Survey of Implemented routing protocol with fuzzy

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Abstract—An ad-hoc wireless network consist of a set of mobile nodes i.e. hosts that are connected by wireless links. The network topology (the physical connectivity of the communication network may keep changing randomly. routing protocols that find a path to be followed by data packets from the source node to a destination node used traditional wired networks cannot be directly applied in ad hoc wireless networks due to their highly dynamic topology ,absence of established infrastructure for the centralized administration .In this paper, have to studied about the proposed routing protocol with fuzzy system and their different parameter. The main purpose of this paper is to provide with latest implementation in different routing protocol with fuzzy system

Keywords— MANETs, AODV, DSDV, DSR, fuzzy System

I.   Introduction

An ad-hoc wireless network consist of a set of mobile nodes i.e. hosts that are connected by wireless links. The network topology (the physical connectivity of the communication network may keep changing randomly. routing protocols that find a path to be followed by data packets from the source node to a destination node used traditional wired networks cannot be directly applied in ad hoc wireless networks due to their highly dynamic topology ,absence of established infrastructure for the centralized administration i.e. base station or access point s bandwidth-constrained wireless links and resource (energy)-constraints nodes . A variety of routing protocol for ad hoc wireless networks has been proposed in the recent past. [1]

The routing protocols for ad hoc wireless network can be broadly classified into four categories based on

- Routing information update mechanism
- Use of temporal information for Routing
- Routing topology
- Utilization of specific resources

Routing is the most fundamental research issue in MANET and must deal with the limitation s such as low bandwidth, high error rates and unpredicatable movement of nodes. Generally routing protocol can be classified into three major categories based on the routing information update mechanism. Proactive protocols every node maintains the network topology information in the form of routing tables by periodically exchanging routing information. Routing information generally flooded in the whole network. Whenever, a node requires a path to a destination, it runs an appropriate path finding algorithm on the topology information it maintain. Such as Destination Sequenced Distance – Vector (DSDV).Wireless routing protocol (WRP) etc
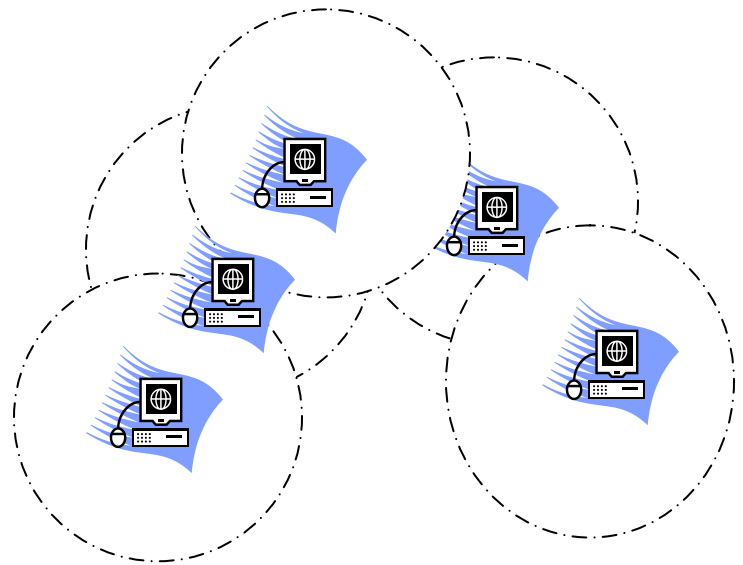

Figure1 : MOBILE ADHOC NETWORK

Reactive protocols, don't maintain the network topology information. They obtain the necessary path when it is required; by using a connection establishment process .hence these protocols do not exchange routing information periodically. Such dynamic source routing protocol (DSR), Ad Hoc on Demand Distance- Vector routing protocol(AODV).Hybrid routing protocols combine best features of the reactive and proactive routing protocols .Nodes within a certain distance from the node concerned , or within a

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particular geographical region, are said to be within the routing zone of the given node For routing within this zone, a table – driven approach is used. For nodes that are located beyond this zone, on demand approach is used. Such as core Extraction Distributed ad hoc Routing protocol (CEDAR), Zone Routing protocol (ZRP).

Recently some intelligent method including the fuzzy systems have been applied to the area of routing in ad hoc network, aiming to obtain more adaptive and flexible models over the existing models .however in relevant researches of the fuzzy system, the destination node waits with in a time frame for accepting all route request packet of the possible paths from the source, than it decides which is the suitable after evaluating the cost of each path depending on fuzzy system. In this work the routing wait time is reduced by making each node along path from the source to the destination participating in selectable optimal route, considering not only the minimum hops, but also the delay period of each path using fuzzy system assessment until reaching the destination which does not require any additional waiting time to send the route reply packet on chosen path.

