

Decentralized Spectrum Selection Algorithm to Consider Hardware Constraints in Cognitive Radio Ad-hoc Networks

Bosung Kim*, Nguyen Manh Tuan*, Byeong-hee Roh*, Dae-Young Kim**, and Soo Bum Park**

**Graduate School of Information and Communication, Ajou University,*

San 5 Wonchon-dong, Youngtong-gu, Suwon-si, 443-749, Korea

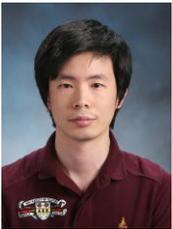
***LIG Nex1 Corporation,*

Pangyo Techno Valley, Sampyeong-dong, Bundang-gu, Seongnam-si, 463-400, Korea

{kbs8354, nmtuan, bhroh}@ajou.ac.kr, {daeyoung.kim81, sbpark93}@lignex1.com

Abstract—The Cognitive Radio (CR) is considered as a solution to increase in wireless devices and traffic in existing networks where inefficient spectrum utilization occurs. Common Control Channel (CCC) of CR helps unlicensed devices to make a decision for availability of spectrum resources in CR Ad Hoc Networks (CRAHNs). Actually, it is not easy to adopt CCC to the network in which supports applications such as military units penetrating deep in unknown and/or hostile territories, wireless networks established for particular social events, or sensor networks deployed for specific tasks. Therefore, various kinds of decentralized MAC protocols are developed recently to consider hardware constraints. However, these protocols also have limitations that they did not consider various operation environments and parameters to enhance the performance. In this paper, we propose a memoryless access based spectrum selection algorithm to overcome the hardware constraints and enhance the spectrum utilization. To evaluate the network performance, simulations are conducted in terms of throughput.

Keyword—Cognitive Radio, Decentralized MAC, Memoryless Access, OPNET, Periodic Sensing, Spectrum Selection.



Bosung Kim received his B.S. degree in Information and Computer Engineering from Ajou University, Suwon, Korea, in 2009 and he is studying as a Ph.D. Candidate in Computer Engineering at Ajou University, Suwon-si, Korea since March 2009. His research interests include the areas of QoS Provision for Multimedia Communication, Tactical Networks, Satellite Systems, Cognitive Radio Networks, and Modeling and Simulation (M&S).



Tuan Nguyen received a B.E degree in Information Technology at University of Science, National University of Vietnam – HCMC. Currently, he is studying as a Master Candidate in Computer Engineering at Ajou University, Suwon, Korea. His research area includes Cognitive Radio networks, and routing protocols.



Byeong-hee Roh received his B.S. degree in electronics engineering from Hanyang University, Seoul, Korea, in 1987 and his M.S. and Ph.D. degrees in electrical engineering from Korea Advanced Institute of Science and Technology (KAIST), Taejon, Korea, in 1989 and 1998, respectively. From 1989 to 1994, he was with the Telecommunication Networks Laboratory, Korea Telecom, as a researcher. From February 1998 to March 2000, he worked with Samsung Electronics Co., Ltd., Korea, as a Senior Engineer. Since March 2000, he has been with the Graduate School of Information and Communication, Ajou University, Suwon, Korea, where he is currently an associate professor. During 2005, he was a visiting associate professor at the Dept. of Computer Science, State University of New York at Stony Brook, New York, USA. His research interests include the areas of mobile multimedia networking, network QoS, wireless sensor networks, network security and military communications.



Dae-Young Kim received his B.S. degree in electronics engineering, M.S. and Ph.D. degree in computer engineering from Kyung Hee University, Korea in 2004, 2006, and 2010, respectively. He is currently with the Communication R&D Lab., LIG Nex1 Co., Ltd., Korea. His research interests include mobile networking & computing, wireless sensor networking, and embedded systems.



Soobum Park received the B.S. in electrical engineering from KAIST, Daejeon, South Korea, in 2001 and the M.S. in the school of information and communication from Hanyang University, Seoul, South Korea, in 2006. Currently, he is a research engineer at the communication research center in LIG Nex1. His research interests include military communications, mobile ad hoc networks, cognitive radio, and future wireless communication systems.