AN EXPERIMENTAL SOLUTION FOR SYSTEMATIC BROADCASTING DATA ADOPTING FORWARDER NODES INFORMATION WITH IT VANETs

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Abstract

From the movement of vehicle and wireless channels likes lossy, challenging an efficient and reliable multi-hop broadcast protocol service in VANETs (Vehicular Ad hoc Networks). In this paper, main task is multi-hop broadcast protocol using a fuzzy logic based method in VANETs. The proposed protocol is FuzzyBR-FNI (Fuzzy broadcast with forwarder node information) and obtains a low overhead by utilizing a subset of forwarder nodes to neighbor data packets. Considering the forwarder node selection, FuzzyBR-FNI together with more than one metrics of the inter-vehicle distance, vehicle mobility and Received Signal Strength Indication by utilizing fuzzy logic technique. After all the expected coverage distance and vehicle mobility are assumed from the forwarder node information which is obtained from the emergency message exchange. FuzzyBR-FNI provides an experimental and convenient result for broadcast facilities in VANETs because FuzzyBR-FNI is independent of position information. We employ real-world practicals and computer simulations to evaluate the performance of FuzzyBR-FNI. The method appraisal is skilled in veins tools and MATLAB environment to prove the efficiency of it.

***Keywords*: fuzzy logic; broadcast protocol; forwarder information; Vehicular Ad hoc Networks; experimental solution.**

1. Introduction

A (VANET) Vehicular Ad hoc Network is used to establish communication among vehicles in close contiguity, among vehicles and nearness fixed roadside device. A multi-hop broadcast protocol is obtained to disseminate traffic warning information (inter-vehicle communication warning, work zone warning etc) to more than one receivers in VANETs. Decreasing broadcast redundancy is essential since it can face to face affect MAC layer contention time at every one node and work on the packet collision probability. In VANETs broadcast protocols are classified to (a) receiver-oriented protocols and (b) sender-oriented protocols. Above the reception of the packets, in the receiver-oriented protocols each node chooses whether to rebroadcast a packet or not. The sender vehicle represents the next forwarders in the sender-oriented protocols. Some of the receiver –oriented protocols are available at [1]-[6] and the redundant broadcasts cannot be excluded absolutely. The sender node describes the forwarder nodes, in sender-oriented protocols. Generally, the selection of forwarder nodes is placed on the message collected by exchanging emergency messages between neighbor nodes. Consequently, for sender oriented protocols the selection of forwarder node algorithm is explicitly an essential part. In existing tasks [7],[8] selecting the efficient forwarder nodes and these are employed position message and road maps which are in accessible in some roads such as lanes. By using Multi-Point Relay (MPR) vehicles to forward data packets [9].These are having multiple increased nearer [10],[11].Though, these approaches are not providing link quality in forwarder node selection. As a result, researchers cannot perform thoroughly in fading surroundings. We introduce multi-hop broadcast protocol in a VANET which is free of location information in this research work. The proposed protocol chooses efficient forwarder nodes by using neighbor information which is collected from emergency message swaps in the neighborhood.

For one and all forwarder node candidate, to evaluate the inter-vehicle distance (for each one-hop neighbor) and node variation the proposed protocol (FuzzyBR-FNI) uses more than one hop neighbor information. T o evaluate the RSSI (Received Signal Strength Indication) between more than one neighbor, the emergency message reception ratio is utilized. The inter-vehicle distance, vehicle mobility and RSSI for the selection of forwarder node is considered in the proposed protocol utilizes a fuzzy logic based method. For further enhancement of reliability, the protocol also uses a common redundancy and greedy transmission approach. By rectifying the fuzzy logic membership functions, the protocol used is modulated for use in different scenarios. Therefore, the protocol can establish a smooth and mobile solution for more than one hop broadcast in VANETs. Using computer simulations and real-world analysis we appraise the proposed protocol by comparing it with alternatives. Veins software is used to develop this research paper in VANETs.

The organization of the research work is provided as follows. In sec. 2, we specify a skimpy form of related works. In sec. 3 we represent a full description of the proposed protocol, fuzzification. Following, we evaluate the Performance of analysis, clarify experimental results and simulation results in sec. 4 and sec. 5 respectively. Finally conclusions in sec. 6.

2. Related Work

Several authors [1-4] propose various broadcasting protocols based on receivers. All these protocols make a precise decision for a node to broadcast further or stand still. Redundant broadcasting still exist and is not eliminated. These protocols cannot promise reliable transmission as probabilistic method in a sparse network.

