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Survey Paper on Improving QOS by Selective Discard & Retransmission of Packets in WSN

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Abstract: *The Wireless Sensor Network (WSN) is a set of distributed sensor nodes. Wireless Sensor Network contains real time data of events and different network packets. Various events on real time data and network packet gather the large amount of data in a network. This results in the congestion problem into a network to degrade the performance of real-time application and servers. Hence we propose the Selective Discard & Retransmission of packets mechanism in WSN for more reliability in the network. The purposed SD&RP mechanism divides the insignificant and significant packets based on their threshold value and stores the control and management information of discarded packet. The retransmission of discarded packets takes place when node is free from congestion in a WSN. Hence purposed technique provides high efficiency and throughput in WSN.*

Keywords: Wireless sensor network, SD&RP, Control and Management packet, and Packet retransmission.

1. INTRODUCTION

Distributed autonomous devices, which use sensors to monitor physical and environmental conditions, are the parts of wireless sensor network. When multiple packets transfer takes place in the WSN simultaneously then traffic problem is created in that network and such network is called congested network [19]. Congested network faces many problems such as delay in packet transfer, waste of valuable or limited resources of network, extra energy consumption in a network [1]. Such problems in WSN degrade the server performance and this type of network is harmful for data transmission.

Congestion problem is created due to a resource sharing problem and limited buffer size in a network where simultaneous multiple packets transmitted in a WSN network [19]. Such congested network looses important packets in a network due to limited buffer size.

Congestion problem in a WSN looses Significant packets in a network leads to various problems [13] such as

- **Number of Retransmission**

Packet loss in congested network causes the retransmission of the packet in network [1]. Such retransmitted packets consume limited and valuable resources of the network as well as the retransmission of packet produce energy and bandwidth consumption of the network. Hence the number of retransmission is too costly.

- **end-to-end delays**

Retransmission of packet in congested network gives the result of end-to-end delay which provides some wrong input to the application.

- **Packet Lifetime**

In congested network high end-to-end delay takes more transmission time than the main waiting time which reduces the lifetime of the packet.

2. EXISTING TECHNIQUES AND THEIR LIMITATIONS

To solve the congestion problem of WSN, many techniques are used like packet drop (PD), partial packet drop (PPD), Earlier Packet drop (EPD) [12], and selective packet drop (SPD) which respectively increase the reduction of congestion in a network [6] and give high throughput but all of this techniques results common drawback i.e. to loss of some important packets in reduction of congestion [3] and some techniques are not supportive to handle the large size packet in a network [19].

3. OBJECTIVE OF THE RESEARCH

In this paper we focus on the technique which avoids the significant packet loss in a reduction of congestion in the network. The technique used in this paper provide efficient way to avoid packet loss by temporary storing the selective insignificant packet information in the network and first give the priority to the important packet in the network for transmission [1]. When network is released from congestion and incoming buffer of node is having specific free size then the Control and management information of selective discarded packet is given back to node. Such technique provides advantages of high buffer size for important packet, transfer of important packets and important information of

discarded packet in a network, and reliability in a network [7].

4. SD&RP SOLUTION

We present here the mechanism of temporary storage of control and management information of selective discarded packet in congested network to provide more space for important packets in a network. This mechanism uses duplicate packets, number of hopes traversed and life time of packet criteria for insignificant packet selection in a network [1].

5. REVIEW OF LITERATURE

A. Title: - Multi-objective optimization for selective packet drops in wireless sensor network.

In this paper we study the Selective packet discard technique. This gives better performance than DT and STD-WSN techniques. In SPD technique we discard insignificant packets in a network and give higher preference and large space to significant packet to arrive in incoming buffer of node. SPD discard only Corrupted Packets, Duplicate packets and based on size of packets and how many hopes travailed by that packet.

Advantage

a) The purposed SPD mechanism much better performance than DT and STD-WSN techniques.
b) In this technique we only discard insignificant packets in a network.

Disadvantages

SPD mechanism loss all information of discarded packets.

B. Title: - Performance Measure of Drop Tail and RED Algorithm

In this paper we Study the difference between the Random Early Detection (RED) and Drop tail for avoiding the congestion in high speed packet switched networks as well as here we try to detect superfluous congestion by averaging the queue size. In case of packet drop End to end delay occurred in Drop tail is more than that of obtained in RED and in case of packet receives the Drop tail is advisable congestion avoidance technique. We found that the loss rate of RED is higher than drop tail.

Advantage

a) It monitors the average queue size by for each output queue.
b) Reduce the conjunction.

Disadvantages

Low delay and low loss rate is required in the network.

C. Title: - Selective Packet Discard in Mobile Video Delivery based on Macro block-Based Distortion Estimation.

Here we present selective voice packet discarding method. The video frames are classified in to two types such as 1) High priority video frames and, 2) Low priority video frames.

Advantages

a) Low processing power.
b) Short battery life of receiver device.

