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Speed optimisation of the mobile PAN coordinator for QoS enhancement in IoT networks

Abstract

The Internet of Things (IoT) network is typified by deployments such as a Wireless Sensor Network (WSN). These WSN's are commonly deployed within a target area for a specific task such as farm monitoring and asset movement control. A group of sensors are typically led by a Personal Area Network Coordinator (PANC). In some situations like in large scale greenhouse monitoring, mobile PANC are required to eliminate energy-hole issues and hence improve the performance of the WSN. The energy-hole issue is a problem caused by the depleted cluster head nodes. In this paper we analyse the performance of a WSN with a mobile PANC. Using inputs from previous empirical studies we designed a scenario of a mobile PAN coordinator using a simulation package. The performance was evaluated. The mobile PANC speed and contact time is monitored and the average network throughput and delay are measured. Based on an analysis of these results a comprehensive set of guidelines are provided for operators of IoT networks. These guidelines optimise the network performance and ultimately lead to cost savings for network providers.

Keywords

Beacon Order; IEEE 802.15.4; Internet of Things (IoT); Mobile WSN; PAN Coordinator; Superframe Order; ZigBee