The dissemination ratio varies in node selection of relay algorithm in most of the sender based protocols. An emergency broadcasting protocol was proposed in [7] by Sa-hoo et al. named as Binary Partition Assisted emergency Broadcast protocol (BPAB). Packets are relayed to the longest distant node in required direction. But due to severe channel fading, the longest transmission results in packet loss. Hence it is essential to consider the channel quality while designing a protocol for VANETs. One our previous work [8] opts a suitable relay node based on vehicular distance, movement and signal level using fuzzy logic. However, the works in [7],[8]emphasizes on position information of the node.

Few position independent work exist in the literature. A Multi-Point Relay (MPR) broadcast scheme in [9] was proposed by TQayyum et al. A broadcast protocol that opts relay nodes using Dominating Connected Set was proposed by Djedid et al. [10].However, Ref. [9] and Ref. [10] do not consider node mobility factor in selecting the appropriate relay node. As a result due to the node movement, the data packets can be lost at relay nodes. Relay nodes are selected by EMPR (Enhanced MPR Broadcast) [11] and the increased radio range and node mobility are observed. However, the wireless channels fading feature does not consider EMPR. A node could receive a hello message from a neighbor at a long distance in wireless channels where suitable conditions are not possible. The neighbor node fails to receive the packet with a high probability if a long-distance neighbor node is selected as a relay node. To solve this problem without deriving the mathematical model, we acquire a flexible solution which is based on fuzzy logic [12] approach. Simulation parameters, its environments and simulation results are used in [13-16]. A new technology in which detection of potential alarming environments are developed by the researcher by using basic messages to avoid accidental situations existed with a peak, iffy traffic conditions and to aid in reducing the broadcast messages [17-18].

Fig. 1 represents the four lane VANETs architecture which uses moving vehicles as nodes for communication. When any two vehicles are travelled for some distance then they get accidents, at that time source vehicle forward the emergency message to incoming of vehicles. Priority is giving which vehicle has long distance and maximum speed and less density such type of vehicle receives the emergency message. the four lane VANETs architecture which uses moving vehicles as nodes for communication. Nodes should be between 100 to 300 meters range. Communication can be between moving vehicles or any base stations. Drivers are alarmed of different road conditions. Communication between cars and road side can be performed by VANET. In this Fig. 1 it uses infrastructure, real time, crucial effect of security and privacy, time-sensitive data exchange as Potential support.

A potential dangerous situation on the road is the Emergency Messages which messages are sent by a vehicle detect. Vehicles are travelling with speed of 120Km/hour. The maximum range is 1Km. Because of radiation effect and congestion road condition, it is not possible to forward the emergency message at a time to the incoming vehicles which are 1Km apart from source node. So this architecture is designed in such a way that emergency message gets forwarded for every 300mts to the destination node.

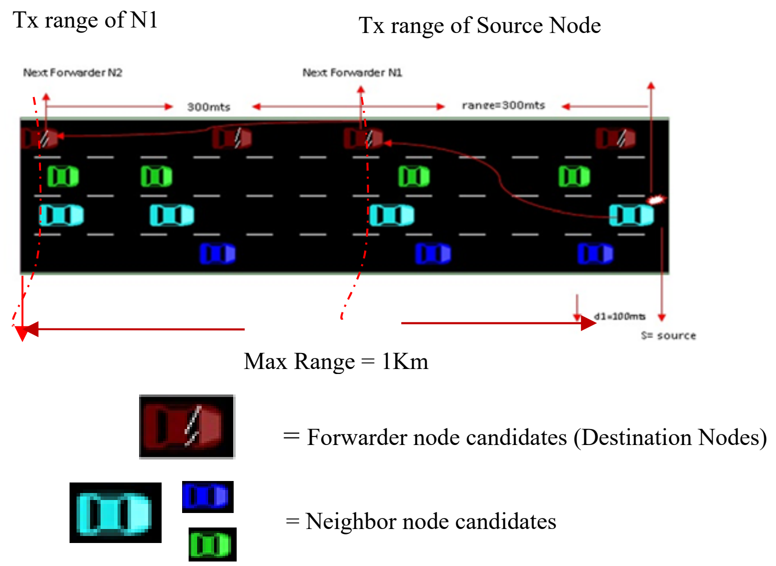

Fig. 1. Four Lanes Architecture in VANET

3. **Proposed Protocol**: FuzzyBR-FNI

3.1. *Protocol Design*

The FuzzyBR-FNI is a proposed protocol, it describes forwarder nodes to forward a packet. Each node occupies the address of the forwarder nodes to the packet prior to broadcasting a packet. Consequent to reception of a packet, a node can rebroadcast the packets specifically assuming it is on its own incorporated in the forwarder node list by lying on reception of a packet.

