隨意式無線網路中 Tone-Based 方向性媒介擷取機制的效能評估

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摘 要

在無線隨意式網路中使用方向性天線能夠大幅減少干擾的影響，並且可以有效的提昇網路系統的傳輸效能。方向性天線能夠提供全向性天線所缺乏的優勢，例如，提升傳輸空間的使用率、減少同頻干擾（co-channel）的情形、增加傳送的距離與節省傳送時所需的電力。為了能夠充分的使用方向性天線的優點，因此必須要有一個適合的媒介存取機制來運作。在許多根據IEEE 802.11 MAC協定所提出用來配合方向性天線的媒介存取協定中，以適用在無線隨意式網路中的Directional-MAC（DMAC）最為被大家所關注。但是在使用方向性天線與DMAC時，會存在一些原本IEEE 802.11隨意式無線網路中不會產生的問題，例如deafness問題的發生。 在本論文中，我們以用來解決deafness問題的Tone-based DMAC(ToneDMAC）媒介存取協定與其相關的天線系統為主要的研究對象。ToneDMAC利用控制頻道發送類似out-of-band方式的訊調(tone)來降低無線隨意式網路中deafness現象的產生，藉以改善網路效能。現今的ToneDMAC以全向性天線的運作模式來廣播訊調給相鄰近的節點，因為傳送範圍的限制，所以在一些情況下還是會受到deafness問題的影響。所以本論文將原來ToneDMAC的訊調廣播機制與使用方向性天線模擬全向性天線運作方式的訊調廣播機制相互比較其對網路系統效能上的影響。我們在使用SNT Qualnet模擬實驗後，觀察到本論文提出的方法可以使得網路節點擷取頻道的機會變得較為公平，不僅節點訊框lost的次數減少了，同時亦提昇了網路整體的吞吐量（Throughput）。

關鍵詞 : 無線隨意式網路 ; 方向性天線

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