Fundamental Storage-Latency Tradeoff in Cache-Aided MIMO Interference Networks

ABSTRACT

➢ Caching is an effective technique to improve user perceived experience for content delivery in wireless networks. Wireless caching differs from traditional web caching in that it can exploit the broadcast nature of wireless medium and hence opportunistically change the network topologies.

➢ This paper studies a cache-aided MIMO interference network with 3 transmitters each equipped with M antennas and 3 receivers each with N antennas. With caching at both the transmitter and receiver sides, the network is changed to hybrid forms of MIMO broadcast channel, MIMO X channel, and MIMO multicast channels.

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➢ We analyze the degrees of freedom (DoF) of these new channel models using practical interference management schemes. Based on the collective use of these DoF results, we then obtain an achievable normalized delivery time (NDT) of the network, an information-theoretic metric that evaluates the worst-case delivery time at given cache sizes.

➢ The obtained NDT is for arbitrary M, N and any feasible cache sizes. It is shown to be optimal in certain cases and within a multiplicative gap of 3 from the optimum in other cases.

EXISTING SYSTEM

➤ The fundamental limits of caching at the receiver side in a shared link with one server and multiple cache-aided receivers. The caching can exploit multicast opportunities even when user demands are different, and hence greatly reduces the traffic load over the shared link.

➤ This is enabled by proper file splitting during the cache placement phase and coded transmission during the content delivery phase, known as coded caching.

PROPOSED SYSTEM

The achievable upper bound of minimum NDT in Theorem 1 is based on the same cache placement strategy in different delivery scheme due to the deployment of multiple antennas. In this section, we first review the file splitting and caching strategy proposed.

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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