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Enhanced Dead Line Aware Zone-Based Multilevel Packet Scheduling in Wireless Sensor Network

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Abstract:

Among several network design problems, like routing protocols and information aggregation that cut back sensor energy consumption and information transmission delay, packet planning at sensor nodes is extremely vital since it ensures delivery of various kinds of data packets based on their priority and fairness with a minimum latency.In this project, we have a tendency to propose a deadline aware multilevel packet priority scheduling. Within the planned theme, each node, except those at the last level of the virtual hierarchy within the zone primarily based topology of WSN, has n levels of priority queues. Per priority of packet node can route the packet to destination. We proposed Enhanced DMP, which helps to improve the dead lock avoidance.

Key word:

Scheduling, priority, queue, information aggregation.

1.Introduction:

RECENT years have witnessed the emergence of wireless sensing element networks (WSNs) as a replacement information-gathering paradigm, within which an oversized range of sensors scatter over a police work field and extract information of interests by reading real-world phenomena from the physical surroundings. Since sensors are generally powered and left unattended once the initial readying, it's usually unworkable to make full the ability provides once they eat up the energy. Thus, energy consumption becomes a primary concern during a WSN, because it is crucial for the network to functionally operate for associate degree expected amount of your time. Indeed, most existing Wireless sensing element Network operative systems use initial comes back initial Serve schedulers that method information packets within the order of their point in time and, thus, need lots of time to be delivered to a relevant base station.

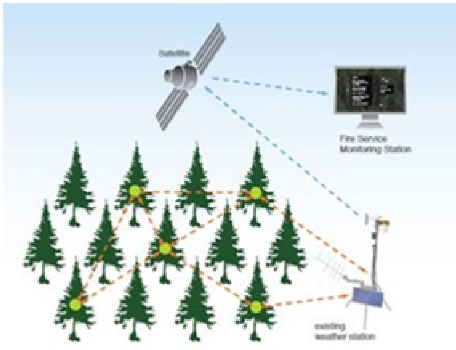

Fig. A wireless sensor network

However, to be substantive, detected information need to reach the baccalaureate BS a particular period or before the expiration of a point in time. In addition, time period emergency information ought to be delivered to baccalaureate with the shortest potential end-to-end delay. Hence, intermediate nodes need dynamic the delivery order of knowledge packets in their prepared queue supported their importance and delivery point in time. Any a lot of, most existing packet programming algorithms of WSN area unit neither dynamic nor appropriate for big scale applications.

2. Related work:

[1] During this paper, author projected a brand new energy-efficient approach for bunch nodes in ad hoc sensing element networks. Supported on, Hybrid Energy-Efficient Distributed bunch that sporadically selects cluster heads per a hybrid of their residual energy and secondary parameter, like nude proximity to its neighbors or node degree. This approach is applied to the planning of many varieties of sensing element network protocols that need energy potency, measurability, prolonged network period of time, and cargo equalization. [2] During this paper, author initial gift the way to place WSN by use of a marginal range to maximize the coverage space once the communication radius of the SN isn't but the sensing radius,

which ends up within the application of normal topology to WSNs preparation. Mobile node rotation will extend WSN topology period of time by over eight times on the average during which is considerably higher than existing alternatives. It considers WSNs that are largely static with low range of mobile relays not much declared for Dynamic WSNs.

In [3] the performance metrics ascertained are information| success rate (the fraction of generated data that matches the access points) and therefore the needed buffer capacities and sensors and therefore the MULEs. [4] During this paper author bestowed the planning and analysis of novel protocols that may dynamically put together a network to attain warranted degrees of coverage and property.

This work differs from existing property or coverage maintenance protocols in many key ways that. it's not extending resolution to handle a lot of refined coverage models and property configuration and develop adaptive coverage reconfiguration for energy-efficient distributed detection and chase techniques. [5] During this paper author have developed AN embedded networked detector design that merges sensing and articulation with adaptive algorithms that are aware of each change in environmental phenomena discovered by the mobile sensors and to separate events discovered by static sensors. They conjointly showed relationship among sampling strategies, event arrival rate, and sampling performance are bestowed. Sensing diversity doesn't introduce that is employed to boost Fidelity Driven Sampling.

