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Performance Comparison of Ad-hoc Routing Protocols

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Abstract *-Specially appointed systems are known by heaps of details like multi-jump remote availability, much of the time change system topology and the requirement for productive element steering conventions that assumes an essential part. This paper introduces an execution examination among two responsive steering conventions for versatile specially appointed systems: Dynamic Source Routing (DSR), Ad Hoc On interest separation Vector (AODV).Both conventions were recreated utilizing the apparatus ns-2 and were look at as far as parcel misfortune proportion, end to end delay, with portable hubs changing number of hubs and velocity. Reproduction uncovered that in spite of the fact that DSR splendidly scales to little systems among low hub speeds, AODV is favored because of its more productive utilization of data transfer capacity.*

Keywords *—AODV, DSR, DSDV, MANET, NS-2.*

I. INTRODUCTION

Portable specially appointed remote systems hold the guarantee without bounds, with the ability to build up systems at whatever time, anyplace. Versatile specially appointed systems (MANETs) are accumulation of portable hubs, powerfully shaping a transitory system without prior system base or brought together organization. These days a ton of examination endeavors concentrate on Mobile Ad-hoc systems.

Directing convention assumes an imperative part if two hosts wish to trade parcels which will be unable to convey straight. All hubs are versatile and can be associated progressively in a self-assertive way. All hubs of these systems carry on as switches and partake in revelation and support of courses to different hubs in the system. This circumstance turns out to be more confused if more hubs are included inside the system. An Ad-Hoc directing convention must have the capacity to choose the best way among the hubs, minimize the data transfer capacity overhead to empower appropriate steering, minimize the time required to focalize after the topology changes.

This paper introduces an execution correlation between two on-interest steering conventions for portable impromptu systems: Dynamic Source Routing (DSR), Ad Hoc On interest separation Vector Routing (AODV).

Both conventions were reenacted utilizing the ns-2 bundle and were thought about as far as normal throughput, parcel misfortune proportion, and steering overhead, while changing number of hubs and pace. Reproduction uncovered that in spite of the fact that DSDV splendidly scales to little systems with low hub speeds, AODV is favored because of its more effective utilization of data transmission.

II. AD-HOC ROUTING PROTOCOLS

The specially appointed steering conventions can be partitioned into two classifications:

Table-driven steering conventions: In table driven directing conventions, steady and breakthrough directing data to each hubs is kept up at every hub. These conventions require every hub to store their steering data and when there is an adjustment in system topology upgrading must be made all through the system.

On-Demand directing conventions: In On-Demand steering conventions, the courses are made as and when required. This kind of conventions finds a course on interest by flooding the system with Route Request parcels. At the point when a source needs to send to a destination, it summons the course disclosure components to discover the way to the destination.

Lately, an assortment of new directing conventions focused on particularly at this environment has been produced.

TABLE 1: COMPARISON OF TABLE-DRIVEN AND ON-DEMAND PROTOCOLS

	Table-driven	**On-demand**
Availablilty of Routing Information	Immediately from route table	After a route discovery
Route Updates	Periodic Advertisments	When requested
Routing Overhead	Proportional to the size of the network regardless of network traffic	Proportional to the number of communicating nodes and increases with increased node mobility

A. Dynamic Source Routing

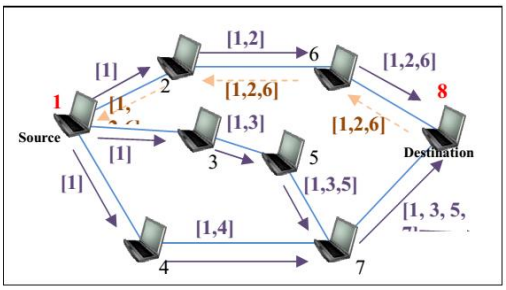
The Dynamic Source Routing (DSR) convention is a source directed on-interest convention. There are two noteworthy stages for the convention: course disclosure and course upkeep. The key contrast amongst DSR and different conventions is the directing data is contained in the bundle header. Since the steering data is contained in the bundle header then the transitional hubs don't have to keep up directing data. A moderate hub may wish to record the Directing data in its tables to enhance execution yet it is not compulsory. Another element of DSR is that it underpins topsy-turvy joins as a course answer can be piggybacked onto a crisp course request parcel. DSR is suited for little to medium measured systems as its overhead can scale the distance down to zero. The overhead will increment fundamentally for systems with bigger jump breadths as additionally steering data will be contained in the parcel headers.

