RESEARCH INVENTY: International Journal of Engineering and Science
ISBN: 2319-6483, ISSN: 2278-4721, Vol. 1, Issue 8 (November 2012), PP 42-48
www.researchinventy.com

Study on a Reliable and Effective Cache Management Technique for DSR Protocol in Mobile Ad hoc Networks

[1]Mrs.K.Santhi,
Assistant Professor,
Dept of Computer Science,
Sri Ramakrishna College of Arts of Arts and Science for Women,
Coimbatore-44.

[2]Dr.M.Punithavalli,
Director-MCA,
Dept of Computer Application,
Sri Ramakrishna Engineering College
Coimbatore-22.

Abstract: Mobile ad hoc network is a special type of wireless network in which a mobile nodes forming a temporary network without the aid of any infrastructure or centralized administration. This paper analysis about improving the performance of route cache in Dynamic Source routing protocol. The Dynamic Source Routing (DSR) for mobile ad hoc networks maintains route caches to store routes that have been found via flooding or through promiscuous overhearing. But DSR route caches have the disadvantages like stale route cache entries, incomplete error notification, and insufficient cache size etc. In this paper, they propose to develop a reliable and effective cache management technique for the DSR protocol. In this technique, initially, we estimate a combined weighted function for each route stored in the cache. Then based on the combined weight function, the routes are arranged such that routes with minimum length and traffic load, maximum energy level and freshness are listed first in the route cache. The route cache is updated such that routes with least weight functions are removed from the list. In the route prediction mechanism, when a link is likely to be broken, it will select the most reliable route as an alternate route from the sorted route cache, before the link breakage. The DSR composed of two phases, namely Route Discovery and Route maintenance, which work together to discover and maintain the source route from the source to the arbitrary destination. Dynamic Source Routing (DSR) for mobile ad hoc networks maintains route caches to store routes that have been found via discovery or through promiscuous overhearing. But DSR route caches have the disadvantages like stale route cache entries, incomplete error notification, and insufficient cache size etc. So it affect the performance of DSR protocol which cause long delay, increase the packet loss, increase the overhead, and decrease the performance of protocol. Thus it requires some mechanism to improve the route cache performance in DSR protocol. This paper will discuss the different strategy of the route cache and the drawbacks of the mechanism.

Keywords*:* DSR, Load Balance.

I. INTRODUCTION.

Mobile ad hoc network: Unlike traditional network, mobile ad hoc network consist of mobile nodes which can join or disappear dynamically from the network.

A) Mobile Ad Hoc Network (MANET)

MANET is a unique type of wireless network in which a set of mobile network interfaces form a transient network without the support of any well-known infrastructure or centralized management. Some of the applications of Ad hoc wireless network include decision making in the battlefield, data acquisition operations in hostile environment, emergency search-and-rescue operations, etc. The characteristics of MANET include dynamic topology, limited resources (such as CPU, battery, bandwidth, etc.), multi-hop communication and limited security. These characteristics set special challenges in routing protocol design [1].

B). On Demand Routing Protocols

In the case of ad hoc networks, since all the nodes cooperate dynamically, the nodes which are not directly connected within the transmission range can also communicates with other nodes for establishing, maintaining routes and forwarding packets. When a sending node originates a data packet addressed to the destination node, an on demand routing protocol searches for and attempts to determine a route to the destination node. An on-demand routing protocol must cache routes formerly discovered, in order to avoid the need of performing a route discovery

before each data packet is sent [2]. Several routing protocols have used on-demand mechanisms including the following

Ad hoc On-Demand Distance Vector Routing (AODV): Adhoc On Demand Distance Vector Routing is a novel algorithm for the operation of adhoc networks. Each Mobile Host operates as a specialized router and routes are obtained as needed (i.e.) on demand with little or no reliance on periodic advertisements [3].

Dynamic Source Routing (DSR): The Dynamic Source Routing protocol (DSR) is a simple and efficient routing protocol designed specifically for use in multi-hop wireless ad hoc networks of mobile nodes. DSR allows the network to be completely self-organizing and self-configuring, without the need for any existing network infrastructure or administration. [4].