3.System description:

Data packets that are sensed at a node are scheduled among a number of levels in the ready queue. According to the priority of the packet and availability of the queue, node will schedule the packet for transmission.Due to separated queue availability packet transmission delay is reduced. Due to reduction in packet transmission delay, node can goes to sleep mode as soon as possible.

So we can improve the energy saving also.In base research paper, node only scheduled priority packet buffering. In our enhancement node can check whether expire packets are buffered or not, if buffered then node deletes dead packet. Due to this operation, we can reduce buffering delay.

4.Implementation & assumption:

4.1.Assumptions:

We make the following assumptions to design and implement DMP packet scheduling scheme.

• Data traffic comprises only real-time and non-real-time data, e.g., real-time health data sensed by body sensors and non-real-time temperature data.
• All data packets (real-time and non-real-time) are of same size.
• Sensors are time synchronized.
• No data aggregation is performed at intermediate nodes for real-time data.
• Nodes are considered located at different levels based on the number of hop counts from BS.
• Timeslots are allocated to nodes at different levels using TDMA scheme, e.g., nodes at the lowest level, lk are assigned timeslot 1. Details of timeslot allocation are explained in the "Terminologies" subsection.
• The ready queue at each node has maximum three levels or sections for real-time data (pr1) non-real-time remote data (pr2) and non-real-time local data (pr3).
• The length of data queues is variable. For instance, the length of real-time data queue (pr1) is assumed to be smaller than that of non-real-time data queues (pr2 and pr3). However, the length of the non-real-time pr2 and pr3 queues are same.
• DMP scheduling scheme uses a multichannel MAC protocol to send multiple packets simultaneously.

The base work of DMP method considers only the priority not dealing with dead line aware system. in our enhancement we are considering the work with the dead line aware with respect to reach time

4.2.Algorithm:

While (task (k,i)) //task means any packet receiving that node i and K means level
{
If (pkt not has life) drop the packet
If (that is real time data)
{
Put that is in PR1 queue
}
Else if (node at which data sensed that's not at lowest level) //data also non real data
{

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If (data is non local) //check whether it came from lowest level node
{
Put in PR2 Queue
} else {
Put in PR3 Queue // local data sensed at that node itself
}
} else { //data sensed at lowest level
Put in PR2 Queue
}
//Some time slot given to level consider total time slot is Tk at k level
Consider data sensing time Ts
Remaining time T1(K) = Tk –Ts
Let total real time task at (NODE)i at level at Level k - nk(pr1)
Proctime(Pr1)k is total time for pr1
Node checks the pkt life time and priority packet
If (pkt detected in Pr1 queue)
{
Calculate remaining life time of packet from the header.
Checks the queue length
If (pkt has less life time but not less than threshold)
{
Send this packet first outside
} else if (reached threshold level life time)
{
Node checks the hop to reach destination
If (next node is destination)
{
Send the packet out
} else drop the packet
}
} else {
If (Proctime (Pr1) k <T1 (k))
{
All pr1 tasks of node (i) at l (k) are processed as FCFS
Remaining Time T2 (k)= T1(k)-ProcTime(Pr1)k
Proctime (Pr2)k is total time for pr2
If (Proctime(Pr2) k < T2(K))
{
All pr2 tasks are processed as FCFS pr3 tasks are processed as FCFS for the remaining time,
T3 (k) = T2 (k) − procTimepr2 (k)
} else {//this loop for if pr1 task time greater than Remaining time T2 (k)
pr2 tasks are processed for t2(k) time
no pr3 tasks are processed
}//end of inner if loop
} else { //this loop for if pr1 task time greater time than total time slot of that level
only pr1 tasks are processed for T1(k) time
no pr2 and pr3 tasks are processed
}
//after this block for pre-emptive type if any task processing at that time any higher priority task comes means its giving priority to that task
If (pr1 queue is empty and pr2 task are processing some time Y since T(K) < Proctimepr2(K))
{
At that time if pr3 task are coming then Pr2 task are pre-empted
If (any pr1 task coming in this)
{
Pr3 task pre-empted and giving priority to Pr1....
Context are transferred again for processing pr3 tasks
}
} //end of if
}//end of while
}
Node checks the pkt life time of non priority packet
If (pkt detected in Pr2 or pr3 queue) {
Calculate remaining life time of packet from the header.
Checks the queue length
If (pkt has less life time but not less than threshold)
{
If (task not under the process in Pr1) {
Send out this packet first
}
Else waiting for ending Pr1 task
} else if (reached threshold level life time) {
Node checks the hop to reach destination
If (next node is destination) {
If (Pr1 Not Under the process OR Pr1 Under the process but not in urgent) {
Send out the packet and make Pr1 to wait for this task
} else if {pr1 in urgent} {
Drop down the packet
}
} else drop the packet
}

