Data Aggregation for Using the Node Coverage Area in Wireless Sensor Networks

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Abstract— **In wireless sensor networks huge number of wireless sensor nodes which is battery powered used for reducing the energy consumption for maintaining the normal functionality of wireless sensor networks. To gather applications that have sensor nodes wastes lots of energy when no data is collected or processed. To turn those nodes to sleep state sleep scheduling algorithms are used when they are not being used. Only when necessary they are wake up. To identify the link free collection of data the node should have transitions of data to reduce energy consumptions. There are more centralization algorithms having efficient distribution with performance in all the networks. So they use minimum number of time slot and reduction of state transitions. In our proposed system they concentrate on correlating information which should be gathered together for more efficient data aggregation. The proposed centralized and distributed algorithms can achieve better energy efficiency due to state transition for reducing them. Thus from our approach we can eliminate redundancy and minimize the number of transmissions. To save energy we can access data simultaneously and the time sequence in the distribution of routing protocol has used for sending the data efficiently and quickly in their network.**

Index Terms—**Wireless sensor network, Sleep scheduling algorithm, state transition, correlating information.**

I. INTRODUCTION

More than thousand mini batteries powered wireless sensor devices organized in a wireless sensor network. Gathering data for aggregation in intermediate node they will first collect data from their children nodes and he received data will be processed to aggregate the value for forwarding the aggregated data in their parent nodes. In most of the sensor nodes of non rechargeable batteries the key has to issue the activity for scheduling the consumption of energy and minimize them [1]. The major energy source for wireless sensors in idle state can listen to consume energy and make them sleep will wake up when necessary. In such sleep scheduling nodes they could operate n low cycle mode for starting them in a periodical manner for checking the activity of the channel [2]. They allow efficient sleep scheduling methods for allowing every node for start up and transmission for receiving the messages without any interference.

The protocols having equal time intervals for long transmission to one data packet is interference free and their approach is simple for assigning its communication link within the network [3]. The scheme involved for scheduling the link results in more number of time slots for necessary consideration with multiple networks which can make space for shared channel reuse. There also exists some redundant data aggregation protocol for energy efficient security with patterns based on data aggregation [4]. If sensor nodes having same data for sensing the sleep mode patterns can transmits its data encryption through their cluster heads.

The limitations for wireless sensor networks can store and power the processing of limitation specific architecture for sensor nodes in efficiency for energy and security for communication protocols. The feasible and inexpensive sensor networks for technology having low cost and low power wireless signals with sensor networks [5]. They can maximize the sensor nodes lifetime and can able to replace batteries with thousands of sensor nodes. In a sensor node network of data transmissions eliminates data redundancy and the number of data transmitted will be minimized for extensive investigation.

The sensor protocols with information for eliminating the redundancy of data transmission having metadata with direct diffusions can set up to collect data for data aggregation In the positive and negative path for patterns of set of data [6]. In a change over for predefined time interval in sensor reading which can collect the patterns of data and send the nodes for matching the critical events. In the extra energy consumption for state transitions have start up time for transmitting the small packets with the transient energy having high energy consumption with actual transmission.

There are many number of time slots for defining and scheduling the problem which needs to fulfill the tasks with intermediate node which can easily collect data from small nodes and compute it immediately without any aggregation value for data. This can have more waiting time with lengthy delay time which can receive the computation for energy consumption with transactions to be saved. With energy model for consuming the nodes with transition consideration for identifying the contiguous link scheduling problem which can link to monitor the channel for scheduling the period for data aggregation in network topology. For tree structure in intermediate node for twice in receiving the data from child node and transmitting the data to parent nodes.

The transmission for child node for data transmission with its parent node having the objective for contiguous link for

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scheduling the problem in wireless sensor network for finding the link scheduling the minimum period of time slots allotted for maximizing the spatial reuse of concurrent transmissions with no interference. The network throughput can be increased and the latency will be reduced with the data aggregation [7]. Normally by scheduling and addressing the energy model for close realistic sensor nodes.

We can identify the contiguous link for wireless networks have scheduling problem which proves the problem for complete presentation of centralized and distributed algorithms have theoretical performance bound to optimum networks. For simulation showing the efficiency for proposed algorithm have total energy consumption with time throughput having more delay.

II. System Model

A. Network Sensor Model

For wireless sensor network in static sensor nodes having single antennas with existing sink nodes that collects data from other sensor nodes. There are no represented sink networks for communicating with the help of graph representing the network for denoting the set of edge references made with communication links [8]. For each node in a network the transmission range would differ with communication link channel for different links in network.

The location of node within the range for transmission with most of the protocols for assuming the synchronization of time in the network with drift of clock can overlook the node. To consider different types of topology network the data gathered over direct graph for common data aggregation. In a gathering tree of data the root for tree will have node for each intermediate nodes that collects data from its child nodes for forwarding the data with its parent node [9]. The graph with no directed cycle for having no path that starts and ends with same node with depth of a node for length longest path from node.

B. Interference transmission Model

In a packet of wireless network transmission can receive all the nodes within the range of its transmission. To broadcast the medium for wireless range in which the link can interfere with the reception of another link. To consider both primary and secondary interference model the interference occurs within a node for communication having different time slots within single communication task. In the other mode of interference a node can be tuned with particular transmitter within the range of transmission which intends to another range of transmission for each node.

Supposing the range for interference of nodes from maximum to minimum range can have range of transmission over ratio for minimum between two links. In such interference over two links of network depends on model of interference which can use model of protocol in consideration of transmission in successful for any node located within distance from not transmitting the data through same time interval. In a model for each state in nodes consuming the power for each model in sleep state and transient state have low power consumption with the sleep state over transient state.

