

Multipath to extend the network lifetime

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Abstract - WSN is collection of wireless node which is formed by many temporary nodes without any infrastructure and architecture. As there is no architecture there are n numbers of nodes present in the range which will create congestion and reduce the life of a network. So we need some technique which gives an acknowledgment before sending the packet to the base station. One big issue when designing wireless sensor network is the routing protocol to make the best use of the severe resource constraints presented by WSN, especially the energy limitation. In this paper, we propose a scheme or algo to extend the network lifetime.

IndexTerms - Wireless sensor networks, multipath routing protocol

I. INTRODUCTION

Wireless networks have become increasingly popular in the computing and communication industries, since their emergence in the '70s. This is predominantly true within the past decade, which has seen wireless networks evolve with the purpose of enabling better mobility. There are two variations of mobile wireless networks [3] - the first is known as infrastructure network, i.e., a network with fixed and wired gateways and the second is infrastructure-less mobile network, better known as an ad hoc network. Wireless mobile ad hoc networks have no fixed routers; hence, all nodes are capable of movement and can be connected dynamically in an arbitrary manner. Meanwhile, nodes of these networks function as routers which discover and maintain routes to other nodes in the network [1].

Wireless Networks

Wireless networks are gaining popularity to its peak today, as the user wants wireless connectivity irrespective of their geographic position. Wireless Networks enable users to communicate and transfer data with each other without any wired medium between them. One of the reasons of the popularity of these networks is widely penetration of wireless devices. Wireless applications and devices mainly emphasize on Wireless Local Area Networks (WLANs). This has mainly two modes of operations, i.e. in the presence of Control Module (CM) also known as Base Stations and Ad-Hoc connectivity where there is no Control Module. Ad-Hoc networks do not depend on fixed infrastructure in order to carry out their operations. The operation mode of such network is stand alone, or may be attached with one or multiple points to provide internet and connectivity to cellular networks.

These networks exhibits the same conventional problems of wireless communications i.e. WSNdwidth limitations, battery power, enhancement of transmission quality and coverage problems.

1.1.1 Network

Before going into the details of wireless network, it is important to understand what a network is and different kind of networks available today. Any collection of devices/ computers connected with each other by means of communication channels that help the users to share resources and communicate with other users. There are two main types of network i.e. wired network and wireless network.

1.1.1.1 Wired Networks

Wired network are those network in which computer devices attached with each with help of wire. The wire is used as medium of communication for transmitting data from one point of the network to other point of the network.

1.1.1.2 Wireless Networks

A network in which, computer devices communicates with each other without any wire. The communication medium between the computer devices is wireless. When a computer device wants to communicate with another device, the destination device must lays within the radio range of each other. Users in wireless networks transmit and receive data using electromagnetic waves. Recently wireless networks are getting more and more popular because of its mobility, simplicity and very affordable and cost saving installation.

1.1.2 Why Wireless Networks?

Wireless networks are getting popular due to their ease of use. Consumer/user is no more dependent on wires where he/she is, easy to move and enjoy being connected to the network.

One of the great features of wireless network that makes it fascinating and distinguishable amongst the traditional wired networks is mobility. This feature gives user the ability to move freely, while being connected to the network. Wireless networks comparatively easy to install than wired network. There is nothing to worry about pulling the cables/wires in wall and ceilings. Wireless networks can be configured according to the need of the users. These can range from small number of users to large full infrastructure networks where the number of users is in thousands.

Wireless networks are very useful for areas where the wire cannot be installed like hilly areas.

On the basis of coverage area the wireless network can be divided into.

