ISSN: 2456 - 4664
International Journal of Advanced Trends in Engineering and Technology
Impact Factor 5.965, Special Issue, February 2018 – Conference Proceedings
National Conference on Recent Trends in Management Studies & Computer Applications
(KRUPACON 2017) On 21st & 22nd September 2017 Organized By
Krupanidhi Group of Institutions, Bangalore, Karnataka

MOBILITY-BASED ROUTING PROTOCOL FOR WIRELESS SENSOR NETWORKS

Rajkumar N*, Vijayamala S Yakri* & Anuradha N**
* Krupanidhi Group of Institutions, Bangalore, Karnataka
** Krupanidhi Degree College, Bangalore, Karnataka

Cite This Article: Rajkumar N, Vijayamala S Yakri & Anuradha N, "Mobility-Based Routing Protocol for Wireless Sensor Networks", International Journal of Advanced Trends in Engineering and Technology, Special Issue, February, Page Number 16-20, 2018.

Abstract:

The discontinuous nature and complex configuration of the Wi-Fi sensor network results in unique routing protocol requirements. The energy efficiency and extended life of the group for use in wireless sensor networks are important features of the routing protocol. Various energy efficiency algorithms have been introduced for wireless sensor networks throughout the year. In this paper, completely independent routing protocols are grouped into static receiver protocols and static receiver protocols. There are two categories of pros and cons indexes available.

Key Words: Routing Protocol, Wireless Sensor Network, Mobility

Introduction:

Wireless sensor (WSN) networks have become an important research area in real projects. These tools include livestock monitoring, environmental tracking, disaster surveillance, anti-military, disturbance prevention, relief efforts, and scalable treatment systems. In recent years, WSN has emerged as a new paradigm of fact-discovery.

The sensor node (SN) starts after useful statistics (e.g. object emission, humidity and temperature, presence of intruders, etc.) are accumulated and the accumulated statistics are corrected early. Due to the distance of processing [1, 2] to the recipient node for final processing, the SN transmission is usually connected to the receiving node through an intermediate SN, so the SN acts as a router to transmit information to other SNs. Use, synchronization, data propagation, database query, connect, find, extract, intermediate software, much less power consumption, encryption and full algorithms to solve sensor problems in several research areas within WSN. Seeing a low battery capacity is a big deal, so it's important to increase the sensor's battery power usage and accept the facts.

WSNs typically run in a dynamic environment. The main causes of this behavior are battery discharge, atmospheric conditions, the emergence of boundaries, confusion between community nodes and receptor flexibility or SN [3]. Due to this, the routes between SNs change very often over the network. For optimal performance, these common references should be identified and referenced using the routing protocol used. Therefore, one of the most serious problems of WSN [4, 5] is the development of energy efficient routing protocols. This white paper describes several protocols based primarily on cellular and static receptors for energy efficient routing.

The routing protocol is reviewed based on the mobility of the receiving node.

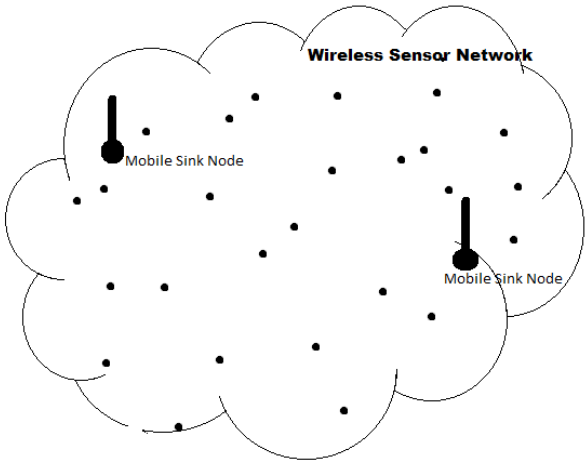

Figure 1: Mobile and static link with sensor network

In this section, we evaluated the deployment of efficient routing protocols in WSN. It also describes the features, advantages and disadvantages of routing protocols.

A. Routing Protocol Distribution:

Routing protocols are grouped and grouped primarily based on the mobility of the receiver. Figure 1 shows a group of different types of routing protocols. FIG. 2 shows the mobile and static receptor topology.

B. Static Sink:

1) Brief Description:

Basically, a WSN has a set of SNs and static listeners used in an environment where the necessary information is available. In one of these cases, most of the energy goes to the MV link module. In real-time conditions, multi-hop communication is required to transmit statistics from the source to the receiving node. Therefore, the power consumption depends on the distance between the SNs [6].