Temporally-Ordered Routing Algorithm (TORA): It uses a "physical or logical clock" to establish the "temporal order" of topological change events which is used to structure the algorithm's reaction to topological changes. The protocol's reaction is structured as a temporally-ordered sequence of diffusing computations; each computation consisting of a sequence of directed link reversals. [5].

Location-Aided Routing (LAR): It utilizes location information to improve performance of routing protocols for ad hoc networks. By using location information, Location-Aided Routing protocols limit the search for a new route to a smaller "request zone" of the ad hoc network [6].

Destination Sequenced Distance Vector Routing (DSDV): It operates in each mobile host as a specialized router, which periodically advertises its view of the interconnection topology with other Mobile Hosts within the network [7].

Associativity -Based Routing (ABR): It is a compromise between broadcast and point-to-point routing. ABR only maintain routes for sources that actually desire routes. However, ABR does not employ route re-construction based on alternate route information [8].

Caching and Multi-Path Routing Protocol (CHAMP): It uses cooperative packet caching and shortest multi-path routing to reduce packet loss due to frequent route breakdowns [9].

C). Caching.

To discover a route whenever required, DSR floods route requests. Because of the high cost of flooding, DSR maintains route caches to accumulate routes that have been established by means of flooding or through promiscuous overhearing [9]. In order to reduce the routing overheads with improved route discovery latency, on-demand routing protocols for mobile ad hoc networks make use of the route caching in different forms. They need to adjust to frequent topology changes for the route caching to be effective [10].

- **Path Cache:** In the case of path cache, a node stores each route including the route from itself to another node.
- **Link Cache:** In the case of link cache, a node adds a link to a topology graph, which represents the node's view of the network topology [11].

  Issues in Caching: DSR route caches have following disadvantages.
- No measures have been taken by DSR, to avoid flooding for a route to a new destination. In order to get the route, DSR has to flood route and accumulate it in route caches.
- In case of high node mobility, entries in route caches rapidly become invalid or ineffective. Data packets suffer needless delays, when an ineffective route is used. Route failures will generate flooding, creating supplementary latency for data packets, when an invalid route is followed [9].
- Stale routes will be rapidly propagated to caches of other nodes because of the use of responding to the route REQ with cached routes. Hence, pre-active and post-active routes are the key sources of cache staleness [11].
- **Incomplete error notification:** In case of link breakages, the routes having an access with the broken link are not propagated to all caches. As an alternative, the route error is unicast merely to the source, whose data packet is accountable for identifying the link breakage by means of a link layer feedback. Therefore only a limited number of caches are cleaned. However the breakdown information is propagated by means of piggybacking it onto the successive route requests from the source. Many caches possibly will remain unclean as the route requests may not be propagated network-wide because of the replies from caches.
- **Expiry:** Presently there is no mechanism to expire stale routes. The stale cache entries will stay permanently in the cache, if they are not cleaned explicitly by the error mechanism.

Quick pollution: There is no technique to resolve the freshness of any route information. For instance, even if a route error remove the stale cache entry, the succeeding routed data packet carrying the same stale route can set that entry right back in. As there will be a large number of routed data packets upstream carrying the stale route to un-erase the route. The above possibility increases at high data rates. By the moderate use of snooping, this difficulty is compounded. A few other node overhearing any transmission, pick the stale routes. Therefore, cache pollution can transmit quite rapidly [10].

II. Related Works.

Sunsook Jung [1] et al., A novel approach to constrain route request broadcast which is based on node caching. Intuition behind node caching is that the nodes involved in recent data packet forwarding have more reliable information about its neighbors and have better locations (e.g., on the intersection of several data routs) than other nodes. The caching nodes which are recently involved in data packet forwarding, and use only them to forward route requests. Dropping route request forwarding from the other nodes considerably reduces routing overhead at the expense of possible destination missing. The suggested node caching techniques can be also viewed as a dynamic implementation of a connected dominating set (CDS). To overcome the known drawback of CDS – overuse of dominating (cached) nodes – by a new load-balancing scheme. Their contributions include: (i) a new node caching enhancement of route request broadcast for reactive ad hoc routing protocols; (ii) implementation of AODV-NC, the node caching enhancement of AODV; (iii) an extensive simulation study of AODV-NC in NS-2 showing (for stressed MANET's) 10-fold reduction in overhead, significant improvement of the packet delivery ratio and the end-to-end delay; (iv) an evaluation of routing load distribution among MANET nodes; and (v) an implementation and simulation study in NS-2 of forwarding load balancing for AODV-NC sustaining considerable improvement in overhead and delivery ratio.