A. RELATED WORK IN ROUTING PROTOCOL WITH FUZZY SYSTEM

We can classify all the work that have been done in different routing protocol with using the fuzzy approaches .In this section ,we will overview some proposed protocols that have been given to designing fuzzy System. A Fuzzy logic theory was first introduced by zadeh in the 1960s as a tool for modeling fuzzy system. Fuzzy system are suitable for uncertain or approximate reasoning, it basically consists a three steps as follows

- Fuzzification: It is a process where crisp input valued are transformed into the membership values of the fuzzy sets.
- Inference: it is a type of engine which is used to calculating the fuzzy output by applies fuzzy rules.
- Defuzzification: Defuzzification is a mathematical process used to convert the fuzzy output to a crisp value.

In proposed fuzzy system, mamdani minimum inference method was used as fuzzy inference method, where the 'and' operation are set to minimum and Defuzzification are carried out. As shown in figure2.
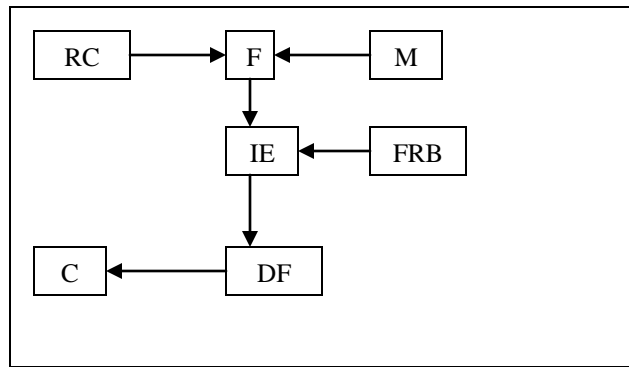

. Figure2. Fuzzy Routing

Where RC: route constraints, F: Fuzzification, M: membership function, IE: interface engine, DF: Defuzzification, C: cost, FRB: fuzzy rule base

In[1] Manickam and Shanmugavel have presented fuzzy based trusted ad hoc on demand distance vector (FTAODV) routing protocol without making any extraneous assumption in the existing AODV is proposed. all nodes in the network independently executed the fuzzy trust model to drive trust on its neighbor .it is found to proposed FTAODV protocol is better than AODV in term of routing overhead ratio, through put ,latency and packet loss.

In [2] Susan Rea and Dirk Pesch have used DSR and mention the effect of multi-metric decisions making using fuzzy logic for Caching decisions. The flooding nature of a route request can harshly influence the performance of a network, as several nodes may initiate floods concurrently, due to this burst the broadcast traffic through the network resulting collisions and retransmission attempts that can cause congestion in a network .Here in this paper presents a multi-metric decision algorithm which implementing the effecting caching need for route discovery and Improve the performance of the network.. Here proposed a fuzzy logic based caching decision as a route selection method.

In [3] Dana, Ghalavand and Farokhi have presented a reliable routing algorithm based on fuzzy logic approach. In this scheme we calculate three parameters: trust value, energy value, and reliability value that are used for finding a stable route from source to destination. During route discovery, every node records its trust value and energy capacity in RREQ packet. In the destination, based on reliability value, is decided which

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route is selected .The path with more reliability value is candidate to route data packets from the source to destination.

In [4] Gasim alandjaini and Eric e.johnson have presented two fuzzy routing approaches i.e. FLWMR and FLWLAMR. In this paper two fuzzy routing approaches are used fuzzy logic wireless multipath routing (FLWMR) which uses the number of hops in a path as it's metric and fuzzy logic wireless load aware multipath routing (FLWLAMR) which uses aggregate packet backlog along path as it's metric. In FLWMR when a source host wants to send a message to s destination, FLWMR first calls upon the local fuzzy logic controller to determine whether to drop the message

In [5] Taqwe odey fahad has presented new fuzzy based protocol i.e. FAODV which used fuzzy system with AODV routing protocol route request message carries the number of delays taken along the path and calculate the fuzzy cost of each time in receive message .Route Request message and update the table in reverse order of route entry to the source of the route request message .if fuzzy cost is less than stored value, than replace the stored value until getting the destination.

