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Energy Detection for Spectrum Sensing in Cognitive Radio

Springer

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ISSN 2191-5768 ISSN 2191-5776 (electronic)
ISBN 978-1-4939-0493-8 ISBN 978-1-4939-0494-5 (eBook)
DOI 10.1007/978-1-4939-0494-5
Springer New York Heidelberg Dordrecht London

Library of Congress Control Number: 2014930296

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Printed on acid-free paper

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Preface

Spectrum sensing is critically important for cognitive radio, an emerging solution to the spectrum congestion and low usage of licensed spectrum. Energy detection is a promising low-complexity and low-cost spectrum sensing technique. Its performance analysis has been revisited extensively in the recent literature. This book thus aims at a comprehensive summary of recent research on energy detection for spectrum sensing in cognitive radio networks. This book is for researchers and engineers in both industry and academia who would like to know more about applications of energy detection.

After introducing cognitive radio and spectrum sensing techniques in Chap. 1, we discuss the basics of conventional energy detection in detail in Chap. 2. To improve conventional energy detection, many alternative energy detection techniques have been developed, which are described in Chap. 3. The common performance measures of energy detector are described in Chap. 4. Finally, Chap. 5 deals with diversity and cooperative spectrum sensing techniques which can significantly improve energy detection performance.

We would like to thank Dr. Xuemin (Sherman) Shen, for his help in publishing this monograph.

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December, 2013

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Acronyms

ADC	Analog-to-digital converter
AUC	Area under the receiver operating characteristic curve
AWGN	Additive white Gaussian noise
BCED	Blindly combined energy detection
BER	Bit error rate
BSC	Binary symmetric channel
CAUC	Complementary AUC
CCI	Co-channel interference
CDF	Cumulative distribution function
CLT	Central limit theorem
CSCG	Circularly symmetric complex Gaussian
CSI	Channel-state information
DSA	Dynamic spectrum access
EGC	Equal gain combining
ENP	Estimated noise power
FCC	Federal Communications Commission
FDMA	Frequency division multiple access
GGN	Generalized Gaussian noise
GMN	Gaussian mixture noise
ICA	Independent component analysis
i.i.d.	Independent and identically distributed
LLR	Log-likelihood ratio
LTE	Long term evolution
MG	Mixture gamma
MGF	Moment generating function
MIMO	Multiple-input multiple-output
MRC	Maximal ratio combining
OFDM	Orthogonal frequency division multiplexing
PDF	Probability density function
PSK	Phase shift keying
ROC	Receiver operating characteristic

SC	Selection combining
SLC	Square-law combining
SLS	Square-law selection
SNR	Signal-to-noise ratio
SPRT	Sequential probability ratio test
SUN	Smart utility networks
TDMA	Time division multiple access
TV	Television
WiMAX	Worldwide interoperability for microwave access
WLAN	Wireless local area network
WRAN	Wireless regional area network