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A Survey of Various Power Efficient Routing Protocols based DSR for MANETs

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Abstract: Mobile Ad hoc networking is considered as a collection of nodes which connect with each other without any aid of centralized administration or constant infrastructure. The nodes which connect in mobile Ad Hoc Network can be laptops and any personal digital instruments that are often limited in resources such as CPU capacity, Storage capacity, battery power and bandwidth. MANET is sensitive to power and energy selected. Since it is operated by a battery, limited sources are necessary to operate it efficiently, so the time of the network can be protracted and performance can be promoted. Dynamic Source Routing Protocol (DSR) is deemed as one of the prominent and predominant routing protocols for Mobile Ad Hoc Networks (MANETs).The Performance of different protocols show that DSR is an eminent routing protocol that consistently performs better than any other routing protocols. But the main challenge that encounters in the DSR is the power because it can not prevail at the same place in the term of energy consumption in the network. This is because in the DSR routing protocol the concept of energy consumption is not taken as a parameter into account at all. This study shows a different energy efficient routing protocols based on DSR in MANET and discusses their Stimuli, functionalities, and restrictions.

Keywords: MANET, DSR Routing Protocol, Energy Efficient DSR Routing Protocols.

I. INTRODUCTION

The concept MANET [1] was derived from a Latin word which means "for this purpose only". The MANET is integration of mobile nodes communicating with each other, without depending on any constant infrastructure. The nodes act both as a router and as a host, the topology of the network will be changing speedily and determination is taken in a distributed manner. The MANETs encounters challenges like, the dynamic movement of nodes in the network topology, the bandwidth, also the multi hop routing and finally, the limited batter resources. MANET has a limited battery power to transmit the packet data from the source to destination ,and because the dynamic locomotion of the network topology ,there is an additional effort done by the nodes and that makes the battery power decrease and ,that affects life time of network in MANET[2]. So the major challenge is, how to manage the energy of each node in the network, which will increase the period of communication between the nodes, and promote the efficiency and lifetime in MANET. The energy exhausted through the process of connection between the nodes in MANET by: Receiving, Sleeping, Idle and Residual energy. If the route in network is not found then the route discovery will start again till it finds the destination node and this will consume the battery power and cause overhead [2].

II. DSR ROUTING PROTOCOL

The Dynamic Source Routing Protocol (DSR) [3] is an efficient routing protocol that was designed to be used in multi-hop, for nodes in mobile Ad Hoc Networks. This routing protocol allows the nodes to communicate with each other without any need for help of centralized administration or constant infrastructure. MANET is viable for connection between soldiers in an army and in disaster assistance etc.

DSR routing protocol [3] suffers from prejudice of energy-consuming. It has major feature to enhance path to data packets from source to destination but the constrains that encounter is transition energy which is lost through the process of communication among the nodes in the network when the data packets are dropped or when it doesn't receive the acknowledgement from the neighboring nodes and at that time the path will be inefficient for data packets.

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III. REVIEW OF LITERATURE

Y. Yu et al. [4] the purpose of GEAR routing protocol is to restore a residual battery power and define over the diverse path that needs to reach destination. This energy routing protocol will take the best path according to the residual power of battery between all received Route request packets. In GEAR routing protocol The barrier will be in using the route cache and the blocking property.

Ivan Stojmenovic et al. [5] and K.Woo et al. [6] in 2001 they proposed energy routing protocol called, Localized power-aware routing algorithm (LEAR) protocol. They altered the process of route discovery for stable energy consumption. This protocol is Very less respective in faint mobility scenery, and do not anticipate secondary path.

Roy Leung et al. [7] MP-DSR is a multi-path dynamic source that is used to provide the soft Quality of service guarantees with respect to end-to-end reliability by detecting a group of multiple disjoint routes and transferring data over these paths. The objective of MP-DSR routing protocol is to provide a reliable path for packet transition with a minimum network overhead. The limitation of MP-DSR is that it selects neighbors solely on local information.

Xu Li Wu Zi-wen et al. [8] the algorithm proposed is Topology control based power aware and battery-life aware dynamic source routing (TPBDSR). The aim of TPBDSR routing protocol is that it uses the term of distributed control where every node adapted its transferring power according to definite range of neighbors.

