International Journal of Research in Advent Technology, Vol.7, No.5S, May 2019
E-ISSN: 2321-9637
Available online at www.ijrat.org

Efficient learning methodologies in delay of Wireless Sensor Network

[1]K. Jayanthi Vagini, [2]Dr.K.Pradeepa
[1]Ph.D Research Scholor, [2]Dean & Associate Professor
Department of Computer Science
AJK College of Arts and Science, Coimbatore
[1]jayanthik248@gmail.com, [2]pradeepa.smk@gmail.com

Abstract—Wireless sensor network is recently most using developing technology in current environment. The fields like sensor nodes, finding traffic between vehicles system, etc., The communication plays major role for the delay of wireless network technologies. In this paper the communication and signal/data processing is made as standardization process. Due to this standardization process the wireless sensor networks feasible, useful and reduce time delay. The mobility of nodes gets the data by routing protocol which is the supporting technologies for the above problem. Topology routing algorithm concentrates on the delay, while traversing the node from source to destination. A unique tag ID or acknowledgement number is created for the node traversing, which is helped to clear the transmission delay during the communication. Routing protocols naturally supports dynamic topology, which is helpful in distributing and control the nodes communication. This leads to develop a link between the nodes for sharing the information within the network.

Keywords—Wireless sensor network, nodes, routing protocol, topology, communication

I.

1. INTRODUCTION

Wireless networks define two kinds of services. One is the basic service set (BSS) and the other one is extended service set (ESS). BSS is a mobile wireless stations is known famously as the Access Point (AP). The BSS without an Access Point is known as an Ad hoc network or Ad hoc Architecture. The BSS with an access point is known as infrastructure network.

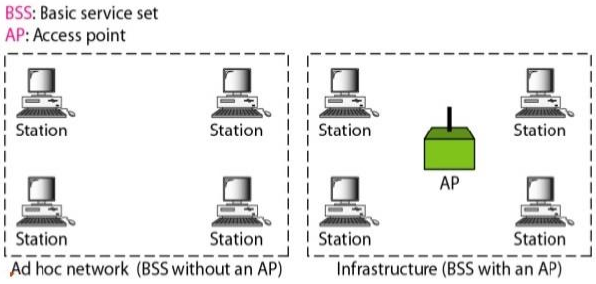

Fig 1.1Ad hoc Network (with and without AP)

Wireless networks define three types of stations based on their Access Point: No-Transition, BSS –Transition and ESS-Transition. These stations lead to hidden and exposed station problem. For eg. the node A transmit the signal to node B while node C is outside the transmission range of node B; likewise, node B is outside the transmission range of node C where node C is transmitting range to node A. Due to this the collision occurs in the hidden station. The solution to the above hidden station is Hand Shaking method. A larger number of links will be established during the handshake method which is used to reduce the transmission delay. The Aps is categorized as three schemes.

One-Plus-One: One working line and one protection line, but both lines are active. The nodes send the data on both line as multi links.

One-to-One: One working line and one protection line. While the sender node uses the working line, the receiver node uses the protection line.

One-to-Many: Only one protection line available for many working lines. If anyone working line is fail protection line can replace any one failure line.

If the number of nodes increased the links also will get increase automatically. Multiple links between the nodes ensures better network performance and minimum delay.

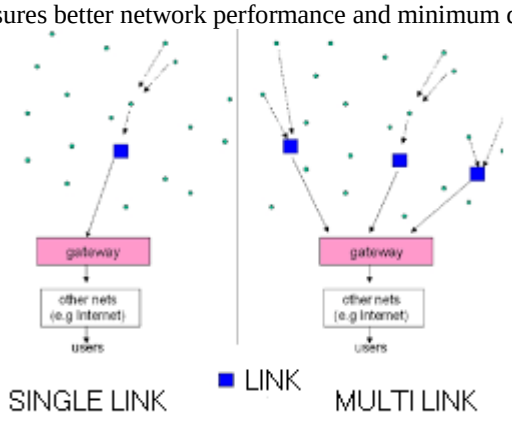

Fig 1.2 Single Link Vs Multi Link

Links are used for exploration or collecting data from various sensor nodes. The communication between node is monitored and tracked either with single link or multi-link within the environment. The links are concatenated of a particular node to avoid data loss and delay problem.

