

Event Driven Dynamic Clustering and Data Aggregation in Wireless Sensor Network

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Abstract : Energy, delay and bandwidth are the prime issues of wireless sensor network (WSN). Energy usage optimization and efficient bandwidth utilization are important issues in WSN. Event triggered data aggregation facilitates such optimal tasks for event affected area in WSN. Reliable delivery of the critical information to sink node is also a major challenge of WSN. To tackle these issues, we propose an event driven dynamic clustering and data aggregation scheme for WSN that enhances the life time of the network by minimizing redundant data transmission. The proposed scheme operates as follows: (1) Whenever the event is triggered, event triggered node selects the cluster head. (2) Cluster head gathers data from sensor nodes within the cluster. (3) Cluster head node identifies and classifies the events out of the collected data using Bayesian classifier. (4) Aggregation of data is done using statistical method. (5) Cluster head discovers the paths to the sink node using residual energy, path distance and bandwidth. (6) If the aggregated data is critical, cluster head sends the aggregated data over the multipath for reliable data communication. (7) Otherwise aggregated data is transmitted towards sink node over the single path which is having the more bandwidth and residual energy. The performance of the scheme is validated for various WSN scenarios to evaluate the effectiveness of the proposed approach in terms of aggregation time, cluster formation time and energy consumed for aggregation.

Keywords : wireless sensor network, dynamic clustering, data aggregation, wireless communication

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