JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Different protocols and techniques for performance improvement in Wireless sensor networks: Survey

Mosami Pulujkar,
mosamib@gmail.com
Kalinga University,Naya Raipur
TSSM's PVPIT,Pune

Dr.Sunil Kumar,
Sunil.kumar@kalingauniversity.ac.in
Kalinga University,Naya Raipur

Dr. Vivek Deshpande,
vsd.deshpande@gmail.com
VIIT,Pune

Dr. Dattatray Waghole
dattawaghole10@gmail.com
JSPM's JSCOE,Pune

Abstract:

As the technology for the processor, communication and the low-power use of built-in computing devices advances, it is now the most extensively utilised WSN (Wireless Sensor Network) service in business and industry. The network design of the Wireless Sensor consists of nodes that monitor factors such as temperature, humidity, pressure, location, vibration and sound. Sensor nodes for smart monitoring, neighbouring node detection, transmission/saving, data collecting, target tracking, surveillance & tracking, sync, node mapping, and efficient routing between base stations and nodes can be utilised in a range of reliable application. Currently, WSNs are organised more advanced. It is fair to anticipate that WSNs will protect the world in 10-15 years with Internet access. This can be quantified by the transition of the Internet into a physical n/w. Such technology is very useful in a variety of disciplines, including medical, the environment, transit, the army, entertainment, national defence, catastrophe management and smart buildings.

Keyword: WSN, sensor nodes, Internet, throughput, delay, energy.

Introduction:

WSN (Wireless Sensor Network) is being used in business and industry applications because to its technical advancements in processors, connectivity, and low-power consumption of embedded computing devices. Each node in the wireless sensor network consists of sensors to monitor several factors, such as temperature, humidity, pressure, location, vibration, and sound. Applications include, for example, smart monitoring, the finding of neighbouring sensors, the dissemination of information, data collecting, tracking, supervision, and routing. WSNs are arranged in a more advanced way at the moment. While there's no certainty that the world will be safeguarded by WSNs in the next decade or two, the likelihood of WSNs and their connectivity being provided over the Internet has a clear prediction: it will be in the range of ten to fifteen years. The transition of the Internet from a virtual n/w to a physical n/w can be measured using this method. It's game-changing in all sorts of areas, including health, the environment, transportation, the military, entertainment, homeland security, and intelligent buildings.

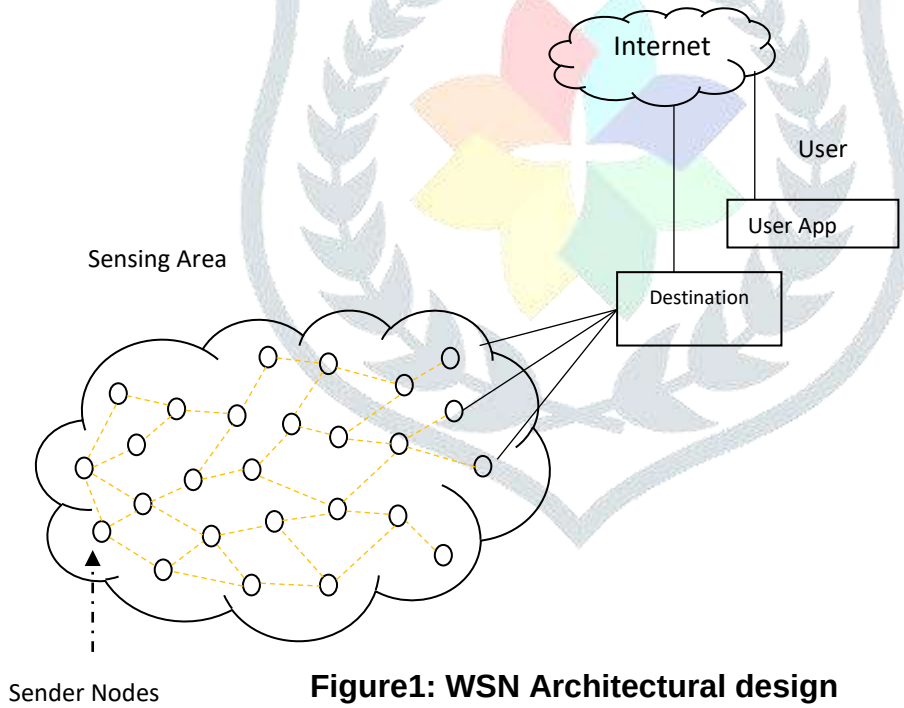

Figure1: WSN Architectural design

WSNs are geographically dispersed sensors and one or with an intermediate node (also called base stations). Physical elements, such as temperatures, noise, and mobility, are monitored in real time to produce new sensory data. Sensor nodes can be used to both collect data and pass data around. A sink receives data from sensors in contrast. For example, sensors should send data to the sink(s) in event monitoring applications in the event of the occurring of some events. The end user may link directly to the Internet, via satellite, or through any wireless connection. In the figure illustrated above, we see a typical WSN structure.

