Resource Allocation for Device-to-Device Communications Underlaying Heterogeneous Cellular Networks Using Coalitional Games

ABSTRACT

Heterogeneous cellular networks (HCNs) with millimeter wave (mmWave) communications included are emerging as a promising candidate for the fifth generation mobile network. With highly directional antenna arrays, mmWave links are able to provide several-Gbps transmission rate. In this paper, we first formulate the problem of the resource allocation among mmWave and the cellular band for multiple D2D pairs from the view point of game theory. Then, with the characteristics of cellular and mmWave communications considered, we propose a coalition formation game to maximize the system sum rate in statistical average sense. We also theoretically prove that our proposed game converges to a Nash-stable equilibrium and further reaches the nearoptimal solution with fast convergence rate. Through extensive simulations under various system parameters, we demonstrate the superior performance of our scheme in terms of the system sum rate compared with several other practical schemes.

EXISTING SYSTEM

- In existing system, an energyefficient mmWave backhauling scheme to deal with the joint optimization problem of concurrent transmission scheduling and power control of small cells densely deployed in HCNs.

- However, mmWave communications have unique characteristics that are different from traditional cellular networks.

- Consequently, network congestion may happen in mmWave networks.

PROPOSED SYSTEM

- We present the coalition game from the view point of game theory to solve the formulated resource sharing problem.

- Based on the problem, we introduce a coalition game theory model, where the D2D pairs tend to form coalitions so that the system utility will improve.

- Then, we utilize the advantages of cellular D2D network and mmWave D2D network, and develop a coalition formation algorithm to implement efficient resource allocation with low computation complexity.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor   -   Intel core i3

- RAM   - 2B

- Hard Disk   - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX

- Tool : Network Simulator-2

- Front End : OTCL (Object Oriented Tool Command Language)

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