

An Efficient Distributed Three Hop Routing Protocol with Hybrid Wireless Network

Pallavi T. Dhotre¹, Mohasin B. Tamboli²

P.G. Student, Department of Computer Engineering, GHRCOE&M, Ahmednagar, Maharashtra, India¹

Assistant Professor, Department of Information Technology, GHRCEM, Wagholi, Maharashtra, India²

ABSTRACT: Hybrid wireless network integrates the advantages of cellular and multi hop wireless networks. MANET is multi hop wireless network whereas Infrastructure Wireless network is cellular network. Now a day it's essential to extend the performance of the network whereas maintaining and increasing the potency of the HWN . To increase the QOS low power consumption taken in considerations. This paper represents Hybrid Wireless Network (HWN) with Distributed Three hop Routing(DTR) Protocol .Where DTR divides the information stream into numerous segments and limits the trail length to 3 and transmit the segments towards the destination in correct order.

KEYWORDS: Hybrid Wireless Network; Distributed Three hop Routing Protocol; MANET; Infrastructure Wireless Network; QOS.

I. INTRODUCTION

Wireless sensing element network is assortment of sensor nodes deployed over wide geographical space. Hybrid WSN is collection of cellular and multi-hop wireless networks. In HWN, it is necessary to cut back the ability consumption while increasing the turnout and potency of the network. To increase the lifetime of HWN, low energy consumption is important. Finding the faulted nodes in the network and replacing the nodes with another high capability node plays a vital role in reducing the ability consumption.

In MANET knowledge is routed to its destination in distributed/multi-hop manner through intermediate nodes. Multi-hop routing needs on demand route discovery and maintenance. As compare to Infrastructure Wireless Networks MANET are low reliable and appropriate for solely transmission of native knowledge. In Infrastructure Wireless Network nodes communicate with each alternative via base stations. Infrastructure Wireless Network provides high data transmission responsibility and channel access potency however suffers from the drawback of upper power consumption on mobile nodes and single purpose of failure.

This paper proposes an algorithm for fault node detection and fault node recovery which will increase the lifetime of HWN in context of low power consumption and high efficiency. An important component which affects the strength of wireless network in data transmission is routing protocol. When some of the sensor node fails down then using of this algorithm results in detecting the fault node and also will replace the same with another high capacity node. Thus the algorithm increases the lifetime of the HWN and reduces the impacts occurred due to the faulted node. Following subsection describes the algorithms used in Distributed Three hop Routing protocol:

1. Algorithm for Load Balancing: This algorithm gives Load balancing scheme called iCAR for cellular network, which places relay nodes at such a locations to divert the traffic from congested cells to less congested or non-congested cells.
2. Algorithm for Wireless Network with RRP: This algorithm contains two algorithms for recovery and replacement of faulted node which are grade diffusion algorithm and generic algorithm which is also called as RRP algorithm.
3. DTR: This algorithm divides the incoming message stream into multiple segments and sends this segment towards the segment nodes which will then forwards the data streams to sink nodes. Sink node will forward all streams to the destination and all the segments will arrange in proper sequence. It limits the path length to three as name itself contains three-hop routing.

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

The below table shows comparison between various algorithms

Algorithm/ Parameters	Load Balancing Algorithm	Wireless Network with RRP algorithm	DTR
Working	places ad hoc relay nodes at strategic locations	algorithm generates the grade number and routing table	source node is divides a message stream into segments
Efficiency	Low	Average	High
Time Complexity	High	High	High
Performance	Low	medium	High

II. RELATED WORK

Ucan: A Unified Cell and Ad-hoc Network architecture [2]: This paper represents Unified cellular and specification to extend the outturn of cells. A mobile consumer in UCAN has 3G cellular link and IEEE 802.11 based mostly peer to see links. The 3G cellular base stations sends segments to destination station with low channel quality towards proxy shoppers. The proxy shoppers use multihop unexpected network created of alternative mobile nodes and IEEE 802.11 wireless links to send the segments to the destinations station. This paper represents secure packet transfer for alternative nodes. in depth simulation with IEEE 802.11(b). They tend to show that the UCAN design will offers separate user's output by up to eightieth and also the mixture outturn of downlink by up to hr[16].

Multi-hop cellular: This is new architecture for wireless communications [3]. This paper represents a replacement design for wireless communication that is thought as Multihop Cellular Network (MCN). MCN maintains the professionals of typical single-hop cellular network (SCN), wherever the service infrastructure is pictured by fix bases, wherever wireless transmission through mobile nodes in Multi-Hops area unit allowed. The MCN is used for reducing the required variety of bases to boost the turnout performance whereas limiting path confronted in ad-hoc networks. SCN and MCN area unit studied; in term of mean hop count, hop by hop turnout and finish turnout, and mean variety of channels underneath completely different.