C. Energy Sensor Model

In each node operating in different states of consuming power at equal level comparing to the extreme power consumption rate will be low in the sleep state for active state sleep state. The sensor node of transient state has sleep to active startup state and the turn down active to sleep state. They have initialization process with state switching for receiving and transmitting the states due to loop for feedback. The frequency for synthesizing different orders of milliseconds can be compared over the start up and turn down process.

This is not as much transient for consuming energy with overhead for time which can have sensor over powers that merges with different time slots which can reduce the frequency together to save energy and time. Activating the sensors for time and power consuming to activate the sensor for packet transmission compared to transient energy it will save both energy and time.

III. Data Aggregation in Wireless Sensor Networks

If any transient state for transmitting and receiving the nodes for listening active state comparing the sensor node having two process with start up and turn down. In a centralization of scheduling with contiguous linking algorithm we might have scheduling problem instead of scheduling time slot with distribution to individual communication link for link nodes scheduling the consecutive time slots [10]. The node for centralization scheduling of algorithm having immediate node scheduling with consecutive time slots with each node start up once received from the neighbor nodes. They can construct merge over graph having conflict based on graph and vertex of communication link according to their weights.

The process for scheduling the weights in order of its decreasing order in which that the node has more increasing links for scheduling them. The merged conflict for consecutive time slots assigned with total number of assigned slots in each and every link. The link scheduling allows incident for overlapping times slots with adjacent same link assignment that cannot cause any interference.

For contiguous link scheduling reuse spatial backtracking in recursive algorithm with minimum conflicts have heuristics of algorithms in the process. Following the schedule constructing the merge of reuse work can have with communication for constructing the matrix with each node. The assigned time slot for nodes in decreasing weight order they assign smallest available time for consecutive time slots in nodes with recursive backtracking in conflicts with heuristics. They broadcast data to different nodes in each node network for links having time slots either use backtracking. The spatial work for heuristic algorithm would know the links.

In the distributed scheduling of wireless sensor nodes with necessary design which is efficient with scalable and distributed algorithms with efficient delay. They rather schedule randomly for decreasing the order globally with weights in order of assuming the contention available for competing the node for channel which can find the contiguous link without any occurrence of interference. They have less

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computation that can run the sensor node which is simple and efficient for distributed scheduling.

There is a consecutive time slot for link with no interference using first heuristics with centralized scheduling which can notify the nodes of interference of range in time slots with packet reception having transmissions that broadcasts assignment information with nodes of interference range which could not receive packets which involved in transmission range.

Both the centralized and distributed algorithms can achieve good and efficient energy for reducing state transitions. The performance can achieve the comparative algorithms with centralized algorithm for different types of networks. They have efficient delay which can reduce the delay in network for scheduling the throughput decreasing the transmission range with average time delay.

IV. Synchronization of Multiple Nodes

The mobile relay node act's as dynamic sensor node which moves around the sensor network. When it is revolve around the particular region, it emits the beacon message to its transmission range in the sensor network. Depends on the network size the number of mobile relay node is configured. The sensor nodes, when receives the beacon messages, the sensor nodes of the particular region starts to sends the collected information. Based on the sequence time and priority of data packets transformation the packets are aggregated in the sink node. The packets are transformed to mobile sink node through the intermediate relay node. They have each sensor node transmits and receives data with fixed transmission and reception power, respectively. So the power consumption is independent of the transmission distance between adjacent nodes. Accordingly, we adopt the following energy model due to calculate the power consumption. Sensor networks most often have a much more complicated topology than the simple examples and not all sensor nodes can communicate with each other directly. Thus, multi-hop synchronization is required, which adds an additional layer of complexity. Clearly, this could be avoided by using an overlay network which provides virtual, single-hop communication from every sensor node to a single master node. DTSR is a reactive time sync protocol, which can be used to obtain times of event detections at multiple observers in the local time of the sink node(s). We provide a more detailed description of the protocol later when formally analyze the time sync errors it introduces.

The heterogeneous sensors and nodes involved in different applications may generate data packets with different attributes. The identical sensors on the nodes involved in the same applications will generate the packets with identical attribute. However, the packets with correlated information should be gathered together for more efficient data aggregation. The proposed system works on ADR protocol. Actually, in the homogeneous environment, our ADA scheme should have advantage over the existing data aggregation scheme employing the static routing protocol. Such as Distributed Time Sequence Routing protocol has used to send the data efficiently and quickly on to their network. In this algorithm to find out the correct node locate route as well as direct path in the network base on the time. DTSR protocol is to transfer the data in to without any modification. Availability parameters mean connectivity and functionality in the network management layer. Connectivity is the physical connectivity of network elements. Loss is the fraction of packets lost in transit from sender to target during a specific time interval, expressed in percentages. Have to improve the network throughput, Network delivery ratio, and availability, data loss.

This helps in redundancy elimination in a network which can minimize the number of transmissions in the average time. They save energy rather than like other networks consuming more energy comparatively. Multiple users can access the data simultaneously within the network without any struck in between. Distributed time sequence routing protocol has used to send the data efficiently and swiftly into their network.

V. Conclusion

In this paper, we identify the contiguous link scheduling problem in WSNs, in which a sensor node starts up only once to receive all the data from its neighbours, and thus can reduce the energy consumption and time overhead in the state transitions. Especially, if the topology is a tree, each node can start up only twice in one scheduling period. We also propose centralized and distributed algorithms with theoretical performance bounds to the optimum in both homogeneous and heterogeneous networks. The simulation results corroborate the theoretical analysis, and show the efficiency of our algorithms in terms of total energy consumption, throughput, and time delay.

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