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MULTICAST OPPORTUNISTIC COURSE-PLOTTING PROTOCOL TO OPTIMIZE LIFETIME OF MANET

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Abstract: An opportunistic multicast course plotting (routing) protocol with awareness of energy consumption to adopt is proposed here. Multicasting regions are considered so that the nodes distributed several multicasting regions in Mobile Adhoc NETwork (MANET) environment based on the geographical location. Every node in the system present in any one of the multicasting region and the nodes in the system assigned with group address along with the node ID. When the source node transmits the message to a multicast group, it will choose the path with highly energy efficient course plotting routes also the information carries the information with source ID. Therefore, the proposed multicast course plotting scheme optimizes the total energy consumption and increase the lifespan of the network.
Index Terms: Opportunistic route, Course-plotting, Multicasting, MANET, Geographical location.

I.INTRODUCTION

MANET plays an essential position in the most considerable applications such as military relevance application, disaster healing, and so forth. An accumulation of self-organised nodes with moving characteristics makes the MANET architecture more flexible and the information's are accessed on demand. The nodes present in the network exhibits as autonomous node since MANET is a decentralized network. Nodes moves randomly and the topology of the network changes dynamically since it leads to route failures. In this way, the likelihood of route failure is higher in the MANET than other static networks. The execution of the specially appointed system has influenced by various applications. The performance of the ad hoc network has affected by route failure, routing and communication overhead, lack of QoS and the signal fading.

Researchers primarily focus on path discovery to increase the execution of the MANET. Ad-Hoc On demand Distance Vector Routing protocol (AODV) was mainly focused for the purpose of route discovery process. It goes under the class of approachable and in need access protocol, this mechanism indicate that it find the path in upon the receipt of Route Request (RREQ) packets from the originating node. It handles the failure in the route found by sending the Route Error (RERR) note to the source node. At that point the AODV reroutes the information to the destination. MAODV [2] is utilized to multicast the information loads over MANET condition. This multicast protocol forms the multicast aggregate by developing the multicast tree. This is the very productive protocol for multicasting in the MANET environment as far as QoS.

The improvement of AODV protocol with regards to wireless ad-hoc network was proposed in [1]. A technique named Weight hop based scheduling for AODV routing protocol was proposed. In this technique, the relay node schedules the packet and dealt with its buffer memory which relying on

the data transfer rate. If the failure occurs in the route, the relay or transfer node stores the data packet and repairs the path then reroute the data packet rather dropping the data. It mainly focuses on the reliability of data transmission however it neglected to consider the Signal to Noise ratio (SNR) value of the connection before route the information packets.

AODV is most broadly utilized for the ad-hoc networks since it accomplishes low routing overhead and elite high performance. A novel stable upgrade for AODV course plotting protocol was proposed in [3]. This upgrade considers the stability or strength of the node, load equilibrium and the least residual distance for selecting path in order to reach destination. At the point when compared with AODV, it gives better performance. In any case, it didn't consider the strength of the signal received at the destination while pass through the route.

Metric based enhancement to AODV is proposed in [5] to diminish the link failure. The stability of the path is considered while choosing the best path to reach the destination due to the frequent link failures.. Execution rate is better for this protocol but it disregards the consideration of signal quality and the trustable rate. To develop energy proficient Token course plotting Protocol was proposed in [4]. Hash chain algorithm is utilized for creation of tokens and it is appended at the end of data packet for the substantiation purpose. However the significant drawback of the system is it didn't consider QoS while choosing the course plotting to achieve the destination.

In recent times, multicasting in MANETs was carried out by projecting plentiful multicast routing protocols. These incorporate Ad Hoc Multicast Routing Protocol Using Expanding Id Numbers (AMRIS), differential target multicast, Multicast Ad-Hoc On-Demand Vector (MAODV) and trivial adaptive multicast are used [7]. Flavors of distance-vector or link-state routing plus supplementary functionalities based large portion of these multicast course plotting protocols to assist the routing or directing operations in exacting ways. Limiting handling overhead, keeping up powerful topology, limiting control overhead, counteracting loops in the systems, increasing multi-bounce routing capacity and so on are the objectives of each one of these protocols.

