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Dynamic Data Prioritization Technique for Improving Quality of Service in Wireless Sensor Network

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Abstract:- **Wireless device networks have extensive range of application like environmental watching, traffic analysis, plan of action systems and process watching. Developing packet planning algorithms in wireless device networks with efficiency will enhance the delivery of packets through wireless links. Packet planning will guarantee quality of service and improve transmission rate in wireless device networks. DDP technique deals with packet planning algorithms. Wireless device network contains a completely different packet planning strategy and each has their own advantage and disadvantage.DDP proposes a formula which is power aware and primarily provides priority based planning which improves the act of task arrangement method in terms of transmission delay along with deadlock prevention.**

Keywords: DDP, Wireless device networks, Data waiting time, Real-Time, Non-Real Time, Packet Planning Algorithm.

I. INTRODUCTION

Wireless device networks is an vast area of research and has many design issues like data aggregation from source node to base station and routing protocols which deals with data transmission, data packet scheduling, sensor power consumption. Based on above criteria important concept is, Data packet delivery is based on priority and fairness with minimum latency. DDP deals mainly with packet scheduling based on priority. According to the application, real-time data packet should be given higher priority and non-real-time data packet should be given less priority. Packet scheduling is a process defined as decision making to select or drop the packet. Dropping of packet will depends on some the characteristics of network such as packet size, bandwidth, packet arrival rate, deadline of packet. Scheduler is used to schedule the packets.

Schedulers will have hard time to handle when all packets coming in with high packet rate, with low bandwidth and packet size is large. The scheduler will make decision to select the packets based on various algorithms. It is by default that all packets may not reach the base station or destination. Some of the packets may be dropped along the way with respect to the above previously mentioned effect of network characteristics. So some the algorithms have been selected for the survey based on various factors like priority, preemptive, non-preemptive, deadline, packet type and number of queues. Various Packet scheduling algorithms are applied mainly to guarantee packet data quality of service and transmission rate in wireless sensor networks

II. LITERATURE REVIEW

Scheduling information packets at device nodes are vital to rank applications of wireless device nodes. Planning information of packets at wireless device nodes decreases the process over-head, transmission waiting and saves power consumption [3]. Information detected as period of time application is given high priority than non-real time information. Wide selection of study and analysis on planning the sleep-wake times of device nodes are performed [1] however solely a little variety of studies live within the literature on the packet planning of device nodes that schedule the dealing out of information packets conferred at a device node and additionally reduces energy consumption[4]-[5]. But, most typically used task planning formula in wireless device networks is first return first Served (FCFS) hardware formula within which the progression of information packets takes place supported point in time and therefore it takes a lot of quantity of your time to be delivered to applicable base station (BS). However, the detected information should reach the bottom station among actual fundamental measure or before the expiration of a point. Additionally there to, period of time emergency information to be delivered to base station with the minimum attainable end-to-end delay. Hence, the intermediate nodes are dynamic, the packet delivery information in the prepared queue supported their significance like real or non-real time data packet and delivery point of packet. However first return first serve formula is inefficient with relevance waiting as well as sensors power consumptions. In existing wireless device networks task planning algorithms doesn't settle for traffic dynamics. Intermediate nodes will provide packet delivery information and modification depending on priority and releasing target packets.

Management of information is vital and necessary to avoid network congestion and poor performance. Packet planning technique maximizes information utilization. The hardware for packet planning ensures that packets are

transmitted from the queue buffer. There are wide ranges of planning techniques those embody random planning, spherical robin planning, and priority planning and weighted truthful queuing planning. It emphasizes rules in link-bandwidth sharing. Wireless device networks use truthful queuing planning algorithms for a share of link capability to ensure multiple packet flow [2]. The buffer helps the queuing system, wherever transmission of packets information takes place. In truthful queuing planning technique accounts for packet information, packet sizes thereby it ensures that every flow has equal probability in transmittal equal quantity in network. Weighted truthful queuing is one of the queuing planning techniques employed in packet planning that permits completely different planning. Therefore weight is achieved through multiplication of packet size thought by truthful queuing algorithms with weight inverse for a connected queue. Packet planning formula technique and active queue management service improves network Quality of Service. The majority accessible packets of wireless device networks are either dynamic or static in favor of wide selection of applications. Since these schedulers are preset and not dynamic however static, and can't be modified in real time for modification within the application necessities or environments [6]. As an example, a period of time priority hardware can't be modified dynamically at some purpose within they operate and it's statically employed in wireless device network applications.

