

A Survey on Priority Based Packet Scheduling

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ABSTRACT: Now a days we are moving towards wireless technology so one of them is Wireless Sensor network, it is used in wide applications like health monitoring, weather monitoring, anti-missile defense system etc. WSN is nothing but collection of different sensor nodes deployed in various regions. Sensor nodes have limited resources like battery power, memory storage, etc. For extending the life- time of WSNs there should be Less Energy Consumption. In this paper we are going to concentrate on priority based packet scheduling technique like FCFS, SJF, RR(Round Robin), Preemptive, non- Preemptive packet scheduling, etc. But this scheduling algorithms have some drawbacks like high end-to-end delay, more Energy consumption routing overheads. In order to overcome these limitations, We are proposing a new packet scheduling algorithm that achieves Reliability, less energy consumption, avoids inconsistent delay of packets. The proposed algorithm is Dynamic Multilevel Priority(DMP) Scheduling Method. DMP changes the concept of Preemption which will assign and dynamically change the priority of the lower priority packets due to existing high priority packet rush at the same queue. In this paper we introduce the concept of the Multilevel queues. For this algorithm we are using three level Queues for processing Real time and Non-Real time packets. In first queue we process highest priority real time packets. In second queue Non-Real time highest priority types of packets are processed and then third queue. In third queue non-real time local data packets with less priority are processed.

KEYWORDS: Wireless Sensor Network, Energy consumption, First Come First Serve, Packet scheduling, Non-preemptive priority scheduling, Preemptive priority scheduling, Real time, Non-Real time, Dynamic Multilevel Packet Scheduling

I. INTRODUCTION

Priority based scheduling technique i.e., scheduling the packets based on their priority which is assigned using the FIFO structure (First In First Out). Whichever the packet comes first into the queue of the Sensor Node's Buffer that packet gets highest priority. It is most typical solution we hired in wireless sensor networks (WSN) for data traffic control and reducing in the packet transfer delay. On behalf of Buffer Memory. Buffer is the one type of part of computer's memory it is the portion that holds data temporary which needs to be scheduled for sending or for receiving from the external node. We are willing to provide high throughput in less data traffic over the nodes and network lanes. Here it will Increase PDR (Packet Delivery Ratio) with DMP (Dynamic multilevel priority) which will be used in packet scheduling in buffer memories. So in the buffers there will be three level queues those are i) Real time (highest priority) packets, ii) Non Real time(second highest)priority packets iii) Non-Real time Local Priority packets.

II. LITERATURE REVIEW

- We have referred following papers for our Survey:

[1]Performance Evaluation of Dynamic Multilevel Priority (DMP) Packet Scheduling Method for Wireless Sensor Networks (WSNs):

- In this paper they have studied different packet scheduling methods and have proposed a DMP algorithm which achieves better QoS and produces less energy consumption results.

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[2] AN EFFICIENT PRIORITY PACKET SCHEDULING ALGORITHM FOR WIRELESS SENSOR NETWORK:

- The three class priority packet scheduling scheme is used here. Location of sensor nodes and processing of pre-emption are the mark factors used for efficient scheduling.

[3] An Energy Efficient Routing Protocol for Wireless Sensor Networks using A-star Algorithm:

- In this paper the author have proposed “Energy Efficient Routing Protocol”(EERP) using A* algorithm. It improves network lifetime by sending data packets via the optimal shortest path.

[4] Joint Congestion Control and Scheduling in Wireless Networks With Network Coding:

- It performs joint congestion and scheduling with network coding in wireless networks. The sent packets need to be forgotten otherwise the buffer space is full hence it leads to dropping of new incoming packets. This affects the overall output of the application.

[5] Reduced-Packet-Delay Generalized Buffer-Aided Relaying Protocol: Simultaneous Activation of Multiple Source-to-Relay Link:

- In this paper there are multiple types of sources that provide links to relay node.

[6] Throughput of Wireless-Powered Relaying Systems with Buffer-Aided Hybrid Relay:

- In this paper they have used two protocols namely-block wise harvest and transmit and block wise mode adaptation protocol for storing the information it received.

[7] Schedulability Analysis for non-Preemptive fixed Priority Multiprocessor scheduling:

- In this paper they have studied the schedulability analysis problem of global “Non preemptive fixed priority scheduling” (NP-FP) on multi processors.

[8] Priority Based Energy Aware (PEA) Routing Protocol for WBANs:

- Here body area networks are used to collect data. Selection of possible path by giving priorities.

