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DATA AGGREGATION USING TRANSMITTED POWER FUZZY LOGIC TECHNIQUES IN WIRELESS SENSOR NETWORKS

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ABSTRACT: Energy efficiency in wireless sensor network [WSN] is the highly important role for the researchers. Transmission power control is a highly powerful technique for minimize the interference and energy consumption in wireless sensor networks. Wireless Sensor Networks have many nodes are connected to the network to calculate the network performance like transmission power. The power consumption is directly related to the size and weight of the nodes. Secure data aggregation is a highly exigent chore in wireless sensor networks. Our paper proposed a secure data aggregation based on clustering techniques using fuzzy logic. The performs the clustering and cluster head process in a network. Each cluster are calculated the distance, power consumed and faith value. Based on these parameters the secure data aggregation using fuzzy logic techniques. After the aggregated data send from the cluster heads to the base stations. Our proposed work has less energy consumption to prolonging the increasing the network life time in wireless sensor networks.

Keywords: Data Aggregation, Distance, Fuzzy Logic

I.INTRODUCTION

Wireless Sensor Networks is one of the important technologies for twenty first century. The recent advances in MEMS and Wireless Communication technologies has a tiny, cheap and smart sensors through a wireless link for various civilian and military applications like environmental monitoring, battle field surveillance, and also industry process control. It also included the temperature, light, sound and humidity. A sensor networks is required fast and easy to install and maintain. Most of the network layer attacks against sensor networks into following categories like spoofed, altered, (or) replayed routing information, selective forwarding, sinkhole attacks, wormholes, HELLO flood attacks, Acknowledgement spoofing. Spoofed attacks a routing protocol is to target the routing information exchanged between nodes. The malicious nodes may refuse to forward certain message and ensuring not propagated will receives message for multi-hop networks.

II.DATA AGGREGATION

Data gathering is one of the main objectives of sensor nodes. It involves collecting the sensed data from multiple sensors and transmitting the data to the base station. It is the process of aggregating the data from the multiple sensors to remove the redundant transmission information to the base station. The various issues into following categories like: 1. Some nodes to transmit the data directly to the base station have reduced energy. 2. The data aggregation for improving clustering techniques to conserved the energy of the sensors. It is also improve the energy efficiency.

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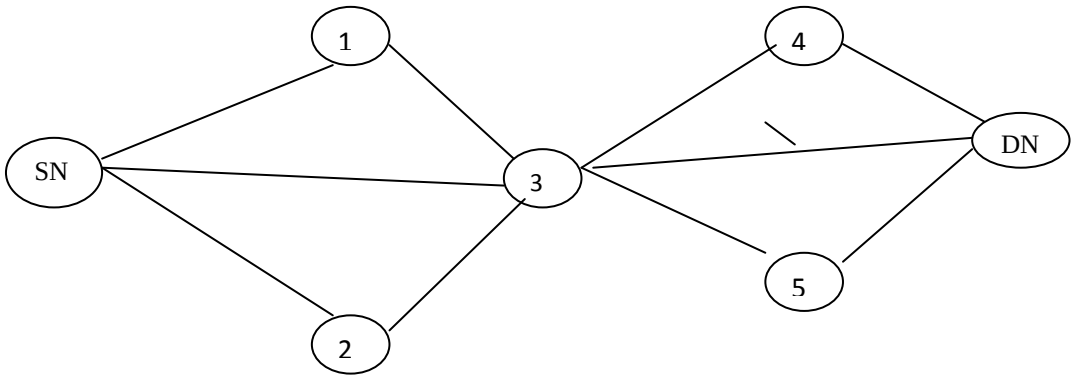

Fig. 1: Network Structure Data Aggregation in Wireless Sensor Networks

III. ATTCAKS IN WSNs

Wormholes attack is a severe threat in wireless sensor networks. The packets from one location tunnels and replays to another location. Jamming attacks the sensor nodes using the radio frequencies causes the message are corrupted in a network. Modification attacks to change the data after send through the receiver. Denial of Service (DOS) attack attempt to computer resources in all layer of OSI model.

