Near	More	medium	small	strong
Near	More	small	Medium small	Above mean
Long	weak	More	Medium small	mean
Long	weak	medium	Rather small	small average
Long	weak	small	small	weak
Long	mean	More	Average big	small average
Long	mean	medium	Medium	strong
Long	mean	small	Medium small	Above mean
Long	More	More	Average big	mean
Long	More	medium	Medium	weak
Long	More	small	Medium small	Very weak
Utmost	weak	More	big	small average
Utmost	weak	medium	Average big	mean
Utmost	weak	small	Medium	small average
Utmost	mean	More	Less big	mean
Utmost	mean	medium	big	small average
Utmost	mean	small	Average big	Above average
Utmost	More	More	big	Very robust
Utmost	More	medium	Less big	Robust
Utmost	More	small	Huge	Above average

At the end of each leader act duration, a leader re-election takes place. At the beginning of the network, random cluster selection takes place and the acting leader is selected. Then their different parameters are calculated and the transmission range for those clusters is calculated accurately as its diameter. The leader will then be selected. Thus, the number of leaders is reduced as the cluster is formed in different ranges. Thus, reducing the number of forwarding H_C. Thus, saving network resources and it is used to extend the life of the network.

Thereafter, the selection for the optimized leader will take place as follows.

IfR_E $\rightarrow$ Mean , $D_{ist \rightarrow P_N}$ $\rightarrow$ utmost,N_D $\rightarrow$ Regular Then, the L_D $\rightarrow$ regular.

If R_E $\rightarrow$ More , $D_{ist \rightarrow P_N}$ $\rightarrow$ utmost,N_D $\rightarrow$ Mean Then, the T_R $\rightarrow$ Robust.

If R_E $\rightarrow$ More , $D_{ist \rightarrow P_N}$ $\rightarrow$Mean,N_D $\rightarrow$ More Then, the T_R $\rightarrow$ Robust

If R_E $\rightarrow$ More , $D_{ist \rightarrow P_N}$ $\rightarrow$Weak,N_D $\rightarrow$ More Then, the T_R $\rightarrow$ More Robust.

Then we need to find its big and small values as already discussed. Then finalize the final leader selection at second cluster duration as follows:

Small (0.81, 0.33, 0.39) → 0.33

Small (0.79, 0.37, 0.49) → 0.37

Small (0.82, 0.27, 0.22) →0.22

Small (0.87 0.28. 0.27) → 0.27

Here, of all the given values, 0.37 is the maximum value. Due to this, the leader selection will be the node that sticks to this number. Thus, only the node that gives accurate outputs on all the selected parameters will run as the leader. Also, the node in the second place will run as the assistant leader.

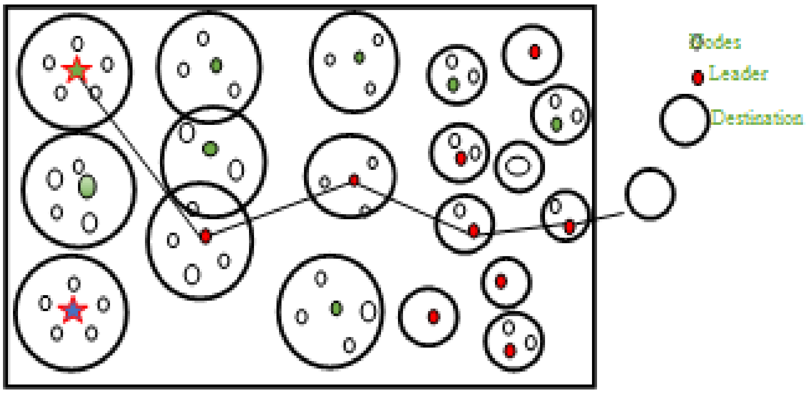

Figure. 1 Cluster Routing

3.5 *Routing Through Ladders*

Once the cluster formed with accurate leader as shown in Figure.1, after this election, during routing, we deliver data from one leader to another leader by contacting the destination then, in the path selection, the distance to one leader and another leader and its angle are calculated and delivered to the data destination by the leader at the shortest distance. For this, the angle and direction between the leaders are calculated and the path is set through it.Once two cluster sets are selected, the minimum probability and maximum probability for their interactions are calculated and its distances are determined.