In the fuzzy logic broadcast forwarder node information (FuzzyBR-FNI), we provide vehicle mobility, inter-vehicle distance and RSSI. In order to provide a convenient response that is indifferent of position information, proposed protocol utilizes neighbor information to understand the vehicle mobility and inter-vehicle distance. In this paper, to represent one-hop neighbor node we specify "neighbor node", and employ " more than one hop neighbor node". Each node represents cannot be directly communicate but a node forwarding the packets with the help of another neighbor node.

VANET is a sharp network in which vehicles can exchange data while moving on roads or communicate with each other. In each vehicle, these networks have a wireless transceiver embedded in it which enables the vehicles to exchange data even when communication architecture is not presented. In FuzzyBR-FNI, each source node neighbor information (more than one hop) is used to evaluate forwarder node candidates set by fuzzy logic based method, we can select the best forwarder nodes in VANETs FuzzyBR-FNI also uses a designing transmission approach and link redundancy to enhance trust ability. The source node transmits a packet synergic times to establish a high reliability if the signal strength to a forwarder node is delicate. An adaptable transmission is utilized when a packet absence occurs at a forwarder node.

Based upon fuzzy set theory, fuzzy logic is agreed with the concept of approximate rather than exact. Elements have degrees of membership in the Fuzzy set theory which are different from classical set theory. Fuzzy set theory represents imprecise information or incomplete by defining set membership as a possibility distribution. By using non-numeric linguistic variables Fuzzy logic can process approximate data toexpress the facts. To represent the degrees of a numerical value belonging to predefined linguistic variables, Fuzzy membership functions are used. To conduct the final fuzzy value from the fuzzy, Fuzzy rules are defined. The final fuzzy value is converted to a numerical value by using Defuzzification.

3.2. *Forwarder Node Calculation Based on Fuzzy Logic*

3.2.1. Fuzzy set theory and Fuzzy logic

In this all the elements possess degrees of membership. Fuzzy logic refers if/then rule to represent with the fuzzy thesis.

3.2.2. *Fuzzification*

Conversion of a numerical to fuzzy value by the membership function is known as 'fuzzification'. The graphical representation of membership function of the RSSI, distance and mobility are in Fig. 2., and Fig. 3. The sender finds the membership function which degree the belongs :{ low, medium, long}, {low, medium, high}, {weak, medium, strong} and {VeryBad; Bad; Notacceptable; Acceptable; Good, Ideal}. By utilizing predefined membership functions and linguistic variables to metamorphose three factors to fuzzy values.

3.2.3. *IF/THEN rules combination and Mapping*

Mapping the fuzzy values for pre-established IF/THEN rules and integrate the rules to obtain the position of the neighbor node as a fuzzy value. The position is Ideal when IF Distance is long, mobility is high, and Signal Strength is Good. In a rule IF part is familiars "precedent" and THEN part is known the consistent. Since multiple rules are applied at a time, combined evaluation results are produced by Min-Max method.

