Reducing Interference in dense deployments of home wireless networks: a graphical game approach

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Abstract:
Increasingly dense deployments of home wireless networks where each unit has its own wireless access point are being deployed without any coordination between the deployed units. Considering this situation, it would be much better if the access points that are topologically closer together, i.e. neighbourhing access points, would form groups, where one member of the group would serve the terminals of all group members in addition to its own terminals, so that the other access points of the group can be silent or even turned off during that period of time, reducing interference and increasing overall Quality of Experience (QoE). The fact that participating units are deployed without any coordination, makes the overall QoE vulnerable to the selfish behaviour of each unit. We propose an approach where each unit operates in an equilibrium of a cooperative game. The graphical game model is used to show that there exists motivation to enter and remain in cooperative groups, in which interference is decreased due to the voluntary cooperation of the adjacent units.