[9] WSN Lifetime Optimization through Controlled Sink Mobility and Packet Buffering:

- In this paper the network lifetime increases by load balancing of the nodes. In this, by using multiple hop path the nodes send the data.

[10] Utility-based Scheduling Algorithm for Wireless Multi-media Sensor Networks:

- Multi media have high requirement of Quality of Service for which they have proposed “Utility-based scheduling” Algorithm that could increase the energy efficiency and satisfies the requirements of QoS of multi media. It includes two steps i) Semi-Markov Model ii) Utility function.

[11] A Pre-emptive Multiple Queue based Congestion Control for Different Traffic Classes in WSN:

- Here reduced packet drop probability and high system utilization and mean queue length is achieved. Here they have maintain multiple queues for controlling congestion.

[12] A Coverage-Based Drop-Policy in Wireless Sensor Network with Disruptive Connection:

- In this paper they have proposed a solution which considers the global coverage to choose which packet are dropped, in order to minimize the impact on remote or large scale monitoring application. The proposed system is named as Coverage-Based Drop-Policy in WSN with Disruptive Connections (CBDP) that improves the network coverage.

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[13] Mind the Smart Gap: A Buffer Management Algorithm for Delay Tolerant Wireless Sensor Networks:

- This paper proposes a novel buffer management algorithm, Smart-Gap, a Quality of Information (QoI) targeted buffer management algorithm. Efficient management and limited memory capacity are the major factors in the delay tolerant Wireless Sensor Network

Table 1:Literature survey-

Sr. No.	Publication Year	Paper Title	Authors	Purpose
1	2015	Performance Evaluation of Dynamic Multilevel Priority (DMP) Packet Scheduling Method for Wireless Sensor Networks (WSNs)	Suhas Bansode,Santosh Sambare	In this paper the proposed algorithm is Dynamic Multilevel Priority (DMP) packet scheduling method for WSN.
2	2012	An Efficient Priority Packet Scheduling Algorithm for Wireless Sensor Network	Lutful Karim,Nidal Nasser,Tarik Taleb,Abdulla Alqallaf	The packets are prioritized in such a way that the scheduling is efficient.
3	2014	An Energy Efficient Routing Protocol for Wireless Sensor Networks using A-star Algorithm	Ali Ghaffari	The lifetime of WSN is extended.
4	2014	Joint Congestion Control and Scheduling in Wireless Networks With Network Coding	Ronghui Hou,King-Shan Lui, Jiandong Li	To reduce Buffer Overhead
5	2016	Reduced-Packet-Delay Generalized Buffer-Aided Relaying Protocol: Simultaneous Activation of Multiple Source-to-Relay Link	Miharu Oiwa,Shinya Sugiura	It focuses on reduction of packet delay by considering overhead and buffering of nodes.
6	2016	Throughput of Wireless-Powered Relaying Systems with Buffer-Aided Hybrid Relay	Sheng Luo,Gang Yang,Kah Chan Teh	They have used the hybrid relay node,source node and destination node for transmitting the information that achieves throughput.
7	2011	Schedulability Analysis for non-Preemptive fixed Priority Multiprocessor scheduling	Nan Guan,Wang Yi,Qingxu Deng,Zonghua Gu,Ge Yu	Non-preemptive is better then preemptive scheduling for a considerable part of real time application on multiprocessor/multi-core platforms.
8	2015	Priority Based Energy Aware (PEA) Routing Protocol for WBANS	Sadaf Talha,Rizwan Ahmad,Adnan Khalid Kiani	In this paper they have used Priority based energy aware routing protocol in which parent nodes have a cost function that depends upon priority and energy.
9	2013	WSN Lifetime Optimization through Controlled Sink Mobility and Packet Buffering	Tifenn Rault,Abdelmadjid Bouabdallah,Yacine Challal	In this paper they have optimized the lifetime of the WSN by controlling sink mobility and buffering of packets.
10	2015	Utility-based Scheduling Algorithm for Wireless Multi-media Sensor Networks:	Han Hao,Ke Wang,Hong Ji,Xi Li,Heli Zhang	It's main purpose is to send multi media data efficiently and meet the QoS requirements.
11	2014	A Pre-emptive Multiple Queue based Congestion Control for Different Traffic Classes in WSN	Sunitha G P,Dilip Kumar S M,Vijay Kumar B P	In this paper they have used to detect congestion in the multiple queues.They also provide QoS and reduced packet waiting time.