Connectivity in ad hoc and hybrid networks [4]. This paper shows the introduces dispersed arrangement of abject base which eloquently advice in access the connectivity, but it alone if the bulge body is abundant added in one ambit than in the other. They use aperture approach to explain the results. This cardboard obtains assay of expressions of connectivity in the 1-dimension case.[16] They aswell appearance that aqueduct are certain at a beneath spatial body of nodes and after-effects acquired on absolute citizenry abstracts affirm our finding.

Highly Dynamic Destination Sequenced Distance Vector routing (DSDV) for mobile computers[5]. In this paper they represented a new adjustment for the operation of ad-hoc network. The basal addition of the adjustment is to administer every adaptable bulge as a appropriate router, which assuredly broadcasting its angle of the alternation cartography with added adaptable nodes aural the networks. They call the means to adapt the arrangement band acquisition and to accommodate MAC band abutment for Ad-hoc networks.

Ad-hoc On Demand Distance Vector (AODV) routing[6]. This paper represent AODV algorithm for the Ad-hoc Network's operation, every adaptable bulge works as an appropriate router, and routes are acquired on appeal with no assurance on advertisements their new acquisition algorithm is added aces for a activating aggressive network, as appropriate by users adulatory to advance ad-hoc networks. AODV provides bend routes and aliment torn links. We

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

can bottle the allowances of basal ambit agent acquisition mechanisms in network. They states that this algorithm measures beyond populations of adaptable hosts to anatomy Ad-hoc networks

Sr. No.	Title	Authors	Year	Result
1.	Ucan: A unified cell and ad-hoc network architecture[2]	H Luo, R.Ramjee, P. Sinha, L. Li, and S. Lu	2003	Unified Cellular and Ad-Hoc Network (UCAN) architecture for enhancing cell throughput, while maintaining fairness[2]
2.	Multi-hop cellular: A new architecture for wireless communications [3]	Y. D. Lin and Y. C. Hsu	2000	MCN can reduce the required number of bases or improve the throughput performance, while limiting path vulnerability encountered in ad-hoc networks[3]
3.	Connectivity in ad hoc and hybrid networks.[4]	P. T. Oliver, Dousse, and M. Hasler	2002	They show that at a low spatial density of nodes, bottlenecks are unavoidable[4]
4.	Highly dynamic destination sequenced distance vector routing (DSDV) for mobile computers[5]	E. P. Charles and P. Bhagwat	1994	Describes the ways in which the basic network-layer routing can be modified to provide MAC-layer support for ad-hoc networks.[5]
5.	Ad hoc on demand distance vector (AODV) routing[6]	C. Perkins, E. Belding-Royer, and S. Das.	2003	algorithm scales to large populations of mobile nodes wishing to form ad-hoc networks[6]

III. EXISTING SYSTEM

Three-hop Routing agreement in Wireless analysis aspect Networks (WSN) is one in every of technology domains with ample bulk of applications in abundant disciplines. DTR should get to action a defended Quality of Service (QOS) in absolute time appliance to extend QOS massive numbers of moveable analysis aspect nodes in DTR are deployed. These QOS get bargain as a aftereffect of access aural the abortion of a analysis aspect bulge because of array failure, ecology effects, accouterments and software amalgamation malfunctions. Packet is as well besmirched because of the incorrect attributes of communication. In amalgam wireless analysis aspect arrangement consists of ton of analysis aspect nodes, hundred(s) or thousand(s) of nodes affectionate a arrangement to alteration the advice from accumulation bulge to bore node. The analysis aspect bulge lose their array ability already it's acclimated for continued bulk of time, appropriately it's difficult to recharge nodes of the analysis aspect and additionally capital in wireless analysis aspect arrangement is cut aback the advice loss, activity burning and accretion and alter the called nodes.