2) Advantages:

- Reliability: A more efficient static receptor network. As receptor sites are known and established, the number of SN translocations also decreases.
- Delay: Since the receiving site is built, the shortest path from the source to the receiving node can be compressed. However, this reduces the bandwidth.
- Throughput: The number of documents sent successfully is greater than the number of lost materials. So the static receiver throughput is much higher than the roaming input.

3) Disadvantages:

- Unbalanced load: Due to insufficient load balancing, the SN distributes more power from the receiver faster than the SN near the SN receiver.
- Increased energy consumption: Because the receiver is located in a fixed function, the distance from the SN to the receiver node is long, so the power lost when transmitting information is greater.

C. Mobile Sink:

1) Brief Explanation:

One of the ways to increase the life expectancy of a population, especially the SN near the receptor, is to use cell receptor nodes. Using multiple static receivers is almost the same in some cases, but using more than one fixed receiver requires additional network costs to capture data at closed speed.

2) Advantages:

- Efficient load balancing: Since the receiving node is not static, the traffic load can be distributed over a large area. We are also considering balancing the WSN traffic load.
- Reduce energy consumption. Cell receptor networks use a single hop model, so there is no charge for SN data transmission, resulting in high quality reduction in energy consumption.
- Service time: Many mobile receivers can reduce insurance time (travel time for the entire community) if they switch their work to random effects on the network.

3) Disadvantages:

- Inappropriate data collection: Mobile receivers may also cause incomplete collection of information from the sensor network because no guarantee is given that the recipient can go through all SNs due to random movements or it may take too long to do so.
- Overhead: The extra effort required to integrate the technology, along with altering the mobility pathway to find remaining pathways from other cellular receptors, leads to additional SN amplification and additional energy consumption.

Sink Mobility Study:

Some WSN routing protocols have been studied primarily on the basis of reviewers' reviews in this segment.

A. Static Sink:

EE-ARP: An energy efficient adaptive routing algorithm has been proposed [7]. To reduce group energy consumption, we use enterprise-wide energy system transfer using hyperlink weakening between SNs. This eliminates delayed packets, ensuring that routing protocols are used in real time with the same overall performance. However, the proposed solution (EE-ARP) is mainly based on -hop and is used in a routing protocol known as an adaptive routing protocol for energy efficiency. The final result of the simulation shows that EE-ARP outperforms traditional THVR and routing protocols in terms of power consumption, packet collapse, current delay and deadline failure.

GSTEB: In particular, a routing scheme for general self-organizing trees based on power balancing (GSTEB) has been proposed [8]. The GSTEB protocol aims to extend the life of a unique community package. In each round, the BS identifies the root node and publishes this root node for other SNs in the community. Then, using the neighbor's true interests, each SN determines the parent SN, and the network establishes a route by transmitting the band data from the BS to the opposite SN. The route can be changed and the routing tree is restored to GSTEB, which is a complex, low protocol, and easy to put off. Simulation results show that the GSTEB protocol outperforms other protocols overall for energy management and group lifetime.

RT-GRACE: Expression of RT-GRACE routing protocol [9]. In this protocol, facts are transferred from the receiving node to the source node using a special process to think about the rest of the SN tools. The proposed algorithm uses the concept of the existing status quo for gradient values (Grace) [10]. In a design that applies road cost and SN energy cost to estimate the total road cost by creating a slope from the power source to the sink. The simulation results of the proposed protocol show that, according to the current real-time routing algorithm, the proposed protocol is more secure than the existing protocol in lifelong prison.

ETR: An additional based routing protocol (ETR) extension tree has been proposed [11]. This protocol uses the Basic Tree Routing Protocol (TR) [12], which is a basic tree-based WSN protocol that assists in top-down decisions under sub-consensus. The proposed system keeps the total cost and efficiency change. Each SN follows an ETR table describing an unmarried transitional neighbor. So each SN has more than one route to the SN listener, so you can give the record a minimum number of hops. Simulation results show that ETR, which is mainly based on transfer memory, energy consumption and transfer area, works in TR.

EBCRP: The author proposed EBCRP (Energy Based Cluster Tracking Protocol) to reduce record transmission delay [13]. The basic theory is that there is an equal number of records for each SN, and only near-field connections are established between SNs. EBCRP works on three levels: chain cluster growth, cluster headphones and protected empire. When a chain cluster

is formed, different rectangular areas are treated as clusters and a cluster chain is created using a step algorithm. In a cluster headset, the CH is determined by the remaining capacity. Using a typical imperial ordered cluster chain, the CH collects and evaluates records from the exceptional SN and sends the information to the receiving node. The above role is played regularly until one of the SNs runs out of all resources. Simulation results show that the proposed method extends the network life and effectively reduces the power consumption per SN.