Soon Don Kwon [2] et al., An on-demand routing protocol for Mobile Ad hoc Network (MANET) is one that searches for and tries to discover a route to some destination node only when a sending node generates a data packet addressed to that node. In order to avoid the need for such a route discovery to be performed before each data packet is sent, such routing protocols must cache previously discovered routes. But the cache itself may contain stale information due to nodes mobility. To solve the problem, a new route cache scheme is to improve the performance of route cache for finding more accurate and faster route to the destination.

David B. Johnson [4] et al, The DSR protocol is composed of the two mechanisms of Route Discovery and Route Maintenance, which work together to allow nodes to discover and maintain source routes to arbitrary destinations in the ad hoc network. The use of source routing allows packet routing to be trivially loop-free, avoids the need for up-to-date routing information in the intermediate nodes through which packets are forwarded, and allows nodes forwarding or overhearing packets to cache the routing information in them for their own future use. All aspects of the protocol operate entirely on-demand, allowing the routing packet overhead of DSR to scale automatically to only that needed to react to changes in the routes currently in use. They have evaluated the operation of DSR through detailed simulation on a variety of movement and communication patterns, and through implementation and significant experimentation in a physical outdoor ad hoc networking test bed and constructed in Pittsburgh, and have demonstrated the excellent performance of the protocol.

Vincent D. Park [5] et al author present a new distributed routing protocol for mobile, multihop, wireless networks. The protocol is one of a family of protocols which we term "link reversal" algorithms. The protocol's reaction is structured as a temporally-ordered sequence of diffusing computations; each computation consisting of a sequence of directed link reversals. The protocol is highly adaptive, efficient and scalable; being best-suited for use in large, dense, mobile networks. In these networks, the protocol's reaction to link failures typically involves only a localized "single pass" of the distributed algorithm. This capability is unique among protocols which are stable in the face of network partitions, and results in the protocol's high degree of adaptively. This desirable behavior is achieved through the novel use of a "physical or logical clock" to establish the "temporal order" of topological change events which is used to structure (or order) the algorithm's reaction to topological changes. They refer to the protocol as the Temporally-Ordered Routing Algorithm (TORA).

Young-Bae Ko [6] et al., this paper suggests an approach to utilize location information (for instance, obtained using the global positioning system) to improve performance of routing protocols for ad hoc networks. By using location information, the proposed Location-Aided Routing (LAR) protocols limit the search for a new route to a smaller "request zone" of the ad hoc network. This results in a significant reduction in the number of routing messages. They present two algorithms to determine the request zone, and also suggest potential optimizations to our algorithms.

Charles E. Perkins [7] et al.., In this paper author present an innovative design for the operation of such ad-hoc networks. The basic idea of the design is to operate each Mobile Host as a specialized router, which periodically advertises its view of the interconnection topology with other Mobile Hosts within the network. This amounts to a new sort of routing protocol. They have investigated modifications to the basic Bellman- Ford routing mechanisms, as specified by RIP to make it suitable for a dynamic and self-starting network mechanism as is required by users wishing to utilize adhoc networks. Their modifications address some of the previous objections to the use of Bellman-Ford, related to the poor looping properties of such algorithms in the face of broken links and the resulting time dependent nature of the interconnection topology describing the links between the Mobile Hosts. Finally, they describe the ways in which the basic network-layer routing can be modified to provide MAC-layer support for ad-hoc networks.