The following are components of a wireless sensor network: Sensor Nodes: A sensor node is a networking node with processing, data collection, and communication capabilities.

A sink, also known as a base station, connects customers and the networks. To obtain required information from the network, issue requests and retrieve results from the sink. A wireless sensor network has nodes ranging from a few dozen to many millions.

Radio modules in wireless sensor nodes provide the wireless sensor nodes with the ability to communicate. Two nodes can communicate with each other in such a way that data can be sent/received. In this case, the two nodes are called directly connected.

WSN's Challenges:

1. Providing world-class service

2. A threat to security

3. Efficiency in Network Bandwidth

4. The ability to cope with the failure of a node

5. Fine-tuning of many layers

6. Capability to handle massive deployment levels

Literature Survey:

There could be WSN congestion, which could limit the feasibility of data transmission, decrease the quality of transmission service, and lower the number of attempts at data transmission. Therefore, it is critical to control network congestion by managing the processes. The intermediate node congestion, severe performance deterioration, and high packet loss rate induced by the PI queue congestion algorithm, PID queue congestion algorithm, were simulated and compared. Additionally, the PNPID algorithm. Since we have determined that, in the majority of circumstances, the PNPID algorithm can stabilise the queue length at a position close to the expected value under varied bit rates, we may draw the conclusion that in most cases, the PNPID method will lower the queue length. In addition, the queue length of customers is quite stable, which suggests that the PNPID algorithm is reliable. Although the PNPID algorithm has a little higher packet loss rate and waiting time than the other three algorithms, it performs better than all three, proving the superiority of the PNPID algorithm. [1]

The model was constructed by applying WSN topology and routing information, as well as battery level, to every WSN. According to this concept, WSNs can fail in two places: nodes and connections. Three experiments were performed to determine whether or not the proposed models are accurate. It was simple to demonstrate how various aspects of a routing protocol affect the region's reliability because of these simulated examples. These contributions to WSN evaluation

can be found in this paper: Mote energy level is seen as the key source of WSN node failure, and the routing method is used to establish the pathways across different WSN regions, while reliability models are dynamically generated. [2]

This paper explored wireless sensor network performance and delay by using directional antennas. The goal of this study is to discover whether directional antennas are advantageous. Similarly, our results are relevant to ad hoc wireless network delay research. While simultaneously minimising multi-hop transmission delay, employing directional antennas yields higher network throughput capacity. While it's true that directional antennas can significantly minimise interference, resulting in improved data speed, in reality, using directional antennas does not actually accomplish this goal. By using directional antennas, the transmission range can be extended, which results in fewer hops. [3]

Literature Survey Table:

PP no	Technique Used	Advantages	Disadvantage
1.	EESRA (Energy Efficient Scalable Routing Algorithm)	Enhanced energy efficiency & load balancing Increases the network lifetime with increase in the size of the network	Residual energies are lower
2.	Low-energy adaptive clustering hierarchy (LEACH)	Minimizing energy loss. Enhances the efficiency of energy	Relatively low residual energy Decrease the lifespan of the node
3.	MOFPL (Multi-objective fractional particle lion algorithm)	Achieves high normalized network energy	Consumes a higher cost End-to-end delay is greater
4.	Blockchain	Ensure the safety of data Network delivery ratio has been improved	Data security needs to be regulated
5.	DLDM (Deep learning-based defence mechanism)	Reduces the usage of energy Reduces the FAR	Reduced packet delivery rate Data dropping ratios are higher.
6.	JDRP (Jellyfish Dynamic Routing Protocol)	It reduces the energy usage and packet delivery delay while increasing the lifetime.	Long-distance data transmission requires a higher level of energy.