- a. Personal Area Network - Personal area network is used for communication between computer devices close to one person [7]. Some of the personal area networks are zigbee, Bluetooth, sensor networks. Bluetooth is low cost wireless connection that can link up devices. These devices normally work within 10 meters, with access speed up to 721 Kbps. This technology is widely used in a range of devices like computer and their accessories i.e. mouse and keyboard, PDAs, printers and mobile phones etc. It is important to understand that Bluetooth as Wireless Personal Area Network (WPAN) is not 801.11 wireless as it do not perform the same job, rather used as wireless replacement for cable in order to connect devices. Bluetooth works at 1.4 GHz WSNd and this may cause interference with Wireless LAN equipments (801.11b, 801.11g).
- b. Local Area Network - Wireless local area network (WLAN) is standardized by Institute of Electrical and Electronics Engineer (IEEE). In local area network the users communicate with each other in local coverage area i.e. building or a campus. WLANs are the substitute of the conventional wired LANs. WLAN is wireless medium that is shared by the devices within the WLAN. WLANs have gained a great amount of popularity. Keeping in mind their mobility feature, they are implemented in mobile devices like laptop, PDAs, Mobile Cell phones etc. In WLAN, wireless Ethernet Protocol, IEEE 801.11 is used. WLAN is mainly used for the connection with internet. The data rate of WLAN is low that is between 11 and 54 Megabits per second (Mbps) as compared to the wired LAN which operates at 100 to 1000 Mbps. This means that any activity that required high WSNdwidth, are better done on wired network rather than on wireless.
- c. Wide Area Network - Wireless wide area network (WWAN) cover geographically larger area than local area network. The wide area networks almost consist of one or two local area networks. Examples of WWAN are Satellite Systems, Paging Networks, 2G and 3G Mobile Cellular.

1.1.3 IEEE Standard for Wireless Networks

Institute of Electrical and Electronics Engineers (IEEE) define the standards for related technologies. IEEE defined three main operational standard for wireless LAN i.e. IEEE 801.11a, 801.11b and 801.11g. The entire three standards belong to IEEE 801.11 protocol family. In 1999 801.11a standard was ratified by IEEE. The 801.11 has a nominal data rate of 54Mbps, but the actual data rates varies between 17-28Mbps.

The most established and frequently deployed wireless network standard is 801.11b. Most of the public wireless “hotspots” use this standard. It operates in 1.4 GHz spectrum and the nominal data transfer is 11 Mbps. Practically, approximately 4-7 Mbps is the actual data transmission rate achieved by this standard..

II. LITERATURE REVIEW

Pandurang Kamat(2005) has defined a work to improve the secure routing in sensor network . Author defined the model for secure route generation in communication network. Author analyze the network under privacy characteristics and to provide the effective data transfer over the network J. Jobin (2005) has defined a effective data transmission scheme to handle communication in sensor network. Author defined a work to provide effective communication while analyzing the bandwidth and energy specification.

Yean-Fu Wen (2007) has defined an effective data aggregation specific routing in communication network. Author has defined a effective scheduled routing in clustered sensor network. Author defined the battery capacity analysis and energy effective communication in sensor network. Author has estimated the energy consumption over the network. Authr has defined the effective cluster construction and data construction for effective aggregative routing.

Yu Gu (2007) has defined effective scheduling mechanism to improve the routing in surveilance based communication network. Author defiend the routing to improve the network lifetime and coverage so that network effectiveness will be improved. Author has defined the effective communication network under energy effectiveness. Author has improve the network under the connectivity requirement.

D.Baghyalakshmi (2010) has presented an energy effective and latency specific communication routing in sensor network. Author has defined the communication under effective network deployment and fault tomerance so that the effective energy efficient communication will be drawn. Author has defined the work to reduce the energy consumption and to improve the network life. Author has defined a fault tolerance specific routing under energy efficient communicaiton. Author has defined the scalability, latency specific communication so that the effective network communication will be drawn. Author has defined a time critical communication under low latency and energy effectiveness. Author defined the work for energy specific communicaiton for data sensing communicaiton. Author has improved the communication for hybrid communication network.

Jiann-Liang Chen (2010) has defined an adaptive route generation for sensor network. Author has improved the communication under proactive, reactive and hybrid routing. Author defined the routing under communication network and to improve the communicaiton over the network. Author has defined an adaptive routing protocol for redundancy communication with effective route generation for network. Author improved the simulation by effective communication route generation.

Amulya Ratna Swain (2010) has defined an energy effective route generation in sensor network. Author has defined the battery effective communication in sensor network. Author defined work under restrictions of node deployment. Author has defined the energy limited routing to conserve the energy and to improve network life. Author has defined two main energy effective scheduling approach called random communication and synchronized communication. Author has defined a sleep scheduling scheme to generate route between two ends. Author has defined a new protocol to generate route under tree specifcaiton analysis and scheduling mechanism so that the energy effective balanced communication is drawn over the network. Author defined the

fault tolerant communication in sensor network. Author presented a energy effective communication so that the network life will be improved and the performance of network will be adaptive.

