Love connection: Researchers develop algorithm for recommending online dating prospects

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University of Iowa researchers may have come up with the right matchmaking formula for online dating sites: Pair people according to their past interests and online mating success, rather than who they say they're interested in.

Kang Zhao, assistant professor of management sciences in the Tippie College of Business, and UI doctoral student Xi Wang are part of a team that recently developed an algorithm for dating sites that uses a person's contact history to recommend partners with whom they may be more amorously compatible. It's similar to the model Netflix uses to recommend movies users might like by tracking their viewing history.

Zhao says he's already been contacted by two dating services interested in learning more about the model. Since it doesn't rely on profile information, Zhao says it can also be used by other online services that match people, such as a job recruiting or college admissions.

Zhao's team used data provided by a popular commercial online dating company whose identity is being kept confidential. It looked at 475,000 initial contacts involving 47,000 users in two U.S. cities over a 196-day span. Of the users, 28,000 were men and 19,000 were women, and men made 80 percent of the initial contacts.

Zhao says the data suggests that only about 25 percent of those initial

contacts were actually reciprocated. To improve that rate, Zhao's team developed a model that combines two factors to recommend contacts: a client's tastes, determined by the types of people the client has contacted; and attractiveness/unattractiveness, determined by how many of those contacts are returned and how many are not.

Those combinations of taste and attractiveness, Zhao says, do a better job of predicting successful connections than relying on information that clients enter into their profile, because what people put in their profile may not always be what they're really interested in. They could be intentionally misleading, or may not know themselves well enough to know their own tastes in the opposite sex, Zhao theorizes. So a man who says on his profile that he likes tall women may in fact be approaching mostly short women, even though the dating website will continue to recommend tall women.

"Your actions reflect your taste and attractiveness in a way that could be more accurate than what you include in your profile," Zhao says. Eventually, Zhao's algorithm will notice that while a client says he likes tall women, he keeps contacting short women, and will change its recommendations to him accordingly.

"In our model, users with similar taste and (un)attractiveness will have higher similarity scores than those who only share common taste or attractiveness," Zhao says. "The model also considers the match of both taste and attractiveness when recommending dating partners. Those who match both a service user's taste and attractiveness are more likely to be recommended than those who may only ignite unilateral interests."

While the data Zhao's team studied suggests the existing model leads to a return rate of about 25 percent, Zhao says a recommender model could improve such returns by 44 percent.

When the researchers looked at the users' profile information, Zhao says they found that their model performs the best for males with "athletic" body types connecting with females with "athletic" or "fit" body types, and for females who indicate that they "want many kids." The model also works best for users who upload more photos of themselves.

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  More information: Zhao's study, "User recommendation in reciprocal and bipartite social networks—a case study of online dating," was co-authored by Mo Yu of Penn State University and Bo Gao of Beijing Jiaotong University. It will be published in a forthcoming issue of the journal *IEEE Intelligent Systems* and is available online at arxiv.org/pdf/1311.2526v1.pdf

Provided by University of Iowa

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