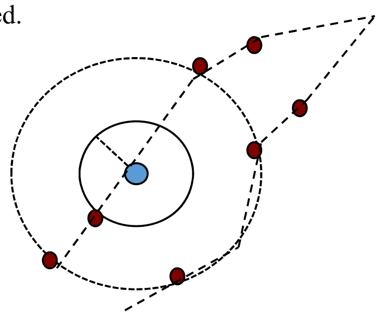

Figure.2 Transmission Ranges

The short-dotted line of the leader indicates its transmission distance and its longest dotted line indicates its communication distance as shown in Figure.2. A leader can summarize the distance of this circular direction and the distance of the destination to communicate with another leader and thereby find their total distance $T_D$and their circumference. We select the shortest route and finally deliver the data. Their total diameter D_M is calculated as follows. Since we have formed cluster sets of different sizes, this circumference will be optimal.

$$\sum T_D = D_{ist1} + \cdots D_{ist2} + D_{istn}$$

$$D_M = \pi T_{R1}{}^2 + \cdots \pi T_{Rn}{}^2$$

4. Results and Discussions

Here, the network is selected in the size of 500 x 500 square meters in which 100nodes are randomly placed with mobility. In it, the constant bit rate application is connected and the nodes started see it to the destination. The path selection required for this is described here. Table 1 contains the used parameters of the network.

Parameter	Value
Traffic Type	CBR- Constant Bit Rate
Nodes	100
Propagation Model	Two Ray Ground
Antenna	Omni-Directional
Network Size	500 ×500

