Comparative study of Proactive, Reactive and Hybrid Routing Protocols

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I.   INTRODUCTION

Routing of wireless sensor network is totally different from traditional routing in wired networks. There is no specific hardware for data accessing remotely so wireless network are unreliable. At the time of communication nodes may stop working, with routing algorithms contain to gather up firm power consuming necessities [1]. Lots of researchers develop number of routing algorithms for WSN.

II.   CLASSIFICATION OF ROUTING PROTOCOLS

Routing protocols are divided into various categories, some of the following as:

[1] Proactive Protocols

[2] Reactive Protocols

[3] Hybrid protocols

Proactive protocols

In this protocol, one or more routing tables are maintained by nodes which are updated regularly. Whenever there is modifies network topology each sensor of network broadcast a message towards entire sensor network .As it decreases the performance and over head cost to maintain up to date information. But it provides the original data towards accessibility of network. DV protocol, DSDV protocol, FSR algorithms are the examples of Proactive protocols.

- **Destination-SequencedDistance-Vector:** Perkins et.al. have introduced DSDV. This [2] algorithm depends on likelihood of old style Bellman-Ford algorithm which is also designed for routing, among definite upgrades, such as, make it circle without any accuse. This algorithm is less hearty as contrast with connection state directing due to issues, for example, estimation to unending less and dynamic impact.

- **FSR:** This algorithm [3] is proposed by Pei et al., is based on the method of graphical data compression algorithm introduced by Kleinrock et.al. This algorithm diminishes the dimension of revise messages with refreshing network data for close-by node on a upper recurrence as for the remote node, that be positioned outside the fisheye degree, and constructs FSR extra versatile to enormous network than protocol.

Reactive protocols (On demand)

Reactive routing [4, 5] strategies, likewise on demand routing, adopt an altogether different strategy to directing as compare to proactive algorithms. A huge level of overhead from proactive algorithms originates from requirement used for each node to keep up a path to each node consistently. In ad-hoc networks, be that as it may, interface network can change much of the time and control overhead is expensive. Various Types of Proactive Routing Protocols are:

- **DSR:-** depends on scheme of resource routing algorithm. In source routing every packet conveys the total arranged rundown of nodes wherein the packet should go through the network.

- **AODV** is also an enhancement for the DSDV protocol. AODV limits quantity route communicates with making route on an on-request premise, instead of keeping up a total rundown of courses as in the DSDV algorithm.

- **TORA** is another source-started on-request routing protocol, base on scheme of connection inversion of Directed Acyclic Graph (ACG).

- **SSA** chooses route dependent on sign steadiness, to the blend of sign quality as well as area dependability, as opposed to utilizing affiliation security as utilized in ABR.

- **LAR:** LAR is a flood based routing algorithm, presented by Ko, et.al. as DSR, so as to utilizations area data so as to decrease route look through space and along these lines limits path organize traffic. It expect to every sensor unit acquires its area data GPS.

- **LMR**: LMR keeps up different paths to arrive at every goal. This component expands the dependability of LMR since at whatever point a route to a specific goal and following accessible route to the goal can be utilized without starting another route development methodology. It utilizes arrangement facts and inter modular organization to maintain a strategic distance from lengthy repetitions [6].

- **ABR**: Toh, introduced ABR algorithm with utilizing the idea of resource routing like DSR, however chooses paths dependent on affiliation strength, which is, association steadiness, of sensor unit.

- **RDMAR**: RDMAR limits routing overheads through restricting question flooding within a constrained territory. It utilizes idea of grouping add up to number, like AODV, to counteract shaping long term loops.

- **CBRP**: CBRP is various leveled on-request routing

algorithm to utilizations resource routing, like DSR, near abstain from framing round and transmit packet.