J.-E. Garcia et al. [9] in 2003 proposed Energy efficient DSR protocol which can be considered as LEAR protocol but the distinction between them is that, in the EEDSR the desired parameter relies on some other factors. According to these factors, the node makes the decision to avert nodes from a rapid sink of battery power, whether it takes the part of sending the packet data or not. EEDSR calculates the remaining battery power of each node periodically. This protocol is restricted for small size network.

M. Tarique et al. [10] ESDSR is examined Energy saving DSR protocol that utilize to combine the feature of transition power control and load sharing. And that provide the improvement in lifetime of network in MANET. The process of this algorithm will start when it determines the path based on load balancing approach, and then dynamically adapted the transition power at each node before it is transferred to the packet. In this protocol Delay may be higher because packets are not forwarded by minimal hop. To arbitrate the rendering an examination of ESDSR with some other routing protocols are desired.

Zupeng Li et al. [11] PDSR is abbreviation of a Peer Computing based Dynamic Source Routing protocol (PDSR) and it is presented as a multi-path protocol. To transmit the packet from the host to destination successfully, this multi path protocol provides an additional and alternative path.

Mohammad Tariq et al [12] have proposed MEDSR protocol which is used to improve the network lifetime in MANET. MEDSR is Minimum Energy Dynamic Source Routing and the mission of this algorithm is that the process of transferring the power should be adapted to the minimum level. In this protocol the restriction is that the packets are forwarded by minimal hops, so the number of hops might be superfat.

B. Kadri et al. [13] presented Weight Based Dynamic Source Routing Protocol WBDSR. In WBDSR routing protocol there is a new metric utilized to estimate the path based on the number of nodes between the host and the destination as in traditional networks. The Weight of each path will be calculated by counting the weight of each node. WBDSR Preferred in only large network. There is no mechanism by which we can measure the power of any intermediate node.

Floriano De Rango et al. [14] MEA-DSR is A Multipath Energy-aware routing that proposed to develop the energy and increase the data packet ratio in the network. In this routing algorithm the packet will be scheduling between the energy efficient route and a technique for raising the traffic and energy load balancing. The limitation of MEA-DSR will appear in faint mobility script higher routing overhead and lower PDR. In faint mobility script higher routing overhead and lower PDR.

Ehsan Khosrowshahi Asl et al. [15] has presented EMP-DSR which is considered as an enhancement version of MP-DSR. The EMP-DSR routing algorithm utilizes an Ant colony optimization method which helps to provide global information. In EMP-DSR routing protocol there are a little number of end-to-end routes with high accuracies.

Vahid Nazari Talooki et al. [16] E2DSR has proposed in 2010 to create an algorithm for path selection and route cache and carried out an energy table. E2DSR is presented as a novel structure for control packets to substitute the

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activity of nodes in the network. In a greater script it requested an integral analysis of protocol performance, utilizing the protocol scalability and represented metrics.

Xu Zhen and Xiao Juan. [17] because the restriction of energy in MANET and the process of discovering the shortest route in real time streaming application was imperfect. They proposed routing algorithm called DSR_ED which is used to avert less powered node and engage the intermediate nodes to guarantee the energy consumption. This protocol should be estimated in intensive network.

Baisakh Nileshkumar R Patel. [18] Energy conscious DSR (ECDSR) was designed to be utilized in route discovery period, the mission of this routing algorithm is to choose the nodes with more elevated energy, rather than those with a minimum hop count. If the energy of node reaches the minimum beginning value, then it will be removed and the nodes transfer the error message to the destination. This protocol has not deemed mobility of nodes. A big number of nodes can be taken to arbitrate the performance.

V.Ramesh and Dr.P.Subbaiah. [19] presented Energy Efficient preemptive dynamic source routing protocol. The EEPDSR is used to minimize the consumption of energy of each intermediate node in the network. The major purpose of this algorithm was to balance the energy consumption between all participating nodes throughout the network. The execution should be anatomized for more intense network with some other energy efficient routing protocols.

Shiva shankar et al. [20] proposed a protocol which is utilized to decrease the consumption of power battery. The major purpose of modifying DSR is to choose the energy efficient routes. The modified DSR is used to find selfish intermediate nodes which drop the packets and preserve their battery power. In this protocol there will be Longer average End to End delay

Shiva Shankar et al. [21] debated that in mobile Ad hoc networks, the power of battery should be utilized efficiently to avoid the extinction of a node or a network. The energy power routing DSR protocol chooses the power restrictions and bandwidth. It uses the status power of mutual routes and each mobile node. The restriction of this protocol will appear in the aggregate time delay is high.

