

Contents

- 1 Introduction 1**
 - 1.1 Cognitive Radio Networks on Licensed Bands 5
 - 1.1.1 Spectrum Sensing 5
 - 1.1.2 Collaborative Spectrum Sensing 8
 - 1.1.3 Database-Driven Cognitive Radio Networks 13
 - 1.2 Privacy Threats in Cognitive Radio Networks 16
 - 1.2.1 Location Privacy 16
 - 1.2.2 Location Privacy in Cognitive Radio Networks 19
 - 1.2.3 Significance 20
- 2 Privacy Preservation Techniques 23**
 - 2.1 Anonymization and Spatial Cloaking 23
 - 2.1.1 Anonymization Operations 23
 - 2.1.2 Anonymization Privacy Models 28
 - 2.2 Random Perturbation 31
 - 2.2.1 Privacy Measure 35
 - 2.3 Differential Privacy 36
 - 2.3.1 Differential Privacy Model 36
 - 2.3.2 Applying Differentially-Private to Set-Valued Data 39
 - 2.3.3 Applying Differentially-Private to Histogram Data 41
 - 2.4 Private Information Retrieval 48
- 3 Location Privacy Preservation in Collaborative Spectrum Sensing 51**
 - 3.1 Modeling Collaborative Spectrum Sensing 52
 - 3.2 Location Privacy Attacks in Collaborative Spectrum Sensing 54
 - 3.2.1 Attacks Under Single-Service-Provider Context 54
 - 3.2.2 Attacks Under Multi-Service-Provider Context 55
 - 3.3 Privacy Preserving Spectrum Sensing 56
 - 3.3.1 Privacy Preservation Under Single-Service-Provider Context 56
 - 3.3.2 Privacy Preservation Under Multi-Service-Provider Context 58

- 4 Location Privacy Preservation in Database-Driven Cognitive Radio Networks 59**
 - 4.1 Location Privacy Attacks in Database-Driven Cognitive Radio Networks 59
 - 4.1.1 Potential Privacy Threats When the Database is the Adversary 59
 - 4.1.2 Potential Privacy Threats When A Secondary User is the Adversary 62
 - 4.2 Privacy Preserving Query for Database-Driven Cognitive Radio Networks 63
- 5 Future Research Directions 67**
 - 5.1 Distributed Cognitive Radio Networks 68
 - 5.2 Privacy Preservation Against More Intelligent Adversaries 68
 - 5.2.1 Modeling Privacy Threats 69
 - 5.2.2 Modeling Interactions Between Users and Adversaries 70
- References 71**



<http://www.springer.com/978-3-319-01942-0>

Location Privacy Preservation in Cognitive Radio
Networks

Wang, W.; Zhang, Q.

2014, IX, 76 p. 31 illus., Softcover

ISBN: 978-3-319-01942-0