III.   HYBRID ROUTING ALGORITHMS

Hybrid protocol consolidate upsides of equally professional dynamic protocol, they locally utilize star dynamic routing algorithm and internally also utilize dynamic routing. Hybrid Routing Protocols consolidate highlights of active as well as proactive algorithms. Primary component of this algorithm is to routing is proactive used for short distance and receptive for lengthy separations. The regular drawback of hybrid routing algorithms is to the sensor units need to keep up abnormal state topological data which prompts additional memory space and energy utilization. Various Types of this kind of algorithms are:

- **ZRP**: ZRP [7] partitions topology in various regions along with try to use distinctive routing algorithms inside and among the regions dependent on shortcomings and qualities of these algorithms. The principle favorable position of this algorithm is which it needs a modest quantity of routing data at every sensor unit, thus it delivers substantially fewer routing traffic in comparison to an unadulterated responsive or proactive plan [8].

- **VGA**: The VGA joins information collection and in network dispensation to accomplish power productivity with expansion of network lifetime [9].

- **TTDD**: The TTDD accept which sensor unit is inactive with area mindful as well as sink nodes are permitted to alter their area powerfully [10]. In figure- 1, a model is introduced for development of framework. For this situation, individual resource B and a sink node S with a two dimensional sensor regions are measured. The resource partitions field within a network of nodes. Every node is a x square. A resource itself is at an intersection purpose of framework. It engenders information declarations to arrive at all different intersections. The TTDD is able to utilize for different mobile sink nodes in a region of inactive sensor units.
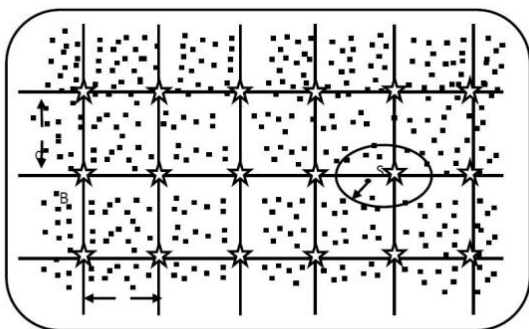

Figure- 1:- One source B and one base station S[10]

- **BCDCP**: BCDCP setup groups dependent on fundamental thought which they will be adjusted [11].

So as to accomplish this, the sink node, earlier than developing the path, gets data on present power position from every one of sensor unit in sensor network. Additionally, in this algorithm the sink node is viewed as a highest power sensor unit among very many power supplies.

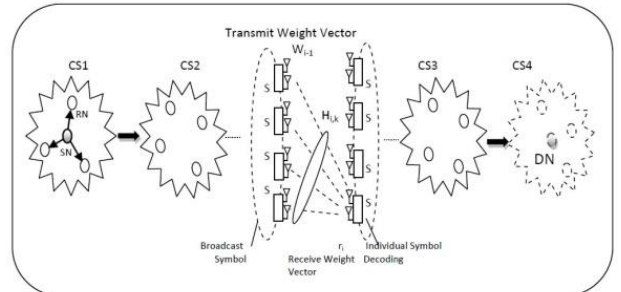- Multihop Virtual Multiple Input Multiple Output (Multihop virtual MIMO):

Figure-2: Multihop virtual MIMO protocol [12]

In this algorithm information are gathered via different source sensor units and send to a distant base station by multiple steps [13]. Figure-2 shows the structure of Multihop virtual MIMO protocol.

Comparisons of Proactive, Reactive and Hybrid Routing Protocols
Table 1: Comparisons of Proactive, Reactive and Hybrid Routing Protocols.

Parameters	Reactive	Proactive	Hybrid
Routing Philosophy	Flat	Flat/Hierarchical	Hierarchical
Routing technique	On demand	Table driven	Combination of both
Overhead in routing	Low	High	Medium
Route availability	Set up when needed	Always available	Depends upon destination's location
Latency	High	Low	Zone dependent
Periodic updates	No	Yes	Required inside Zone
Storage need	Depends on number of routes kept	Low	Depends upon size of the Zone
Scalability	Not scalable, suited to small network	Not scalable	Scalable to large network

IV.   CONCLUSION

In This paper the comparative study of Proactive, Reactive and Hybrid Routing algorithm has been done on the various parameters Like Latency, Storage Scalability, Route availability etc. To conclude the performance of these routing algorithms and estimate the efficiency of the protocol for better uses.

