International Journal of Research in Engineering, Science and Management
Volume-2, Issue-4, April-2019
www.ijresm.com | ISSN (Online): 2581-5792

Efficient Way of Flooding Avoidance using ASF Algorithm in Wireless Data Centers

J. S. Kanchana[1], M. Priya[2]
[1]AssociateProfessor, Department of Information Technology, KLNCE, Madurai, India
[2]Student, Department of Information Technology, KLNCE, Madurai, India

***Abstract*: Wireless sensor network (WSN) has huge numbers of limited resources and sensor nodes are to be developed for several applications. A WSN is a network which has the numerous nodes which are to be deployed in a predicted boundary area. In WSN, the nodes are deploying to validate data such as pressure, humidity, high temperature, communication and energy resources. In this paper, we proposed an efficient way of flooding avoidance with the help of the adaptive selective flooding algorithm in wireless sensor network. This method is one of the easiest and simplest effective methods. This algorithm helps to reach data or packets from source to destination with particular selection of nodes when the flooding is to be occurred in transmission. This method is more robust compare than various existing methods. The simulation and results show there is the analysis of the parameters such as throughput, packet delivery ratio, packet drop, and reliable analysis of the network.**

***Keywords*: Flooding, wireless sensor network, easiest, adaptive selective flooding, efficient way**

1. Introduction

A wireless sensor network is explained as network has small size and less number of complex devices which is called as sensor nodes. This is to be analyzed based on environment and collect the information from the transmission field and which are to communicate through link like wireless. The sensor node has the capable of communicate with one another which are to be comprised of analyzing, processing, transmitting, and mobilizing of positioning and powering units.

In wireless sensor network, the routing is the major problem, which is challenging due to predicted characteristics of particular network, which differs from other networks such as vehicular ad hoc network, mobile ad hoc network and mobile networks. The fig. 1 shows structure of wireless sensor network.

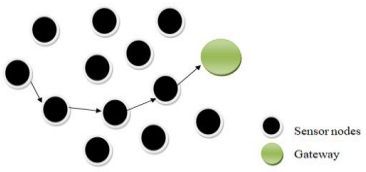

Fig. 1. Wireless sensor network

A. Flooding in wireless sensor network

In flooding process, each and every node helps to differ with a piece of the information over a network which is to start by transmitting a copy of that particular information to all its neighbors. When the nodes receive the data, the copy of the data is to be transmitted to other nodes and the time is to be taken based on the group of nodes. The flooding process is simple but this has the problems like consumption of energy and implosion. Flooding is widely used for conventional and also wireless sensor network. The flooding scheme is the directionality information which helps to reduce the number of intermediate nodes. These nodes are to be used reducing the number of intermediate nodes for unnecessarily forwarding packets. The fig. 2 shows structure of flooding in wireless sensor network.

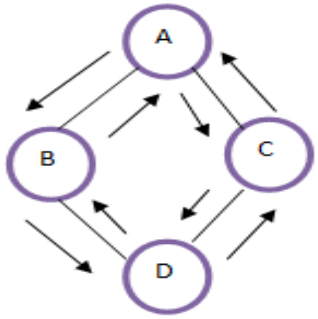

Fig. 2. Structure of flooding in wireless sensor network

B. Selective flooding mechanism

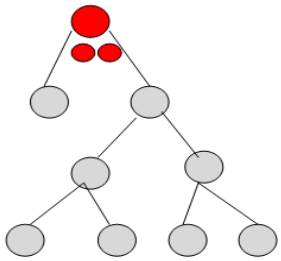

Fig. 3. Selective flooding pictorial representation

In every sources, the routing helps to store the major parts of an information that is one is network topology and another one is link state information. In this routing, the topology is the static one, which does not expensive in terms of network overhead. In this routing, the link state information is more expensive because the regular intervals taking non-trivial

amount of bandwidth across the network. The selective flooding helps to initiate and store the network topology, but not the information about the link state across the network. The fig. 3 shows the pictorial representation of selective flooding.