Chai-Keong Toh [8] et al., in his paper author presents a new, simple and bandwidth-efficient distributed routing protocol to support mobile computing in a conference size ad-hoc mobile network environment. Unlike the conventional approaches such as link-state and distance-vector distributed routing algorithms, our protocol does not attempt to consistently maintain routing information in every node. In an ad-hoc mobile network where mobile hosts (MHs) are acting as routers and where routes are made inconsistent by MHs' movement, they employ an associativity-based routing scheme where a route is selected based on nodes having associativity states that imply periods of stability. In this manner, the routes selected are likely to be long-lived and hence there is no need to restart frequently, resulting in higher attainable throughput. Route requests are broadcast on a per need basis. The association property also allows the integration of ad-hoc routing into a BS-oriented Wireless LAN (WLAN) environment, providing the fault tolerancein times of base stations (BSs) failures. To discover shorter routes and to shorten the route recovery time when the association property is violated, the localised-query and quick-abort mechanisms are respectively incorporated into the protocol. To further increase cell capacity and lower transmission power requirements, a dynamic cell size adjustment scheme is introduced. The protocol is free from loops, deadlock and packet duplicates and has scalable memory requirements. Simulation results obtained reveal that shorter and better routes can be discovered during route re-constructions.

Alvin Valera [9] et al., in this paper author proposes a new routing protocol called Caching and Multipath (CHAMP) Routing Protocol. CHAMP uses cooperative packet caching and shortest multipath routing to reduce packet loss due to frequent route breakdowns. Simulation results reveal that by using a five-packet data cache, CHAMP exhibits excellent improvement in packet delivery, outperforming AODV and DSR by at most 30% in stressful scenarios. Furthermore, end-to-end delay is significantly reduced while routing overhead is lower at high mobility rates.

Yih-Chun Hu [10] et al.., In this paper author present a new mechanism which we call epoch numbers, to reduce this problem of cache staleness, by preventing the re-learning of stale knowledge of a link after having earlier heard that the link has broken. Their scheme does not rely on ad hoc mechanisms such as short-lived negative caching; rather, they allow a node having heard both of a broken link and a discovery of the same link to sequence the two events in order to determine whether the link break or the link discovery occurred before the other.

Shobha.K.R [11] et al., in this paper presents an analysis of the effect of intelligent caching in a non clustered network, using on-demand routing protocols in wireless ad hoc networks. The analysis carried out is based on the Dynamic Source Routing protocol (DSR), which operates entirely on-demand. DSR uses the cache in every node to save the paths that are learnt during route discovery procedure. In this implementation, caching these paths only at intermediate nodes and using the paths from these caches when required is tried. This technique helps in storing more number of routes that are learnt without erasing the entries in the cache, to store a new route that is learnt. The simulation results on DSR have shown that this technique drastically increases the available memory for

caching the routes discovered without affecting the performance of the DSR routing protocol in any way, except for a small increase in end to end delay.

M.Neelakantappa [12] et al., Routing in the MANET is a major challenging problem to solve, because of its dynamic topology and infrastructure less nature, namely Dynamic Source Routing (DSR) is one of the widely used routing protocols for MANETS protocol. It was proven that, several of the optimizations proposed on the DSR protocol, tend to hurt the performance especially in the case of high node mobility and low traffic load. In this paper the performance issues has been studied extensively. Taking DSR with certain optimizations turned off as a base, three intuitive techniques are proposed to improve the performance of DSR. Using the simulations, it was shown that the proposed techniques provide significant performance improvements for various network densities and traffic load.

Xin Yu [13] et al., In this paper, author proposes proactively disseminating the broken link information to the nodes that have that link in their caches. They define a new cache structure called a cache table and present a distributed cache update algorithm. Each node maintains in its cache table the information necessary for cache updates. When a link failure is detected, the algorithm notifies all reachable nodes that have cached the link in a distributed manner. The algorithm does not use any ad hoc parameters, thus making route caches fully adaptive to topology changes. They show that the algorithm outperforms DSR with path caches and with Link-Max Life, an adaptive timeout mechanism for link caches and conclude that proactive cache updating is key to the adaptation of on-demand routing protocols to mobility.

