance

Fig 4 defines the examination of throughput performance as the number of data bytes received successfully.Through put is the number of deals produced overtime during a test. Its also expressed as the quantum of needed capacity that a website or operation can handle. It suggests a better throughput with the help of luciferin state of all the nodes. The higher the luciferin higher the amount of data can be sent via the communication link.

The suggested Apex based Guira Delve Wandering Escalation algorithm(AGDWA) which is a combination of Glowworm Swarm Optimization-cuckoo search (GSO-CS) algorithm achieves 87% of result compared to existing algorithms Ad-Hoc On-demand Distance Vector (AODV) throughput performance of 72% and Dynamic Cloudlet-assisted Routing Mechanism (DCRM) throughput performance of 75%.

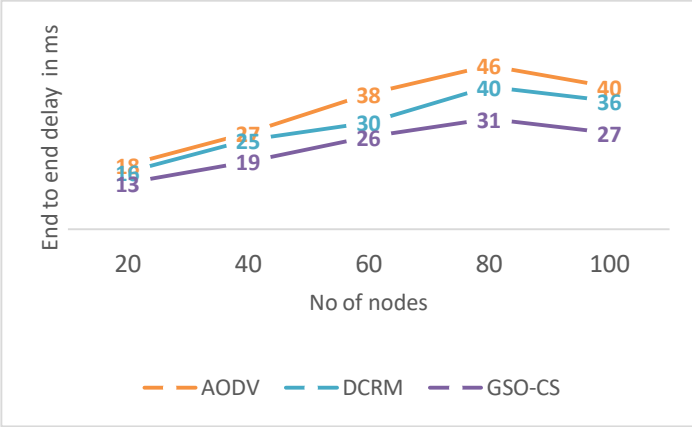

Fig.5.Delay Performance

Fig 5 identifies detention to delay performance to transfer the data packets from a source knot to a destination knot in time performance. Delay is an important QoS parameter for encouraging data in a time constraint WSNs terrain(13). In this paper we propose a detention apprehensive routing protocol for transmission of time critical event information to the Sink of WSNs.

The proposed Apex based Guira Delve Wandering

Escalation algorithm**(**AGDWA) which is a combination of Glowworm Swarm Optimization-cuckoo search (GSO-CS) algorithm reduces delay and achieves the delayed performance of 27ms. In contrast, the existing algorithms Ad-hoc On-demand Distance Vector (AODV) achieves performance of 46ms. Dynamic Cloudlet-assisted Routing Mechanism (14) achieves performance of 40ms.

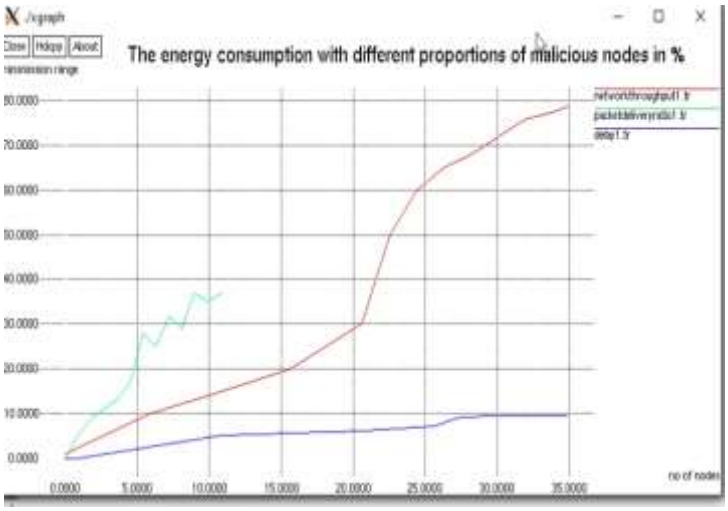

Fig.6.Energy consumption with different proportions of malicious nodes

In the above graph compare the network throughput, packet delivery ratio and delay performance for transmission and reduced the energy consumption. The throughput is higher when the nodes to travel increases and at the same time the packet is delivered by using shortest path with the use of minimum nodes to reach the destination. The energy consumption is less here due to the use of short distance with higher potential node to reach the destination.

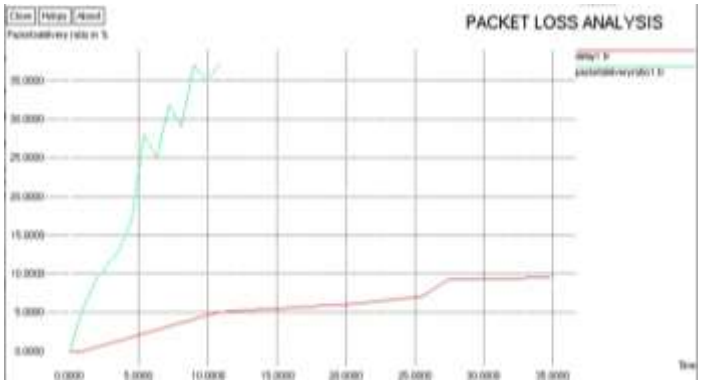

Fig.7.Packet loss analysis

In the above graph, the comparison between the delay and the packet delivery ratio. The loss is less than the other techniques. The delay is quite slower and so the packet loss is lower than using methods of on demand adhoc and cloudlet assisted mechanisms.

6. CONCLUSION AND FUTURE WORKS

In this project, we proposed an efficient technique for the connectivity restoration in which it does an efficient routing by means of soft computing techniques. The proposed system finds a way to clear the traffic and the malicious attack before the packet is being transmitted. If there is a blockage in the network, it comes back to the previous stage but not start from the first. The delay performance is reduced by using our proposed system

The measured packet loss and energy consumption is also reduced while comparing to other existing methods. The proposed algorithm provides the best results compared to existing methods. It gives better efficiency in transmitting the packets when the nodes increase from to higher points. The node that carries the

packets from source to destination will be higher in the ratio by using this algorithm with the main focus on the distance and direction

The AGDWE algorithm gives the data that can be transmitted in the better way and there is no packet losses and deliver of effective packets is to be determined based on the performance of the system while comparing to previous papers we provide a better way of less energy consumption for nodes that transfer to near by network .

The future work will be the system to have the location in where some data losses are happened in the security concerns and the identifying the node by correct assurance of the location.

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