1) LITERATURE REVIEW

In Gasim alandjaini and Eric e.johnson, two fuzzy routing approaches are used FUZZY LOGIC WIRELESS MULTIPATH ROUTING (FLWMR) which uses the number of hops in a path as it's metric and FUZZY LOGIC WIRELESS LOAD AWARE MULTIPATH ROUTING (FLWLAMR) which uses aggregate packet backlog along path as it's metric.,

In FLWMR when a source host wants to send a message to s destination, FLWMR first calls upon the local fuzzy logic controller to determine whether to drop the message. Fuzzy logic controller has two inputs message precedence and network status. Fuzzy logic rules are used in FLWMR to determine whether to route message through zero, one, multiple or all available paths in a network these rules depend upon the priority of the messages and traffic congestion in the network. For example if we wish to discard low importance message when network is congested, we would include a rule: if message precedence is routine and network status is poor then discard the message. We take two inputs in fuzzy logic controller i.e. message precedence and network status and one output the routing decision.

	Routine	poor	immediate	Flash
Poor	Discard	Multiple	Multiple	flood
Moderate	Discard	Single	Multiple	flood

Good				
Good	Single	Single	Multiple	Multiple
Excellent	Single	Single	Single	Multiple

Figure 3*: FLWMR FAM table*

The rules are expressed in mamdani form:
RI: IF x is Ai and y is Bj then z is ck.
Where x, y and z are linguistic variables representing two process state variable and one control variable: Ai, Bj, Ck are linguistic values respectively.

In Taqwe odey fahad, used one fuzzy routing approaches and introduced the new protocol i.e. FAODV protocol. Here we used fuzzy system with AODV routing protocol route request message carries the number of delays taken along the path and calculate the fuzzy cost of each time in receive message .Route Request message and update the table in reverse order of route entry to the source of the route request message .if fuzzy cost is less than stored value, than replace the stored value until getting the destination, it also reduce the routing time by this scheme and also reduce memory overhead.

In this protocol we used some rules of fuzzy which depend upon the packet hop count value and delay. As shown in figure4 triangular membership function are used to represents the input and output with the three linguistic variable of the input low medium and high and five output: very low, low, medium, high and very high.

In J. Martine Leo Manickam and S. Shanmugavel, proposed the fuzzy based trust model is integrated with AODV protocol. Here trust model is constructed by trust verification during these phase each node verifies the trust worthiness of neighbor from which it receive the control packet. In AODV routing protocol, nodes will interact only with the trusted neighbors. During fuzzy input parameter extraction, each node monitors its neighbors based on directly experienced events. During fuzzy based trust computation, the mamdani based fuzzy model is used to compute the trust from the monitored events to have a direct trust on its neighbors. These computed trust levels are then associated with the routing process in AODV. As shown in figure trust model these model is also based on some rule base and calculate the fuzzy value.

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		DELAY		
		LOW	MEDIUM	HIGH
HOP COUNT	LOW			
		VERY LOW	LOW	MEDIUM
	MEDIUM	LOW	MEDIUM	HIGH
	HIGH	MEDIUM	HIGH	VERY HIGH

Figure 4: Rule base for FAODV

Figure 5: trust model

a) CONCLUSION

In fuzzy logic wireless multipath routing (FLWMR) provide higher reliability and lower delay for important traffic the do the previous protocols and in most cases offer better performance for all traffic and some other parameter which improved the overall performance.

o   Average end to end delay of data packets it is the average time by data packets when released by sources until reach their destination, as FAODV, FLWMR, FLWLAMR,, FTAODV data packet delay decreased as compared to AODV, DSR and SMR.

o   packet delivery fraction it is the ratio of data packets delivered to the destination to those sent by the source .it is depend are two factor effect of mobility: many data packets are dropped during the aodv, DSR, SMR route discovery and route recovery as FAODV, FLWMR, FLWLAMR,, FTAODV mobility increase

o   normalization load; the average number of routing overhead packets transmitted for each delivered data packet in simple words it is the ratio of total number of control packets and transmitted data packets received by the destination .as DSR has least overhead high efficiency are provided due to their single route for each session.