G. Amoussou [14] et al. in this paper author present an approach for designing routing protocol based on a new metric namely the Effective Communication Distance (EFCD). EFCD is derived from the prediction of link duration which is considered as a stability measure. The prediction algorithm is based on Kalman filtering and exploited available physical layer information such as mobility model, received power and SINR (Signal to Interference and Noise Ratio). Unlike other methods which propose nodes position and relative speed predictions, ours predicts the effective communication distance between nodes according to mobile environments. Moreover, slow fading is used to evaluate and improve nodes relative speed change. Motivated by the opportunities offered by interaction between physical and upper layers, this paper investigates the effect of channel aware routing on DSR performances. We modified the route cache structure which selects a route according to two metrics: EFCD and hop count. Cross layer integration to DSR is presented and implemented in OPNET.

Md. Golam Kaosar [15] et al.., in this paper author propose a new method of improving the performance of Dynamic Source Routing (DSR) protocol. In DSR, as well as other on-demand routing protocols, every established path is considered as temporary to reflect the mobility effect, therefore, once a path is established, it is associated with an expiration time. After that expiration time the path is deleted from the route cache of the nodes. In practice the mobility of nodes are not equal all the time and they propose to treat paths differently according to their stationary, rather than deleting them after every expiration time to improve performance.

D.Loganathan [16] et al., the dynamics of an ad hoc network are a challenge to protocol design because mobility of nodes leads to unstable routing, and consequently flows encounter fluctuations in resource availability on various paths during the lifetime of a session. There are several routing protocols like DSDV, AODV, DSR, OLSR, Etc… which have been proposed for providing communication among all the nodes in the network. This paper presents the comparison performance of DSR protocol with enhanced DSR protocol which is combined with the multicost algorithm in DSR. In the modified approach of DSR, is to enhance the performance of Packet Delivery Ratio and throughput of the wireless ad hoc networks.

G.Narasa Reddy [17] et al., author propose a modification to the existing DSR protocol. In this paper, they add a link breakage prediction algorithm to the Dynamic Source Routing (DSR) protocol. The mobile node uses signal power strength from the received packets to predict the link breakage time, and sends a warning to the source node of the packet if the link is soon-to-be-broken. The source node can perform a pro-active route rebuild to avoid disconnection. Intermediate nodes in the route continuously monitor the signal strength at the time of communication, based on a predefined threshold signal value. Intermediate node sends a message to the source node that the route is likely to be disconnected, if signal strength falls below the threshold value. If source receive this message it starts using backup route and if back route also fails then it finds alternative route. The backup route will minimize the time consuming process of finding an alternative route to some extent. Experiments demonstrate that adding link breakage prediction to DSR can significantly reduce the total number of dropped data packets (by at

least 25%). Simulation results show that the probability of the communication breakage decreases when parallel routes are used.

Parul Sharma [18] et al., MANET is a self organized and self configurable network where the mobile nodes move arbitrarily. The mobile nodes can receive and forward packets as a router. Each node operates not only as an end system, but also as a router to forward packets. The nodes are free to move about and organize themselves into a network. These nodes change position frequent-ly. For relatively small networks flat routing protocols may be sufficient. However, in larger networks either hierarchical or geographic routing protocols are needed. The protocols have to be chosen according to network characteristics, such as density, size and the mobility of the nodes. MANET does not require any fixed infrastructure, such as a base station; therefore, it is an attractive option for connecting devices quickly and spontaneously. In this three routing protocols AODV (Ad- Hoc On-Demand Distance Vector), DSDV (Destination Sequenced Dis-tance-Vector) and DSR (Dynamic Source Routing Protocol) are compared. Most of the previous research on MANET routing protocols have focused on simulation study by varying various parameters, such as network size, pause times etc. The performance of these routing proto-cols is analyzed in terms of their Packet Delivery Fraction, Average End-to-End Delay and their results are shown in graphical forms. The comparison analysis will be carrying out about these protocols and in the last the conclusion will be presented, that which routing protocol is the best one for mobile ad -hoc networks.

R. Bhuvaneswari [19] et al., in this work author discuss about reduce the effect of overhearing and avoid the stale route problems while improving the energy efficiency using the Efficient Source Routing Scheme (ESRS) algorithm. Due to the lack of route cache update, the stale route entry and overhearing is originated among the network. For that, they developed five mechanisms to improve route cache performance in DSR. By simulation results the proposed algorithm achieves better performance than the existing methods.