III. ANALYSIS ON DATA PACKET SCHEDULING ALGORITHMS

Analysis on data packet scheduling procedure can take place by several factors, as it is illustrated in Figure 1.

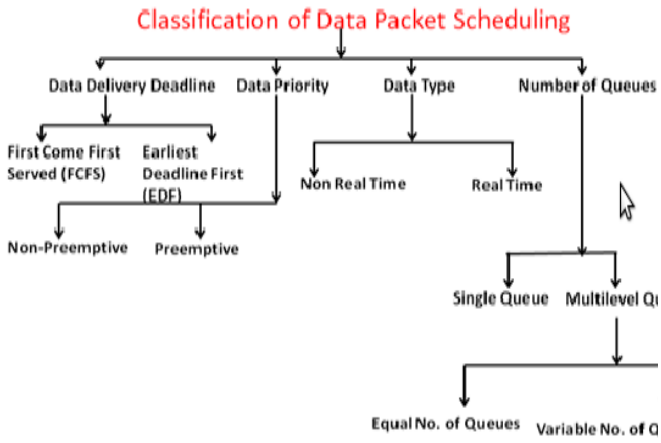

Fig.1. Classification of data packet scheduling

Packet programming schemes may be classified by numerous factors like point in time, priority, kinds of packets and variety of queues. Here during this analysis the following factors are illustrated.

A. Deadline

Resourcefully schedule a collection of incoming packets in order to transfer each packet to its destination with in time. If there's no such a schedule exists, then there's got to realize that permits a most variety of packets to satisfy their deadlines. Packet programming schemes may be classified supported the point in time of arrival of information packets to the bottom station (BS)

First return initial Served (FCFS)

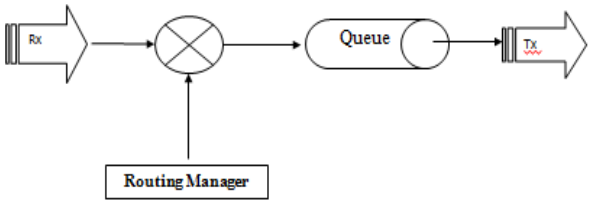

Fig.2. FCFS Block-Diagram

From fig.2, Most bestowed wireless sensors networks applications uses first come first Serve (FCFS) schedulers method, for sending packets from source to destination. Router will send packets in (FCFS) order.

Once the method is prepared it enters in to the ready queue, its method management Block is coupled on to the tail of the queue. In initial return initial Serve, knowledge that arrives late to the in-between nodes, also it takes more time to deliver packets at base station (BS). Since close neighboring nodes takes fewer time to processes in between nodes. In initial return initial Serve method packets arrival is late, as well as these packets expertise long waiting times.

Earliest point in time initial (EDF): It's a dynamic algorithm program for real time software system to put processes in priority queue. Whenever variety of Packets information is available at queue, every packet includes a point in time at intervals that will send to Base station. The priority queue can check the method with nearest point in time and also have the packet knowledge that has the earliest point in time is distributed initial. This algorithmic program is taken into account to be economical as well as best, due to less waiting time.

From analysis [8] proposes a period communication design for major sensing element networks, which is having more importance in computer hardware. Information facilitates the longest distance from the supply node to Base Station and has the shortest point in time, area unit prioritized. If the point in time of a selected task expires, the relevant packets will be present at intermediate nodes. Although this method provides low network traffic as well as overhead processing, it's not economical because it utilizes resources like remembrance, power and will increase process waiting time. The performance of the theme may be increased through incorporating initial return initial Serve.