- Two principle instruments: Route Maintenance and Route Discovery
- Route Discovery instrument is like the one in AODV yet with source steering
- Route Maintenance is proficient through course reserves
- Entries in course reserves are overhauled as hubs learn new courses, numerous courses can be put away.

B. Ad hoc On-demand Distance Vector Routing

Specially appointed On-interest Distance Vector Routing (AODV) is an on-interest adaptation of the table-driven Dynamic Destination Sequenced Distance-Vector (DSDV) convention. To discover a course to the target, the source communicates a course ask for parcel. This communicate message proliferates through the system until it achieves a transitional hub that has late course data about the destination or until it achieves the destination. At the point when middle hubs advances the course ask for parcel it records in its own tables which hub the course ask for originated from. This data is utilized to shape the answer way for the course answer bundle as AODV uses just symmetric connections. As the course answer parcel crosses back to the source, the hubs along the opposite way enter the directing data into their tables. At whatever point a connection disappointment happens, the source is told and a course disclosure can be asked for again if necessary.

- Based on standard Distance Vector Algorithm
- Nodes keep up course reserve and uses destination grouping number for every course section
- Does nothing when association between end focuses is still legitimate
- Route Discovery Mechanism is started when a course to new destination is required by communicating a Route Request Packet (RREQ).



– Route Error Packets (RERR) are utilized to eradicate broken connections

Figure 1. DSR Protocol

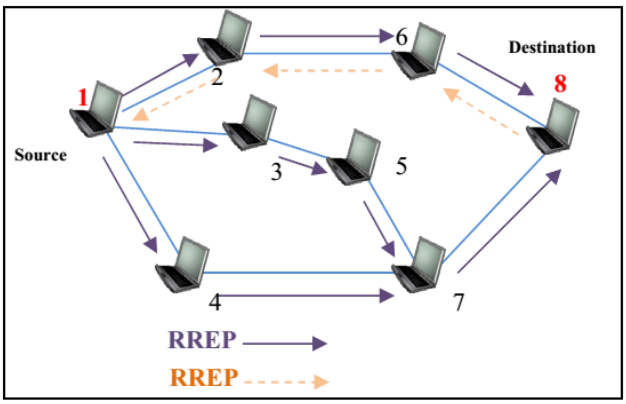


Figure 2. AODV Protocol

III. DESTINATION-SEQUENCEDDIST ANCE-VECTORS ROUTING (DSDV)

Destination-Sequenced Distance-Vector Routing (DSDV) is a table-driven steering plan for specially appointed versatile systems taking into account the Bellman-Ford calculation. The change made to the Bellman-Ford calculation incorporates flexibility from Loops in directing tables by utilizing grouping numbers. It was created by C. Perkins and P. Bhagwat in 1994. The DSDV convention can be utilized as a part of portable impromptu systems administration situations by expecting that each taking an interest hub goes about as a switch. both hub must keep up a table that comprises of all the conceivable destinations. In this steering convention, a section of the table contains the location identifier of a destination, the briefest known separation metric to that destination measured in bounce checks and the location identifier of the hub that is the principal jump on the most limited way to the destination. Every versatile hub in the plan keeps up a directing table in which all the conceivable destinations and the quantity of jumps to them in the system are recorded. A succession number is likewise connected with both course/way to the destination. The course marked with the most elevated succession number is constantly utilized. This likewise helps in recognizing the stale courses from the new ones, in this manner keeping away from the development of circles. Likewise, to minimize the movement produced, there are two sorts of bundles in the framework. One is known as "full dump", which is a bundle that conveys all the data around a change. Be that as it may, at the season of incidental development, another sort of bundle called "incremental" will be utilized, which will convey only the progressions, subsequently, expanding the general effectiveness of the framework. DSDV requires a standard overhaul of its steering tables, which goes through battery power and a little measure of transfer speed notwithstanding when the system is unmoving. At whatever point the topology of the system changes, another grouping number is vital before the system re-merges; in this way, DSDV is not reasonable for very dynamic systems.

IV. SIMULATION ENVIRONMENT

Recreation Model

The outcomes reported in this paper depend on the study led on the premise of reproduction instrument NS2 that is an item arranged, discrete occasion driven system test system created at UC Berkeley written in C++ and OTcl. The general test system is portrayed by a Tcl bunch Simulator. It gives a position of interfaces to arranging a reproduction and for picking the sort of occasion scheduler used to drive the recreation. At the point when a new reenactment item is made in tcl, the instatement methodology plays out the accompanying operations:

- initialize the packet format

- make a scheduler (defaults to a calendar scheduler)
- make a "null agent" (a discard sink used in various places)

We utilize tcl to design the topology, the hubs, the channel, to plan the occasions, and so forth.

