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Socially Aware Cooperative Device-to-Device (D2D) Communications

Background

One of the core technology components of the newly evolving 5G architecture, device-to-device (D2D) communication, is a promising approach to increase network capacity by promoting direct communication between mobile devices. Instead of consuming additional tower bandwidth to download the same data to multiple devices within a traditional cellular network, a device within a D2D network draws cached data from other local wireless devices. Data transfers faster and more reliably since each device has multiple relay connections to the internet source. Existing D2D frameworks assume that all devices within a network are equally likely to share data and equally willing to cooperate. However, this is not always the case as users download different content based on their interests and do not wish to be exposed to potential security vulnerabilities.

Invention Description

Researchers at ASU have developed a software platform for socially aware cooperative D2D communication that leverages social trust and reciprocity to promote effective cooperation between devices. Its framework allows open communication for altruistic relay assistance between trustworthy devices, while forming reciprocal groups between untrustworthy devices that provide mutually beneficial relay assistance to one another. Trustworthiness can be based on social media connections since users within social media networks are more likely to download similar content and trust each other. This software platform enhances device communication without jeopardizing security, resulting in faster data transfer and a reduction in the collective bandwidth consumption of a mobile network.

This invention is covered by [U.S. Pat. No. 10,827,503](#).

Potential Applications

- 5G mobile networks
- Cloud networking
- D2D communications

- Live streaming and file downloading

Benefits and Advantages

- Reduces bandwidth consumption of mobile networks
- Optimizes D2D communication through social affiliation
- Faster data transfer
- More reliable network connectivity

Related Publication (PDF): [Social Trust and Social Reciprocity Based Cooperative D2D Communications](#)

[Faculty Profile of Professor Junshan Zhang](#)