

Cognitive Radio Networks

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This book describes a communication paradigm that could shape the future of wireless communication networks, Opportunistic Spectrum Access (OSA) in Cognitive Radio Networks (CRN). While several theoretical OSA approaches have been proposed, they are challenged by the practical limitations of cognitive radios: the key enabling technology of OSA. This book presents an unprecedented formulation of the OSA problem in CNR that takes into account the practical limitations encountered due to existing technologies. Based on such a problem formulation, this book presents a framework and protocol details implementing the analytically-optimized solution of this problem. Unlike the state-of-the-art of CRN implementations that typically target software define radios which are not suitable for real systems, this book describes the implementation of distributed OSA, using practical radio transceiver technologies. It provides a thorough characterization of the gains available to theoretical OSA approaches if the practical limitations are taken into consideration. Tackles the cognitive radio networks performance optimization problem, taking into account the practical limitations of todays technologies;Provides thorough performance evaluation in arbitrary, large-scale networks, as well as microscopic, small-scale performance evaluation, using realistic hardware implementation;Presents an empirical study of the gains available over existing techniques by adopting practical approaches;Tackles the cognitive radio networks performance optimization problem, taking into account the practical limitations of todays technologies;Provides thorough performance evaluation in arbitrary, large-scale networks, as well as microscopic, small-scale performance evaluation, using realistic hardware implementation;Presents an empirical study of the gains available over existing techniques by adopting practical approaches;

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