Versatile Node is the fundamental ns Node object with included functionalities like development, ability to transmit and get on a channel that permits it to be utilized to make portable, remote reenactment environment.

The reproduction in NS2 can be depicted as appeared in Fig.3. The situation document portrays the development example of the hubs. The correspondence document portrays the activity in the system.

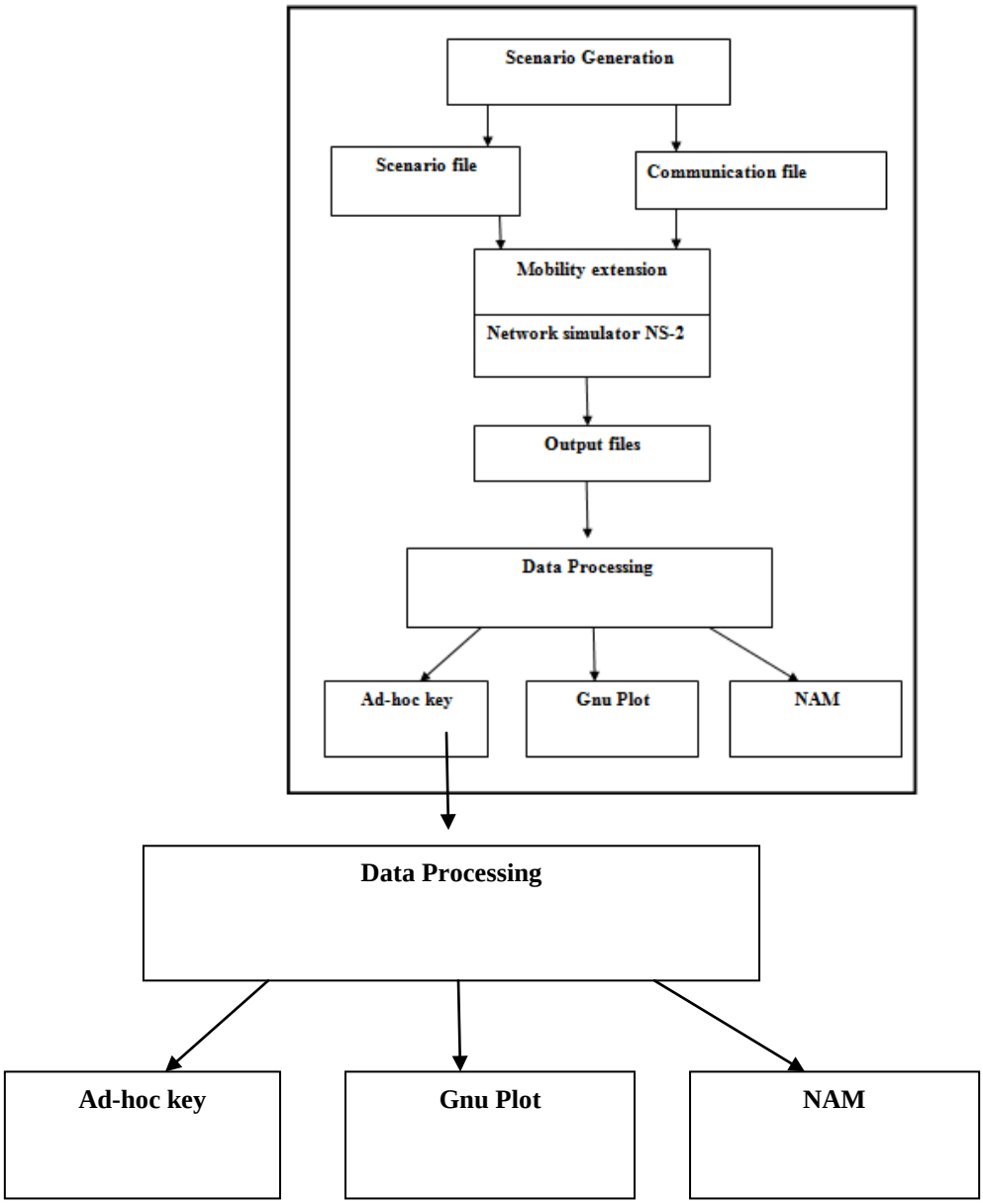


Fig.3. Simulation Procedure

V. COMPARISONS

To assess the execution of specially appointed system steering conventions, the accompanying measurements were considered:

Packet Delivery Fraction (PDF) Result

PDF is the proportion between the quantities of bundles began by the application layer sources and the quantity of parcels got by the sinks at the last destination. It will portray the misfortune rate that will be seen by the vehicle conventions, which thus influences the most extreme throughput that the system can bolster. As far as parcel conveyance proportion, DSR performs well when the quantity of hubs is less as the heap will be less. However its execution decreases with expanded number of hubs because of more movement in the

system. The execution of DSDV is better with more number of hubs than in correlation with the other two conventions. The execution of AODV is reliably uniform.

