Distributed Interference and Delay Aware Design for D2D Communication in Large Wireless Networks with Adaptive Interference Estimation

ABSTRACT

We investigate distributed flow control and power allocation strategies for delay-aware Device-to-Device (D2D) communication underlaying large wireless networks, where D2D pairs reuse the resource blocks (RBs) of interior cellular users (CUEs). We consider a distributed D2D power allocation framework, where the D2D pairs individually attempt to maximize their own time-average throughput utility, while collectively guaranteeing the time-average coverage probability of CUEs in multiple cells. We design a novel method to compute the individual budget of interference from each D2D pair to CUEs based on stochastic geometry tools.

CONT….

- Then, accounting for time varying channel fading and dynamic D2D traffic arrival, we design a distributed interference-and-delay-aware (DIDA) flow control and power allocation strategy based on Lyapunov optimization and several interference estimation methods.
- We also analytically derive the performance bounds of D2D pairs and prove that the coverage probability of CUEs can be guaranteed regardless of the interference estimation error at D2D receivers. Finally, simulation results suggest that adaptive interference estimation methods are preferred and demonstrate that the DIDA strategy achieves substantial performance improvement against alternative strategies.

EXISTING SYSTEM

- D2D communication can use either overlay or underlay spectrum access. In overlay spectrum access, D2D pairs and cellular users (CUEs) are allocated orthogonal Resource Blocks (RBs), while in underlay spectrum access, D2D pairs share RBs with CUEs. Commonly, underlay spectrum access is preferred because it can significantly enhance spectral efficiency.
- However, the coexistence of D2D pairs and CUEs in underlay spectrum access incurs both intra-tier and cross-tier interference. Therefore, we must appropriately balance the throughput demand of D2D pairs and the reliable communication of CUEs. Efficient interference management, e.g., through power allocation, is thus required for the successful coexistence of D2D pairs and CUEs, especially when the base stations (BSs), CUEs, and D2D pairs are randomly located.

PROPOSED SYSTEM

In this paper, we focus on the design of distributed flow control and power allocation strategies for delay-aware D2D communication underlaying large wireless networks, which also take into account the interference created by the D2D pairs.

Hardware requirements

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

REFERENCES

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