In section 2, there are various papers are analyzed based on our proposed objective and section 3 shows proposed processing stages. In section 4 shows performance analysis of various parameters based on our proposed objective and section 5 shows overall conclusion of our objection and proposed paper.

2. Related work

A selective packet inspection is proposed by Tommy Chin Jr [1] et al to detect DoS flooding using software defined networking. In this paper, a new attack detection method is to propose which are to be coordinated and monitored over a network. This method is capable to solve an issue with fast manner and which gives a high accuracy while balancing the workload on the OVS. In this paper, we proposed a novel method for detection and mitigation of TCP SYN flood attacks on the global environment for network innovations. This paper has the following information such as Geni and SDN, collaborative attack detection and containment approach, system architecture, system design, algorithms, communication protocol, implementation on Geni, and simulation parameter analysis. The further development of this paper is to analyze and to develop a systematic methodology along this line of work.

Ping Wang [2] et al proposed a TR069 WAN management protocol for WIA – PA wireless sensor networks. This paper presents an extension of a management range of TR069 protocol to the wireless sensor network. The unified device management is to be process between the internet and wireless sensor network direct manner. In this paper, we applied a TR069 management protocol which helps to achieve a unified management of the device integration and the communication occurs from the internet to the wireless sensor network. This paper has the following information such as architecture of the entire system, management protocol design, management mechanism, virtual device mechanism, data model mapping mechanism, protocol conversion interface, and implementation model, single and multiple node implementation process, memory and CPU performance, and simulation parameter analysis. In this paper, the virtual device structure is to be developed in the CPE. This paper application is to be extended from the internet to the WIA – PA wireless sensor network.

Syed Muhammad Haider Aejaz [3] et al proposed a performance of a partner selection algorithm in IEEE 802.15.4 based wireless sensor network. In this paper, the investigation is to be applied for effectiveness of cooperative of wireless sensor network. In this paper, this approach is to be introduced the algorithm like worst link first coding gain based partner selection algorithm which is to be applied together with a sending power level of an outage criterion. This method helps to decrease energy and increase the lifetime of the network. This paper has the following information such as system model, IEEE 802.15.4, lifetime of the network, analysis of error probabilities and simulated parameters performances. The major advantage of this paper is to reduce the data rate, periodic transmission of data and the lifetime improvement of the network.

A data compression in wireless visual sensor networks using wavelets is proposed by Shabir Ahmad Sofi [4] et al. In this paper, the performance will be analyzed with different wavelets transform. These wavelets are to be analyzed based on energy efficient and real time image data transformation with the help of the wireless sensor network. This paper has the following information such as system overview, design of data monitoring node, wavelet analysis, implementation of the algorithm like wavelet transform, energy analysis transmission time analysis, and the performance parameters analysis. The further development of this paper is to be extended for multimedia wireless sensor networks and which are to be presented with similar types of analysis could be taken for packet losses and memory usage.

Younghwan Choio [5] et. al. proposed a study on coupling software defined networking and wireless sensor network. In this paper, the wireless sensor network based routing algorithms which can be designed for various applications. There are two different routing algorithms are to run simultaneously on the same sensor nodes and networks. This paper helps to analyze the coupling of SDN and wireless sensor networks. This paper has the following information such as system architectures, control plane analysis, data plane analysis, system requirements and analysis, programmable sensor networking, control plane with data plane, communication channel for control plane, and overhead for control plane analysis. This paper helps to provide the details about the SDN with wireless sensor networks. The further development of this paper helps to increase the challenges and to solve it for programmable sensor networking process.