B. Priority:

From fig.3 Priority based queues are introduced, so that the packets can be delivered to destination based on priority technique. Priority scheme can be categorized in two ways they are pre-emptive, non-pre-emptive programming. Once packet knowledge arrives at the prepared queue of the computer hardware, its priority is compared with the priority of the presently running knowledge packet within the queue.

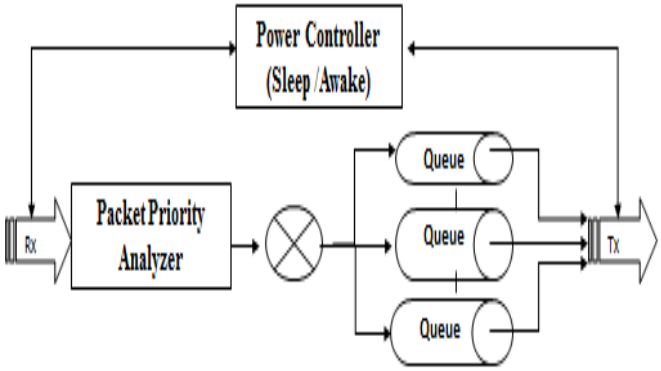

Fig 3.DMP-Only Priority Based

Non-preemptive programming: In non-preemptive priority packet scheduling, once first packet starts execution, second packet has to be in waiting queue So second packet should wait within the prepared queue till the execution of first packet.

Pre-emptive programming: In this method packets are executed depend upon the priority. More priority packet should be executed first and then less priority packet will be executed. So that queue can go to sleep mode automatically.

Packet programming mechanisms that area unit utilized in tiny OS [7]-[9], the wide used operative system of WSN and classify them as either cooperative or preventative. Cooperative programming schemes may be supported a dynamic priority programming mechanism, like EDF and [10] that uses queues with two special priorities. The computer hardware vigorously link between the two queues which provides point in time for fresh arrived packets. If the target of two packets area unit completely different, the shorter point in time packet would be placed into the higher-priority queue and also the longer point in time packet would be placed into the lower-priority one. Cooperative schedulers in Tiny OS area unit appropriate for applications with restricted system resources and with no onerous period needs. On the opposite hand, preventative programming may be supported the Emergency Task initial Rate Monotonic (ET-RM) theme. ET-RM is associate degree extension to Rate Monotonic (RM), a static priority programming, whereby the shortest-deadline job has the very best priority. ET-RM divides WSN tasks into amount Tasks, whose priorities area unit determined by a RM algorithmic program, and non-period tasks, that have higher priority than PTs and might interrupt, whenever needed, a running periodic task.

C. Packet Type:

Packet kind Packet programming schemes may be classified supported the kinds of information packets, that area unit as follows. Period packet scheduling, Packets at sensing element nodes supported their sorts and priorities. Packets Period knowledge area ….unit has the top priority among all knowledge packets within the prepared queue. So, they are processed with very best priority and delivered to the base station with a minimum waiting time.

Non-real-time packet scheduling: Non-real time packets have lesser priority than period tasks. they're thus delivered to BS either victimization initial return initial serve or shortest job initial basis once no period packet exists at the prepared queue of a sensing element node. These packets may be intuitively preempted by period packets. Although packet programming mechanisms of Tiny OS area unit straightforward and area unit used broadly in sensing element nodes, they cannot be useful to any or all applications, as the more implementation time of bound knowledge packets, period packets might well be placed into starvation. In addition, the info queue may be stuffed up terribly fast, if native data packets area unit a lot of frequent that causes the reject of period packets from different nodes. To abolish these drawbacks, [6] planned associate degree improved priority-based soft period packet programming algorithmic program. Schedulers traverse the waiting queue for the info packets and opt for the tiniest packet id because the highest priority to execute. Every packet is allotted associate degree Execute Counter, carry out soap time, i.e., the most important initial task implementation time. The management element compares the present packet id with the previous packet id. If it's constant, the system execute it and decrements the enumeration variable. Otherwise, if the enumeration variable is null, the management element terminates this packet and different packets get the chance to be dead. However, packet priorities area unit determined throughout the compilation section that cannot be modified throughout the execution time. If high priority packets area unit perpetually in carrying out, the low priority packets cannot be enforced. If low-priority packets absorb the resources for a protracted time, the following high-precedence packets cannot get response in time.

