Abstract

Wireless Sensor Networks are a class of wireless networks intended for monitoring physical and environmental phenomena. The main task of sensor nodes is to collect specific data from surrounding environment and then route it to the base station or sink. The power efficiency and life time maximization are the foremost requirements of sensor networks. When a particular event is detected, the sensor nodes become active and there is a sudden burst of traffic towards the sink. This may lead to buffer overflow at the nodes causing packet drops and finally degrades overall network performance. Congestion leads to wastage of energy and minimizes the lifetime of sensor nodes. In sensor networks more energy is spend for
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communication rather than for computation. Hence it is necessary to ensure that the drop rate of transit packets which travel many hops in the network is reduced. This in turn brings down energy consumption and increases lifetime of sensor nodes. This paper proposes an efficient cross-layer congestion control scheme that can detect and avoid congestion in an event driven peer to peer sensor network. It provides priority based traffic scheduling with a dual queue scheduler which favours transit packets. Congestion is detected based on the buffer occupancy and a hop by hop back pressure mechanism is used as a fast reaction to congestion. In order to prevent persistent congestion the source sending rate is updated by the sink periodically with the help of an adaptive rate control algorithm. To route packets through less congested paths, the routing protocol in the proposed scheme makes use of the interface queue length of neighbourhood nodes to select the best next hop. The dual queue scheduler, hop by hop back pressure and adaptive rate control algorithm can together control both persistent and transient congestion in wireless sensor network.

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Index Terms

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Keywords

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