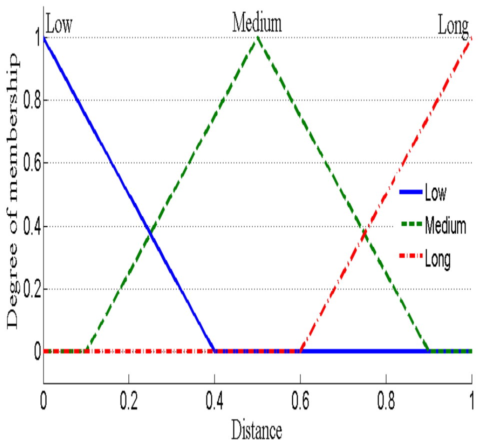

Fig. 2. Distance Factor

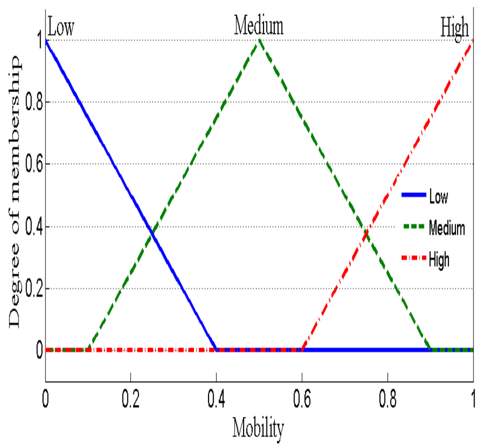

Fig. 3. Mobility Factor

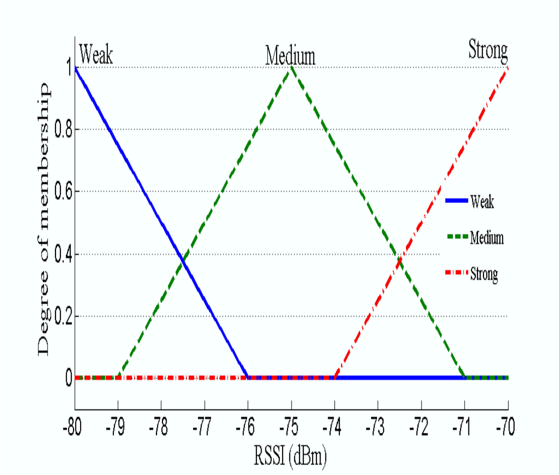

Fig. 4. RSSI Factor

The Fig. 2 represents the x axis and y axis which can be taken within the span 0 to 1. The span of low distance is from 0 to 0.42. The span of medium distance is 0.1 to 0.92 and the span of long distance is from 0.1 to 1. The Fig. 2 represents the linguistic variables which are low, medium and long.

The Fig. 3 represents the x axis and y axis which can be taken within the span 0 to 1. The span of low distance is from 0 to 0.42. The span of medium distance is 0.1 to 0.92 and the span of long distance is from 0.1 to 1. The Fig. 3 represents the linguistic variables which are low, medium and high.

The Fig 4 represents the x axis assigned with RSSI (-80 dBm to -70dBm) and y axis assigned the degree of membership function with 0 to 1. The values -79.53 dBm to -76.01 dBm represent the weak signal, the values -79.10 dBm to -71 dBm represent the medium signal and strong signal assigned -74.01dBm to -70 dBm. The Fig. 4 represents the linguistic variables which are weak, medium and strong.

Rule No	Distance	Mobility	Signal Strength	Position
Rul1	Long	H	Strong	Ideal
Rul2	Long	H	M	Good
Rul3	Long	H	Weak	NotAcceptable
Rul4	Long	M	Strong	Good
Rul5	Long	M	M	Acceptable
Rul6	Long	M	Weak	Bad
Rul7	Long	Low	Strong	NotAcceptable
Rul8	Long	Low	M	Bad
Rul9	Long	Low	Weak	VeryBad
Rul10	Medium	H	Strong	Good
Rul11	Medium	H	M	Acceptable
Rul12	Medium	H	Weak	Bad
Rul13	Medium	M	Strong	Acceptable
Rul14	Medium	M	M	NotAcceptable
Rul15	Medium	M	Weak	Bad
Rul16	Medium	Low	Strong	Bad
Rul17	Medium	Low	M	Bad
Rul18	Medium	Low	Weak	VeryBad
Rul19	Low	H	Strong	NotAcceptable
Rul20	Low	H	M	Bad
Rul21	Low	H	Weak	VeryBad
Rul22	Low	M	Strong	Bad
Rul23	Low	M	M	Bad
Rul24	Low	M	Weak	VeryBad
Rul25	Low	Low	Strong	Bad
Rul26	Low	Low	M	VeryBad
Rul27	Low	Low	Weak	VeryBad

Table 1. Rules

Where Rul1 to Rul27 represented as Rule1 to Rule27, H is given as High and M is given as Medium.