D. Number of Queue:

Variety of Queue Packet programming schemes can even be classified supported the amount of levels within the prepared queue of a sensing element node. This area unit as follows, Single Queue: every sensing element node includes a single prepared queue. (All kinds or every kind or every type or all sorts) of information packets enter the prepared queue and area unit regular supported completely different criterion: type, priority, size, etc.

Solo queue programming includes a high starvation rate. Multi-level Queue: every node has a lot of queues. Knowledge packets area unit placed into the various queues in keeping with their priorities and kinds. Thus, programming has two phases: (i) allocating tasks among completely different queues, (ii) programming packets in every queue. The amount of queues at a node depends on the extent of the node within the network. As an example, a node at the bottom level or a leaf node includes a less variety of queues while a node at the higher levels has a lot of queues to scale back less transmission delay and balance network energy consumptions.

To eliminate issues in [6] proposed a construction queue computer hardware theme that uses a distinct variety of queues in keeping with the placement of sensing element nodes within the network. This move towards two styles of

scheduling: straightforward priority-based and multi-initial return initial serve queue-based. Within the former, knowledge enters the prepared queue in keeping with priority however this programming additionally includes more starvation rate.

The multi-initial return initial serve queue is split into a most of three queues, looking at the placement of the node within the network. If the bottom stage, nodes that area unit placed at level have just one queue however there are a unit two queues for nodes at level. Every queue has its priority set to high, mid, or low. Once a node receives a packet, the node decides the packet's main concern in keeping with the hop count of the packet and consequently sends it to the applicable queue. However, this programming scheme doesn't provide variety variables of queues with the position of sensing element nodes to scale back the continuous delay.

IV. DEAD LINE AWARE MULTILEVEL PRIORITY PACKET SCHEDULING:

Dead line aware construction priority packet programming provides planned technique, every node excluding those at the last stage of topology of Wireless sensor Network (WSN) has three stages of priority of queue. Fig.4 illustrates that three levels of queues are controlled by queue analyzers, priority of packets are delivered to destination based on hop count method so that traffic can be minimized between nodes.

Period packets area unit sited into the top-priority queue and may prevent packets in alternative queues. Non-real time packets area unit sited into two alternative queues supported an exact threshold of their expected interval. Leaf nodes contain two queues for period and non-real-time knowledge packets since they are doing not get knowledge from alternative nodes and so, decrease finish-to- end delay. Together with this the detector will check whether packets expire or not, packets area unit buffered or not, if buffered then node deletes lifeless packet.

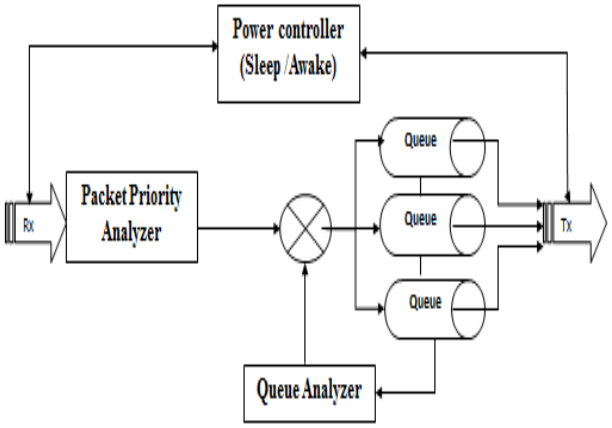

Fig 4.DDP-Hop based Priority

V. DEAD LOCK AVOIDANCE METHOD:

If a real-time task holds the resources for a more period of time, other tasks require waiting for an approximate period of time, causing the event of a deadlock. Deadlock condition decreases the act of task arrangement method in terms of nonstop delay. Each process declares the more number of resources of each type which it may require. This method is concerned about the number of available and allocated resources, and the maximum possible demands of the processes. When a process requests an available resource, the system must decide if immediate allocation leaves the system in a safe state.