5.Result:

In our paper, we have a tendency to analyzed completely different network atmosphere with main network parameters like Packet delay.

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We achieved our ultimate goal by applying our proposed deadline aware multilevel packet priority scheduling. We compared our proposed method with FIFO, Priority scheduling.Compare than all other method our method provides less delay and high energy saving.

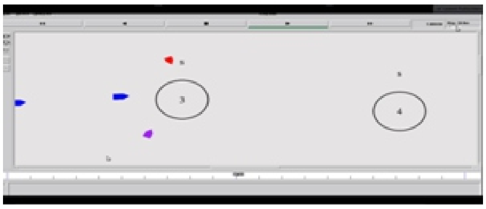

Fig2. Node 3 receives the data from neighbor node at more over same time.

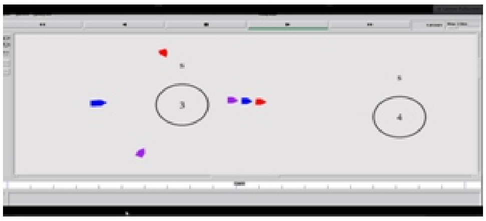

Fig.3 after buffering the packets, node sends the high priority data as first.

From our result, we will grasp we have a tendency to improved our network performance.Result shown bellow is packet delivery performance. In this graph, there are the 3 atmospheres (without priority environment, with priority atmosphere and enhanced dead line aware environment) shown.

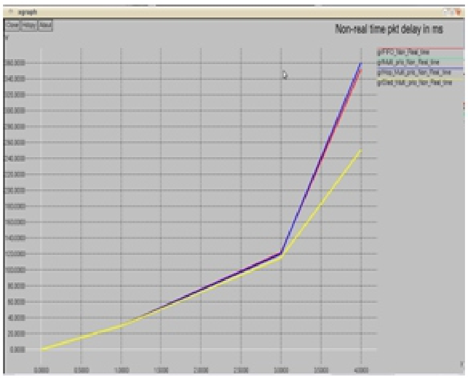

Fig. 4. Delay for non-real time packets

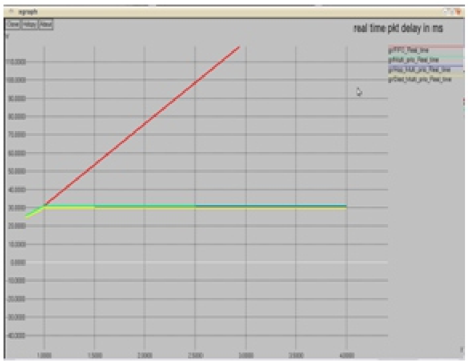

Fig. 5 Delay for non-real time packets

Conclusion:

We enhanced the Dynamic multilevel packet scheduling, and our proposed method assigned the task priority based on task deadline instead of only the priority. To reduce processing overhead and save bandwidth, we considered removing tasks with expired deadlines from the medium. Furthermore, if a real-time task holds the resources for a longer period of time, other tasks need to wait for an undefined period time, causing the occurrence of a deadlock. We have tested our method without deadlock problem.

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