

IST-054
Cooperative MIMO

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Abstract

The purpose of this project is to investigate the benefits of a new approach to communication in wireless networks that has become known as cooperative diversity or cooperative MIMO. This approach attempts to have the nodes in a wireless network work together to reduce transmission power for efficiency while at the same time increasing the performance of the system. In particular this approach should increase system capacity and reduce delay. Essentially, the nodes in the network pool their antennas to obtain gains only possible through using more antennas than any one of the nodes possess individually. There has been a great deal of research on cooperative diversity by our research group and by others. Thus far the studies have been fairly theoretical and have not dealt with practical issues. The goal of this project is to investigate these practical issues. In particular we want to know if cooperative diversity will produce the gains that have been predicted by theoretical studies in a real system. If this is the case, then these approaches can potentially be used in 802.11 products. It turns out that Agere Systems is the leading company in the 802.11 (wireless computer networks) area and new cooperative MIMO based products could provide market advantage in this area in the future. The goals of this project will be accomplished through collaborative efforts between Lehigh University and Agere Systems, with support from the Pennsylvania Infrastructure Technology Alliance (PITA), the National Science Foundation (NSF) and the Air Force Office of Scientific Research (AFOSR).

Close technical interaction with Agere will allow us to capitalize on our signal processing and communications expertise and their expertise in the chip manufacturing.