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A prediction-based asynchronous MAC protocol for heavy traffic load in wireless sensor networks

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Abstract

Radio transceiver often consumes most of energy in a sensor node. To achieve low power consumption, every node periodically schedules its radio transceiver into sleep or active state, which is usually called duty cycle mechanism in MAC protocol. In this paper, we design a novel Prediction-Based Asynchronous MAC protocol (PBA-MAC) for heavy traffic load in wireless sensor networks. PBA-MAC applies an efficient wakeup mechanism to save the energy of a sensor node as much as possible. It reduces communication cost by enabling a sender to predict the intended receiver's wakeup time, without introducing unnecessary idle listening or overhearing cost. In addition, it introduces an exponential advance mechanism to handle the prediction error caused by clock drift and hardware platform latency. More importantly, its backcast-based retransmission characteristic can efficiently

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