

Researchers improve fast-moving mobile networks

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Mobile ad hoc networks (MANETs) allow people in multiple, rapidly-moving vehicles to communicate with each other – such as in military or emergency-response situations. Researchers from North Carolina State University have devised a method to improve the quality and efficiency of data transmission in these networks.

"Our goal was to get the highest data rate possible, without compromising the fidelity of the signal," says Dr. Alexandra Duel-Hallen, a professor of electrical and computer engineering at NC State and co-author of a paper describing the work.

Transmitting data within MANETs is challenging because every node that transmits and receives data is in motion – and the faster they are moving, the harder it is for the network to identify effective relay "paths" for transmitting data. This is because the power of the data-transmission channels fluctuates much more rapidly at high speed.

In other words, a transmitter may try to send a message through Relay A, because Relay A has a strong signal. However, because the transmitter and Relay A are both moving quickly, Relay A's signal might be weak by the time the message actually gets there. And a weak signal could result in the message being garbled.

To address this issue, researchers developed a method to improve the ability of each node in the network to select the best path for relaying data, as well as the best for transmitting the data that ensures reliable

reception.

When a node needs to transmit a message, it first measures the strength of transmissions it is receiving from potential relays. Those data are then plugged in to an algorithm that predicts which relay will be strongest when the message is transmitted. By predicting the strength of the relay, the algorithm also tells the node the rate at which it should transmit the data. If it tries to send too much data too quickly, the data quality will suffer – the data could be compromised. If the rate of data transmission is too slow, the network won't be operating at peak efficiency.

More information: The paper, "Enabling Adaptive Rate and Relay Selection for 802.11 Mobile Ad Hoc Networks," will be presented at IEEE's International Conference on Communications in Ottawa, June 10-15.

Provided by North Carolina State University

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