o   End to end delay of data packet at different speed is decreased in routing algorithm based on fuzzy-logic (RRAF) as compared to AODV. Packet delivery ratio is also increase. Overall throughput is increase in RRAF as compare to aodv. End to end delay of data packet at different pause time is increased in RRAF as compared to AODV.
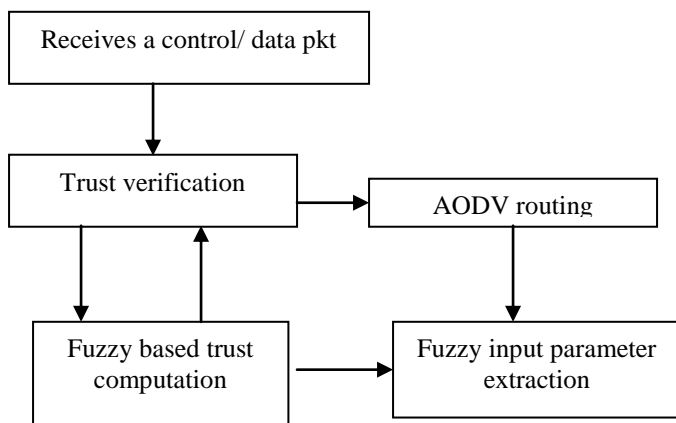
PROPOSED AND FUTURE WORK

In a multi-hop mobile ad hoc network (MANET) mobile nodes are communicate with each other ,by using the different type of routing protocol such as ad hoc On demand vector routing (AODV).Here, the main purpose of theses paper is to implementing the AODV routing protocol algorithm by making routing decision depend on the fuzzy cost based and on the delay in conjunction with the number of hops in each path ,In AODV routing protocol offer the quick adaptation to dynamic link conditions and determine the unicast routes to destinations within the ad hoc network. In Ad hoc on demand Distance- Vector routing protocol perform varies activities, route is established whenever a node needs a "next hop" to forward a packet to a destination .In AODV,

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Source broadcasts Route Request (RREQ) message for specified destination, and Its Intermediate node, Forwards (broadcasts) message toward destination, Creates next-hop entry for reverse path to source, to use when sending reply bidirectional links. In Route Reply Destination unicast Route Reply (RREP) message to source RREP contains sequence number, hop-count field (initialized to 0).It will be sent along "reverse" path hops created by intermediate nodes which forwarded RREQ .In Intermediate node Create next-hop entry for destination as RREP is received, forward along "reverse path" hop and Increment hop-count field in RREP and forward. In AODV If Source getting multiple replies, uses one with lowest hop count and Each node maintains non decreasing sequence number ,Sent in RREQ, RREP messages, incremented with each new message and also Used the "timestamp" routing table entries for "freshness" comparison when Intermediate node may return RREP if it has routing table entry for destination which is "fresher" than source's (or equal with lower hop count),In Routing table entries assigned "lifetime", deleted on expiration, Unique ID is also included in RREQ for duplicate rejection. Route Maintenance Used when link breakage occurs Link breakage detected by link-layer ACK, "passive ACK", AODV "Hello" messages, Detecting node may attempt "local repair": Send RREQ for destination from intermediate node, and Route Error (RERR) message generate and Contain the list of unreachable destinations, Sent to "precursors": neighbors who recently sent packet which was forwarded over broken link and Propagated recursively.
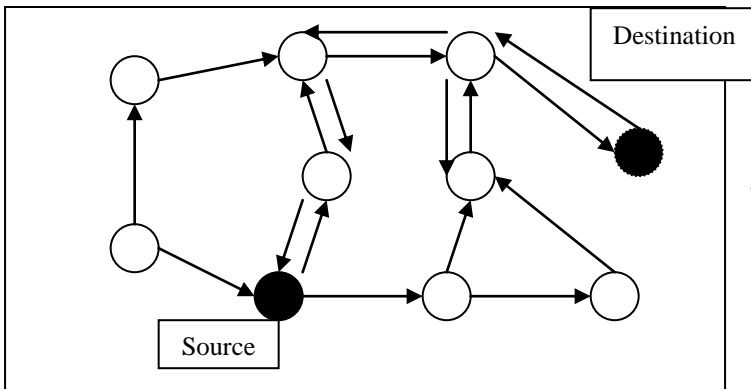
As shown in figure:

Figure6: AODV ROUTE DESCOVERY

to define .they are follows:

o Packet delivery ratio: ratio between number of receiving data packets by the destination and number of data packet originate by the source.
o Average end to end delays: it is the average time taken by data packets when it travel through the network from source to destination.
o Normalization Routing Load: it is ratio between the total number of control packets and transmitted data packets in the network

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About Author (s):

Priti rajawat ITM university Gwalior, research Topic On Adhoc Network(survey of implemented routing protocol)paper id "CEEE-13-244" ,here survey the fuzzy based routing and their effect in the network

APPENDIX

Some keywords are used in that papers which are important

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