Yuanyuan Zeng (2010) has defined a real time communication routing for effective power aware scheduling. Author improve the communication over the sensor network for real time communication. Author handle the associated problems such as coverage range problem, delivery fault etc. Author improved the TDMA scheduling along with effective route generation.

Feng Liu (2010) has defined an effective communication routing and scheduling so that the network life will be improved. Author has defined the power effective communication so that the energy effective network communication. Author has defined the periodic communication in sensor network so that the sleep scheduling scheme and deployment of sensor network will be improved. Author defined the effective packet delivery with effective scheduled routing in sensor network.

Qian Ye (2010) has defined an effective multipath routing in multimedia sensor network. Author defined a disjoint path communication routing. Author defined the work to deliver the multimedia traffic in communication. Author defined the disjoint multipath routing in sensor network. Author defined the packet communication and its classification. Author improved the real time communication and reliable communication under priority specific scheduling model. Author defined the traffic aware routing and scheduling so that the simulation results will be effective.

Ajinkya Kher (2010) has defined an effective routing schedule with communication delay in sensor network. Author defined the energy effective communication in sensor network. Author defined the work to improve the duty cycle and to improve the transmission under defined range. Author has presented the minimum delay effective communication in sensor network so that the computation in the network is reduced. Author defined the topology specific communication in sensor network. Author defined two main scheduling algorithm to reduce the communication delay and to improve the network life. Author has defined the communication under delay parameters and the performance parameters. Author has defined the effective communication over the network.

Zhe Zang (2011) has defined effective route generation in sensor network. Author improved the routing under reliability and low cost communication in sensor network. Author defined hop effective communication so that the reliable communication will be drawn. Author improve the hop effective routing policy so that the effective route quality will be improved. Author defined the network topology specific route generation in sensor network. Author provided the effective packet communication to reduce the communication cost. Author defined work to improve the network life time, reliability and communication by reducing the overhead.

III. PROBLEM DEFINITION

Sensor area network is most critical about energy and efficiency as network contains huge amount of data transmission over the network. Due to huge amount of data more chances will occur for data loss over the network. So we propose an algorithm to get an efficient network. Our work is based on Path Selection and Energy preserving which gives efficient maximally covering sensor network. The Path Selection gives the initial route and the broken link or hole in the path look for alternate path using Energy Preserving

IV. SOURCES OF DATA

As we are working on broken link problem in a sensor network. Because of this we have to first establish a WSN network and need to define the basic properties of the network. We can define these property just by studying some existing network or some case study of sensor network. As the solution is to generate a new routing approach to resolve the problem we need to study the existing algorithm for the same problem.

V. RESEARCH METHODOLOGY

In an adhoc network distance is the major factor respective to which routing algorithm. But in these presented work we have considered multiple parameters to identify the right communication path. The parameters included in this work are

- Energy
- Packet Loss Analysis
- Communication Rate Analysis
- Communication Delay

Based on these all vectors the reliable and efficient communication path will be generated and that path will be taken as the main routing path on which the communication will be performed. As the algorithm begin, the source and the destination nodes are specified explicitly between which the communication path will be generated. Now it will send the request to the source node and the wait is performed for the reply. As the reply is obtained it signify the right communication can be taken place. Now to perform the effective communication between the source and the destination the effective parameters are required to identify for each neighbor node of current node.

Now to perform the effective communication we need to find the next effective neighbor over which the communication will be performed. In this work, the parameteric analysis is performed on each node to identify the best neighbor. The parameters considered here are the energy, delay analysis, loss analysis and communication rate analysis on each node. The analysis is performed at two level. At first level the communication parameters such as loss rate, delay and communication rate are analyzed. Once these parameters setup the next effective node, the energy analysis is performed. If the neighbor node identified by the communication parameters is effective then it will be set as next communication hop otherwise the analysis is performed based on energy parameter. The process is repeated till the destination node is not arrived.

VI. CONCLUSIONS AND FUTURE WORK

In this , we have studied many existent routing protocols in WSN and compare their parameters as well as limitations in terms of the delay , throughput. Then we propose an algo which is basically based on path selection as well as energy conserving property so as to maintain the wsn network lifetime.

VII. REFERENCES

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