2. DIFFERENT GENERATIONS OF WIRELESS SENSOR NETWORKS

(a)WIRELESS SENSOR NETWORK: The sensor technology supports large volume of industrial and consumer applications both academia and industry. Wireless sensor networks examine the node and send information from one

sensor to another through the links. Due to this technology the link developed between nodes. The nodes are connected typically using bridges or routers. The utility of this connection establish the transferring data from a sender node to receiver with acknowledgment ID tag. The heart of the wireless sensor networks is sensor. Different sensor technologies are

i. MEMS: Micro electro mechanical system- It is the technology of microscopic devices. It distinguishes between molecular nanotechnology or molecular electronics. The materials used for manufacture MEMS are silicon, Polymers, metals and ceramics. Using silicon Integrated Circuits are created. Polymers used for creating injection molding, embossing or stereo lithography. Metals also used to create MEMS element like gold, nickel, aluminum, silver, platinum, copper, chromium, titanium and tungsten. Using ceramics MEMS element like elastic modulus are prepared.

ii. CMOS: Complementary metal oxide semiconductor – This technology used to create several circuits which is the heart of image sensor. CMOS circuits use a combination of p-type and n type metal oxide (PMOS p-type metal oxide semiconductor, NMOS n-type metal oxide semiconductor). Static Dissipation is the combination of PMOS and NMOS which provide the output of threshold value. Each node will maintain the threshold value for reducing delay. Dynamic dissipation is used for charging and discharging of load capacitances among the node.

iii. LED Sensors: LED sensor used as multi touch but offers less information. It works with the principle of input diode and output cathode. The devices sensed with multi colors as voltage result.

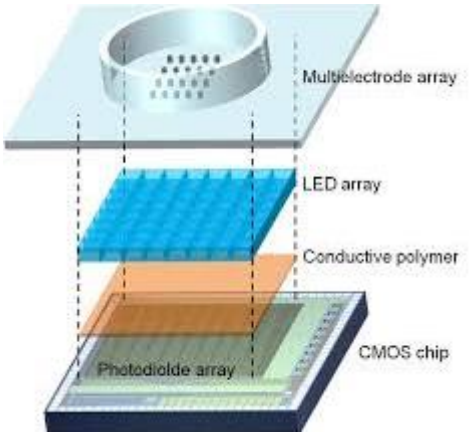

Fig 2.1 Layout of MEMS, CMOS, LED Sensor

(b)WIRELESS NETWORK: The different wireless network supporting during the communication of node are

i. 1G Wireless Standards: Two separate frequency band for sending and receiving data through node is maintained. Example AMPS. Analog cellular.

ii. 2G Wireless Systems: The development of 2G shows in the digital cellular, PC, Mobile data, wireless LAN. Four major standards in this category are GSM, IS-54, JDC, IS-95. Mobile data services describe digital services with GPRS, TETRA. Wireless LAN standards are IEEE 802.11, IEEE 802.11b, IEEE 802.11a, HIPER LAN/2, HIPER LAN/1.

iii. 3G Standards: This is a development of international standard which combines and overtake of 2G and 1G. WLAN and WPAN (Wireless local area network and wireless personal area network) emerging technology in 3G which provides better quality than 2G systems.

iv. 4G Standards: More quality than 3G as it uses International Mobile Telecommunications advanced. Envisioned by the DARPA.

v. 5G Standards: This technology is used to efficiently manage spectrum use transmission power with routing protocol. Which is more fastest and more reliable than al l other standards.

Technology	1G	2G	3G	4G	5G
Start/Deployment	1970-80	1990-2004	2004-10	Now	Soon (probably by 2020)
Data Bandwidth	2Kbps	64 Kbps	2 Mbps	1 Gbps	Higher than 1 Gbps
Technology	Analog	Digital	CDMA 2000, UMTS,EDGE	Wi-Max, Wi-Fi, LTE	WWWW
Core Network	PSTN	PSTN	Packet N/W	Internet	Internet
Multiplexing	FDMA	TDMA/CDMA	CDMA	CDMA	CDMA
Switching	Circuit	Circuit,Packet	Packet	All Packet	All Packet
Primary Service	Analog Phone Calls	Digital Phone Calls and Messaging	Phone calls, Messaging, Data	All-IP Service (including Voice Messages)	High speed, High capacity and provide large broadcasting of data in Gbps
Key differentiator	Mobility	Secure, Mass adoption	Better Internet experience	Faster Broadband Internet, Lower Latency	Better coverage and no droped calls, much lower latency, Better performance

Table 2.1 Comparison between 1G, 2G, 3G, 4G, 5G

3. ROUTING PROTOCOL

There are three main major classes routing protocols. They are type 1- Interior Gateway Protocols (Link state routing protocols such as OSPF, IS-IS), type 2 – Interior Gateway Protocols (Distance vector routing protocols such as RIP, IGRP), type 3 – Exterior gateway Protocols (such as BGP, EGP).

