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Multi-Antenna Assisted Spectrum Sensing for Cognitive Radio in Nakagami-M Fading Channel

Mrs. T. G Dhaarani[1], Monish R[2], Puviyarasu S[3], Ramya V[4], Subasri S[5]
Assistant Professor, Department of Electronics and Communication Engineering[1]
Final Year Students, Department of Electronics and Communication Engineering[2,3,4,5]
Nandha Engineering College, Erode, Tamil Nadu, India

Abstract: *CR (Cognitive Radio) is a key technology that enables the limited and inefficiently used frequency bands to be used more effectively with an opportunistic approach. Communication performance and continuity in cognitive radio networks are highly dependent on whether the spectrum sensing function is performed correctly or not. Spectrum sensing is a critical issue of cognitive radio technology because of the shadowing, fading, and time-varying natures of wireless channels. To sense the limited or unused frequency bands, different methods for spectrum sensing have been proposed. Here, improved energy detection is used for this work. Energy detection is a spectrum sensing technique based on measuring the received signal energy and deciding the presence or absence of the primary user by comparing the received energy level with a threshold. Fading channels shows that the speed of the SU increases, the energy detection performance decreases in deterioration in detection probability.*

Keywords: Cognitive Radio Networks, Energy Detection, Nakagami m Fading Channel, Spectrum Sensing

REFERENCES

[1]. Brijesh soni, Dhaval k Patel, Zhiguo Ding, and Sumei sun, "On Sensing Performance of Multi-Antenna Mobile Cognitive Radio Conditioned on Primary User Activity Statistics," IEEE Wireless Commun. J., vol. 1,no. 4, pp.289–299,May.2022.
[2]. K. D. Singh, P. Rawat, and J.-M. Bonnin, "Cognitive radio for vehicular ad hoc networks (CR-VANETs): Approaches and challenges," EURASIPJ. Wireless Commun.Netw.,vol.2017,no.1,p.49,2019.
[3]. D. Jiang and L. Delgrossi, "IEEE 802.11 p: Towards an international standard for wireless access in vehicular environments," in Proc. IEEEVTC, May 2018, pp.2036–2040.
[4]. J. Mitola and G. Q. Maguire, Jr., "Cognitive radio: Making softwareradios more personal," IEEE Pers. Commun., vol. 6, no. 4, pp. 13–18,Apr. 2016.
[5]. H. Urkowitz, "Energy detection of unknown deterministic signals,"Proc. IEEE,vol.55,no.4,pp.523–531,Apr.2016.
[6]. F. F. Digham, M.-S. Alouini, and M. K. Simon, "On the energy detection of unknown signals over fading channels," IEEE Trans. Commun.,vol. 55, no. 1, pp. 21–24,Jan.2014.
[7]. S. P. Herath, N. Rajatheva, and C. Tellambura, "Energy detection of unknown signals in fading and diversity reception," IEEE Trans. Commun., vol. 59, no. 9, pp.2443–2453,Sep.2013.
[8]. V. A. Aalo, "Performance of maximal-ratio diversity systems in a correlated Nakagami-fading environment," IEEE Trans. Commun., vol. 43,no. 8, pp. 2360–2369,Aug.2013.
[9]. W. C. Y. Lee, Mobile Communications Design Fundamentals, 2nd ed.New York,NY,USA:Wiley,2012.
[10]. V. R. S. Banjade, N. Rajatheva, and C. Tellambura "Performance analysis of energy detection with multiple correlated antenna cognitive radio in Nakagami-m fading," IEEE Commun. Lett., vol. 16, no. 4,pp. 502–505, Apr. 2012.
[11]. Y. Huang and X. Huang, "Spectrum sensing over frequency-selective fading channel with tap and spatial correlations," in Proc. IEEE PIMRC,Sep. 2012, pp. 2143–2148.
[12]. S. Al-Juboori and X. Fernando, "Correlated multichannel spectrum sensing cognitive radio system with selection combining," in Proc. IEEEGLOBECOM, Dec.2011,pp.1–6.
[13]. S. Al-Juboori and X. N. Fernando, "Multiantenna spectrum sensing over correlated Nakagami-m channels

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with MRC and EGC diversity receptions," IEEE Trans.Veh.Technol.,vol.67,no.3,pp.2155–2164,Mar.2011.

[14]. S. Al-Juboori, X. Fernando, Y. Deng, and A. Nallanathan, "Impact of interbranch correlation on multichannel spectrum sensing with SC and SSC diversity combining schemes," IEEE Trans. Veh. Technol., vol. 68,no. 1, pp. 456–470,Jan.2009.

[15]. A. W. Min and K. G. Shin, "Impact of mobility on spectrum sensing in cognitive radio networks," in Proc. ACM Workshop Cognit. Radio Netw.,2005, pp.13–18.

[16]. A. S. Cacciapuoti, I. F. Akyildiz, and L. Paura, "Primary-user mobility impact on spectrum sensing in cognitive radio networks," in Proc.IEEE 22nd Int. Symp. Pers., Indoor Mobile Radio Commun., Sep. 2002,pp. 451–456.

[17]. L. Gahane, P. K. Sharma, N. Varshney, T. A. Tsiftsis, and P. Kumar,"An improved energy detector for mobile cognitive users over generalized fading channels," IEEE Trans. Commun., vol. 66, no. 2,pp. 534–545, Feb. 2000.

[18]. O. Thakkar, D. K. Patel, Y. L. Guan, S. Sun, Y. C. Chang, and J. M.-Y. Lim, "On the joint impact of SU mobility and PU activity in cognitive vehicular networks with improved energy detection," in Proc. IEEE 89th Veh. Technol. Conf.,Apr.1996,pp.1–6.

[19]. S. Zhu, C. Guo, C. Feng, and X. Liu, "Performance analysis of cooperative spectrum sensing in cognitive vehicular networks with dense traffic," in Proc. IEEE83rdVeh.Technol.Conf.,May1991,pp.1–6.

[20]. Y. Zhao, P. Paul, C. Xin, and M. Song, "Performance analysis of spectrum sensing with mobile SUs in cognitive radio networks," in Proc. IEEE ICC, Jun. 1985, pp. 2761–2766.