A network lifetime improvement using routing algorithm is implemented by G. Pradeebaa [6] et al with sleep mode in wireless sensor network. This paper presents a one dimensional network and which is look at decreasing the energy during routing the data packets. The wireless sensor network lifetime will be increased based on routing protocols. This paper used as two algorithms which are energy saving via opportunistic routing algorithm and the geographic random forwarding algorithm. These algorithms help to reduce the energy consumption and increase the lifetime of the network. This paper has the information such as system model, network model, energy model, optimal transmission distance, neighboring node selection, routing algorithm, ENS_OR algorithm, GeRaF algorithm, sleep mode concept, average residual energy, packet reception ratio, standard deviation of residual energy, network lifetime, first dead node, and performance parameters.

G.Sudha [7] et al proposed a network coding base real time wireless sensor network for environment monitoring. The network coding is to be implemented with the help of the cc2530 microcontroller and the performance of the network is to be evaluated by the analysis of the packet delivery ratio and packet error rate. This method helps to reduce the minimum number of transmission and the repetition of packets which can be decreased by the usage of the network coding. This paper has the following information such as architecture, algorithm analysis, performance of the network coding and the process of conventional routing and the performance evaluation of all simulated parameters. This paper gives the results as the minimum transmission a without knowing prior knowledge about the network which helps to transmit the data between sensor nodes.

A SYN flooding attack is proposed Ms. K. Geetha [8] et. al. for identification and analysis. This paper helps to analyze the various types of denial of services attacks which should be analyzed in mobile ad hoc network. SYN flooding is one type of denial of services attack, and it should be denied the further legitimate services. This paper has following information such as internet protocol, transmission control protocol, ad hoc on demand distance vector protocol, destination sequenced distance vector protocol, SYN flood identification, performance analysis, packet delivery ratio analysis, average end to end delay analysis, throughput analysis and delay or jitter analysis. The further development of this paper is to be analyzed with the node level or the network level detections are also possible which may be considered.

3. Proposed methodology

We proposed an efficient way of flooding avoidance with the help of the adaptive selective flooding algorithm in wireless sensor network. This method is one of the easiest and simplest effective methods. This algorithm helps to reach data or packets from source to destination with particular selection of nodes when the flooding is to be occurred in transmission. This method is more robust compare than various existing methods.

A. Flooding mechanism

There are various traditional flooding techniques are to be presented and it has various advantages based on their performance such as delivery ratio, energy efficiency, energy cost, delay analysis, power analysis etc. The flooding is to be designed, a node is to initiate a broadcasting process then a packet will reach it from its previous hosting node. When the low duty cycle of network two neighbors are to be presented these are to be denoted as wake up stage at same time. The delivery ratio of the packets should become worse based on many nodes received at simultaneously. We are analyzing a series of simulations based on the reducing the duty cycle from 100 percentages to 1 percentage present in a randomly generated network with 50 nodes. The tradition flooding method is to be adapted to the low duty cycle networks with the permitting of multiple transmissions of the same packet and ARQ based mechanism which helps to deal with unreliable links. The figure.4 shows original flooding structure present in network. In this figure, the source node should be transmitted packets to destination based on its neighbors and dumped over loaded packets. The pseudocode shows the flooding of messages during transmissions.

Pseudo Code

```
Input: msg.ttl – configured numbers of nodes which helps to
forward the msg
Msg.mid – the msg ID;
R – msg receiving node;
Flooding_On ()
{
        If (R gathers msg for the first time)
        {
  R develops a predicted entry for msg in R.msglist;
  If (msg.ttl > 0)
    R forwards msg;
        }
        Else
        {
        R develops a predicted entry for msg in R.msglist
        Determine entries (R.msglist, msg.mid);
        Merge blocks (R.blockset);
        R drops msg;
        }
}
```

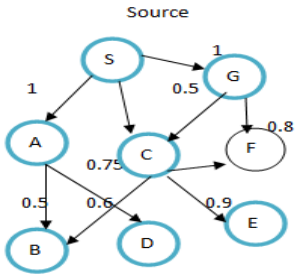

Fig. 4. Original structure of flooding mechanism

B. System architecture and data packets

The fig. 5 shows the framework architecture of flood route mechanism. The modules and the interactions which are to be implemented the adaptive selective algorithm each node is to be depicted which is to be represented in figure.5. Each node has one engine which helps to routing the process. Application modules help to entry data packets types and responding flooding policies with the engine. These modules are to be interacted with each other through invocations. This is to be depicted as arrows originating from the caller. In flooding, the similar data should originate from a single node, which can receive its destination through different routes. The final node and also intermediate nodes are uniquely determining the similar data packets.

