CH selection: cluster heads are selected based on the fuzzy logic.

Clustering: Separate group of nodes are created. The proposed system works in four modules

- Network Creation and Setting Parameters to nodes
- Cluster Head Selection and Life Time calculation
- Changing duty cycle of sensor node
- Performance Evolution

A. Network Creation and Setting Parameters to nodes

In Create Network the network is created according to the user specified number of nodes and communication range. The communication range specifies the range a node can communicate with other nodes. The nodes are randomly deployed in a simulated network environment. The NAM simulator will be used for that. For the simulator the number of nodes, base station location and initial parameters of each node will be set using this module and all node values and range of the nodes are set using this module Routing protocol is used in this method to transfer data through cluster heads. Time of simulation has been set in this method.

B. Cluster Head Selection and Life Time calculation

Based on the parameter values cluster head is selected usi fuzzy logic controller and clusters are formed and t transmission of data is considered as one round and fuzzy logic controller will calculate at which round the very first node is died and which round half of the nodes has been died is calculated and displayed and that will be produced as output and accordingly it displays the change in the parameter values in the terminal.

Cluster Head Selection

The parameter values like STR, TTR AND RPS values are collected in the fuzzy logic controller jar file then based on those values life time is calculated for every node and the node which is having more energy that node is selected as cluster head. Here we have considered the energy value which is having more than 0.4 that will be considered as cluster head.

Life Time Calculation

The one transmission is considered as one cycle and tat value is stored in round flag as the number of cycles increases round flag count will be increased and finally it will be displayed in the terminal. Fuzzy logic controller will calculate energy dissipation in the nodes and remaining energy in the nodes at each round will be displayed in the terminal. Finally at which round the first node will dies is displayed as output in the terminal.

C. Changing Duty Cycle of Sensor Node

Here Extended the lifetime by changing the duty cycle of each sensor node so that during the sleep time the energy will not be deducted from nodes thus the life time will be increased that has proved by displaying the round at which first node fails and at which node half of the nodes will dies. From the output total number of rounds is less in extended fuzzy logic compare to fuzzy logic.

D. Performance Evolution

Plot graph of all the results using gnuplot the module for this is shown below. The graphs will show the difference in Existing system and the proposed system.

Advantages of the Proposed System

The proposed FLTP protocol has the ability to find nodes and maintain the route while transmission of data which is better than other protocols.
The proposed FLTP protocol is highly energy efficient when compared to FLTP.
The proposed FLTP not only detects the life time it also extends the life time.
The proposed system uses two FLC's in order to From the above graph we can analyze that as the number of increase the speed of evaluation of life time and to get more accurate results nodes increases energy will be deducted more in case of FUZZY logic and less in EFUZZY logic.

4. Simulation Results

Scenario 1:

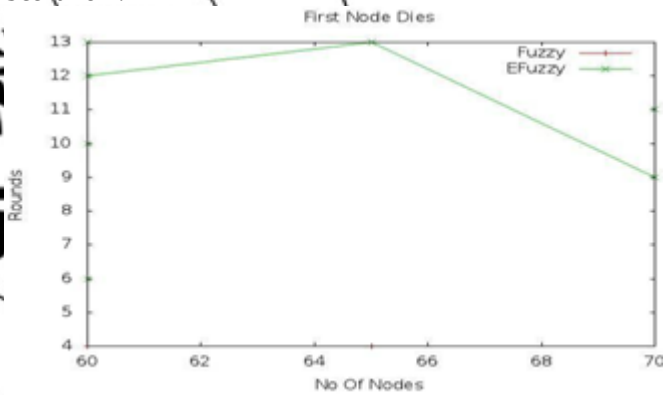

Figure 5: Graph shows No of Nodes vs Rounds

From the above graph we can analyze that first node die in less number of rounds in case of FUZZY and more number of rounds in case of EFUZZY.

Scenario 2:

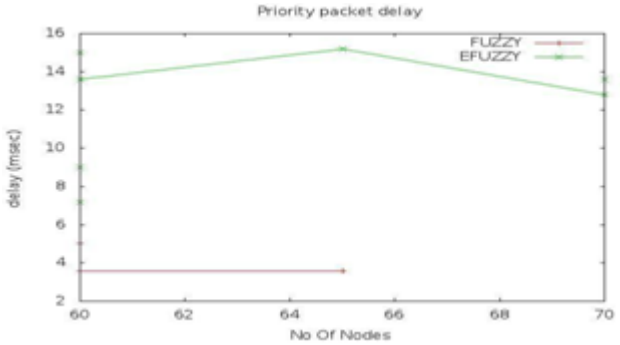

Figure 6: Graph shows No of Nodes vs. Delay for Priority Packets

Scenario 3:

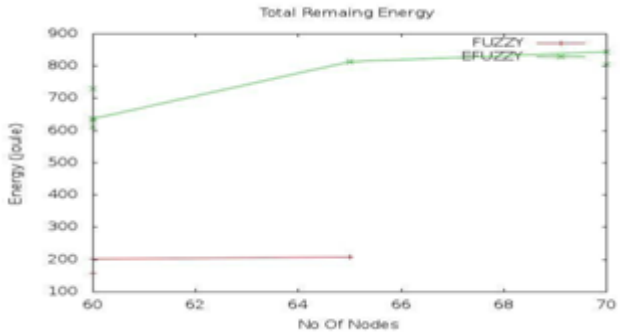

Figure 7: Graph shows No of Nodes vs. Energy

5. Conclusion and Future Work

As a result of these experiments, It has been conclude that FLTP is a stable and energy-efficient clustering algorithm for WSNs and it is a stable and energy-efficient controller for calculating the energy reduction of sensors in WSN.FLTP is used to extend the life time of sensors by changing the duty cycles of each sensors thus wastage of energy is reduced and life time is extended thus we can conclude that using this method we can predict the sensor life time and extend the lifetime of WSN. As a future work, the fuzzy clustering approach can be extended for handling mobile sensor nodes. Residual energy, distance to the base station and competition radius fuzzy sets can be adjusted in order to find optimal cluster-head radius values. In addition to this, the optimal maximum competition radius values for each scenario can be estimated by applying extensive tests. Some additional parameters such as node degree, density and local distance may also be employed to improve the performance of fuzzy clustering approach.

From the above graph we can analyze that as the number of nodes increases delay for priority packet will be more in case of FUZZY logic and less in EFUZZY logic

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Author Profile

Pawan Kumar G received B.E. degree in Sri Revanna Sideshwara College of Engineering Bangalore and Perceiving M.tech. Degree in Computer Network Engineering from CMR institute of technology.

Mr.Manoj Challa is pursuing Ph.D(CSE) in S.V.University, Tirupati, India. He completed his M.E (CSE) from Hindustan College of Engineering, Tamil Nadu in 2003. He is presently working as Associate Professor, CMR Institute of Technology, Bangalore. He presented nearly 19 papers in national and international Journals & Conferences. His research areas include Artificial intelligence and Computer Networks.