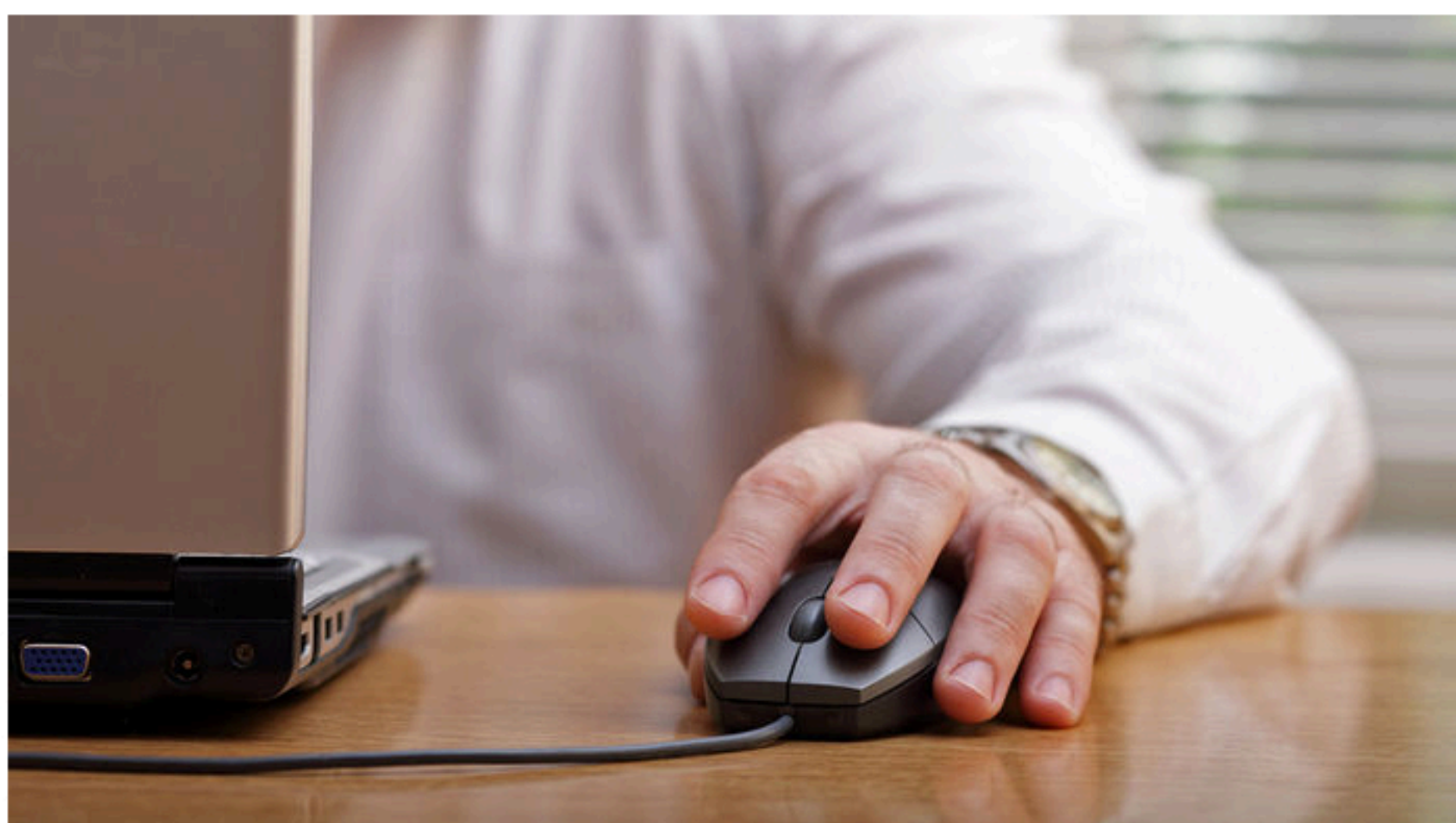By tracking cursor movement, lie detection becomes a game of cat and mouse.   DeanDrobot/iStock Photo

Are you lying about your identity? Artificial intelligence can tell by how you use your mouse

By **Matthew Hutson** | Jun. 9, 2017 , 3:30 PM

Every year, **millions of people have their identities stolen**. There's no foolproof way to pinpoint fakers, but thanks to Italian researchers, investigators may soon have another tool at their disposal —a way to suss out frauds and other liars online with just a few clicks of a mouse.

Traditional methods of lie detection include face-to-face interviews and polygraphs that measure heart rate and skin conductance. But they can't be done remotely, or with large numbers of people. Researchers have come up with effective computer-based tests that measure reaction time in response to true and false personal information. For the tests to work, though, experimenters have to know the truth in advance.

To get around this obstacle, a team of Italian researchers has come up with an innovative way of figuring out the truth. They asked 20 volunteers to memorize the details of a fake identity and assume it as their own. The subjects then answered a set of yes-or-no questions using a computer, as did 20 truth-telling volunteers. Questions included things like: "Is Giulia your name?" and "Were you born in 1995?" Researchers recorded each answer and measured how the subjects' mouse cursors moved, from the bottom middle of the screen to "yes" and "no" buttons in the top two corners.

Because liars can get to be as good as the rest of us at telling the truth, the researchers threw a wrench into their experiment. In addition to the 12 expected questions, they asked 12 unexpected questions based on the volunteers' new identities. For example, they asked about a person's zodiac sign, based on their birth date. And they asked about the capital city of the subject's presumed region. A fraud might have memorized a fake birthday, but not known the corresponding zodiac sign, or been able to calculate it quickly enough. "We've found that if people rehearse lies, lying can be as easy as telling the truth," says Bruno Verschuere, a forensic psychologist at the University of Amsterdam who was not involved in the research, "except when you ask unexpected questions."

The experimenters trained a computer to sort liars from truth tellers using the number of incorrect answers they gave. The team's four machine-learning algorithms ranged in accuracy from 77.5% to 85%. But when the researchers included features of the mouse paths—such as deviation from a straight line—in their training materials, **computers were able to successfully pick out the liars 90% to 95% of the time**, the researchers reported last month in *PLOS ONE*.

They also trained and tested the algorithms using only questions that the liars answered truthfully, such as whether they were Italian. The algorithms could still identify the fibbers with 77.5% to 80% accuracy. Jumping back and forth between telling the truth and lying seems to have a broad effect on people's behavior, the scientists say. Having to tell a lie changes the way people tell the truth.

But would such a method work in the real world? Giuseppe Sartori, a forensic neuroscientist at the University of Padua in Italy and an author of the paper, says it could be used as a "first screen" to check people's alibis in criminal investigations, verify identities online, or even cull terrorists from refugees at border checkpoints. It likely won't have the same accuracy it does in the lab, but he calls the study a good "proof of concept."

"It's a clever idea," says Giorgio Ganis, a cognitive neuroscientist at Plymouth University in the United Kingdom. "But it's not obvious that it's going to be super useful." Ganis notes that in the real world, fraudsters would likely spend more time researching their backstories, making surprising questions harder to find. "You're going to catch the dumb criminals and dumb terrorists," he says, "which is better than nothing, I guess." Sartori adds that even though impostors might learn their purported zodiac sign, other unexpected questions are practically unlimited. Do they know the cross streets of their purported home address? Do they know the layout of the restaurant where they say they were on the night of a crime? The study brings a whole new meaning to the game of cat and mouse.

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