



TECHNOLOGY

Cooperative Transmission in Wireless Multi-Hop Networks

OVERVIEW

Background

Cooperative communication enhances performance in wireless environments. The idea of cooperation emerged from the realization that spatial diversity can counteract the effects of fading, shadowing, attenuation and interference. Most recent developments capitalize on the properties of the wireless medium to enhance transmission rate and quality through collaborative coding at the physical layer. However, evidence shows that performance gains can be achieved even when cooperation is implemented at the network protocol level.

Innovative Technology

Researchers at the University of Maryland have proposed a novel technique to enhance rate and quality in wireless network environments through cooperative relaying at the network level and not at the physical layer. This new technique uses a multi-hop relaying concept among source nodes, whereby a packet is delivered to the destination through either a direct link or through multi-hop relaying by intermediate source users. By following an opportunistic and dynamic cooperation strategy, all users in the network simultaneously achieve higher stable throughput and smaller delay.

Advantages

- Characterizes the stable throughput region of both work-conserving and time division multiple access (TDMA) policies for a larger network of users
- Characterizes the average delay performance for individual users. All users experience less average delay after cooperation is performed.
- When the inter-user channel quality is improved, the same cooperation strategy can lead to even higher throughput and delay performance gains for all users.
- Strictly contains the non-cooperative stable throughput region

Applications

- Techniques
- Software
- Design procedures
- Products for implementing network-level cooperation

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Patent(s) pending

LICENSE STATUS

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CATEGORIES

- Microelectronics
- Information Technology

EXTERNAL RESOURCES

- [US Patent 8,542,579](#)

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