Shiva Prakash [20] et al., the wireless links in this network are highly error prone and can go down frequently due to mobility of nodes, interference and less infrastructure. Therefore, routing in MANET is a critical task due to highly dynamic environment. Many protocols were given for solving the problem of routing in MANET e.g., DSR, AODV, DSDV etc. This paper presents a protocol which eliminates the problem which occur in the DSR protocol like the inconsistency occur due to routing information in the route cache of stale node. The proposed protocol also reduces the packet dropped, packet delay time and the message overhead in the network as compared to DSR by utilizing effective path discovery and path maintenance procedure.

Santhi [21] et al., Dynamic Source Routing (DSR) for mobile ad hoc networks maintains route caches to store routes that have been found via flooding or through promiscuous overhearing. But DSR route caches have the disadvantages like stale route cache entries, incomplete error notification, and insufficient cache size etc. In this paper, we propose to develop a reliable and effective cache management technique for the DSR protocol. In this technique, initially, we estimate a combined weighted function for each route stored in the cache. Then based on the combined weight function, the routes are arranged such that routes with minimum length and traffic load, maximum energy level and freshness are listed first in the route cache. The route cache is updated such that routes with least weight functions are removed from the list. In the route prediction mechanism, when a link is likely to be broken, it will select the most reliable route as an alternate route from the sorted route cache, before the link breakage. By NS2 simulation, we show that the proposed cache management technique for DSR protocol achieves better delivery ratio with reduced delay, overhead and energy consumption.

III. Conclusion.

In this paper, we have presented an various techniques in improving the route cache performance in DSR routing protocol by reducing the state information, latency, overhead and increases throughput, packet delivery ratio.

References

[1]. Sunsook Jung, Nisar Hundewale and Alex Zelikovsky, "Node Caching Enhancement of Reactive Ad Hoc Routing Protocols", Proceedings IEEE Wireless Communication and Networking Conference (WCNC'05), March 2005, Volume 4, 1970- 1975.

[2]. Soon Don Kwon, Jung Shin Park and Jai Yong Lee, "A New Route Cache Scheme in On-Demand Routing Protocols for MANET", International Conference of Information Technology & Application (ICITA), 2002.

[3]. Charles E. Perkins and Elizabeth M. Royer, "Adhoc On Demand Distance Vector Routing", Proceedings of the 2nd IEEE Workshop on Mobile Computing Systems and Applications, pp. 90-100, New Orleans, LA, February 1999.

[4]. David B. Johnson, David A. Maltz and Josh Broch, "DSR: The Dynamic Source Routing Protocol for Multi-Hop Wireless Ad Hoc Networks", In Ad Hoc Networking, edited by Charles E. Perkins, Chapter 5 (2001), pp. 139-172, 2001.

[5]. Vincent D. Park and M. Scott Corson, "A Highly Adaptive Distributed Routing Algorithm for Mobile Wireless Networks", Proceedings IEEE in INFOCOM '97, Sixteenth Annual Joint Conference of the IEEE Computer and Communications Societies, Vol. 3 (1997), pp. 1405-1413, 1997.

[6]. Young-Bae Ko and Nitin H. Vaidya, "Location-Aided Routing (LAR) in mobile ad hoc networks", Wireless Networks, Volume 6, Issue 4, Pages: 307 – 321, July, 2000.

[7]. Charles E. Perkins and Pravin Bhagwat, "Highly Dynamic Destination-Sequenced Distance-Vector Routing (DSDV) for Mobile Computers", ACM SIGCOMM Computer Communication Review, Volume 24, Pages: 234 - 244, Issue 4, October, 1994.

[8]. Chai-Keong Toh, "Associativity-Based Routing for Ad-Hoc Mobile Networks", Wireless Personal Communications: An International Journal, Volume 4 and Issue-2, Pages: 103 – 139, March 1997.

[9]. Alvin Valera, Winston K.G. Seah and SV Rao, "Cooperative Packet Caching and Shortest Multipath Routing in Mobile Ad hoc Networks", In Proceedings of IEEE INFOCOM, , pp. 260-269, March-April, 2003.