Average End to End Delay Result

The deferral is influenced by high rate of CBR parcels too. The cradles turn out to be full much snappier, so the parcels need to stay in the cushions an any longer timeframe before they are sent. This can be seen at the DSR directing convention when it was stretch around 2400 parcels at the 0 portability. For normal end-to-end defer the execution of DSR and AODV are verging on uniform. In any case, the execution of DSDV is corrupting because of expansion in the quantity of hubs the heap of trade of steering tables turns out to be high and the recurrence of trade additionally increments because of the portability of hubs.

Number of Packets Dropped

The quantity of information parcels that are not effectively sent to the destination. As far as dropped parcels, DSDV's execution is the most exceedingly terrible. The execution debases with the expansion in the quantity of hubs. AODV and DSR performs reliably well with expansion in the quantity of hubs.

VI. RELATED WORKS

G. Rajkumar, P. Kasiram and D. Parthiban 2012 [1] the most important objective of the paper is to increase the throughput thereby reducing the routing overhead and jitter among nodes. To achieve this, it is proposed to go for reactive routing protocols. Proactive routing protocols use table-driven strategy that is the routing tables are exchanged periodically among nodes which results in more power consumption. To overcome these problems, we go for DSR and AODV. These routing protocols use on-demand strategy that is the routes are established from source node to destination only on demand which minimizes the jitter level. Using "Network Simulator 2.35" the performance of AODV and DSR protocols are compared for large number of nodes in the presence of ambient noise level whereas in the existing works lesser number of nodes is only considered. From our results it is evident that AODV protocol consumes lesser energy than DSR and in the presence of high routing overhead, AODV outperforms DSR by yielding higher throughput with less jitter.

Mehdi Barati 2012 [2] Proposing power efficient routing protocols for Mobile Ad hoc Network (MANET) and Wireless Sensor Network is an uphill and challenging task. Many different routing protocols based on different features have been proposed to the IETF. Performances of many of these routing protocols have been evaluated focusing on metrics such as delay, routing overhead, and packet delivery. However, no studies have been done to investigate power aspect of these routing protocols. Thus, this paper will discuss about the power consumption aspect of the MANET routing protocols. A performance comparison of Dynamic Source Routing (DSR) and Ad hoc On-Demand Distance Vector (AODV) routing protocols with respect to average energy consumption and routing power consumption are explained thoroughly. Then, an evaluation of how the varying metrics in diverse scenarios affect the power consumption in these two protocols is discussed. A detailed simulation model using Network Simulator 2 (NS2) with different mobility and traffic models are used to study their energy consumption. lastly, an evaluation of these routing protocols based on energy consumption is presented.

Mina Vajed Khiavi 2012 [3] Routing protocols have central role in some mobile ad hoc network (MANET). There are a lot of routing protocol that exhibit different performance levels in different scenarios. We compare AODV, DSDV, DSR and TORA routing protocol in mobile ad hoc networks to determine the best operational conditions for every protocol. We analyses these routing protocols by extensive simulations in ns-2 simulator and show that how pause time and number of nodes affect their performance. In this study performance is measured in terms of Packet Delivery Ratio, Network Life Time, scheme Life Time, End-to-End Delay and Routing Overhead.

Parul Sharma, 2012 [4] A Mobile Ad-hoc Network (MANET) is a collection of wireless nodes that can dynamically form a network to exchange information without via any pre-existing fixed network infrastructure. MANET is a self organized and self configurable network where the mobile nodes shift arbitrarily. The mobile nodes can receive and forward packets as a router. Each node operates not only as an end scheme, 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 frequently. 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 Distance-Vector) and DSR (Dynamic Source Routing Protocol) are compared. nearly all 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 protocols 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.

