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Energy Aware Multipath Routing Scheme in Ad Hoc Network Using Fitness Function

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ABSTRACT
Mobile ad hoc network is a group of wireless mobile nodes that dynamically form a short-term network without the reliance of any infrastructure or central administration. Energy consumption is considered as one of the major constraints in MANET, as the mobile links do not possess permanent power supply and have to rely on batteries, thus reducing network lifetime as batteries get exhausted very quickly as links move and change their positions rapidly across MANET.. The proposed protocol is called AOMDV with the fitness function (FF-AOMDV). The fitness function is used to find the optimal path from source node to destination node to reduce the energy consumption in multipath routing. The performance of the proposed FF-AOMDV protocol has been evaluated by using network simulator version 2, where the performance was compared with AOMDV and ad hoc on demand multipath routing with life maximization (AOMR-LM) protocols, the two most popular protocols proposed in this area. The comparison was evaluated based on energy consumption, throughput, packet delivery ratio, end-to-end delay, network lifetime and routing overhead ratio performance metrics, varying the node speed, packet size, and simulation time. The results clearly demonstrate that the proposed FF-AOMDV outperformed AOMDV and AOMR-LM under majority of the network performance metrics and parameters.

KEYWORD: *Mobile ad hoc network, multipath routing, fitness function*

INTRODUCTION
The performance of computer and wireless communications has advanced in recent years. As a result, it is expected that the use and application of advanced mobile wireless computing will be increasingly widespread. Much of this future development will involve the utilization of the Internet Protocol (IP) suite. Mobile ad hoc networks (MANETs) are envisioned to support effective and robust mobile wireless network operation through the incorporation of routing functionality into mobile nodes. These networks are foreseen to have topologies that are multi-hop, dynamic, random, and sometimes rapidly changing. These topologies will possibly be composed of wireless links that are relatively bandwidth-constrained [1]. Ad hoc networks are crucial in the evolution of wireless networks, as they are composed of mobile nodes which communicate over wireless links without central control. The traditional wireless and mobile communication problems like bandwidth optimization, transmission quality enhancement and power control are directly inherited by ad-hoc wireless networks. Furthermore, new research problems like Configuration advertising, discovery and maintenance are also brought on by ad hoc networks because of their multi-hop nature, lack of a fixed infrastructure and ad-hoc addressing and self-routing. There have been numerous proposals on different approaches and protocols as there are multiple standardization efforts being done in the Internet Engineering Task Force and even as academic and industrial ventures.

EXISTING SYSTEM
An Energy-entropy Multipath Routing optimization algorithm in MANET based on GA (EMRGA). The key idea of the protocol was to find the minimal node residual energy of each route in the process of

selecting a path by descending node residual energy. It can balance individual nodes battery power utilization and hence prolong the entire networks lifetime and energy variance. Experimental results show that the algorithm is efficient and has a promising performance advantage for multipath traffic engineering and evaluates the route stability in dynamic mobile networks

DISADVANTAGES:

1. In MANETs, the limited battery capacity of a mobile node affects network survivability since links are disconnected when the battery is exhausted.
2. The traditional wireless and mobile communication problems like bandwidth optimization transmission quality enhancement and power control are directly inherited by ad-hoc wireless networks, further ,new research problems like configuration advertising discovery and maintenance are also brought on by ad hoc networks because of their multi-hop nature lack of a fixed infrastructure and ad-hoc addressing and self-routing.

PROPOSED FF-AOMDV

Energy consumption in MANET by applying the Fitness Function technique to optimize the energy consumption in Ad Hoc on Demand Multipath Distance Vector (AOMDV) routing protocol. The proposed protocol is called Ad Hoc on Demand Multipath Distance Vector with the Fitness Function (FF-AOMDV). The fitness function is used to find the optimal path from the source to the destination to reduce the energy consumption in multipath routing. The performance of the proposed FFAOMDV protocol was evaluated by using Network Simulator Version 2 (NS-2), where the performance was compared with AOMDV and Ad Hoc on Demand Multipath Routing with Life Maximization (AOMRLM) protocols, the two most popular protocols proposed in this area. The comparison was evaluated based on energy consumption, throughput, packet delivery ratio, end-to-end delay, network lifetime and routing overhead ratio performance metrics, varying the node speed, packet size and simulation time. The results clearly demonstrate that the proposed FF-AOMDV outperformed AOMDV and AOMR-LM under majority of the network performance metrics and parameters.