GMCAR: A network-based multicast algorithm has been proposed to avoid congestion routing (GMCAR) [14]. In the GMCAR protocol, the space is divided into networks, and each grid contains single artisans and several social networks during the day. All major sensors support boards with unique diagonal drainage paths. To establish the trajectory, the dependence of the jump and the density of the network variables are used. GMCAR has a complex routing system, multiple diagonal paths to the target node for non-border networks, and a single path to the target node for final networks. Selecting a different master SN in GMCAR alleviates congestion by using a traffic sharing method. In addition, GMCAR takes QoS into account to make this algorithm high quality in terms of network throughput, network lifetime, transmission delay reduction, etc.

PDC: Cluster Synchronization Protocol (PDC) has been proposed [15]. It also adopts a cluster planning system for management purposes, eliminating the need to distribute periodic reconciliation records throughout the network. Simulation results show that the PDC outperforms other PDC models that focus only on tracking power consumption, call latency, and performance.

TMC: Various methods have been proposed to test the ease with which social networks [16] receive information. Within a class of many-to-one chat protocol called convergent transmission, this has been achieved using a real-time simulation method. The author does not forget about the company time on the frequency channel. It was then proven to reduce the length of the day for a single frequency by combining reservations with bandwidth management and energy tracking. It is more efficient to organize the transmission with more than one frequency. The composition of various channel problem techniques has also been studied, and it has been mathematically determined that high-frequency channels, with about 200 SNs, tend to reduce the main interference of medium-sized networks. The buckles are also low-grade and limited. Simulation results show that the recommended method uses grouping density for reproduction, unlike other current methods. The effects of other channels and disturbances were also measured at the end of the graph.

B. Mobile Sink:

Rails: A data distribution infrastructure called Rails has been proposed as a domain-based routing protocol [17]. Undoubtedly, this protocol creates an architecture called a train in which all statistical records (metadata) are stored. SN rails have been installed for easy use in the sensor network center. In case of problems, he runs around the railroad and gives useful results. After collecting the metadata, the metadata distribution node transmits the information to the target node. With this method, the target node retrieves the data of interest. This post analyzes the complexity of solving railroad and loop problems and compares it to a secondary hiring area hash rack (GHT) with two-level deployment options for protocol sensor network statistics and Wi-Fi ratings. Mobile network (TTDD). Simulation results show that Railroad requires much less energy compared to GHT and TTDD, and Railroad may have some factors affecting scalability and energy consumption.

Circuit Routing: To conserve SN resources over the life of a rapidly evolving network, a circular routing scheme has been proposed [18]. This system is based on conference proximity theory. The circular drawing facilitates the formation of a digital ring that can easily adapt the current position of the receiver to the standard ring and SN. This allows the SN to use the ring to rebuild the sink with a little overhead if necessary. For a real-time package that advertises mobile receiver space on the network and wants to reduce these costs to preserve the value of complex receivers, the proposed rule works as expected. Simulation results show that in terms of energy efficiency, the new rule set plays a more important role than LBDD [19] and Railroad, thus increasing the network lifetime and reducing the monitoring gap to fair expectations.

LBDD: A linear method of empirical information dissemination (LBDD) has been proposed. In LBDD, the network is divided into SN lines or vertical bars. This line is replied to the meeting place. The included SN is called the interactive or strip SN. The classification and compilation steps are given in the LBDD protocol. When the SN generates information during the propagation process, it sends the record to the nearest embedded SN. Question message for embedded SN, problem with receiver node vertical during serial transmission. It's a built-in SN that detects that on all routes, these messages are sent internally along the line before reaching the desired SN. This information is sent directly to the receiving node. LBDD shows that LBDD outperforms conventional protocols in terms of periodic and questionable situations compared to conventional protocols for class classification and average results.

Rendezvous: A rendezvous routing protocol that finds meeting points in the center of the sensor population and creates a tree in that area [20]. He uses a smart way of talking. First, the target for the tree near the sink and the SN source sends each data from that tree to the sink. The tree receives data about the target node's area in a second process through the SN Gateway, and the provider's SN uses the information obtained from the tree to immediately send the information to the target node. The proposed protocol uses several parameters compared to other similar protocols, especially energy consumption, network lifetime, packet delivery rate and latency. Compared to conventional plans that require train, circular routing and LBDD, the proposed system is a simulation result showing that the previous method is suitable for estimating the transmission rate and completion delay. The power provided by the second operating solution is much less than the methods currently used.