		It's easy to handle data route	Delay in transmission
7.	EMABRD (Exponential Moving Average based Replica Detection)	An increased probability of detection	Costs of computation are higher The cost of communication has risen as well.
8.	k-anonymity	Achieves anonymity for sink-node Reduce power consumption	Complexity of computation Costs and energy usage increase as a result of increased network overhead. Power usage is reduced.
9.	FT-TSTP	Increased fault tolerance Delivery rates is higher	Consumption of extra energy Requires a reliable supply of power

Conclusion:

A wireless sensor network is a set of scattered nodes, each of which monitors a different area. The WSN is built to convey the data to the sink node. The amount of effort that goes into WSN QoS parameter research is remarkable: there are so many people working on various parameters, such as delay, congestion control, dependability, and energy usage. WSNs require efficient traffic flow and good flow control for uninterrupted data delivery. Most of the authors are focusing on wireless sensor network (WSN) issues such as the delivery ratio, power consumption, and dependability. This document is an excellent guide for anyone just starting out when it comes to researching WSNs' numerous parameters. The MAC protocol will be utilized in future sensor network development, and this will result in dependable and congestion-free data transport. The MAC protocol will be utilized in future sensor network development, and this will result in dependable and congestion-free data transport. This document is an excellent guide for anyone just starting out when it comes to researching WSNs' numerous parameters. There are so many people working on various parameters such as delay, congestion control, dependability, and energy usage.

Reference:

[1] E. F. Ahmed Elsmany, M. A. Omar, T. Wan and A. A. Altahir, "EESRA: Energy Efficient Scalable Routing Algorithm for Wireless Sensor Networks," IEEE Access, vol. 7, pp. 96974-96983, 2019, doi: 10.1109/ACCESS.2019.2929578.

[2] W. Wu, N. Xiong and C. Wu, "Improved clustering algorithm based on energy consumption in wireless sensor networks," in IET Networks, vol. 6, no. 3, pp. 47-53, 5 2017, doi: 10.1049/iet-net.2016.0115.

[3] Deepak Mehtra,Sharad Saxen,"MCH-EOR: Multi-objective Cluster Head Based Energy-aware Optimized Routing algorithm in Wireless Sensor Networks",Sustainable Computing: Informatics and Systems, Vol.28, 2020

[4] K. Haseeb, N. Islam, A. Almogren and I. Ud Din, "Intrusion Prevention Framework for Secure Routing in WSN-Based Mobile Internet of Things," IEEE Access, vol. 7, pp. 185496-185505, 2019, doi: 10.1109/ACCESS.2019.2960633.

[5] M. Premkumar, T.V.P. Sundararajan,"DLDM: Deep learning-based defense mechanism for denial of service attacks in wireless sensor networks", Microprocessors and Microsystems, Vol.79, 2020

[6] V. Bibin Christopher, J. Jasper,"Jellyfish Dynamic Routing Protocol with Mobile Sink for Location Privacy and Congestion Avoidance in Wireless Sensor Networks", Journal of Systems Architecture, July 2020

[7] S. Anitha, P. Jayanthi, V. Chandrasekaran,"An Intelligent Based Healthcare Security Monitoring Schemes For Detection Of Node Replication Attack In Wireless Sensor Networks", Measurement, 2020.

[8] Thomas Haakensen and Preetha Thulasiraman,"Enhancing Sink Node Anonymity in Tactical Sensor Networks using a Reactive Routing Protocol", IEEE, 2018

[9] Roberto Milton Scheffel, Antônio Augusto Fröhlich,"FT-TSTP: A Multi-Gateway Fully Reactive Geographical Routing Protocol to Improve WSN Reliability", IEEE, 2018

[10] Yang, X., Chen, X., Xia, R., & Qian, Z. (2018). Wireless Sensor Network Congestion Control Based on Standard Particle Swarm Optimization and Single Neuron PID. Sensors, 18(4), 1265.

[11] Dâmaso, A., Rosa, N., & Maciel, P. (2014). Reliability of Wireless Sensor Networks. Sensors, 14(9), 15760–15785.

[12] Dai, H. (2009). Throughput and delay in wireless sensor networks using directional antennas. 2009 International Conference on Intelligent Sensors, Sensor Networks and Information Processing (ISSNIP).

[13] Dattatray S Waghole, Vivek S Deshpande, “Characterization of wireless sensor networks for traffic & delay”, IEEE conf on Cloud & Ubiquitous Computing & Emerging Technologies, pp. 69-72, 2013.

[14] Dattatray S Waghole, Vivek S Deshpande, “Reducing delay data dissemination using mobile sink in wireless sensor networks”, international Journal of Soft Computing and Engineering (IJSCE), vol 3 issue 1, pp. 305-308, 2013.