ADVANTAGES:

1. Various power-mindful steering conventions have been proposed by considering the vitality utilization designed for the communication or the rest of the battery intensity of the versatile hubs or together.
2. By utilizing such power-mindful data, different steering expenses and way determination calculations have been explored to improve the vitality effectiveness in the MA-NET
3. The vitality use conspire gives the system life time to be superior to the presence framework.

SYSTEM ARCHITECTURE

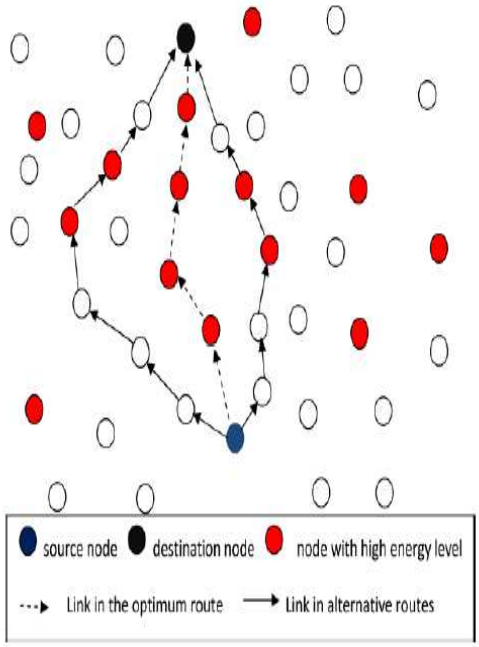

Figure 1 Optimum route selections in FF-AOMDV

In the above figure portray the part of wellness work, the wellness capacity will look hub with high vitality level in the system then it begin to discover multipath to transmit information from source to goal among the numerous way it locate the ideal way to transmit the information so vitality utilization will be less while transmitting information from source to goal.

The FF-AOM-DV at first communicates a RR-EQ with a specific end goal to assemble data in regards to the accessible courses towards the goal as appeared in figure 1 where the wellness work plays out a sweep on the system so as to find hubs that have a larger amount of vitality. The resource position will after that get a RR-EP so as to contain data on the accessible courses towards the goal alongside their vitality levels. Figuring each course's vitality point, the wellness capacity will then contrast with finding

the course with most noteworthy vitality level. The separation of this course will be considered.

The ideal course alludes to the course that has the most noteworthy vitality level and the less separation. Need is given to the vitality level, as observed on the course with the spasmodic bolt. In another situation, if the course has the most noteworthy vitality level, however does not have the briefest separation, it can likewise be picked yet with less need. In some different situations, if the middle of the road hubs situated between the source and goal with lesser vitality levels contrasted with different hubs in the system, the wellness capacity will pick the course in view of the most brief separation accessible.

MODULES:

Network Configuration

Sensor hubs are haphazardly appropriated in the detecting field. In this venture we are utilizing remote sensor organize. In this system, the hubs are static and settled. The sensor hubs are sense the data and after that send to the server. In the event that the source hub sends the bundle, it will send through the halfway hub. The hubs are imparts just inside the correspondence run.

Fitness function

The wellness work is an improvement method that comes as a piece of numerous enhancement calculations, for example, hereditary calculation, honey bee province calculation, firefly calculation and molecule swarm advancement calculation. The wellness work finds the most vital factor in the advancement procedure, which could be numerous components relying upon the point of the exploration. In MA-NET, the wellness factor is generally vitality, separation, deferral, and transmission capacity. This matches the explanations behind planning any directing convention, as they expect to improve the system assets.

Model Evaluation Environment

The course determination will be entirely unexpected. At the point when a RR-EQ is communicated and gotten, the source hub will have three sorts of data so as to locate the most brief and streamlined course way with limited vitality utilization. This data include Information about systems every hub's energy level the separation of each route the vitality expended during the time spent route revelation the course, which expends less vitality, could be the course that has the most limited separation the course with the largest amount of vitality or both the source hub will then sends the information parcels by means of the course with most elevated vitality level after which will ascertain its vitality utilization

Performance Evaluation

Execution of recreation are utilizing the x graph for assess the execution utilize some measurements of packets conveyance the proportion of the quantity of parcel got at goal and number of bundle sent by the source. Throughput spoke framework information efficiency amid the system task. Framework throughput was spoken to through the measure of information that was conveyed from a source to a goal amid a timeframe. End-to-End delay the normal time taken for a parcel to be transmitted from source to goal. Energy level number of vitality devoured when the information ought to be transmitted. Vitality consumption.