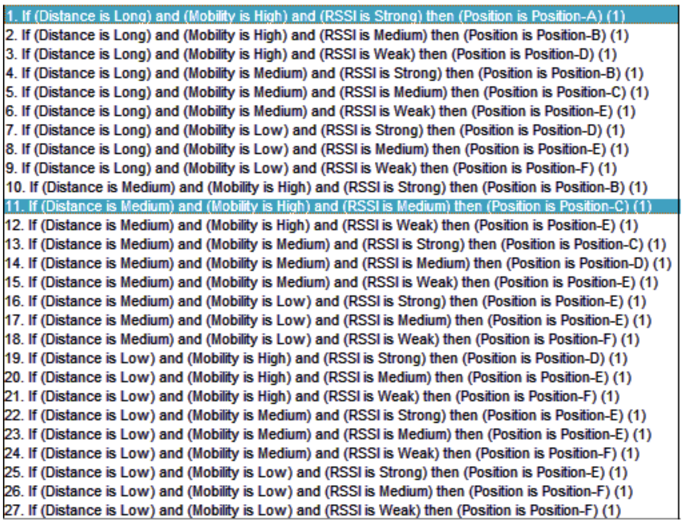
1. If (Distance is Long) and (Mobility is High) and (RSSI is Strong) then (Position is Position-A) (1)
2. If (Distance is Long) and (Mobility is High) and (RSSI is Medium) then (Position is Position-B) (1)
3. If (Distance is Long) and (Mobility is High) and (RSSI is Weak) then (Position is Position-D) (1)
4. If (Distance is Long) and (Mobility is Medium) and (RSSI is Strong) then (Position is Position-B) (1)
5. If (Distance is Long) and (Mobility is Medium) and (RSSI is Medium) then (Position is Position-C) (1)
6. If (Distance is Long) and (Mobility is Medium) and (RSSI is Weak) then (Position is Position-E) (1)
7. If (Distance is Long) and (Mobility is Low) and (RSSI is Strong) then (Position is Position-D) (1)
8. If (Distance is Long) and (Mobility is Low) and (RSSI is Medium) then (Position is Position-E) (1)
9. If (Distance is Long) and (Mobility is Low) and (RSSI is Weak) then (Position is Position-F) (1)
10. If (Distance is Medium) and (Mobility is High) and (RSSI is Strong) then (Position is Position-B) (1)
11. If (Distance is Medium) and (Mobility is High) and (RSSI is Medium) then (Position is Position-C) (1)
12. If (Distance is Medium) and (Mobility is High) and (RSSI is Weak) then (Position is Position-E) (1)
13. If (Distance is Medium) and (Mobility is Medium) and (RSSI is Strong) then (Position is Position-C) (1)
14. If (Distance is Medium) and (Mobility is Medium) and (RSSI is Medium) then (Position is Position-D) (1)
15. If (Distance is Medium) and (Mobility is Medium) and (RSSI is Weak) then (Position is Position-E) (1)
16. If (Distance is Medium) and (Mobility is Low) and (RSSI is Strong) then (Position is Position-E) (1)
17. If (Distance is Medium) and (Mobility is Low) and (RSSI is Medium) then (Position is Position-E) (1)
18. If (Distance is Medium) and (Mobility is Low) and (RSSI is Weak) then (Position is Position-F) (1)
19. If (Distance is Low) and (Mobility is High) and (RSSI is Strong) then (Position is Position-D) (1)
20. If (Distance is Low) and (Mobility is High) and (RSSI is Medium) then (Position is Position-E) (1)
21. If (Distance is Low) and (Mobility is High) and (RSSI is Weak) then (Position is Position-F) (1)
22. If (Distance is Low) and (Mobility is Medium) and (RSSI is Strong) then (Position is Position-E) (1)
23. If (Distance is Low) and (Mobility is Medium) and (RSSI is Medium) then (Position is Position-E) (1)
24. If (Distance is Low) and (Mobility is Medium) and (RSSI is Weak) then (Position is Position-F) (1)
25. If (Distance is Low) and (Mobility is Low) and (RSSI is Strong) then (Position is Position-E) (1)
26. If (Distance is Low) and (Mobility is Low) and (RSSI is Medium) then (Position is Position-F) (1)
27. If (Distance is Low) and (Mobility is Low) and (RSSI is Weak) then (Position is Position-F) (1)

Fig. 5. Rule Editor

The twenty seven possible rules has been shown in table 1. Critical issues that occur further in opting specific forward nodes can be resolved efficiently and traffic modulations are altered with the fuzzy logic based technique. Fig. 5 came from table 1.

3.3. *Plot and Jointly of IF/THEN Rules*

According to three metrics that is vehicle distance, vehicle mobility and vehicle RSSI, by using their fuzzy values a node utilizes the IF/THEN rules (as determined in Table 1 which has 27 fuzzy rules) to evaluate the position of the neighbor. The related variables of the position are given as {Ideal, Good, Acceptable, Not Acceptable, Bad and Very Bad). For example from Table 1 Rule1 is represented as follows. IF Distance is long, mobility is high, and RSSI is strong THEN position is Ideal. At the same duration, multiple rules are assigned to join their calculation outputs where we utilize the COG (Centre of Gravity) method. In the COG method, for each rule the lowest value of the precedent is employed as the ultimate degree.