3.1 OSPF: Open Shortest Path First Routing Protocol. In this paper, the delay problem is minimized by using OSPF. It is used to calculate the shortest route or path of the destination node in multi-link stage. OSPF is a link state routing protocol, which determine each link with its corresponding node and calculate the delay propagation. During this communication of link state routing protocol any failures is found, it can be rectified through topology. Area Border Router (ABR) information is recorded as data base for every link in the router. Each link is combined for summarizing the node status. Each link will be serve as point-to-point communication. This point-to-point router is used for adjacency between the node communications.

Cumulative cost = sum of all outgoing link between nodes

Best Route Selection = Link which has the lowest cumulative cost

OSPF Messages: Use five different types of messages for communication. 1. Hello, 2. Database Description (DBD), 3. Link State Request(LSR), 4. Link State Update (LSU), 5. Link State Acknowledgement (LSW).

OSPF Areas: OSPF network is split into areas. The types are Backbone area, Stub area, Not-So-Stubby area, Proprietary

extensions, Totally Stubby area, NSSA totally tubby area, transit area.
OSPF Router types: OSPF different categories of routers are, Internal Router(IR), Area Border router (ABR), Backbone Router(BR), Autonomous System Boundary Router(ASBR).

4. KEY MANAGEMENT OF WSN

The key management of wireless sensor network is it security. It protects the network frame against the tremendous direct and indirect attacks. Wireless sensor networks receive security arguments like confidentiality, integrity, availability, authentication, refreshment. Secure wireless sensor networks applications against attacks include sinkhole attack, selective forward attacks, wormhole attacks, Hello flood attacks, Sybil attack, Denial-of-service attack, sink replication attack.

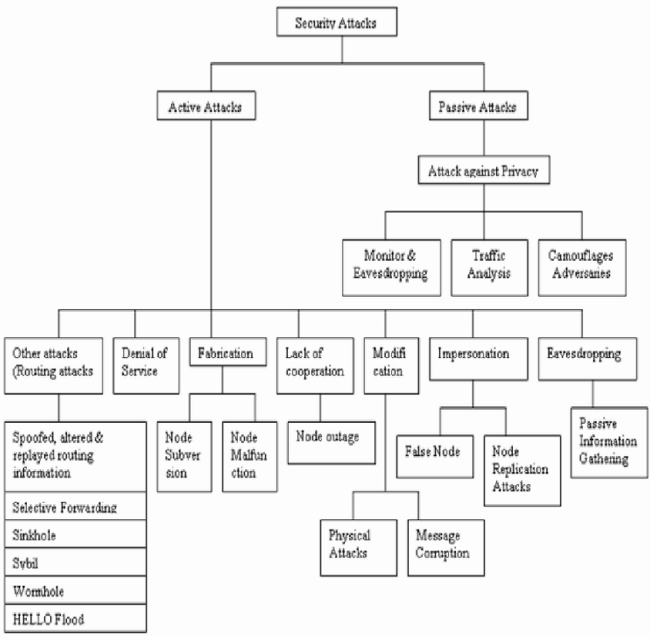

Fig 4.1 Different types of attacks in Wireless Sensor Networks

The Key mechanism of wireless sensor network is standardization technology of using cryptographic key among sensor nodes. The major advantage of using cryptographic key is, during the communication cryptographic key share the data of common nodes. During sensor with routing protocol communication, the cryptographic key generates PIN number for every node which is unique. The indirect attack is extract out with the help of PIN number.

5. SENSOR WITH ROUTING PROTOCOL APPLICATIONS

Wireless Sensor Network (WSN) developed in various applications like commercial, industrial, environmental, military systems, health care, aircraft monitoring, geological monitoring, biomedical sensor network, Traffic monitoring, target tracking.
Wireless Sensor Network (WSN) supports different types of sensors like seismic, acoustic, magnetic, radar, infrared, mobile deductive, visual, thermal, home appliances, and also widely used in ambient situations.
The main characteristics of using wireless sensor network(WSN) is simple to use, scalability for large scale of functioning, capacity for handling failure nodes, less consumption of power to nodes.

