

无线多媒体传感器网络中的动态频谱分配技术研究

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Studies on Dynamic Spectrum Allocation in Wireless Multimedia Sensor Networks

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摘要

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摘要 无线多媒体传感器网络(WMSNs)具有实时监控, 收集和处理多媒体信息的功能, 有广泛的应用前景。较之传统无线传感器网络, WMSNs 无线传输多媒体信息需要更大带宽。然而, 随着无线通信设备的广泛应用, 有限的可用频谱资源日益匮乏。利用动态频谱分配技术, 可以扩展 WMSNs 的通信频段, 增强抗干扰能力。考虑到 WMSNs 节点的物理限制, 如计算能力和能量供应, 该文提出了适合 WMSNs 的频谱感知方法和频谱管理方法。频谱感知采用各节点的轮换机制感知整个频段; 频谱管理可以确保对授权用户影响最小的信道被首先使用。WMSNs 使用上述方法可以感知周围无线电环境, 利用空闲私有频段进行无线通信。最后, 通过实验证明了该文提出的动态频谱分配技术对 WMSNs 的有效性。

关键词: 无线传感器网络 无线多媒体传感器 频谱感知 动态频率分配 认知无线电

Abstract: Wireless Multimedia Sensor Networks (WMSNs) can real-time monitor, collect and process multimedia information. They have wide applications. Compared to other traditional sensor networks, WMSNs need more bandwidth to transmit multimedia information. However, the limited radio frequency spectrum appears more and more precious as the wireless communication devices are gaining momentum. Dynamic spectrum allocation can extend the spectrum used by wireless multimedia sensor networks and eliminate the interferences. In this paper, a novel method for spectrum sensing and management is proposed. So that WMSNs which are limited by energy and computation ability can sense spectrum environment via periodical rotation and communicate by available spare spectrum. Finally, the validity of proposed methods are proved by the experiment.

Keywords: Wireless Sensor Networks (WSNs) Wireless multimedia sensor Spectrum sensing Dynamic frequency allocation Cognitive Radio (CR)

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