

# Study shows how Facebook's mutual-friends feature creates security risks, privacy concerns

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Pittsburgh

The mutual-friends feature on social networks such as Facebook, which displays users' shared friendships, might not be so "friendly."

Often revered for bringing people together, the [mutual-friends](#) feature on [Facebook](#) actually creates myriad [security risks](#) and [privacy concerns](#) according to a University of Pittsburgh study published in *Computers & Security*. The study demonstrates that even though users can tailor their [privacy](#) settings, hackers can still find private information through mutual-friends features.

"Oftentimes, mutual-friends features have not been created in tandem with privacy setting designs, and inadequate thought with regards to security and privacy issues has been given," said James Joshi, principal investigator of the study and associate professor of information assurance and security in Pitt's School of Information Sciences. "With such a huge user base in such systems, a minor privacy breach can have a significant impact."

Together with his colleagues—Mohd Anwar, a former faculty member in Pitt's School of Information Sciences and now assistant professor at North Carolina A&T State University, and Lei Jin, a PhD candidate in Pitt's School of Information Sciences—Joshi examined three different types of attacks on social network users using an offline Facebook dataset containing 63,731 users from the New Orleans regional network. This dataset (chosen because it was open to the public) also included more than a million friend links.

Using computer simulation programs, the researchers first demonstrated a "friend exposure" attack, exploring how many private friends an

"attacker" could find of a specific target user. The attacks were tested on 10 randomly chosen user groups with sizes ranging between 500 and 5,000 individuals, as well as sample groups that were computer generated based on shared interests across user profiles. The same process was used for the "distant neighbor exposure attack," through which the attacker's goal was to identify private distant neighbors from the initial target. These distant neighbors indicate users that are friends of friends of the target user (two degrees of separation) or even friends of friends of friends of the target user (three degrees of separation).

Finally, the team initiated a "hybrid attack," in which an attacker tried to identify both the target's private friends and distant neighbors.

They found that an attacker identified more than 60 percent of a target's private friends in the "mutual-friend based attack." Likewise, an attacker could find, on average, 67 percent of a target's private distant neighbors by using 100 compromised user accounts.

"Being able to see mutual [friends](#) may allow one to find out important and private social connections of a targeted user," said Joshi. "An attacker can infer such information as political affiliations or private information that could be socially embarrassing. More importantly, the information that's gathered could be used, in combination with other background information about the targeted user, to create false identities that appear even more authentic than the actual user."

"It is important to understand all possible privacy threats to users of [social networking](#) sites so that appropriate mechanisms can be developed. This work of ours is an effort to comprehensively understand such threats related to the mutual-friend feature so that appropriate measures can be taken."

Joshi cites the need for better privacy-protection settings to mitigate the

problem—but those that can also be easily navigated by [users](#).

**More information:** The paper, "Mutual-friend Based attacks in Social Network Systems," was first [published](#) online April 22 in Computers & Security.

Provided by University of Pittsburgh

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