

Routing Protocols for Wireless Sensor Networks

Alex Aronski and Adrian Segall

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Abstract

Up-to-date technology makes possible the production of low-cost micro-sensor devices, which can perform short-range wireless communications and relatively complicated calculations. An ad-hoc network consisting of a large number of such devices, which are randomly distributed in a specified area, can be used in a variety of commercial and military applications. Such micro-sensor devices with small production expenses are battery powered and hence have extremely short lifetime. Therefore, the use of wireless sensor networks is ineffective without proper attention to utilization of energy resources.

Providing reliable and yet energy efficient routing protocols is of an utmost importance in Sensor Networks. Wireless Sensor Networks imply multi-hop data forwarding over unreliable and moving nodes. The main challenge is to find the right equilibrium point between quality of data delivery and the energy invested. Insufficient quality of data delivery may fail the application deployed over the wireless sensor network, while an energy wasteful protocol may significantly shorten the lifetime of the network, thus making the deployment inefficient for its purpose.

A wide range of routing protocols were proposed in the recent years, but only few of them take into consideration movement of the sensor nodes, focusing mainly on their unreliability or channel errors. Two main types of approaches to routing in WSN's can be identified in the literature: data-centric and path-based. In this work we will show that by borrowing a few concepts from data-centric protocols, it is possible to vastly improve the efficiency of classic path-based approaches. Our simulations show that the suggested routing protocol, which we name Data Centric Braided Multipath (DCBM), is well suited to handle routing in Wireless Sensor Networks with moderate sensor node movement.