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12	2012	A Coverage-Based Drop-Policy in Wireless Sensor Network with Disruptive Connection	Daniel Frazao Luiz, Carlos M. S. Figueiredo, Eduardo F. Nakamura	Buffer manages the coverage Based Drop Policy that improves the network coverage.
13	2015	Mind the Smart Gap: A Buffer Management Algorithm for Delay Tolerant Wireless Sensor Networks	Pehr Soderman, Karl-Johan Grinnemo, Markus Hidell, Peter Sjodin	Efficient buffer management.

- In table 1. we have surveyed the Last 5-6 years Journal papers on the Wireless sensor networks, Data packet transfer. We have studied overall different types of buffer management and packet scheduling techniques from the above Journal papers. Following things we have concluded from the above papers which we have shown in the existing system and the proposed system.

III. EXISITING SYSTEM

- In the given existing system different types of scheduling methods are given namely Earliest Deadline First(EDF), First Come First Served(FCFS), Pre-emptive, Non-preemptive, Single Queue, Multi-level Queue, Real-Time and Non-Real Time Packet Scheduling methods are studied. In the [1] they have proposed an algorithm called “Dynamic Multilevel Priority”(DMP) packet scheduling. They have used a multilevel buffer with 3-levels of queue.

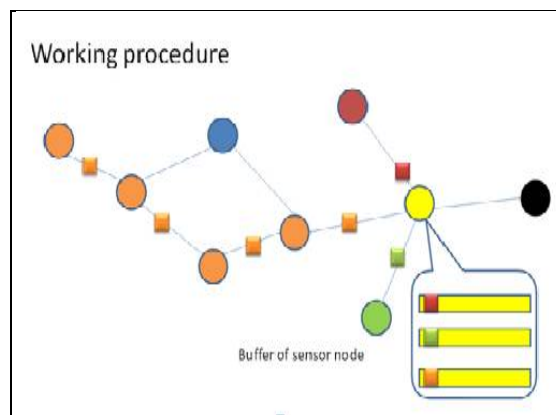


Fig. 1(a) Working procedure of existing system: Buffer Management with 3-Multi-Level Queue

- The Fig.1 (a) represents the **multilevel queue** for proper management of buffer. Where it contains the three level queues with each of the buffer those queues named as **i) Real time Queue ii) Non Real-time Queue iii) Local Priority Queue**. When the first Packet arrived from the respected source node then that packet gets highest priority. Then the second priority packet that arrived after the packet which received first will be assigned to the Non real time Queue. The packet which is received last that will be assigned by the Local priority queue. It will gain the Lowest Priority as per the buffer Schedule.

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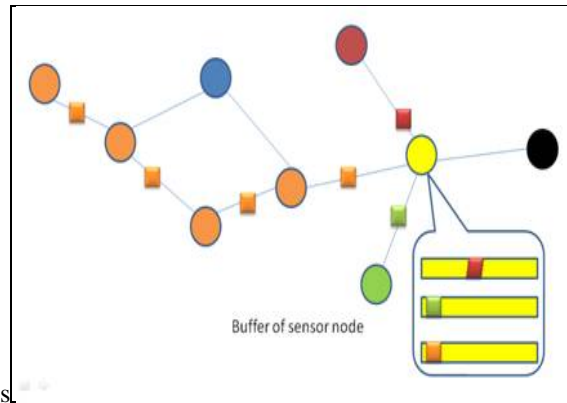


Fig. 1:(b)Real-Time Highest Priority Packets

- Fig.1 (b): In the **first queue** all the real time highest priority packets are processed first for avoiding packet loss and to get efficient throughput of overall application. Hence as shown in first queue the packet 'RED' is having highest priority so it will get processed first and will be transferred to the next node for further processing and to achieve efficiency for overall application.

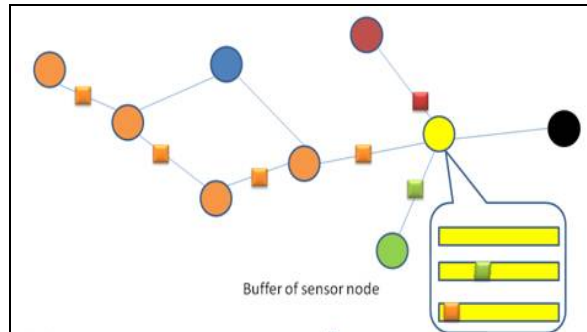


Fig. 1:(c) Non Real-Time Second Highest priority packets

- Fig.1 (c):In the **second queue** all non-real time second highest priority packets are processed. These packets are given second highest priority because they are Non-Real Time Packets which can be processed with some delay.