Fig 5.1 Wireless Sensor Network Applications

The main advantage of wireless sensor networks is infrastructure portable, helpful in the places like non-network coverage area, more flexible when additional requirement is added, low cost pricing, and also accommodate with new devices easily.

6. CONCLUSION

Wireless Sensor Network(WSN) are achieving faster in the development of network world. Most of the applications today developed with the technology of wireless sensor network. Wireless Sensor Network provide the maximum output as quick data transfer including minimum delay and interruption, maximum throughput. The most useful localization sensor is come through WSN, which is available in mobile application itself. These all leads to successful use of Wireless sensor systems.

REFERENCES

[1] S. Mahajan, J. Malhotra, and S. Sharma, "An energy balanced QoS based cluster head selection strategy for WSN," Egyptian Informatics Journal, vol. 15, pp. 189-199, 11// 2014.
[2] Hari Prabhat Gupta et al. “Geographic Routing in Clustered Wireless Sensor Networks Among Obstacles”, IEEESensors Journal, Vol.15, No.5, May 2015.
[3] C.-Y.Chang, J.-P. Sheu, Y.-C. Chen, and S.-W. Chang, “An obstacle-free and power-efficient deployment algorithm for wireless sensor networks,” IEEE Trans. Syst., Man, Cybern., Part A, vol. 39, no. 4, pp. 795–806, Jul.2009.
[4] J.S.Lee et al, “Fuzzy logic based clustering approach for WSN using energy prediction”, IEEE Sensors Journal, Vol.12, No.9, Sep 2012.
[5] S.Yang,H.Cheng, and F.Wang, “Genetic algorithms with immigrants and memory schemes for dynamic shortest path routing problems in mobile Ad Hoc networks,” IEEE Trans. Syst., Man, Cybern., Part C, vol. 40, no. 1, pp. 52–63, Jan. 2010.

[6] B. Singh and D. K. Lobiyal, "Energy-aware Cluster Head Selection Using Particle Swarm Optimization and Analysis of Packet Retransmissions in WSN," Procedia Technology, vol. 4, pp. 171-176, // 2012.
[7] A. Wang, D. Yang, and D. Sun, "A clustering algorithm based on energy information and cluster heads expectation for wireless sensor networks," Computers & Electrical Engineering, vol. 38, pp. 662-671, 5// 2012.
[8] F. Saleem, Y. Moeen, M. Behzad, M. A. Hasnat, Z. A. Khan, U. Qasim, et al., "IDDR: Improved Density Controlled Divide-and-Rule Scheme for Energy Efficient Routing in Wireless Sensor Networks," Procedia Computer Science, vol. 34, pp. 212-219, // 2014.
[9] W. Yanwei, L. Xiang-Yang, L. YunHao, and L. Wei, "Energy-Efficient Wake-Up Scheduling for Data Collection and Aggregation," IEEE Transactions on Parallel and Distributed Systems, , vol. 21, pp. 275-287, 2010.
[10] P. Shrivastava and S. B. Pokle, "Energy Efficient Scheduling Strategy for Data Collection in Wireless Sensor Networks," in 2014 International Conference on Electronic Systems, Signal Processing and Computing Technologies (ICESC), , 2014, pp. 170-173.
[11] ChengzhiLong,Yixing Li and Yihong Li,"A Multi-Hop Routng Scheme Based On Different Spatial Density Of Nodes in WSN'S".Journal of Theoretical and Applied Information Technology.Vol.46 No.1.Dec.2012.
[12] Pallavi Jain and Harminder Kaur, " An Improved Gateway Based Multi Hop Routing Protocol for Wireless Sensor Network" International Journal of Information & Computation Technology. Vol.4.No 15,pp.1567-1574. 2014.
[13] Shobti Saini and Meenakshi Sharma., "Prolonging the Network Lifetime of Heterogeneous WSN's Using MECRSEP",IEEE, International Conference on Electronics, Communication and Computational engineering.(ICECCE).2014.
[14] Siddiq Iqbal,Sandesh B.Shagrithaya,and Sandeep Gourda G.P., ",Performance Analysis of SEP and its Extensions in WSN's.", IEEE, International Conference on Advance Communication Control and Computing Technologies.(ICACCT). 2014.
[15] Amanjot Singh Toor and Taranpreet Kaur, "Implementation and Analysis of Stable Election Protocol", International Journal of Advanced Research in Computer Science and Software Engineering.Vol.3,Issue 9. 2013.