CCS: Chain-based routing protocol [22] was introduced as a concentric clustering scheme (CCS). CCS is working to develop a data aggregation algorithm for sensor networks using energy routing protocols [23]. Initially, all energies are divided into rounded areas of varying degrees, representing several clusters. Different thresholds are added to the cluster depending on the distance to the BS cluster. Level 1 is assigned to clusters near the BS, etc. In each cluster, multiple chains are created and the SN

chain is selected as CH. Data is transmitted along the shortest chain path per channel for each SN [24-28]. This data is transmitted from CH2 to an adjacent single jump channel in the other band. Simulation results show that the system designed, unlike PEGASIS's measurements, as in the output sensitivity, is energy efficient [29-31].

Conclusion:

WSNs have more routing problems than standard data routing protocols due to the limited resources of a stress-prone network. This paper is about the latest findings on WSN's routing protocol. Document tracking methods are divided into class, electrostatic discharge and cell. Here are a few examples of protocols that differentiate primarily for each of these classes based on performance and requirements, including grouping, scalability, complexity, portability, information aggregation, etc. The purpose of this overview is not to provide detailed information. It is topology routing, but it also helps researchers choose the best structure for their specific scenario.

Acknowledgement:

The authors express gratitude towards the assistance provided by The Management, Krupanidhi Group of Institutions (KGI) and Krupanidhi Research Incubation Centre, KGI in completing the research. We also thank our Research Mentors who guided us throughout the research and helped us in achieving the desired results.

References:

1. A. Sinha & A. Chandrakasan, "Dynamic power management in wireless sensor networks," IEEE Desig. Test Compute, vol. 2, pp. 62–74, Mar. 2001.
2. A. Nayak & I. Stojmenovic, Wireless sensor and actuator networks, John-Whiley & Sons, 2010.
3. J.S. Lee & W. L. Cheng, "Fuzzy-logic-based clustering approach for wireless sensor networks using energy predication," IEEE Sensors Journal, vol. 9, pp. 2891–2897, Sep. 2012.
4. N. A. Pantazis & D.D. Vergados, "A survey on power control issues in wireless sensor networks," IEEE Communications Surveys and Tutorials," vol. 1–4, pp. 86–107. Oct. 2007.
5. S. S. Wang & Z. P. Chen, "LCM: a link-aware clustering mechanism for energy-efficient routing in wireless sensor networks," IEEE Sensors Journal, vol. 2, pp. 728–736, Feb. 2017.
6. E. Lee, S. Park, J. Lee, S. Oh, & S. H. Kim, "Novel service protocol for supporting remote and mobile users in wireless sensor networks with multiple static sinks," Wireless Networks, vol. 4, pp. 861–875. May 2011.
7. S. Rachamalla & A. S. Kancherla, "A two-hop based adaptive routing protocol for real-time wireless sensor networks," SpringerPlus, vol. 1, pp. 1110. July 2016.
8. Z. Han, J. Wu, J. Zhang, L. Liu, & K. Tian, "A general self-organized tree-based energy-balance routing protocol for wireless sensor network," IEEE Transactions on Nuclear Science, vol. 2, pp. 732–740, Apr. 2014.
9. N. Hassan, N. M. Khan, G. Ahmed, & R. Ramer, "Real-time gradient cost establishment (RT-GRACE) for an energy-aware routing in wireless sensor networks," IEEE Sensor Networks and Information Processing, pp. 54–59, Apr. 2013.
10. N. M. Khan, Z. Khalid, & G. Ahmed, "Gradient cost establishment (grace) for an energy-aware routing in wireless sensor networks," EURASIP Journal on Wireless Communications and Networking, p. 7, Feb. 2009.
11. W. Qiu, E. Skafidas, & P. Hao, "Enhanced tree routing for wireless sensor networks," Ad Hoc Networks, vol. 3, pp. 638–650, May 2009.
12. T. Kim, D. Kim, N. Park, S. E. Yoo, & T. S. López, "Shortcut tree routing in ZigBee networks," in IEEE 2nd International Symposium on Wireless Pervasive Computing, Feb. 2007.
13. B. Xi-rong, Z. Shi, X. Ding-yu, & Q. Zhi-tao, "An energy-balanced chain-cluster routing protocol for wireless sensor networks," in IEEE In Networks Security Wireless Communications and Trusted Computing (NSWCTC), vol. 2, Apr. 2010, pp. 79–84.
14. O. Banimelhem & S. Khasawneh, "GMCAR: Grid-based multipath with congestion avoidance routing protocol in wireless sensor networks," Ad Hoc Networks, vol. 7, pp. 1346–1361, Sep. 2012.
15. T. Ngo-Quynh, V. Tran-Quang, & Q. Nguyen-Trung, "A low-latency communication protocol for target tracking in wireless sensor networks," EURASIP Journal on Wireless Communications and Networking, vol. 1, pp. 1–15. Dec. 2016.
16. O.D. Incel, A. Ghosh, B. Krishnamachari, & K. Chintalapudi, "Fast data collection in tree-based wireless sensor networks," IEEE Transactions on Mobile Computing, vol. 1, pp. 86–99, Jan. 2012.
17. J. H. Shin, J. Kim, K. Park, & D. Park, "Railroad: virtual infrastructure for data dissemination in wireless sensor networks," in Proceedings of the 2nd ACM International Workshop on Performance Evaluation of Wireless Ad Hoc, Sensor, and Ubiquitous Networks, Oct. 2005, pp. 168–174.
18. C. Tunca, S. Isik, M. Y. Donmez, & C. Ersoy, "Ring routing: An energy efficient routing protocol for wireless sensor networks with a mobile sink," IEEE Transactions on Mobile Computing, vol. 9, pp. 1947–1960, Sep. 2015.
19. E. B. Hamida & G. Chelius, "A line-based data dissemination protocol for wireless sensor networks with mobile sink," in IEEE International Conference on Communications, May 2008, pp. 2201–2205.
20. S. Sharma, D. Puthal, S. K. Jena, A. Y. Zomaya, & R. Ranjan, "Rendezvous based routing protocol for wireless sensor networks with mobile sink," The Journal of Supercomputing, pp. 1–21, 2016.
21. A.E. Kostin, Y. Fanaeian, & H. Al-Wattar, "Anycast tree-based routing in mobile wireless sensor networks with multiple sinks," Wireless Networks, vol. 2, pp. 579–598, Feb. 2016.
22. S. M. Jung, Y. J. Han, & T. M. Chung, "The concentric clustering scheme for efficient energy consumption in the PEGASIS," in IEEE 9th International Conference on Advanced Communication Technology, vol. 1, pp. 260–265, Feb. 2007.