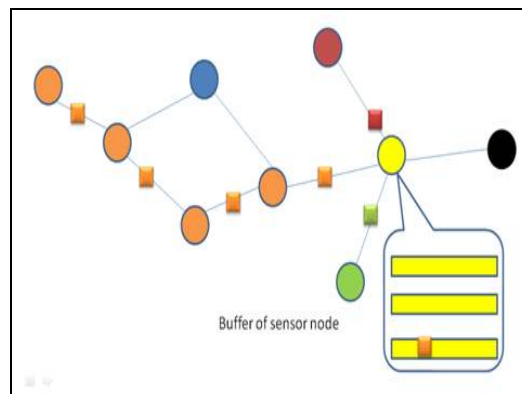


Fig. 1:(d) Non Real-Time Lowest priority packets

- Fig.1 (d):finally in the **third queue** all the non-real time lowest priority packets are processed. The packets which arrive at the sink node at the last time slot will be assigned third lowest priority.
- First priority is given to all the **real-time packets**,second priority is given to all the **non-real time packets** and then at the end lowest priority is given to all the Non-Real time local packets.

IV. PROPOSED SYSTEM

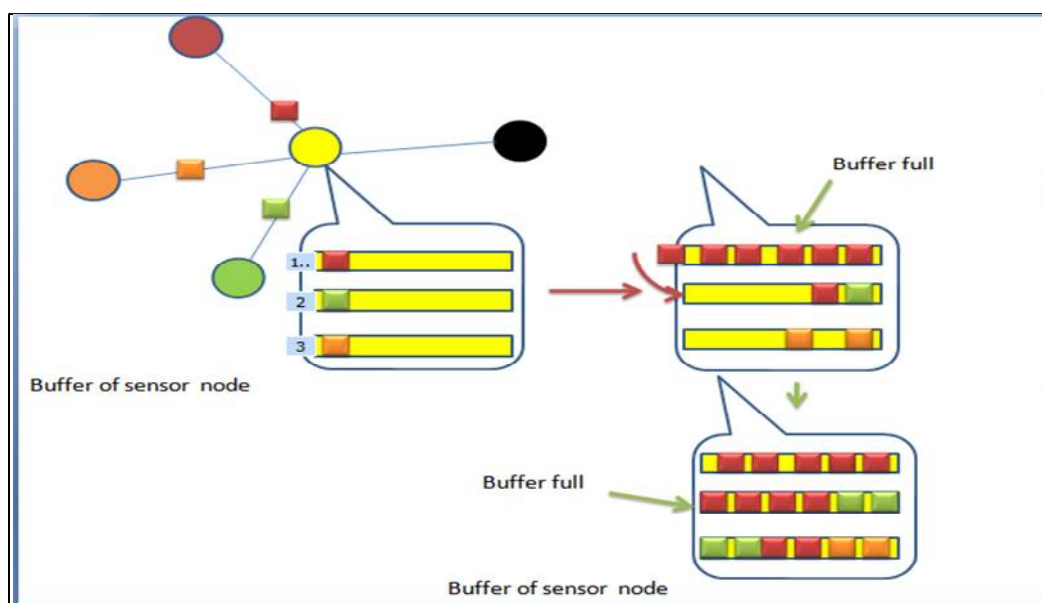


Fig. 2 Proposed system

- In our “**proposed system**” we are using **3-multilevel queues** concept for proper **buffer management**,to avoid packet loss and buffer overflow,we are going to use an **efficient packet scheduling method**.
- In Fig.2 there are 3-queues queue 1,2,and,3.As discussed about the 3-multilevel queues concept when the **Queue 1** becomes full with **real-time packets** which are present in the network the other real-time packets are then dropped in the network for avoiding it all the real-time packets are moved to the second queue so that the real time packets get processed with some delay to achieve QoS like Reliability.
- Similarly,if **Queue 2** becomes full then both **real-time packets** and **non-real time second highest priority packets** are moved to **Queue 3** and **all 3 types of packets** are processed with some delay to achieve efficient throughput of the overall application.

V.CONCLUSION

In this paper we have studied the concept of multilevel priority queues which contains three levels of queues. first level priority queue i)Real time priority packet which is stored in first of most queues ii) Non Real Time priority packets with second highest priority fits into the second high priority queue iii) Non Real time Local priority packets are the lowest priority packets which are having lowest priority get fit into third queue. For source node for data packet transmission the energy efficient relay is been added. Smart Gap determines the priority of a sample packet by the error or gap that a loss of this packet would impose on an overall series of measurements.

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