

Study and analysis of Cognitive Radio channel scanning technology for Wi-Fi networks

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Wi-Fi has become such a ubiquitous wireless technology in a relatively short period that it is not surprising; we are in the midst of at least one Wi-Fi network no matter wherever we are. Each one of us has a Laptop/Smartphone/Netbook competing against each other for the Wi-Fi bandwidth and thus has to compromise on data speeds in order to share the limited Wi-Fi spectrum. Contrary to this Wi-Fi crowding phenomenon which is yet to worsen with the ongoing explosive growth of wireless devices, studies show that 90% of the time, spectrum designated to legacy technologies like the TV spectrum was found unoccupied and not every channel was in use always. Cognitive Radio Technology is the riposte to this paradoxical situation. Cognitive Radios (CR) are envisioned to solve the challenge of spectrum scarcity when communication technologies have increasingly started relying on the wireless medium. CR is an intelligent radio which scans the radio spectrum for free channels and uses them to its own advantage. Though CR technology definitely sounds a promising candidate to deal with this crowding Wi-Fi spectrum, not much is known on how energy efficient these CRs and their Spectrum Scanning processes are. Our work is to study and analyze these energy-intensive Spectrum Scanning processes and further propose techniques to make them more energy efficient, thereby making battery constrained portable devices operate for longer durations. Our work also increases the reliability and availability of wireless networks in rural areas of Kansas where opportunity of recharging batteries is limited.