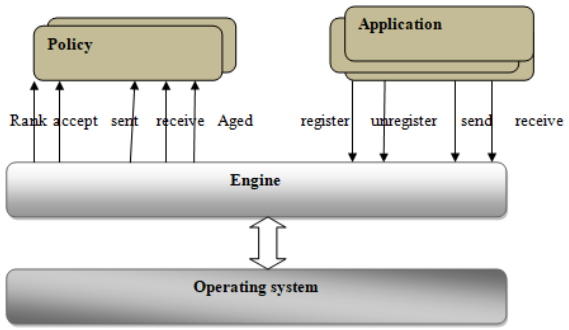

Fig. 5. Framework architecture for flooding analysis

C. *Adaptive selective flooding algorithm*

The selective flooding routing mechanism helps to analyze the multi hop routing and it is to be targeted at environmental monitoring application and the sensor nodes are presenting in a formal tree structure which is to be linked with the single sink node. This method helps to fulfill the aim of creating the routes between the channel head to the sink node through the gateways. There are following advantages are presenting in the selective flooding mechanisms.

- In the selective flooding mechanism, nodes are to be reached at destination appropriate manner and the energy is to be saved of the remaining nodes.
- In the selective flooding, the route request packets do not present in the network which is to reduce control packet overhead.
- The route request packets are to be modified based on the computation process.
- The less amount of memory is to be required to store the packet in the routing tables.

The algorithm shows the adaptive selective flooding process present in the wireless sensor network.

Algorithm
Step 1: Creation of nodes and to initialize labels at each node.
Step 2: Source and destination will choose based on the node energy
Step 3: Messages are transmitting from source to destination stage
Step 4: Flooding occurring on that routing path and then the flooding occur node is to be chosen and remove
Step 5: the credible path will choose based on the message content and node capability and finally information will reach at destination.

4. Simulation and result analysis

We proposed an efficient way of flooding avoidance with the help of the adaptive selective flooding algorithm in wireless sensor network. This method is one of the easiest and simplest effective methods. This algorithm helps to reach data or packets from source to destination with particular selection of nodes when the flooding is to be occurred in transmission. This method is more robust compare than various existing methods. In the simulation and result stage there are various parameters are to be analyzed and it has various performances analysis graph model. Our existing model is selective flooding analysis based on DSDV routing process and our proposed model is adaptive selective flooding based on AODV routing protocol.

The table 1 shows performance parameters comparisons based on our existing and proposed mechanism.

A. *Goodput analysis*

The Goodput is defined as the number of packet successfully reached at the destination to time period during data transmission. It is to be measured as bps (bits per second). The fig. 6 shows Goodput analysis.

$$GP = \frac{Number\ of\ packets\ successfully\ reached\ at\ destination}{Time\ Period} \quad (1)$$

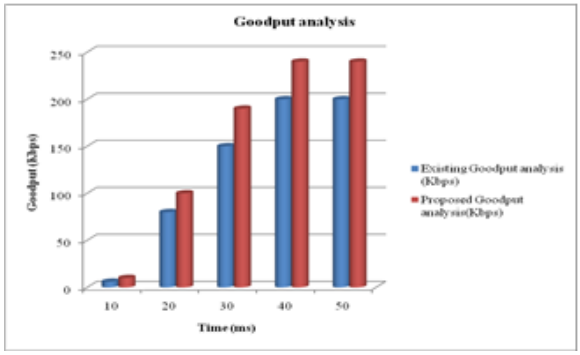

Fig. 6. Goodput analysis

B. *Reliability analysis*

The reliability is defined as the total number of packets reached at the destination to the total time taken for that process. The fig. 7 shows reliability analysis.