IV. PROPOSED WORK

This Paper presents is to detect the shortest path between the neighbour nodes in the network to transmitted the power and improve the network life time of the network using Fuzzy Logic. It includes three phases to improve the network performance using adaptive transmission technique

A. Neighbour Identification

Network nodes are represented by the vertices and also direct connectivity between the nodes by the edges. Sensor nodes are maximum flow from one node to the other node to calculate the distance. The Combinatorial Structure are called as network structure. The Number of vertices are connected to the source node in a network is called its neighbour node and the number of edges are its size. Two or more edges of a network joining the same pair of vertices are called multiple edges and corresponding network is known as multipath network.

B. Shortest Path Detection

Networks can be represented by weighted graphs. The nodes are the vertices. The communication links are the edges. Edge weights can be used to represent metrics, e.g. cost associated with the communication links. The distance between two vertices i and j is the length of a shortest path joining them and is denoted by D[i,j].

C. Transmission Power

In wireless sensor networks, the nodes are read the number of edges from the source node to the neighbour node. First we initialize the transmission power is denoted X. If the node i is less than number of edges then get the distance between the edges to transmitted power in the networks. If the Edges is less than the distance, write down the transmitted power and then calculate the total transmitted power consumed value. Final we calculate the Total power consumed of the whole networks.

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D. Transmission power using shortesh path

Networks can be represented by clustering approach. The distance between two vertices of node i and j is the length of a shortest path joining them and is denoted by D[i,j]. If there is no path between cluster head of each node joining i and j then we define as D[i,j]=0**.** First we initialize the transmission power is denoted R. If the node i is less than number of edges are connected to the each cluster head node selection then get the distance between the edges to transmitted power in the networks. Final we calculate the Total power consumed of the whole networks**.**

The Sensor nodes are grouped various clusters and each clusters have elected as one cluster head with ID. The cluster head to calculate the distance between each member and also exchanged the topology to discover the packets. The cluster head collect the data from each member to calculate the power level by using the formula.

Power= Energy * Time

Finally the Fuzzy Logic is used to select the best nodes for aggregation. The Parameters like faith value, power level and distance from each node through cluster head as taken as input and fuzzy rules are formed. The rules are based on the output will be treated as the best node and worst node. The best nodes are aggregated with the cluster head ID, the data send to the base station. The Cluster Head ID is mentioned like the nodes are the best node in the network. The Remaining Worst nodes are eliminating in the network.

1.Distance Calculation

The Euclidean distance from each cluster head through the neighboring nodes (a,b) calculated by using the formula,

$$\mathbf{D = ((a_2-a_1)^2 + (b_2-b_1)^2))^{1/2}}$$

2. Energy Calculation

The Energy calculated by using the formula in a network,

$$\mathbf{E_{total} = E_{tx} + E_{rx} + E_{intial} + E_{sensing}}$$

Where,

E_{total}- Total energy cost in a network
E_{tx}-Transmitter cost
E_{rx}-Receiver cost
E_{intial}- Idle energy cost in a network
$E_{sensing}$- sensing node energy cost

3. Fuzzy Logic

The degree of the input fundamental steps and condition of fuzzy logic are strong-minded. On the basis of the rule is gritty. The results are acquired every fuzzy rules are multiple together with single overall results. The fuzzy sets of A with a membership function of X rules are determined. Antecedent 1 and 2 are the low the consequent are high.

Distance (D)= { [BN, a], [WN, b] }

Where,

a-Fuzzy set membership grade Best Node in Cluster ID with distance calculation
b-Fuzzy set membership grade Worst Node in Cluster ID with distance calculation

Power Consumed (P)= { [BN, c], [WN, d] }

Where,

c-Fuzzy set membership grade Best Node in Cluster ID with power consumption
d-Fuzzy set membership grade Worst Node in Cluster ID with power consumption

Faith Value (F)= { [BN, e], [WN, f] }

Where,

e-Fuzzy set membership grade Best Node in Cluster ID with faith value
f-Fuzzy set membership grade Worst Node in Cluster ID with faith value

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Table I: Decision Making using Fuzzy Logic Techniques

Distance D	Power Consumed P	Faith Value F	Consequences
Low	Low	High	Best
Low	High	High	Best
High	Low	Less	Best
Low	Low	Less	Best
High	High	Less	Worst
High	Low	Less	Worst
Low	High	Less	Worst
High	High	High	Worst

V. RESULTS

Nodes have been transmitted at a specified interval one after another. Figure 2 shows that the clustering techniques transmitted data to the base stations. Figure 3 shows that the Average Energy Consumption of the Network. Figure 4 shows that the Throughput in secured data aggregation using Fuzzy Logic techniques.