3.4. *Fuzzification*

With the help of membership functions, the numerical representation can be changed into fuzzy by using Fuzzification technique. Eqn (1) represent the triangular membership functions that use to form Fig. 2, Fig. 3 and Fig. 4 with the parameters distance, mobility, and RSSI.

$$\mu_a(xi) = \begin{cases} 0 & \text{when} \quad xi \leq ai \\ \dfrac{xi - ai}{ni - ai} & \text{when} \quad ai < xi < ni \\ \dfrac{bi - xi}{bi - ni} & \text{when} \quad ni < xi < bi \end{cases} \qquad \text{Eqn(1)}$$

A triangular membership function $\mu_a(xi)$ is obtained by the above equation 1 and is depicted in Fig. 6. Crisp output can be obtained from fuzzy inference performance i.e Defuzzification.

The Center of Gravity method (COG) mathematically represented as follows:

$$X^{\#} = \frac{\int \mu_a(xi) \times x dX}{\int \mu_a(xi) dX} \qquad \text{Eqn(2)}$$

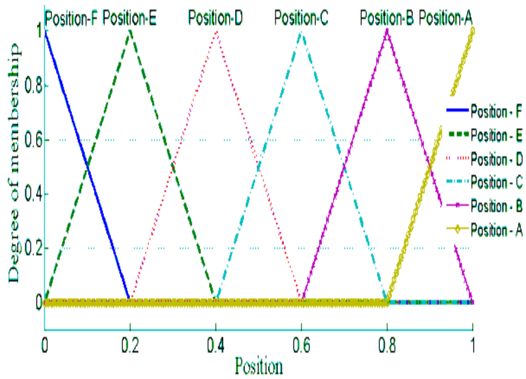

Fig. 6. Membership function Position Output

From Fig. 6 Where Position A= Ideal, Position B= Good, Position C = Acceptance, Position D = NotAcceptable, Position E = Bad and Position F = VeryBad.

3.5. *Defuzzification*

Defuzzification uses output membership function for changing membership degrees to a numeric value as represented in Fig. 6. The defuzzification is done using Center of Gravity (COG). For example the Ideal degree for position is 1, for position is 0.75 is Good degree and for degree 0.5 is acceptable position and for degree 0.25 is reaming position. The final value is derived from the centroid obtained.

Non-Fuzzy Algorithm 1

Step 1: If (redis>=ten and redis<=fifty)
and (redis>=ten and redis<=thirty)
then betrail = ninety percentage
else betrail = hundred percentage
redis = range effective distance
betrail = Bernoulli trial

Distance = 290 mts
Range is source radio range=300 mts
Range effective distance(redis)=Range- Disatance

Fuzzy Algorithm 2

Step1: **If** (TraCii → obtain present velocity ( ) . x - stored message →get WSMessage data ( ). x >Zero &&NeighborN<= Four && range1 - range effective distance1 <= Ten) then betrail= 100percent;
else
Step2: **If**(NeighborN>=Six) && (NeighborN<=Eight) then
betrail = 90percent
else
Step3: **If**(NeighborN>=Eight) && (NeighborN<=Ten) then
betrail = 80percent
else
Step4: **If**(NeighborN>=Ten) && (NeighborN<=Twelve) then
betrail = 70percent
else
Step5: **If**(NeighborN>=Twelve)&&(NeighborN<=Fourteen) then
betrail = 60percent
else
Step6: **If**(NeighborN>=Fourteen)&&(NeighborN<=Sixteen)
betrail = 50ercent
else
Step7: **If**(NeighborN>=Sixteen)&&(NeighborN<=Eighteen) then
betrail = 40percent
else
Step8: If(NeighborN>=Eighteen)&&(NeighborN<=Twenty) then
betrail = 30percent
else
Step9: **If**(NeighborN>=Twenty)&&(NeighborN<=Twentytwo)then
betrail = 20percent
else
betrail= 10percent

Where betrail = Bernoulli trial
Where NeighborN is Neighbor Nodes.

In non-fuzzy algorithm 1 which vehicle has satisfied with only one condition like long distance, priority is giving to such type of vehicle for receiving emergency message. From fuzzy algorithm 2 Which vehicle has satisfied with more than one condition like long distance and maximum speed and less density, such type of vehicle receive 100% emergency message that is be trail(Bernoulli trail probability) is 100 % , otherwise be trail gets reduced by a factor of 10%.