In spite of a variety of multicast coordinating protocols have low execution in MANETs on the grounds that in mainly powerful form, nodes move intuitively, in this way the given topology changes once in a while and unusually. Also, battery power and data transmission are limited. These impediments in mishmash with the dynamic network topology make multicasting course plotting protocol outlining for MANETs to a enormous degree testing [6].

A novel multicast course plotting protocol Multicast Opportunistic Energy Based Routing Protocol (MOEBRP) is employed to defeat the above difficulties. Route is built dynamically by this protocol and it enables the source node with conclusion of next forwarding node until reach the multicast group [8]. The step by step preparation of the proposed scheme is given in the following section.

II. PROPOSED METHOD

MANET is largely employed in the significant application like recovery of catastrophe and military reconnaissance, the multicast routing or direction finding protocol towards the aim is necessary for the highly dynamic condition. Numerous reactive and proactive routing protocols are available for multicasting. Based on the request only, reactive protocol chooses the route. Proactive multicast routing protocols has less scalability than the reactive multicast routing. But the important obstruction of reactive routing protocol is the source node may tolerate with long deferral to increase the route before sending the data packets.

To overcome the delay caused due to the selection of path Multicast Opportunistic Energy Based Course-plotting Protocol (MOEBCP) is proposed. The data forwarding is accomplished by the node which present closest to the destination. In this way, the route or path is built dynamically. To a certain extent the multicast tree forms the multicast group regarding the environmental position. Every single multicast group has a unique ID. Any node can come inside to any multicast group whenever and left out of multicast group at any instance. The following figure explains the proposed multicast routing scheme.

Figure.1. MANET Architecture with Multicast Opportunistic Energy Based Routing eme

The node S forwards the data packet only via the node with highest residual energy and nearest to the intended multicast group as shown in Fig-1. Each multicast group has any number of moving nodes. Origin node S appends the unique multicast group Id with the information or header. Multiple forwarder nodes is required to forward the data packets if the node is unavailing of communication range. Leftover energy is carried out for selecting the next hop process. The outstanding energy denotes that the availability of remaining energy in the node. The residual energy of the node is computed by using the following formula

$$Node's\ Residual\ energy = Tp \times E_P(t)$$

Where,

P_T →Number of packets transmitted

$E_P(t)$ →Energy required for transmitting one data packet

The source node itself doesn't know the relay nodes in the route to reach the multicast group since the packets are transmitted on demand. It reduces the deferral or delay in the network system by developing the route dynamically. The life span of the network gets enlarged by forwarding the data packets via highest residual energy nodes. The throughput of the system is analyzed to estimate the performance.

III. SIMULATION ANALYSIS

NS2 Simulator tool is used to analyze the network performance. The nodes are distributed in the simulation area 1000×1000 and the total number of nodes used in this scenario is 60. The mobility model used in the simulation environment is Random Way-point mobility Model (RWM) and the traffic model is Constant Bit Rate (CBR). The network simulation parameters are described below:

Table.1.Model Parameter

Parameter	Value
Simulator Tool	NS2(Ver. 2.28)
Total number of nodes used	60
Routing protocol	MOEBRP
Transmission range	250m
Mobility model	Random Way Point
Traffic model	CBR
Simulation Area	1000×1000

The performance of our proposed scheme is analyzed by using the data recorded file by generating the recorded database or trace file. The delay and throughput occurred during the simulation is recorded in the trace file. While executing the trace file the following output has been obtained.