23. S. Lindse, C. Raghavendra, & K. M. Sivalingam, "Data gathering algorithms in sensor networks using energy metrics," IEEE Transactions on Parallel and Distributed Systems, vol. 9, pp. 924–935, Sep. 2002.
24. Kevin Andrews, S, Rajavarman, VN &Rajkumar, N 2017, 'Remote Digital Circuit Emulation and Verification Using Adruino Board through WIFI Enabled Internet of Things (IoT)', International Journal of Control Theory and Applications, vol.10, no.11, pp.421-427.
25. Jeyabalraja, V, Josephine, MS, Rajkumar, N & Sarala Devi, V 2015, 'Automated Toll Plaza Using XBEE and GSM', International Journal of Applied Environmental Sciences, vol.10, no.1, pp. 154-157.
26. Viji Vinod, Rajkumar, N, Karthikeyan, S & Subramanian, C 2015, 'Expectation of Rising Customer Intelligence System in Road Service Transport using Cloud Services', International Journal of Applied Environmental Sciences, vol.10, no.1, pp. 135-142.
27. Sarala Devi, V, Rajkumar, N, Subramanian, C & Karthikeyan, S 2015, 'An Enhanced Protocol for the Evaluation of QOS using Collective-Path Routing Protocol in Hybrid Wireless Networks', International Journal of Applied Environmental Sciences, vol.10, no.1, pp. 92-107.
28. Mercy Beulah, E, Nirmala Sugirtha Rajini, S & Rajkumar, N 2015, 'Data Mining and Business Intelligence applications in Shipping Industry', International Journal of Applied Environmental Sciences, vol.10, no.1, pp. 87-91.
29. Abinaya, S, Rajkumar, N, Josephine, MS & Karthikeyan, S 2016, 'A study on Keyword ranked Searching and Encrypted over mobile Cloud Data', Proceedings of the National conference on Smart Information Light fidelity (Li-fi) Internet of things Conferences (Silicon'16), Dr. MGR Educational and Research Institute University, Chennai
30. Dhiviya, M, Karthikeyan, S & Rajkumar, N 2016, 'Survey paper on Wireless Mesh networks – routing Metrics in Network Layer', Proceedings of the National conference on Smart Information Light fidelity (Li-fi) Internet of things Conferences (Silicon'16), Dr. MGR Educational and Research Institute University, Chennai
31. Jenkins Godwin Dhas, J, Sathish, N, Sri Surendran, RajKumar, N & Viji Vinod 2014, 'Alert System for Home Using GSM Technology', Proceedings of the International Conference on Empowerment of Persons with Multiple Disabilities, NewDelhi, India, pp. 87