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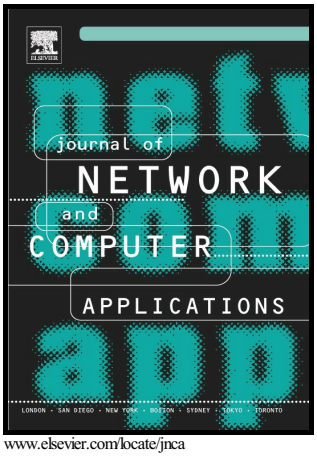

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A Power-Aware MAC layer Protocol For Real-Time Communication in Wireless Embedded Systems

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Abstract

The number of battery-operated devices with wireless communication capabilities has increased enormously in the last years and is expected to increase even more in the future. A fundamental need in these systems is to guarantee a minimum system lifetime and timing constraints through a careful management of energy, communication, and computational resources. This paper describes WBuST, a MAC layer protocol designed to bound the maximum delay of real-time messages and guarantee the system lifetime by properly allocating a share of the available bandwidth to each node of the network. The protocol allows multi-hop wireless communication under different network topologies. The proposed approach is assessed through theoretical analysis and experimental results.

Keywords: Wireless embedded networks, media access control, multi-channel, energy management, real-time streams.

1. Introduction

In the recent years, the interest on networked wireless systems has experienced an exponential growth, mainly due to the wide range of applications, including defense systems, health monitoring, domotics, intelligent buildings and industrial control systems.

The delay introduced by the network has a significant impact on the system performance, which can be specified according to different Quality of Service