Lifetime Analysis

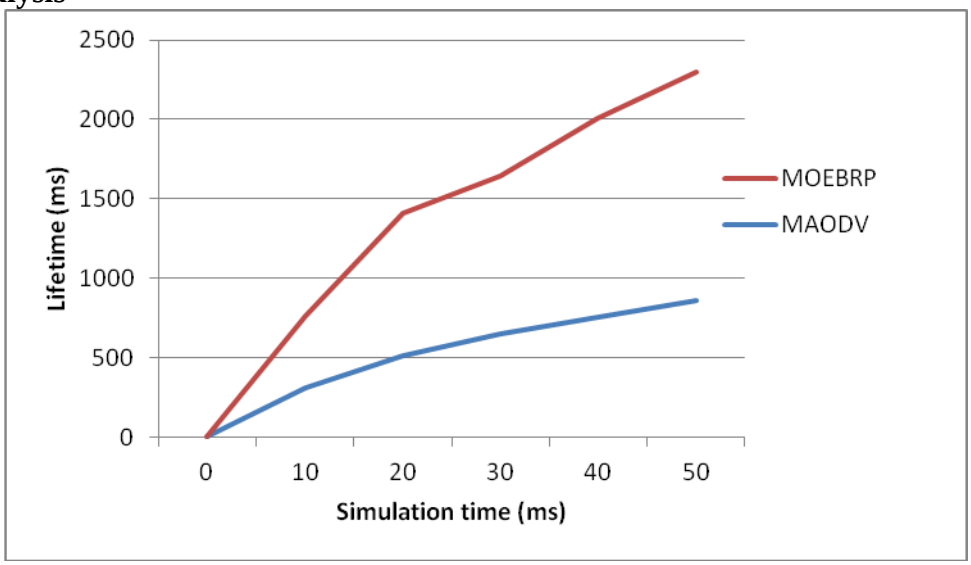

Figure.2 Lifetime analysis of proposed scheme

The above graph shows the lifetime analysis of our proposed multicast routing scheme refuge Energy Aware Multicast on-demand Routing. The graph is plotted between the number of nodes in the simulation and the lifetime of the Nodes in the MANET. As the number of nodes in the simulation increases the number of malicious nodes also gets increased. Figure.2 shows that our proposed scheme MOEBRP gives improved performance than the existing AODV alone used to find the direction to reach destination in order.

Throughput Analysis

The graph for the throughput is obtained by executing the trace file follow record. The quantity of packets received by each receiver is calculated by npkts_ command in ns2 simulator.

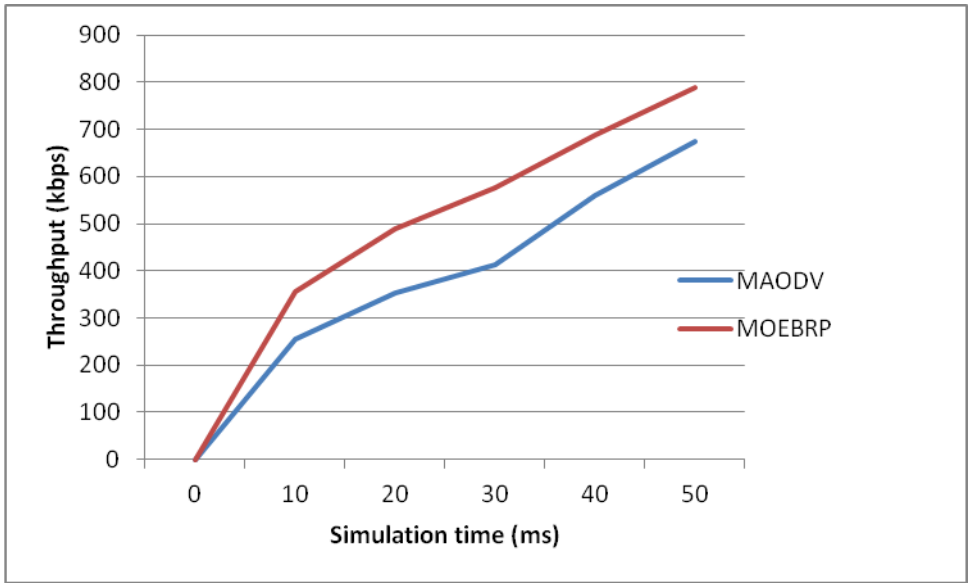

Figure.3 Throughput for MAODV Vs MOEBRP

Then the throughput is calculated by triumphant number of packets received per unit time. The value acquired from that computation is classified previously. The Throughput is ascertained by utilizing the accompanying equation: Throughput= No. of packets received/Time Figure.3 shows that our proposed

scheme provides high throughput than the MAODV alone used to find the multicast route in the Mobile Adhoc Network.

IV. CONCLUSION

This paper proposed a energy aware multicast opportunistic routing scheme for MANET. In this proposed scheme, the nodes no need to maintain the routing table. The route is discovered only on-demand. The source node transmits the data packet to the multicast group with the reference of unique multicast group ID. The intermediate multicast forwarder node is selected based on its residual energy and distance between the multicast groups. The nodes with the same group ID receive the data packets when intermediate node forwards to the multicast group. Thus the proposed scheme increases the lifetime and increases the QOS in terms of throughput and delay.

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