D. Title: - Performance of Selective Packet Dropping Schemes in Multi-Hope Networks.

In This paper we Study the Packet dropping Network Application in Multi-Hope Network for different traffic and we study the difference between various packet dropping policies such as Partial Packet Discard (PPD), Early Packet Discard (EPD), Age Priority Packet Discarding (APPD) and Preemptive Partial Packet Discard (pPPD). The contributions of this paper consist of a comprehensive comparison of the various selective packet dropping policies with respect to the absolute performance as well as the predictability at the application level in multi-hop networks.

Advantages

a) Reduce transmission of traffic.
b) Alleviate congestion.

Disadvantages

The QoS mapping function for other QoS parameter.

E. Title: - Enhancing Application Throughput by Selective Packet Dropping

In the Network we Many times face the network congested or traffic problem so that's why to reduce the congestion and traffic we use the selected packet drop police in the network which reduce congestion and transmission traffic. In this paper we study the new packet dropping police called preemptive PPD (pPPD) that exhibits superior performance.

Advantages

a) Performance of pPPD remains good even as the message lengths are increased.
b) pPPD performs better than APPD.

Disadvantage

a) The switch processing overheads are higher for the pPPD.
b) Plan on experimenting with real traces of traffic.

F. Title: - Congestion Control for Packet Voice by Selective Packet Discarding

In this paper we study how to reduce the time delay as well as the multiplexer memory requirements in packet voice systems. We examine packet voice multiplexers in which packets are selectively discarded from the arrival traffic to the multiplexer. The packets which are not discarded are served on FIFO basis and that's why not discarding packet having same delay. In the packet discarding decision packets are assigned to two different classes such as

Class 1:- those which should be transmitted if possible, irrespective of congestion conditions.
Class 2:- those which may be discarded to relieve congestion.

This paper is focused on the queuing behavior of the system under the congestion control.

Advantages

a) The control procedures can reduce the mean waiting time.
b) Reduce multiplexer memory requirements in packet voice system.

Disadvantage

a) The larger packet size produces larger waiting time.
b) To apply this technique to video packets.

6. SYSTEM OVERVIEW

In this work, we studied in detail about the congestion avoidance mechanism by new selective packet discard technique. Earlier, we know that discarding criteria for selective packets completely discard whole packet. Hence, there is permanent loss of control and management information which resides in packet like signaling, sequence no and acknowledgment, association, synchronization, information of the packet.

6.1 Control and Management packets

Control and management packets are used for short transmissions. These packets are used as intermediate to source and destination for communication and control. Control packets contain RTS, CTS and ACK packets. These packets are used in four way handshake in addition with power save polling packets and short packets. It shows the end of contention free period within a specific BSS or IBSS.

- **Control Packets**

RTS, CTS, ACK
Request to send, clear to send, and acknowledgement, respectively, these are the types of control packet used in the four way handshake to avoid the collision.

- **Management Packets**

Management packets are used to support authentication, association, and synchronization. Management packet contains fix or variable length data fields which is defined in specific sub-type.

Association: - This packet denotes the association of current users. Request/response management packets handle the association, reassociation and disassociation.

Synchronization: - In WLANs there are various types of synchronization. The Management packet "BEACON" keeps members of BSS synchronized. The State of own synchronization is reported by the devices.

The above presented SD&RP system diagram shows that when packets coming to node 1 from source node, then firstly priority algorithm is applied on that packets to set appropriate priority according to algorithm. The priorities are assigned to network packets on the basis of their threshold value. In second step the discarding algorithm only pass the high priority packets in a network and the low priority packets discarded. Before discarding, the SD&RP is applied on packets for temporary storing the control and management information in a virtual database (DB). In the third step the temporary stored control and management information of discarded packet are passed to incoming queue of processing node.

6.2 Comparison between SPD and SD&RP Mechanism

Performance	SPD	SD&RP
Packet Discard	In this mechanism it discard hole packet information	In this mechanism it temporary stores the Control and Management information of discarded packet
Retransmission	Here retransmission of discarded packet never take place	Here retransmission of discarded packet take place
Efficiency	Due to loss of hole packet information it provides comparatively low efficiency in WSN than the SD&RP	The retransmission of Control and Management information of discarded packet provides high efficiency in WSN

7. Conclusion

The proposed additional work in SPD technique forms the SD&RP mechanism. The SD&RP used to solve the traffic problem in a WSN. The SD&RP avoids the traffic in a network by using the mechanism that we have implemented. This mechanism stores significant information of packets to be discarded rather whole dropping of packet. The special MOO characteristics that simultaneously optimize multiple OF assist SD&RP to give good reliability of network. None of the solution to solve the congestion of the network without dropping some significant packets in a network but SD&RP mechanism gives the solution of without dropping control and management information of the discarded packet and result will be high lifetime of node, low energy consumption, low end-to-end delay and high throughput ratio of the system. In future we focus on energy consumption in WSN to give better performance than the expected result.

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