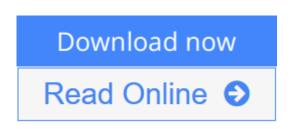# Multimedia over Cognitive Radio Networks: Algorithms, Protocols, and Experiments

By Fei Hu, Sunil Kumar

Multimedia over Cognitive Radio Networks: Algorithms, Protocols, and Experiments By Fei Hu, Sunil Kumar

With nearly 7 billion mobile phone subscriptions worldwide, mobility and computing have become pervasive in our society and business. Moreover, new mobile multimedia communication services are challenging telecommunication operators. To support the significant increase in multimedia traffic?especially video?over wireless networks, new technological infrastructure must be created. Cognitive Radio Networks (CRNs) are widely regarded as one of the most promising technologies for future wireless communications. This book explains how to efficiently deliver video, audio, and other data over CRNs.

Covering advanced algorithms, protocols, and hardware-/software-based experiments, this book describes how to encode video in a prioritized way to send to dynamic radio links. It discusses different FEC codes for video reliability and explains how different machine learning algorithms can be used for video quality control. It also explains how to use readily available software tools to build a CRN simulation model.

This book explains both theoretical and experimental designs. It describes how universal software radio peripheral (USRP) boards can be used for real-time, high-resolution video transmission. It also discusses how a USRP board can sense the spectrum dynamics and how it can be controlled by GNU Radio software. A separate chapter discusses how the network simulator ns-2 can be used to build a simulated CRN platform.

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Editorial Review

About the Author

Dr. Fei Hu is currently an associate professor in the Department of Electrical and Computer Engineering at the University of Alabama, Tuscaloosa, Alabama. He obtained his PhD at Tongji University (Shanghai, China) in the field of signal processing (in 1999) and at Clarkson University (Potsdam, New York) in electrical and computer engineering (in 2002). He has published more than 160 journal/conference papers and books. Dr. Hu's research has been supported by U.S. National Science Foundation, Cisco, Sprint, and other sources. His research expertise can be summarized as 3S: Security, Signals, Sensors.

Dr. Sunil Kumar is currently a professor and Thomas G. Pine Faculty Fellow in the Department of Electrical and Computer Engineering at San Diego State University (SDSU), San Diego, California. He received his PhD in electrical and electronics engineering from the Birla Institute of Technology and Science (BITS), Pilani, India, in 1997. From 1997 to 2002, Dr. Kumar was a postdoctoral researcher and adjunct faculty at the University of Southern California, Los Angeles. He also worked as a consultant in industry on JPEG2000- and MPEG-4-related projects, and was a member of the US delegation in JPEG2000 standardization activities. Prior to joining SDSU, Dr. Kumar was an assistant professor at Clarkson University, Potsdam, New York (2002–2006). He was an ASEE Summer Faculty Fellow at the Air Force Research Lab in Rome, New York, during the summer of 2007 and 2008, where he conducted research in Airborne Wireless Networks. Dr. Kumar is a senior member of IEEE and has published more than 125 research articles in international journals and conferences, including three books/book chapters. His research has been supported by grants/awards from the National Science Foundation, U.S. Air Force Research Lab, Department of Energy, California Energy Commission, and other agencies. His research areas include wireless networks, cross-layer and QoS-aware wireless protocols, and error-resilient video compression.

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