Receiver Energy Save Algorithm in MIMO 802.11n Wireless Networks

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SUMMARY

UCLA researchers in the Department of Computer Science have developed a novel MIMO Receiver Energy Save Algorithm that yields energy savings of up to 37% in 802.11n enabled portable devices over the IEEE 802.11n's default Spatial Multiplexing Power Save feature.

BACKGROUND

The IEEE 802.11n standard has opened the door for fully leveraging Multiple-input Multiple-output (MIMO) antenna technologies in computer communications over wireless LANs. An 802.11n device using multiple transmit-receive antennas can reach data rates of up to 600Mbps. However, the increased transfer rate comes at the cost of higher MIMO circuitry power consumption, which grows with the number of active antennas.

To combat this issue, the IEEE 802.11n standard proposed the Spatial Multiplexing Power Save (SMPS) feature which allows an 802.11n device to retain one active receive antenna to mitigate MIMO circuitry power consumption. Unfortunately, experiments revel that the SMPS feature may save MIMO circuitry power consumption but it does not always save power for the overall system.

INNOVATION

Researchers at UCLA have developed an 802.11n standard compliant receiver energy save algorithm for MIMO 802.11n wireless devices that identifies and sets the most energy-efficient receiver antenna settings. The novel MIMO Receiver Energy Save Algorithm yields significant energy savings for 802.11n enabled portable devices such as smart phones and tablet PCs.

APPLICATIONS

Ideal for smart phones, tablet PCs, laptops and other 802.11n enabled portable devices

ADVANTAGES

- Novel low-cost sampling scheme
- Novel metrics which considers both power consumption and throughput to select the best antenna settings
- Significantly lowers system power consumption

STATE OF DEVELOPMENT

Researchers have developed, implemented and tested the novel Energy Save Algorithm using commodity 802.11n devices.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

MIMO, IEEE 802.11n, Spatial Multiplexing Power Save

CATEGORIZED AS

- **Communications**
  - Networking
  - Wireless

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