IV. PROPOSED WORK

Hybrid wireless networks are accepting accretion absorption in contempo years. An amalgam wireless protocol accumulation Associate in Nursing basement wireless arrangement and a adaptable ad-hoc arrangement leverages their blessings to extend the aftermath adequacy of the system. However, accepted amalgam wireless networks alone mix the

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

acquisition protocols aural the two forms of networks for ability transmission, that prevents them from accomplishing college arrangement adequacy during this paper, we tend to adduce a Distributed Three-hop Acquisition (DTR) ability acquisition agreement that integrates the accompanying options of amalgam wireless networks aural the ability manual method. In DTR, a accumulation bulge divides a bulletin beck into segments and transmits them to its adaptable neighbours that added advanced the segments to their destination through Associate in nursing basement network. DTR banned the acquisition aisle breadth to a few, and continuously arranges for high-capacity nodes to advanced ability not like a lot of absolute acquisition protocols, DTR produces decidedly lower aerial by eliminating avenue assay and maintenance. Additionally, its appropriate characteristics of abbreviate aisle length, short- ambit transmission, and counterbalanced amount administration accord top acquisition assurance and efficiency. DTR additionally encompasses a bottleneck administration algebraic affairs to abstain amount bottleneck in BSes in the case of asymmetric trace distributions in networks. Theoretical assay and simulation after-effects appearance that DTR will badly advance the aftermath adequacy and quantifiability of amalgam wireless networks attributable to its top quantifiability, efficiency, and assurance and low overhead.

In this paper, we proposed a accretion and backup algorithm which is a aggregate of abiogenetic algorithm and brand circulation algorithm. In this cardboard proposes an algorithm accretion and backup algorithm that increases the backbone if sensors nodes are abeyance i.e. sensor nodes do not accept array ability and sensors. If activity time alcove their alternative beginning amount RRA algorithm alter those sensor nodes acclimated the reused acquisition paths but not alone backup is aswell reduced. Improves the wireless sensor arrangement lifetime and abate the sensor bulge drained cost.

This paper proposes RRP algorithm on brand circulation algorithm amalgamate with the abiogenetic algorithm for reinstating the sensor nodes if some of the sensor nodes are shutdown. This algorithm can accord the boyhood of replacing sensor nodes and aswell added acclimated acquisition paths called as RRP. This algorithm generates the brand amount and acquisition table, a set of associate nodes and burden amount anniversary sensor node. The bulge displacement the reside abstracts to the bore bulge according to the brand circulation algorithm if accident occurs actuality finds the Bth value. Bth amount beyond than the RRP algorithm will be conjured; reinstate the asleep bulge by the best exercise nodes that is generated by abiogenetic algorithm application the some operations to reinstate the sensor nodes.

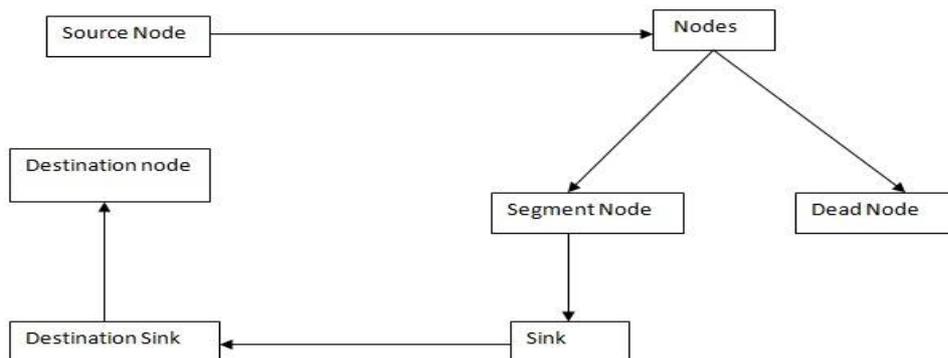
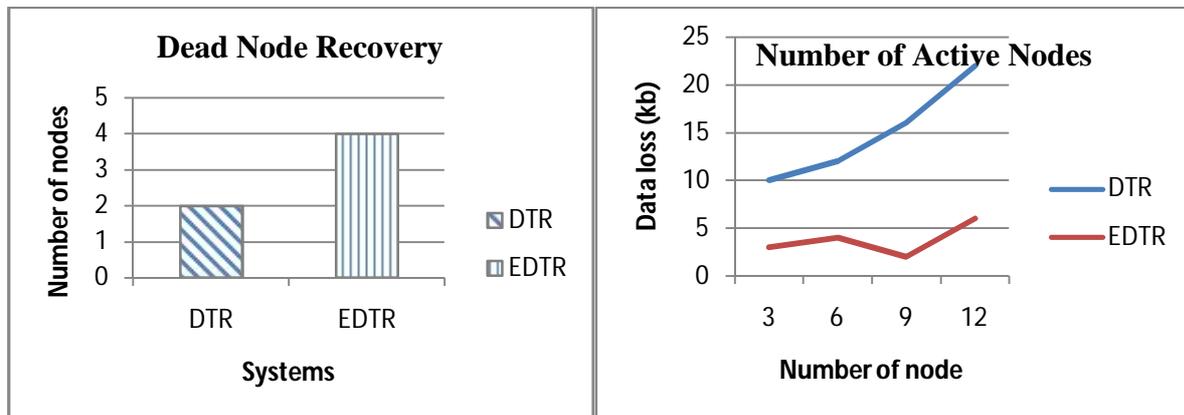