V.   REFERENCES

[1] S. Misra et al. (eds.), "Guide to Wireless Sensor Networks, Computer Communications and Networks", DOI: 10.1007/978-1-84882-218-4 4, Springer- Verlag London Limited 2009.

[2] S. Murthy, C. Siva Ram and B.S. Manoj, ‒Ad Hoc Wireless Networks: Architectures and Protocols,‖ Prentice Hall, Chapter 7, 2004.

[3] G. Pei, M. Gerla, T.-W. Chen, ‒Fisheye state routing in mobile ad hoc networks," in: ‒Proceedings of IEEE ICDCS Workshop on Wireless Networks and Mobile Computing‖, April 2000, pp. D71‒ D78.

[4] Asra Anjum, Shaik Apsar Pasha, "A Brief View of Computer Network Topology for Data Communication and Networking", International Journal of Engineering Trends and Technology (IJETT) ‒Volume22 Number 7-April 2015 ISSN:2231- 5381 Pg 319-32 http://www.ijettjournal.org.

[5] F. Li and Y. Wang, "Routing in Vehicular Ad Hoc Networks: A Survey," IEEE Vehicular Technology Magazine, vol. 2, no. 2, pp. 12- 22, June 2007.

[6] M. S. Corson and A. Ephremides, "A Distributed Routing Algorithm for Mobile Wireless Networks," ACM/Baltzer Wireless Networks J., vol. 1, no. 1, Feb. 1995, pp. 61–81.

[7] G. Pei, M. Gerla, T.-W. Chen, ‒Fisheye state routing in mobile ad hoc networks," in: ‒Proceedings of IEEE ICDCS Workshop on Wireless Networks and Mobile Computing‖, April 2000, pp. D71‒ D78.

[8] Z. Haas, M. Pearlman, ‒The Performance of Query Control Schemes for the Zone Routing Protocol,‖ IEEE/ACM Trans. Netw., USA, Piscataway,2001, Vol. 9, Issue 4, pp. 427-438.

[9] J.N Al-Karaki, R. Mustafa, A. Kamal, ‒Data Aggregation in Wireless Sensor Networks Exact and Approximate Algorithms," In Proc. IEEE Workshop High Performance Switching and Routing 2004, Phoenix,AZ, 2004, pp. 241-245.

[10]   H. Luo, F. Ye, J. Cheng, S. Lu, L. Zhang, "TTDD: Two-Tier Data Dissemination in Large-Scale Wireless Sensor Networks," Wireless Networks, Springer Netherlands, 2005, Vol. 11, Issue 1, pp. 161-175.

[11]   S. Muruganathan, D. Ma, R. Bhasin, A. Fapojuwo, "A Centralized Energy- Efficient Routing Protocol for Wireless Sensor Networks,‖ IEEE

Commun. Mag., 2005, Vol. 43, Issue 3, pp. 8-13.

[12]   Zhang, J., R. Shankaran, M.A. Orgun, V. Varadharajan, A. Sattar, "A trust management architecture for hierarchical wireless sensor networks. In Local Computer Networks (LCN)‖, IEEE 35th Conference ,pp: 264-267,2010.

[13]   Y. Yuan, Z. He, M. Chen, ‒Virtual MIMO-based Cross-layer Design for Wireless Sensor Networks,‖ IEEE Trans. Veh. Technol., 2006, Vol. 55, Issue 3, pp. 856-864.

[14]   B. Karp and H. T. Kung, "GPSR: Greedy perimeter stateless routing for wireless networks", Proceedings ACM MobiCom'00, Boston, MA, Aug. 2000, pp. 243-254.