Uma Rathore Bhatt et al. [22] DSR1 is routing algorithm developed, for improving the performance of MANET in expression of average end to end delay, average jitter, remaining power and throughput. The DSR1 improves the performance of network by decreasing the overflowing of route request packets. DSR1 does not implement well in small networks.

Dr.V.Ramesh et al. [23] presented Energy Efficient Preemptive DSR protocol that utilized, to explain the energy conservative method to upgrade the efficiency of routing protocol. The main objective of EEPDSR routing algorithm is to minimize the routing overhead throughout the network. The implementation should be analyzed for more intense network with some other energy efficient routing protocols. In the algorithm proposed by Navin mani upadhyay and Kunal gaurav. [24] the nodes appear as intermediate nodes which enhance the consumption of energy over the network. To improve and increase the lifetime of network the consumption of energy in network should be reduced.

Shubhajeet Chatterjee and Swagatam Das. [25] Proposed Enhanced DSR (E-Ant-DSR) which is considered as an enhanced version of the well-known Dynamic Source Routing (DSR) scheme based on the Ant Colony Optimization (ACO) algorithm, This Enhanced DSR (E-Ant-DSR) can generate a high data packet delivery ratio in little end to end delay with low routing overhead and low energy consumption.

In the algorithm proposed by G. Krishna Priya and Dr. G. Prakash Babu. [26] an E-E-DSR is used to improve the lifetime of the network. E-E-DSR is energy aware dynamic source routing protocol which is utilized to promise a secure routing by choosing high and efficient energy nodes as intermediate nodes. This routing algorithm is used to consume less energy over the network in MANET.

Hina Khalid and Tahir Nawaz. [27] The key purpose of ESDSR is to take a path from source to destination in a manner that every middle node will contain higher amount of power at a particular time. So as dissenting to taking minimum hop count mechanism in the process of node discovery stage, ESDSR chooses ways whose intermediary nodes have elevated, left over battery energy.

Nagaraj M. Lutimath et al. [28] Proposed an efficient multipath routing protocol (EM-DSR) based on DSR. The main objective of this routing algorithm is to find multi-paths from host to destination by taking the consideration of the maximum remaining energy of the route to transfer the data.

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Manish Chandra Bhatt [29] has presented EECDSR which is utilized to decrease the energy consumption with the constancy of the ECDSR .in enhanced ECDSR each and every node can be traced by its GPS signal and by this approach, it can find the appropriate location of each node. This helps in selection the intermediate nodes between source and destination.

Table1. Various energy-efficient routing protocols based DSR

Routing Protocol	Year	Stimulus	Restriction
MDSR	2014	It maintains the energy of nodes during the phase of route discovery and data transition.	In this protocol it required more improvement in route maintenance.
EADSR	2015	It analyzes the energy consumption and estimate the required energy for a node.	It needs some real tests to validate their performance.
EEDSR	2015	Exhausts little energy and also assures a secure routing by choosing high efficient Energy nodes as intermediate nodes.	Delay time may be higher. To judge the execution a test of EEDSR with some other routing protocols are requested.
EM-DSR	2016	considering the Maximum remaining energy of the route to transfer the data.	This Protocol demands for enhancement in cost metric.
ESDSR	2016	Takes a path in a manner that every middle node will contain higher amount of power at a particular time.	It demands for improvement in performance and that seek experience and analyze with others routing protocols.
EECDSR	2017	Used to reduce the energy Consumption with the constancy of the ECDSR.	In this protocol they didn't considered the mobility of the node.

IV. CONCLUSION

This paper concentrated on the variant of power-efficient DSR routing protocols in MANET to obtain a dependable paths for routing with little energy consumption. To design a routing protocol in MANET, the restricted energy resources of nodes appear a ticklish issue. Various routing protocols have been reviewed in terms of their important merits. This article shows several of these protocols which summarized in conjunction with their Stimuli and restrictions. In MANET, each approach has its features and constraints as depicted in the table1 and literature review section. To get the best performance in term of energy efficiency, the scenario and topology of network plays a crucial role in determining which protocol should be used. Energy efficient routing protocols based DSR have their different methodologies, diverse performance environment, distinct execution metrics and various mechanisms. Each protocol has some enhancements over others. One protocol executes well in some aspects while the same protocol has shortage in other implementation issues. There is still much scope to discover such an energy efficient protocol that enhance the lifetime of network, assure network connectivity and decrease energy consumption by modulating the existing DSR based routing protocol.

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