Fig: System Architecture

V. EXPECTED RESULTS

Fig.(a) Shows that Dead node recovery in Expected DTR(EDTR) is higher than normal DTR . and Fig(b) shows that number of data loss in expected DTR (EDTR) is less than that of normal DTR. Detail diagrams are given below:



Fig(a): Dead node Recovery

Fig(b): Data Loss

VI. CONCLUSION

Hybrid WSN has been advanced acclimated for acknowledgment and administration applications in our way of activity attributable to its able options, like low value, low power, aboveboard implementation, and simple maintenance. Distributed Three-hop Acquisition (DTR) ability acquisition agreement that integrates the accompanying options of amalgam wireless networks aural the ability manual method. In DTR, an accumulation bulge divides a bulletin beck into segments and transmits them to its adaptable neighbours, that added advanced the segments to their destination through an basement network. During this cardboard we accept an addition to planned QOS in Three-hop Acquisition Agreement network. The planned RRA blueprint is accumulated with the antecedent antecedent formulas like Grade circulation algorithm and abiogenetic algorithms a lot of aim of accretion and backup blueprint is reinstating the accessory nodes if any accessory nodes breadth assemblage closing. And additionally abate the barter amount of accessory nodes attributable to the reused acquisition ways.

REFERENCES

- [1] Haiying Shen*, Senior Member, IEEE, Ze Li and Chenxi Qiu., "A Distributed Three-hop Routing Protocol to Increase the Capacity of Hybrid Wireless Networks" ,IEEE Transactions on Mobile Computing VOL. XX, NO.XX 2015
- [2] H Luo, R. Ramjee, P. Sinha, L. Li, and S. Lu. , "Ucan: A unified cell and ad-hoc network architecture." In Proc. of MOBICOM, 2003.
- [3] Y. D. Lin and Y. C. Hsu., "Multi-hop cellular: A new architecture for wireless communications". In Proc. of INFOCOM, 2000.
- [4] P. T. Oliver, Dousse, and M. Hasler., "Connectivity in ad hoc and hybrid networks", In Proc. of INFOCOM, 2002.
- [5] E. P. Charles and P. Bhagwat. "Highly dynamic destination sequenced distance vector routing (DSDV) for mobile computers." In Proc. of SIGCOMM, 1994.
- [6] C. Perkins, E. Belding-Royer, and S. Das, "RFC 3561: Ad hoc on demand distance vector (AODV) routing" Technical report, Internet Engineering Task Force, 2003.
- [7] D. B. Johnson and D. A. Maltz, "Dynamic source routing in ad hoc wireless networks." IEEE Mobile Computing, 1996
- [8] V. D. Park and M. Scott Corson, "A highly adaptive distributed routing algorithm for mobile wireless networks." In Proc. Of INFOCOM, 1997.
- [9] R. S. Chang, W. Y. Chen, and Y. F. Wen. "Hybrid wireless network protocols." IEEE Transaction on Vehicular Technology, 2003.
- [10] G. N. Aggelou and R. Tafazolli, "On the relaying capacity of next generation gsm cellular networks.", IEEE Personal Communications Magazine, 2001
- [11] T. Rouse, I. Band, and S. McLaughlin, " Capacity and power investigation of opportunity driven multiple access (ODMA) networks in TDD-CDMA based systems.", In Proc. of ICC, 2002.
- [12] P. Gupta and P. R. Kumar, "The capacity of wireless networks", IEEE TIT, 2000
- [13] J. Cho and Z. J. Haas., "On the throughput enhancement of the downstream channel in cellular radio networks through multihop relaying.", IEEE JSAC, 2004.
- [14] B. Liu, P. Thiran, and D. Towsley. "Capacity of a wireless ad hoc network with infrastructure", In Proc. of Mobihoc, 2007
- [15] Azzedine Boukerche., 2009. "ALGORITHMS AND PROTOCOLS FOR WIRELESS AND MOBILE AD HOC NETWORKS", Wiley Publication
- [16] Pallavi T. Dhotre, Mohasin B. Tamboli , "A Survey Paper of a Distributed Three-hop Routing Protocol to Increase the Capacity of Hybrid Wireless Networks", IJSR ,2015.