Table II: Simulation Parameters of the Network

S.No	Parameter	Value
1.	Transmitting Power	60mW
2.	Receiving Power	40mW
3.	Idle Power	8.3mW
4.	Inactive Power	15.2mW
5.	Energy per Individual node	50J
6.	Weighting Parameters W_1 and W_2	0.4, 0.8

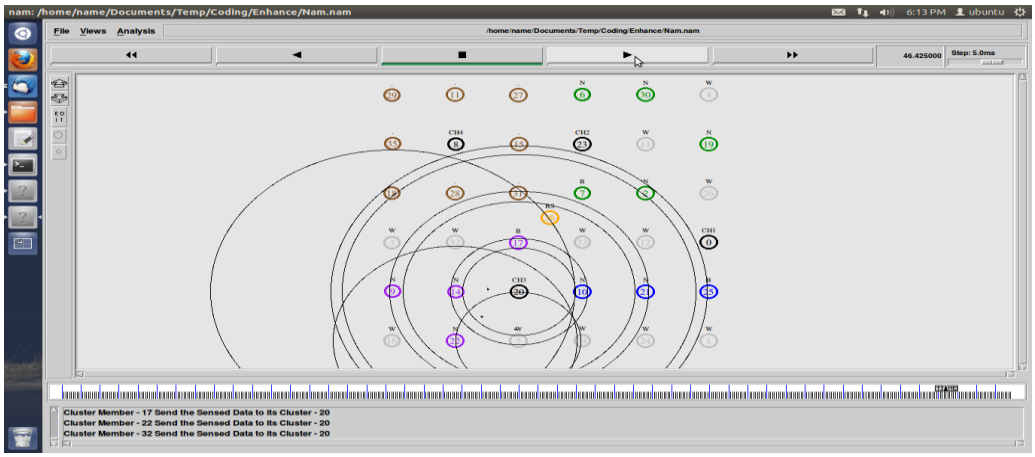

Fig. 2: Clustering techniques transmitted data to the base station

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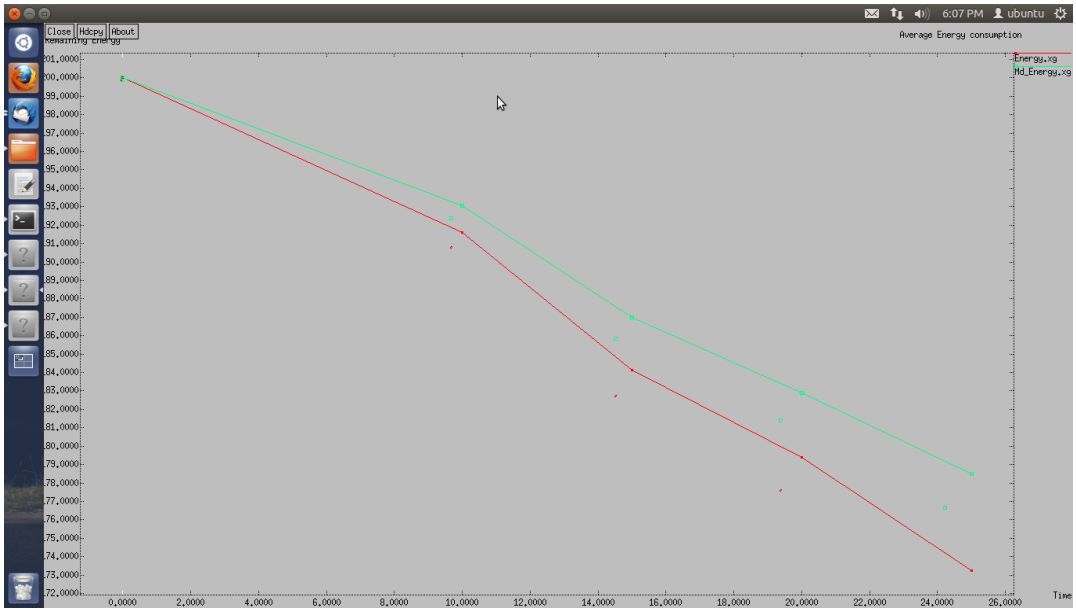