4. Performance of Analysis

4.1. *Distance Factor*

$$DFA(K) = \begin{cases} \dfrac{d(K)}{L}, & d(K) <= L \\ 1, & d(K) > L \end{cases} \qquad \text{Eqn (3)}$$

Up On receiving an emergency message from K, distance factor (DFA) is computed by a node as in equation (3). In Equation (3), d(K) is distance between occurring node and the node K. By the maximum distance L, consistent communication may be provided.

4.2. *Mobility Factor*

$$MFA(K) \leftarrow (1-\partial) \times MFA(K) + \partial \times \left(1 - \frac{|d_t(K) - d_{t-1}(K)|}{L}\right) \qquad \text{Eqn (4)}$$

From a nearby K up on getting of an emergency message, a node determines a (MFA) mobility factor as in equation (4). For higher MFA value, the compatibility of the surrounding node will be higher. The distance between the surrounding node is d_t (K) instant node at a time t and ∂ is the smoothing factor in equation (4). By selecting various samples and showed complete analysis.

4.3. *Signal Strength Indicator*

$$\mathrm{RSSIFA(K)} \leftarrow (1-\partial)\times \mathrm{RSSIFA(K)} + \partial \times \left(1-\frac{\mathrm{RXThreshd}}{\mathrm{RxPwr}}\right) \qquad \text{Eqn (5)}$$

After receiving message from a neighborhood node K, it estimates 'Received Signal Strength Indication Factor' (RSSIF) as Eqn.5. 'RxPwr' denoted as received signal power, '∂' is fostering factor, and 'RXThreshd' represents reception threshold.

5. Simulation Results

Table 2 specifies the simulation parameters. MATLAB software (R2021a) is used for the simulations of the proposed system. The mobility of nodes are generated by using SUMO tool.

Environment Measurements	100mts * 100mts
Number of Vehicles	60 to 400
Mobility Generation	SUMO, OMNeT++
Total Sources	40 to 50
Total Packets	50 Packets / Source
Packet Size	512 Bytes
Data Rate	One Packet / Sec
MAC	IEEE 802.11 MAC (2Mbps)
Simulation Time	500 Secs

Table 2. Simulation Parameters

The proposed specifications and the network simulations are briefed in the table 2. In selection of next forwarder node we can get better presentation in fuzzy logic method, compared to the non-fuzzy method with respect to delay, hops, rebroadcast counts [19-20].

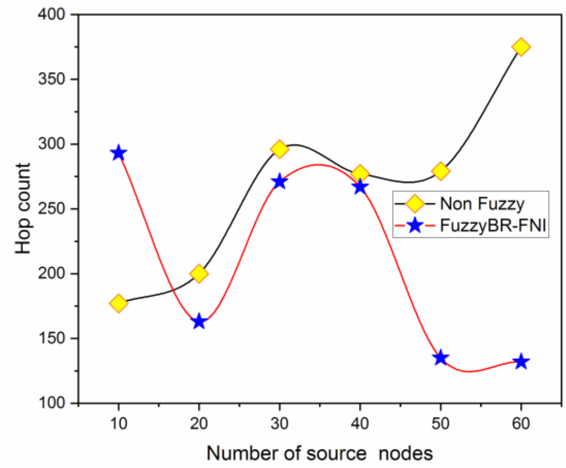

Fig. 7. Number of source nodes vs Hop count.

The Fig. 7 which depicts the graph between number of source nodes and hop count. It can be noticed that the hop count gets decreases as number of source nodes increases in proposed fuzzy logic technique. In non-fuzzy logic technique, hop count gets increased as number of source nodes increases.

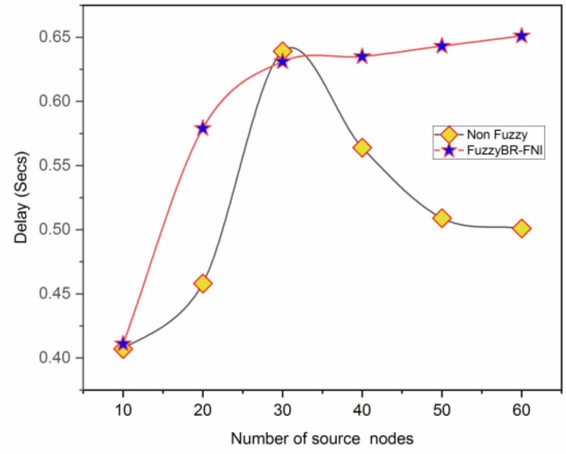

Fig. 8. Delay versus source nodes.

