

Cooperative Beamforming for Indoor Body Area Networks

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Abstract:

This paper applies cooperative beamforming to Body Area Networks (BAN). We consider an indoor environment with multiple BANs are located and have to transmit data toward specific sinks, in fixed positions. Nodes deployed on the same body may cooperate in order to form Virtual Antenna Arrays (VAA), transmitting data toward one out of the available sinks. Sinks are equipped, on their turn, with multiple antennas, such that a Multiple Input Multiple Output (MIMO) transmission system is established. The cooperation technique employed is beamforming in which antenna elements, on both transmitter and receiver side, set their weight coefficients such that the received signal is maximized. We investigate different scheduling techniques that sinks may adopt in order to optimise different performance metrics. We also propose a more advanced mechanism in which sinks sense the channel in different directions prior to scheduling the transmissions. Considered metrics include Block Error Rate (BLER), Signal to Noise Ratio (SNR), Signal to Interference and Noise Ratio (SINR) and Jain index. Results obtained through simulations clearly show the advantages of cooperation among nodes in BANs. We also provide an insight on the performance obtained by applying different scheduling algorithms on indoor BAN scenario.