$$Reliability = \frac{Total\ no.of\ packets\ receive\ at\ destination}{Time\ time\ taken} \quad (2)$$

Table 1
Performance parameters comparison

Time (ms)	Goodput (Kbps)		Reliability (bps)		Packet delivery ratio	
	Selective Flooding Algorithm	ASF Algorithm	Selective Flooding Algorithm	ASF Algorithm	Selective Flooding Algorithm	ASF Algorithm
10	6	10	1.00	1.200	1.050	1.100
20	80	100	0.99	1.20	0.750	1.099
30	150	190	0.8	1.15	0.62	1.088
40	200	240	0.5	1.12	0.955	1.00
50	200	240	0.5	1.10	0.955	1.00

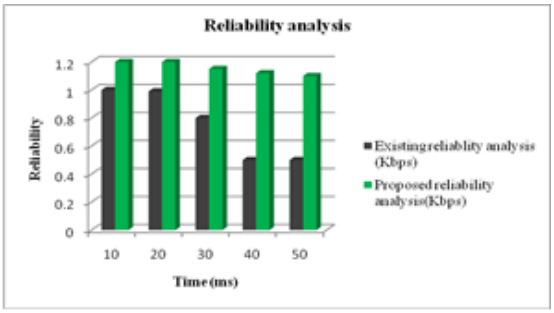

Fig. 7. Reliability analysis

C. *Packet delivery ratio analysis*

The packet delivery ratio is defined as ratio between the total numbers of packets received by the receiver to the total number of packets generated by the sender. The figure.8 shows packet delivery ratio analysis.

$$PDR = \frac{No.\,of\ packets\ received}{No.\,of\ packets\ generated} \tag{3}$$

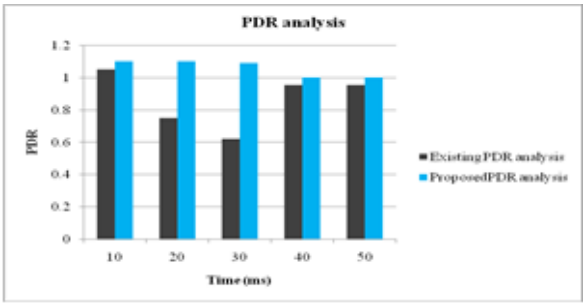

Fig. 8. Packet delivery ratio analysis

D. *Jitter analysis*

Table 2
Comparison of Jitter analysis

No. of packets	Exiting methodology	Proposed methodology
5	0.54	0.1
10	0.65	0.22
20	0.75	0.35
30	0.85	0.36
40	0.9	0.39

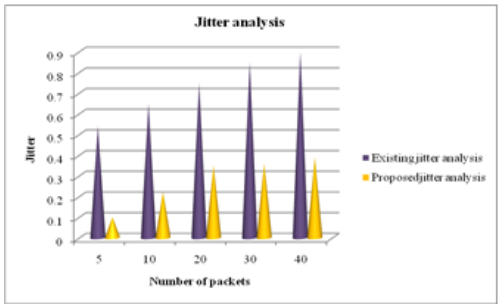

Fig. 9. Jitter analysis

The jitter is defined as the delay variation in the packets received by the receiver when the packers take a time delay between source and destination. The table 2 represents the jitter analysis of existing and proposed mechanisms. The fig. 9 shows jitter analysis.

5. Conclusion

We proposed an efficient way of flooding avoidance with the help of the adaptive selective flooding algorithm in wireless sensor network. This method is one of the easiest and simplest effective methods. This algorithm helps to reach data or packets from source to destination with particular selection of nodes when the flooding is to be occurred in transmission. This method is more robust compare than various existing methods. In the simulation and result stage there are various parameters are to be analyzed and it has various performances analysis graph model. Our existing model is selective flooding analysis based on DSDV routing process and our proposed model is adaptive selective flooding based on AODV routing protocol. The simulation and result gives the better result compare exiting mechanism. So our proposed methodology helps to increase packet delivery ratio, throughput and reliability of the network and to decrease the jitter of the network.