VI. RESULTS:

The act of the planned packet arrangement method is evaluated, comparing it beside the FCFS and DMP. The link is made in terms of standard packet waiting time and nonstop transmission interruption of data. The proposed Dead line aware multilevel priority packet arrangement scheme allows special types of data packets to be processed depending up on their properties. Because real-time and crisis data should be processed with the low delay, they are processed with the main priority and can block tasks with lower priorities located in the other queues. Every individual task has a separate ID and real time task will preside over the first task. To give importance to the non-real time tasks and avoid massive delay, power saving method is proposed.

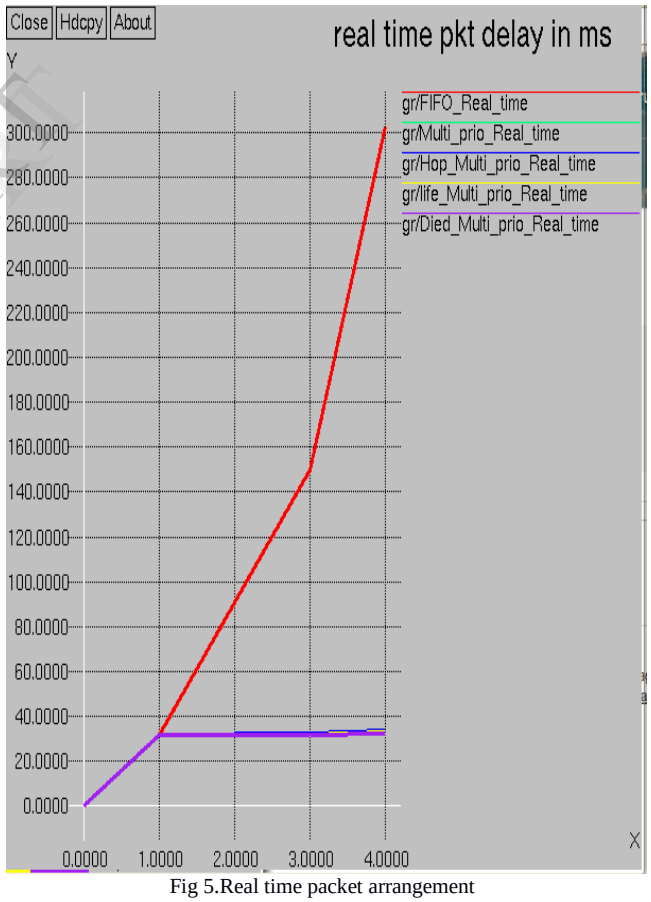

Fig 5.Real time packet arrangement

Fig.5 shows real time packet scheduling scheme. It provides important data packets, which is to be delivered to destination first without any loss of data. Fig.5 shows delay comparison between FIFO, PRIORITY, HOP, LIFE TIME, DEAD packet removal. From the x-graph delay for

dead packet of real time scheduling is less compared with other schemes.