From the Fig. 8, it is observed that when delay increases the number of source nodes also increases in the proposed fuzzy logic technique. In non-fuzzy logic technique delay gets decreased as source nodes number increases.

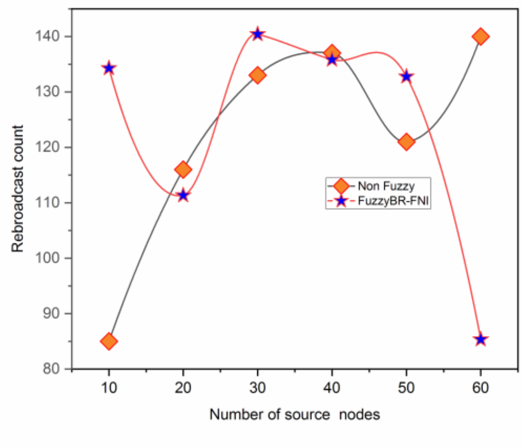

Fig. 9. Rebroadcast count versus source nodes

From the given Fig. 9 it can be represented that as number of source nodes growths and the rebroadcast count reduces in the case of proposed protocol fuzzy logic technique. In non-fuzzy logic technique number of source nodes increases and rebroadcast count gets increased.

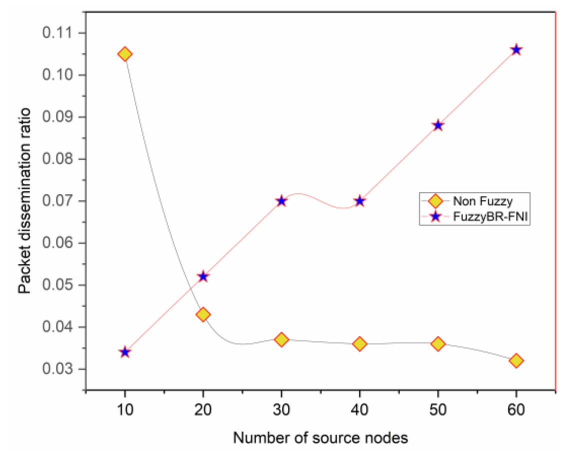

Fig.10. Packet Dissemination Ratio versus source nodes.

From the given Fig. 10 shows the graph between PDR (Packet Dissemination Ratio) and source nodes number. It can be observed that as PDR increases the source nodes number and also increases in proposed protocol fuzzy logic technique. In non-fuzzy logic technique when PDR gets reduced, source nodes number increases.

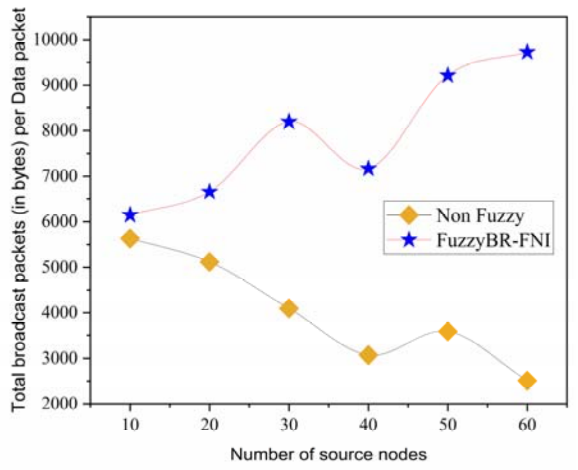

Fig. 11. Source nodes versus Total broadcast bytes per data packet.

From the given Fig. 11 ,it shows that as number of source nodes increases the total broadcast bytes slowly decreases but at node 60, rapidly increases in the case of proposed protocol fuzzy logic technique where as in non-fuzzy logic technique as number of source nodes increases, total broadcast bytes gradually increases at node 50 and at remaining nodes slowly decreases.

6. Conclusion

We have developed FuzzyBR-FNI (Fuzzy broadcast with forwarder node information) for VANETs with a several hop broadcast protocol. Proposed protocol is autonomous of placing systems and it surmise the vehicle variation and distance using neighbor information, and three factors (Distance, mobility and RSSI) are used to select best forwarder nodes in VANETs. In VANETs, both simulation and original results revealed that for broadcasting the data dissemination the present protocol can be a practical solution. Simulation results may be persistent about glaring enhancement of the proposed real time methodology on conventional alternatives.

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