Manveen Singh Chadha, Ranbir Joon and Sandeep 2012 [5] wireless network that can be formed without the need for any pre-existing infrastructure in which every node can act as a router. Mobile ad hoc network (MANET) is an autonomous scheme of mobile nodes connected by wireless links. Each node operates not only as an end scheme, 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 frequently. The main classes of routing protocols are Proactive, Reactive and Hybrid. A Reactive (on-demand) routing strategy is a popular routing category for wireless ad hoc routing The design follows the idea that each node tries to reduce routing overhead by sending routing packets whenever a communication is requested. In this work an attempt has been made to compare the performance of three prominent on demand reactive routing protocols for MANETs:- Ad hoc On Demand Distance Vector (AODV), Dynamic Source Routing (DSR) protocols and Ad-hoc On-demand Multipath Distance Vector Routing (AOMDV). DSR and AODV are reactive gateway discovery algorithms where a mobile device of MANET connects by gateway only when it is needed. AOMDV was designed primarily for highly dynamic ad hoc networks where link failures and route breaks occur frequently. It maintains routes for destinations in active communication and uses sequence numbers to determine the newness of routing information to prevent routing loops. It is a timer-based protocol and provides a method for mobile nodes to respond to link breaks and topology changes. The performance differentials are analyzed using varying simulation time. These simulations are carried out using the ns-2 network simulator. The results presented in this work illustrate the importance in carefully evaluating and implementing routing protocols in an ad hoc environment.

Muhammad Shaffatul Islam, Md. Adnan Riaz, Mohammed Tarique 2012 [6] Mobile Ad hoc Networks (MANETs) are very considered attractive for a lot of applications. Routing protocol is considered as the most important element of MANET. However, media streaming over MANET is a quite demanding task. the performances of MANET routing protocols have been investigated for video applications. Some popular routing protocols namely Dynamic Source Routing (DSR), Ad hoc On-demand Distance Vector (AODV), Temporally-Ordered Routing Algorithm (TORA), Optimized Link State Routing Protocol (OLSR), and Geographic Routing Protocol (GRP) have been considered in this paper. A comparative performance analysis of these routing protocols has been presented in this paper for supporting video streaming applications.