References

[1] T. Chin, X. Mountrouidou, X. Li and K. Xiong, "Selective Packet Inspection to Detect DoS Flooding Using Software Defined Networking (SDN)," *2015 IEEE 35th International Conference on Distributed Computing Systems Workshops*, Columbus, OH, 2015, pp. 95-99.

[2] Ping Wang, Chang Zhang, Heng Wang and XiaoYuan Xu, "A TR069 WAN management protocol for WIA-PA Wireless Sensor Networks," *2016 25th Wireless and Optical Communication Conference (WOCC)*, Chengdu, 2016, pp. 1-4.

[3] S. M. H. Aejaz, T. Zemen and A. Springer, "Performance of a partner selection algorithm in IEEE 802.15.4 based wireless sensor networks," *2016 IEEE Topical Conference on Wireless Sensors and Sensor Networks (WiSNet)*, Austin, TX, 2016, pp. 4-6.

[4] S. A. Sofi and R. Naaz, "Data compression in Wireless Visual Sensor networks using wavelets," *2016 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)*, Chennai, 2016, pp. 1286-1290.

[5] Younghwan Choi, Yunchul Choi and Yong-Geun Hong, "Study on coupling of software-defined networking and wireless sensor networks," *2016 Eighth International Conference on Ubiquitous and Future Networks (ICUFN)*, Vienna, 2016, pp. 900-902.

[6] G. Pradeebaa and N. Lavanis, "Network lifetime improvement using routing algorithm with sleep mode in wireless sensor network," *2016 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)*, Chennai, 2016, pp. 1572-1575.

[7] G. Sudha, R. Prakash, A. B. Ganesh and S. V. Girish, "Network coding based real time wireless sensor network for environmental monitoring," *2016 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET)*, Chennai, 2016, pp. 1269-1272.

[8] K. Geetha and N. Sreenath, "SYN flooding attack — Identification and analysis," *International Conference on Information Communication and Embedded Systems (ICICES2014)*, Chennai, 2014, pp. 1-7.

[9] K. Andersson and M. S. Hossain, "Heterogeneous wireless sensor networks for flood prediction decision support systems," *2015 IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS)*, Hong Kong, 2015, pp. 133-137.

[10] J. Celestine, K. Vallepalli, T. Vinayaraj, J. Almotir and A. Abuzneid, "An energy efficient flooding protocol for enhanced security in Wireless Sensor Networks," *2015 Long Island Systems, Applications and Technology*, Farmingdale, NY, 2015, pp. 1-6.

[11] F. Khan, S. Memon, I. A. Jokhio and S. H. Jokhio, "Wireless sensor network based flood/drought forecasting system," *2015 IEEE SENSORS*, Busan, 2015, pp. 1-4.
[12] X. Shen *et al*., "OppCode: Correlated Opportunistic Coding for Energy-Efficient Flooding in Wireless Sensor Networks," in *IEEE Transactions on Industrial Informatics*, vol. 11, no. 6, pp. 1631-1642, Dec. 2015.
[13] N. Pavitha and S. N. Shelke, "Tactics for providing location privacy against global adversaries in wireless sensor networks," *2015 International Conference on Computer, Communication and Control (IC4)*, Indore, 2015, pp. 1-5.
[14] S. Das and A. Das, "An algorithm to detect malicious nodes in wireless sensor network using enhanced LEACH protocol," *2015 International Conference on Advances in Computer Engineering and Applications*, Ghaziabad, 2015, pp. 875-881.
[15] F. Entezami and C. Politis, "3DPBARP: A three dimensions position based adaptive real-time routing protocol for wireless sensor networks," *2015 7th International Conference on New Technologies, Mobility and Security (NTMS)*, Paris, 2015, pp. 1-5.