Table.1 Network Parameters

e-ISSN : 0976-5166
p-ISSN : 2231-3850

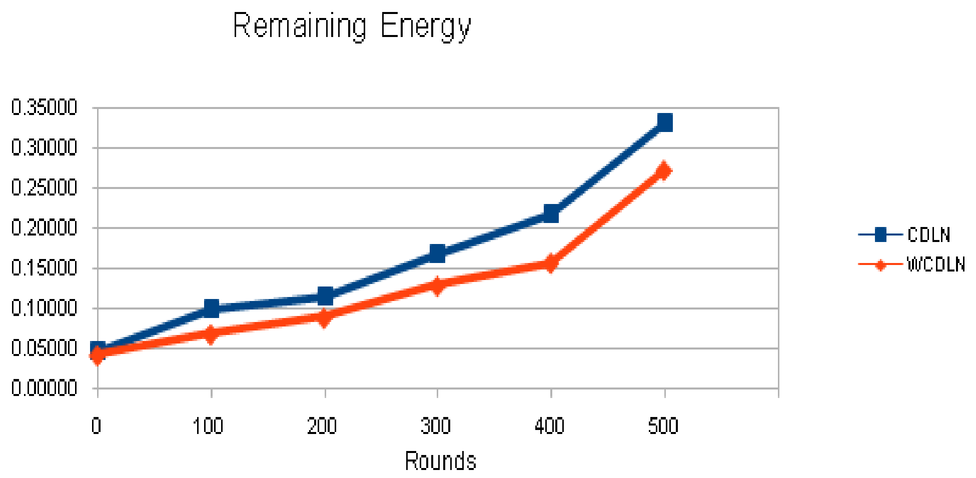

Figure.3 Rounds vs. Remaining Energy

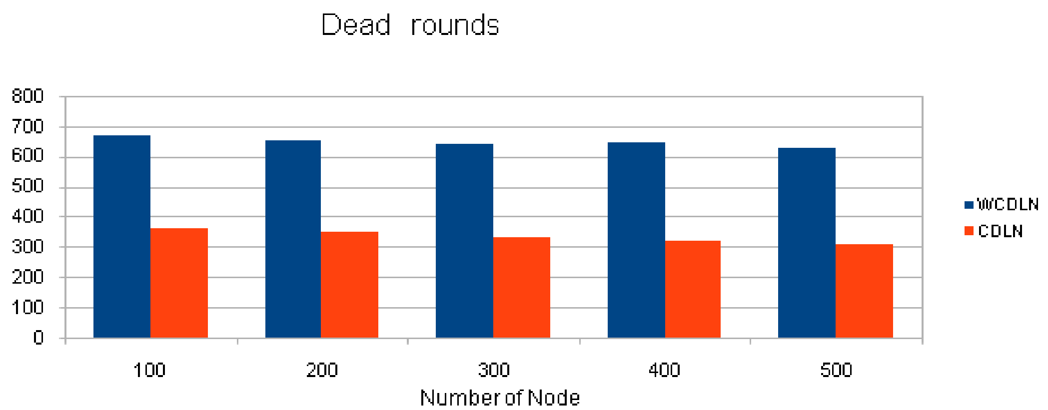

Figure.4 Node vs. Dead Rounds

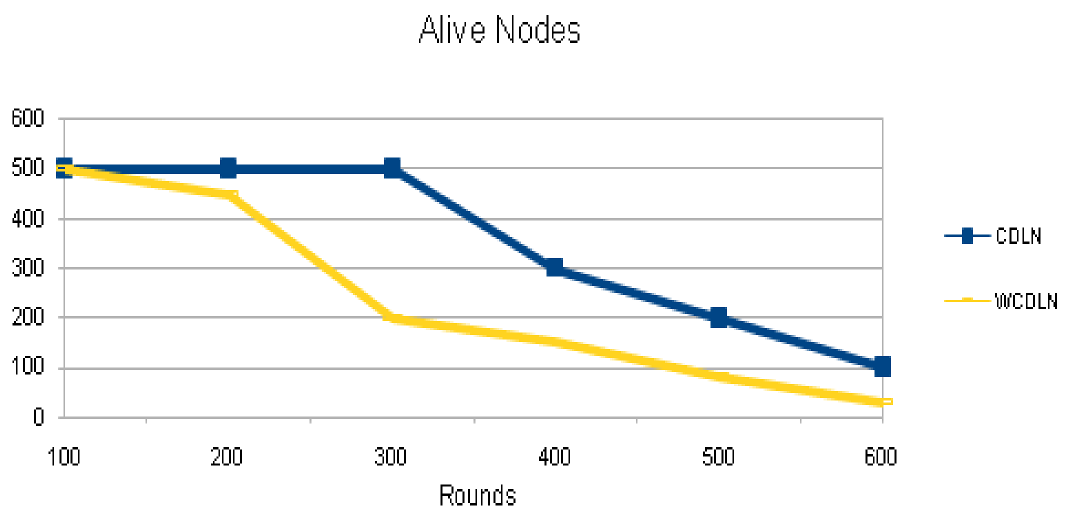

Figure.5 Rounds vs. Alive Nodes

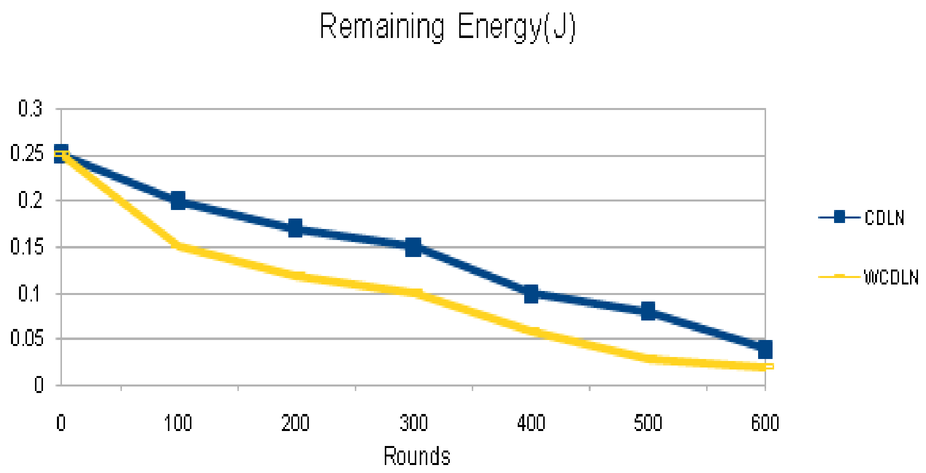

Figure.6. Average Remaining Energy

In these graphs, their losses, remaining energy, and nodes are calculated according to the energy of the nodes. Thus, we can see that the resources of the network have been turned off and the system has been used. From this we realize that the distance of the nodes, their transmission range and cluster members count are at the right level. If the number of dead nodes in the network is low and the number of living nodes is high, the protocol running on that network can be assumed to run with accurate calculations. Due to this we see that the remaining energy of the network has increased. From Figure.3 to Figure 6, all the results are tested according to the changes in the cluster forming rounds and the number of nodes. Thus, we can see more living nodes, as well as more remaining energy and less dead nodes. This is an expression of the quality of measures.

5. Conclusion and Future Work

In this network, the nodes are randomly placed and integrated by wireless propagation. All those nodes are formed by their optimal transmission range, cluster set, by calculating energy, neighbor count, distance between them and their transmission range. Similarly, in fuzzy optimization mode, the leader election takes place. Thereafter, in the leader-to-leader communication mode, routing is done. In that routing, the distance and circumference of the communication between the leaders are taken into account and the data is sent along the path where they have the lowest values. Thus. It can be seen that their energy level is very low.

In the future, same network we can focus on the Mac layer along with cognitive channel optimization, we can further reduce network delay and save network resources and prolong the life of the network.

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