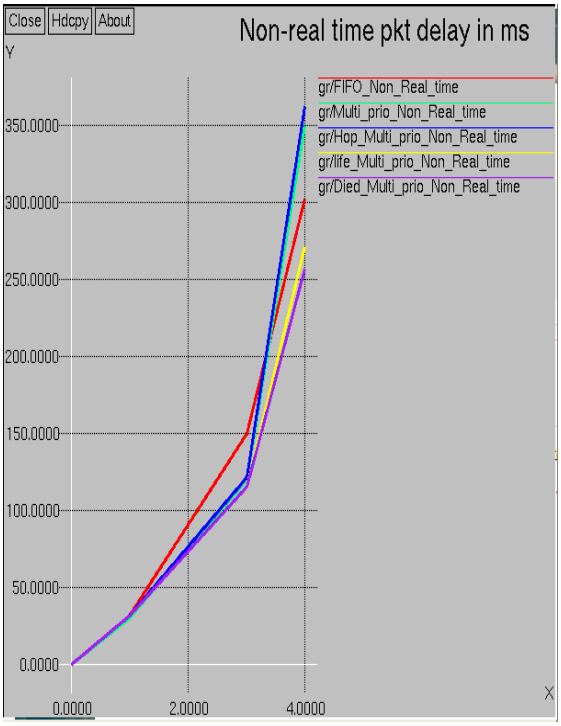

Fig 6. Non-real time packet arrangement

Fig.6 shows non- real time packet arrangement. During this method non real time data should be delivered after real time data. Fig.6 shows delay comparison between FIFO, PRIORITY, HOP, LIFE TIME, DEAD packet removal. From the fig.6delay for dead packet of non real time arrangement scheme is less compared with other schemes.

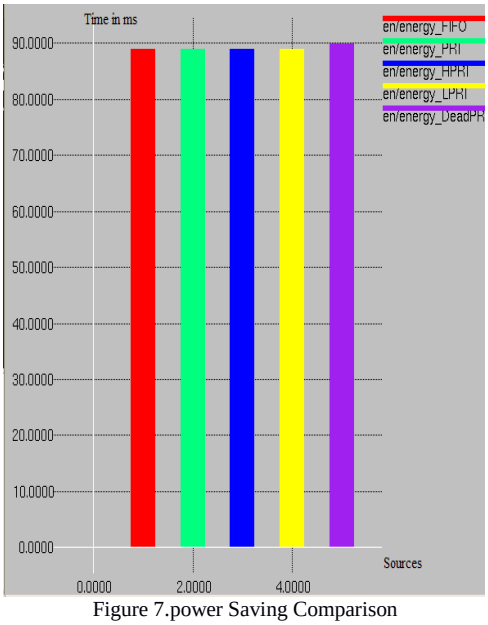

Figure 7.power Saving Comparison

Fig.7 shows power saving comparison data. Fig.7 provides comparison between FIFO, PRIORITY, HOP, LIFE TIME, DEAD packet removal. From x- graph, for dead packet removal is having more power saving than other schemes,

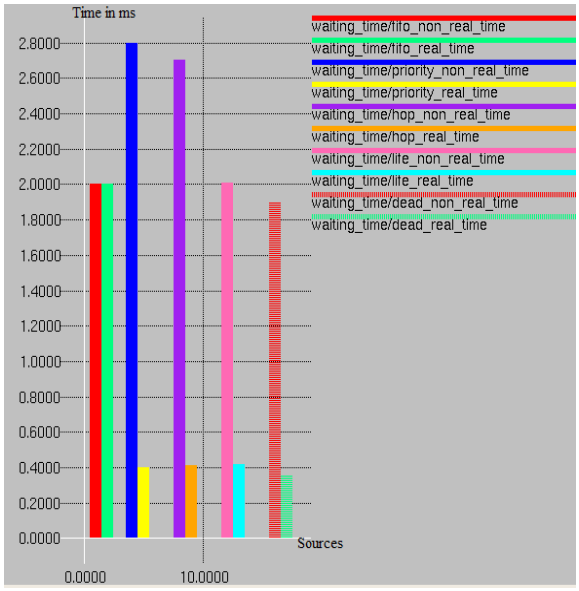

Figure 8.Delay Comparison

Fig.8 shows delay for real, non -real time packet arrangement. During this method waiting time for real, non-real time scheduling between FIFO, PRIORITY, HOP, LIFE TIME, DEAD packet removal is compared. From the x graph delay for dead packet of real time scheduling scheme is less compared with other schemes

VII. CONCLUSION:

DDP aims at providing different quality of service parameters like increasing fairness, minimizing transmission delay, reducing energy consumption and removal of dead packets. Packet programming mistreatment multiple queues is that the analyzed and dead line aware construction priority packet programming shows higher performance than all the remaining protocols.

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