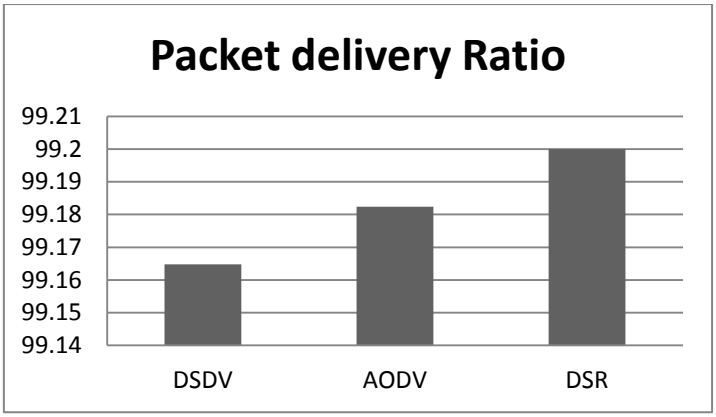


Figure 4 Packet delivery ratios when terrain area is 300 m x 300 m

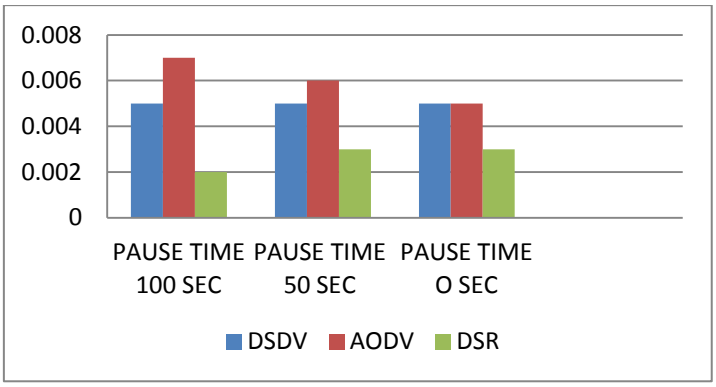


Figure 5 Pause Time v/s End to End Delay

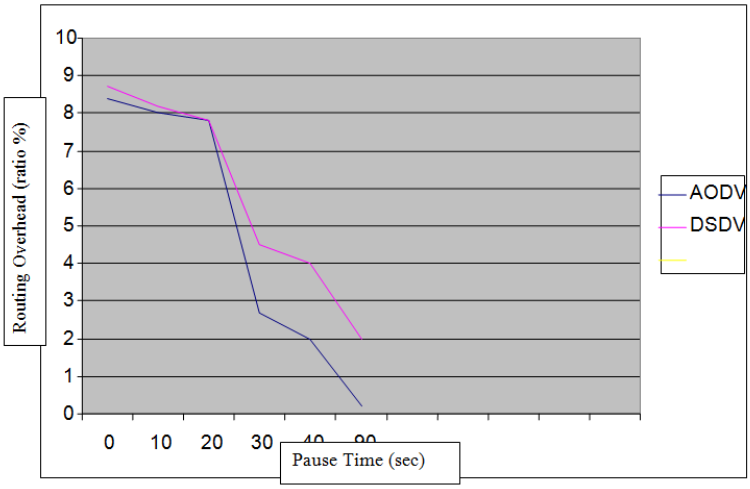


Figure 6 Routing Overhead between DSDV and AODV

VII. CONCLUSION

The essential activities identified with the three steering conventions to be specific AODV and DSR were examined in subtle element. On interest driven conventions, as AODV, DSR and DSDV, performed exceptionally well for bundle conveyance with quick development and portability rate. AODV appears to perform enhanced than DSR on a few circumstances. Nonetheless, when portability builds AODV has as a rule better execution. The On-interest convention AODV performed especially well, while DSR couldn't accomplish great parcel conveyance proportion while moving additional every now and again. DSR is source steering convention, which implies that byte overhead in every bundle can influence the aggregate byte overhead when the heap offered and size of the system increments. On favorable position with source directing is that amid course disclosure operation it adapts more courses. A blend of the conventions can be utilized for good result

VIII. REFERENCES

[1]. G. Rajkumar, P. Kasiram and D. Parthiban, "Optimized QoS Metrics and performance comparation of DSR and AODV Routing Protocols", Proc. of IEEE Conference on advances in Engineering, Science and Management (ICAESM-2012), March 30-31, 2012

[2]. Mehdi Barati, Kayvan Atefi, Farshad Khosravi and Yashar Azab Daftari, "Performance Evaluation of Energy Consumption for AODV and DSR Routing Protocols in MANET", Proc. of IEEE Conference on Computer & Information Science (ICCIS-2012).

[3]. Mina Vajed Khiavi, Shahram Jamali, Sajjad Jahanbakhsh Gudakahriz, "Performance comparison of AODV, DSDV, DSR, TORA routing protocols in MANETs", International Research Journal of Applied and Basic Sciences, Vol. 3(7), 2012.

[4]. Parul Sharma, Arvind Kalia and Jawahar Thakur, "Performance analysis of AODV, DSR and DSDV Routing Protocols in Mobile Adhoc Networks (MANET)", Journal of Information Systems and Communication, Vol. 3, Issue 1, 2012

[5]. Manveen Singh Chadha, Ranbir Joon and Sandeep, "Simulation and Comparison of AODV, DSR and AOMDV Routing Protocols in MANETs", International Journal of Soft Computing and Engineering (IJSCE), Vol. 2, Issue 3, July 2012.

[6]. Muhammad Shaffatul Islam, Md. Adnan Riaz, Mohammed Tarique, " Performance analysis of the routing protocols for video streaming over Mobile ad hoc networks", International Journal of Computer Networks & Communications (IJCNC), Vol. 4, No. 3, May 2012

[7]. V. Sharma, H. Singh and M. Kaur, "Implementation and Analysis of OFDM based IEEE 802.11g VANET", IJCNWMC, Trans-Tellar, pp. 47-54, 2013

[8]. H. Ahmed and M. Khurram, "Performance Analysis of MAC Layer Protocols in Wireless Sensor Network", I.J. Information Engineering and Electronic Business, vol. 5, (2014), pp. 44-52.

[9]. A. Patel and R. Upadhyay, "Performance analysis of Slotted CSMA/CA MAC protocol under different parameters for static IEEE 802.15.4 Wireless Sensor Networks", International Journal of Emerging Technologies in Computational and Applied Sciences (IJETCAS), (2013) June-August.

[10]. G. Singh and S. Singh, "Evaluation of the effect of Node Movements in Mobile Ad Hoc Networks (MANETs)", International Journal of Advanced Research in Computer and Communication Engineering, (2015) September.

[11]. Z. Khan, Tayeba, H. Farman, I.I. Awan and A. Nawaz, "Impact of Mobility Models over Multipath Routing Protocols", International Journal of Information Technology & Computer Science (IJITCS) (http://www.ijitcs.com), vol. 19, no. 1, (2014).