Fig. 3: Average Energy Consumption

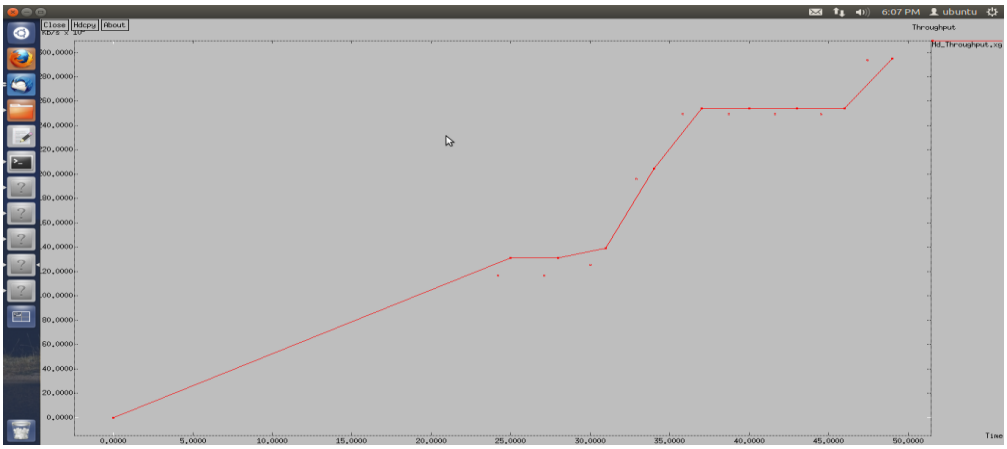

Fig. 4: Throughput in Secured data aggregation using Fuzzy Logic

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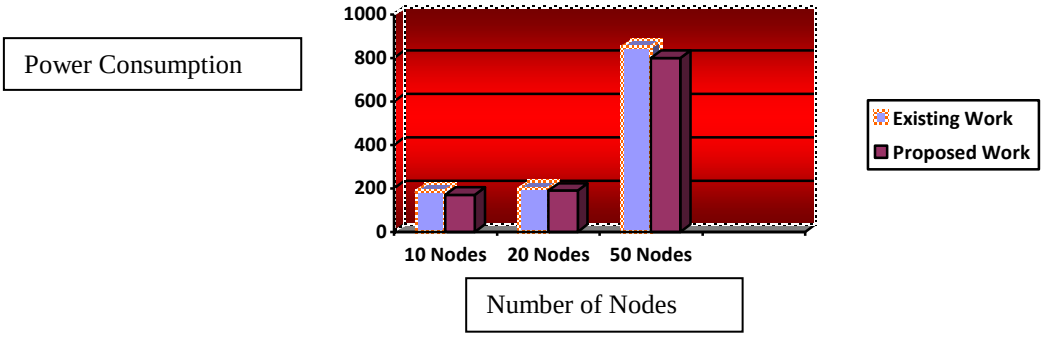

Fig. 5: Power Consumption of Various Nodes

VI. CONCLUSION

The Sensor Nodes have higher signal strength are elected as cluster heads. The parameters are distance, Power consumed and faith value of sensor nodes can be used as data aggregation. The fuzzy logic consider as the best node and worst node. After the classification the best node are selected as data aggregation then the worst node are neglected by cluster head. By simulated the results our technique has superior the throughput with condensed packet drop and also a lesser amount of energy consumption. The results are proved the effectiveness of our proposed techniques.

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