[10]. Yih-Chun Hu and David B. Johnson, "Ensuring Cache Freshness in On- Demand Ad Hoc Network Routing Protocols", Proceedings in Second Workshop Principles of Mobile Computing, pp. 25-30, 2002.

[11]. Shobha.K.R and K. Rajanikanth, "Intelligent Caching in on-demand Routing Protocol for Mobile Adhoc Networks", World Academy of Science, Engineering and Technology 56, 2009.

[12]. Prof. M.Neelakantappa, Dr.B.Satyanarayana and Dr. A.Damodharam, "Performance Improvement Techniques for Dynamic Source Routing Protocol in Mobile Ad Hoc Networks", International Journal of Recent Trends in Engineering, Vol 2, No. 2, November 2009.

[13]. Xin Yu, "Distributed Cache Updating for the Dynamic Source Routing Protocol", IEEE Transactions on Mobile Computing, Volume 5, Issue 6, June 2006.

[14]. G. Amoussou, H.Mohanna, M.Kadoch and Z. Dziong, "Improvement of Route Cache in DSR Protocol by Predicting Effective Communication Distance between Nodes", ICSEA 2006 and ICSNC 2006 Tahiti, French Polynesia , October 29 - November 4, 2006.

[15]. Md. Golam Kaosar, Ashraf S. Hasan Mahmoud, Tarek R. Sheltami, "Performance Improvement of Dynamic Source Routing Protocol Considering the Mobility Effect of Nodes in Cache Management", IEEE 2006.

[16]. D.Loganathan, P.Ramamoorthy, "Enhanced DSR Protocol with Multicost Algorithm in Wireless Ad hoc Networks.", International Journal of Engineering Science and Technology (IJEST), ISSN : 0975-5462, Vol. 4, PP - 3773-3778, No.08 August 2012

[17]. G.Narasa Reddy, A.Avanthi, R.Prasanth Reddy, "Enhancing DSR Protocol Performance in Mobile Ad Hoc Networks using Proactive Route Maintenance (PRM)."International Journal of Advanced Research in Computer Science and Software Engineering, Volume 2, Issue 5, PP-366-371 May 2012

[18]. Parul Sharma, Arvind Kalia And Jawahar Thakur, "Performance Analysis Of Aodv, Dsr And Dsdv Routing Protocols In Mobile Ad-Hoc Network (Manet)," Journal of Information Systems and Communication, ISSN: 0976-8742 & E-ISSN: 0976-8750, Volume 3, Issue 1, 2012, pp.-322-326, Feb 2012.

[19]. R. Bhuvaneswari, M. Viswanathan, " Efficient Source Routing Scheme for Mobile Adhoc Networks," International Journal of Computer Applications (0975 – 888) Volume 48– No.17, PP - 15-20, June 2012

[20]. Shiva Prakash1, Rajeev Kumar2, Brijesh Nayak3, Manindar Kumar Yadav. "A Highly Effective and Efficient Route Discovery & Maintenance in DSR," International Journal on Computer Science and Engineering (IJCSE), ISSN : 0975-3397, PP- 1546-1553, Vol. 3 No. 4 Apr 2011.

[21]. K.Santhi , Dr. M.Punithavalli "A Reliable and Effective Cache Management Technique for DSR Protocol in Mobile Adhoc Networks", 2011 3rd International conference on Computer Modeling and Simulation (ICCMS 2011)

Authors

K.Santhi received the B.Sc (Phy) degree from the Department of Physics, M.C.A and M.Phil degree from the Department of computer science, Bharathiar University, Coimbatore, in 1998, 2001 and 2004 respectively. She is currently pursuing the Ph.D degree in Anna University, Coimbatore. She is working in the Sri Ramakrishna College of arts and science for women from 2001 to till date. Her area of interest is Networking.

Dr.M.Punithavalli is the Director and Head of the Department of Computer Application, Sri Ramakrishna Engineering College. She obtained her Ph.D degree in computer science in the year 2007 from Alagappa University. She has published 50 papers in various journal and conference proceedings. Her research interests are in the area of Data Mining, Networking.