RESULTS

Simulation Results

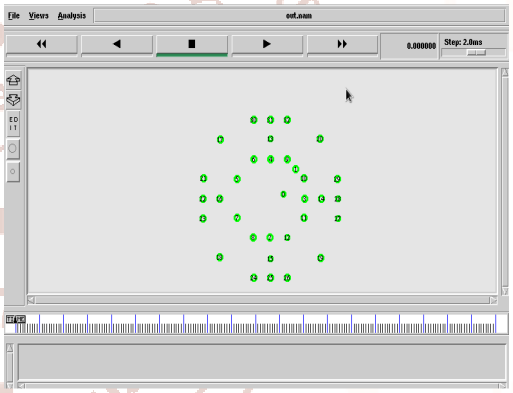

Figure2: Shows the node with high energy level.

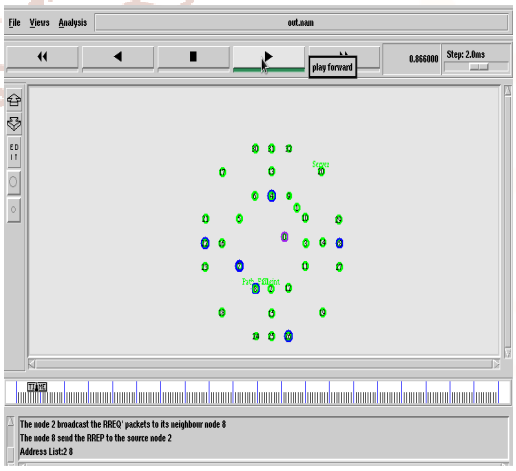

Figure3: Shows node with high energy and node with low energy level. In the above diagram node 8 and node 2 having low energy so that those could not have capacity to transmit data

PERFORMANCE ANALYSIS

The experiments compared the performance of routing protocols with increasing number of nodes

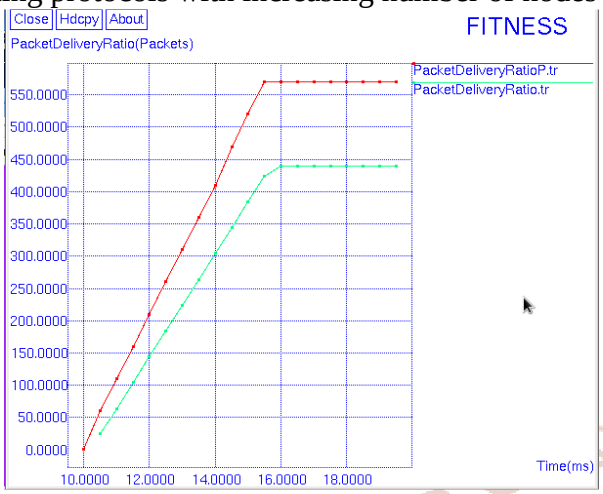

Figure4: We can see packet delivery ration is high (Green Line) compare to existing system (Red Line). So that we can transfer the more data at the same time.

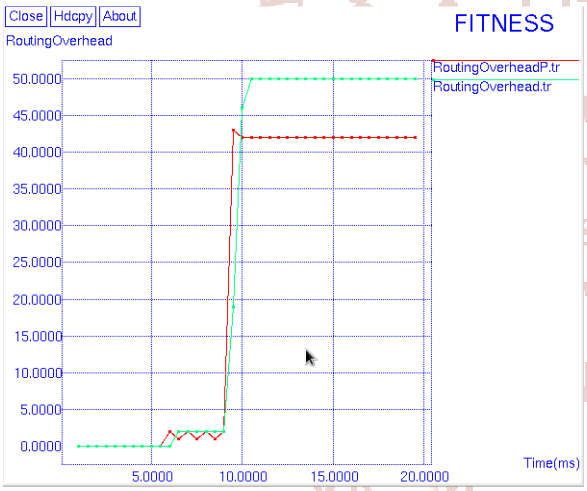

Figure5: Graph show less overhead in proposed system compare to existing system.

CONCLUSION

The multipath directing calculation called FF-AOM-DV mimicked utilizing NS-2 under three unique situations fluctuating speed parcel dimension and reproduction instance. These situations were tried by five execution measurements (Packet conveyance proportion, Throughput, End-to-end-delay, Energy utilization and Network lifetime). Reproduction comes about demonstrated so as to the future FF-AOM-DV calculation has performed much superior to both AO-MR-LM and AO-MDV in throughput, bundle conveyance proportion and end to end delay. It additionally performed well against AO-MDV for preserving more vitality and better system lifetime. As a future work, there are a few situations that could be actualized with this investigation to improve the vitality utilization and system lifetime. For example, it is conceivable to consider another system asset which is the transfer speed as another wellness esteem. For this situation the estimations for choosing courses towards the goal will accord vitality, separation and data transfer capacity.

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